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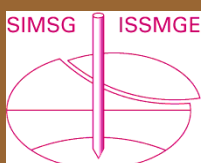


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ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
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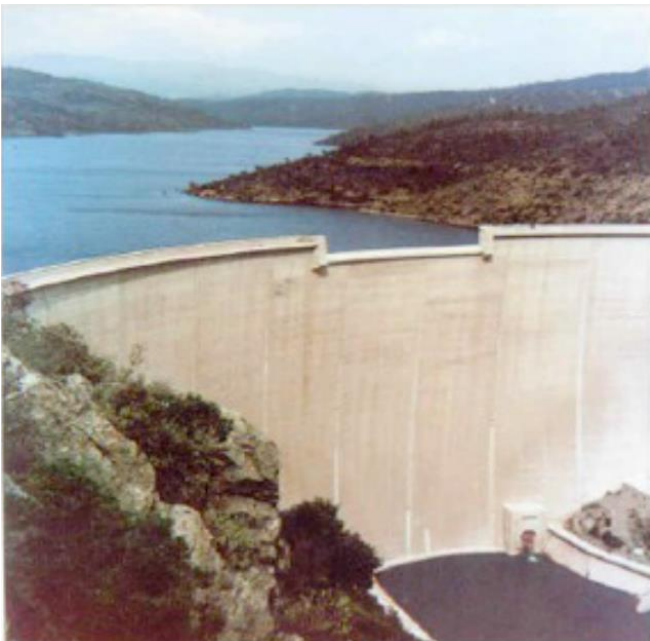
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Malpasset Dam Failure (France, December 2, 1959)



Malpasset Arch Dam and Reservoir prior to failure and near full capacity (view from downstream).

Quick Facts

Location: Fréjus, France
Year Constructed: 1954
Type: Masonry/Concrete
Height: 218 ft.
Primary Purpose: Irrigation, Water Supply
Date of Incident: December 2, 1959
Evacuation: No
Fatalities: 421

Description & Background

Malpasset Dam was a concrete arch dam located on the Riviera in the Cannes District near Fréjus, in Southern France. Exhibiting curvature in both the plan and section directions, the double-curvature arch structure spanned the Reyrhan River. At the time of completion in 1954, it was reported as the thinnest arch dam of its height (218 feet) with a maximum thickness of 22.2 feet. The dam was equipped with one un-gated, notched spillway at the center of its 736-foot-long crest. Because the planned left abutment of the dam (from an upstream perspective) was higher than site topography, a large dihedral thrust block was placed below the dam to raise it to the necessary height. Construction of the dam began in 1952 and the first filling of the reservoir began on April 20, 1954. Approximately five years later, when the first filling was nearly complete, Malpasset Dam failed on December 2, 1959 after the area experienced several days of heavy rain and high winds. The sudden failure of the dam resulted in the death of 421 people when emergency rescue attempts were thwarted due to the inaccessibility of the town's flooded roadways and access routes.

A series of foundation deficiencies and human oversight led to the instability issues at the Malpasset Dam. The dam was designed by Andre Coyne with the primary goal of opti-

mizing its shape and thinning its structure. Prior to construction, little effort was devoted to analyzing the geology of the foundation on which the dam was to be located. Geological investigations that took place after the dam's failure revealed that it had been built on a gneiss formation with a foliation structure exhibiting a slope of thirty to fifty degrees in the downstream direction of the dam. In addition, a fault oriented perpendicular to the river was discovered just downstream of the dam.

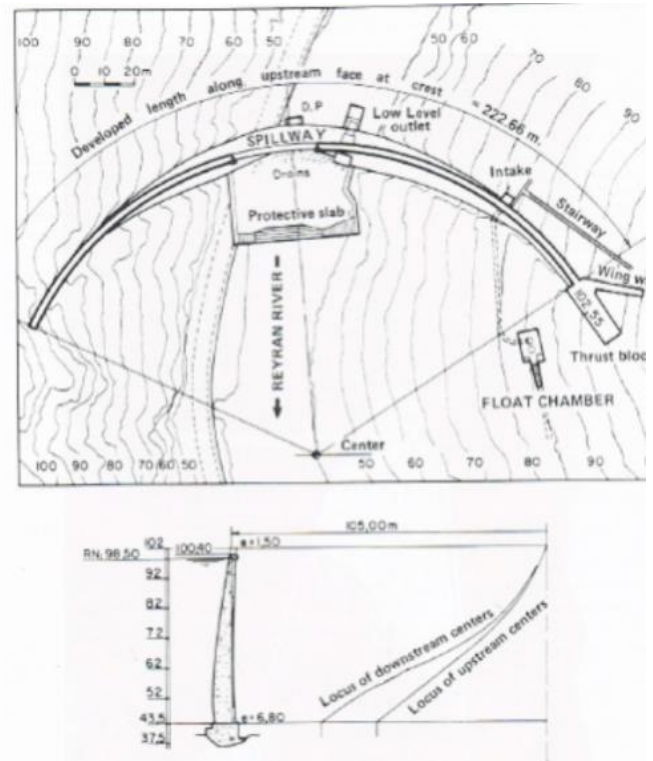


Fig.18. Plan and section of the dam.

Representative plan and section design drawings of Malpasset Dam (Photo source: Richard E. Goodman, 2013 AEG Shlemon Specialty Conference).

The foliation pattern of the foundation in combination with the presence of the fault and the forces associated with the water accumulating behind the dam caused the gneiss along the left abutment to enter a compressive state in which the permeability of the formation decreased with the increasing pressure behind the dam. Uplift pressure at the abutment caused by this phenomenon increased with the filling of the reservoir until it was great enough to dislodge the thrust block. Failure of the left abutment led to the ultimate failure of Malpasset Dam as cracks resulting from the uplift pressures that moved the thrust block propagated quickly across the dam face.

References:

- (1) Duffaut, P. (2013, 5:5). [The Traps Behind the Failure of Malpasset Arch Dam, France, in 1959. Journal of Rock Mechanics and Geotechnical Engineering, 335-341.](#)
- (2) Goodman, R. (2013). On the Failure of Malpasset Dam. *AEG Shlemon Specialty Conference: Dam Failures and Incidents*. Denver: Association of Environmental and Engineering Geologists.

Lessons Learned

- Concrete gravity dams should be evaluated to accommodate full uplift.
- Dam incidents and failures can fundamentally be attributed to human factors.

- Early Warning Systems can provide real-time information on the health of a dam, conditions during incidents, and advanced warning to evacuate ahead of dam failure flooding.
- Stability of the dam foundation and other geologic features must be considered during dam design.
- Timely warning and rapid public response are critical to saving lives during a dam emergency.

Additional Lessons Learned (Not Yet Developed)

1. External independent peer review of designs and decisions is an effective means of providing quality assurance and reducing the risk associated with design oversights and deficiencies.

Photos



Remnants of left abutment and upstream/downstream fault lines (view from downstream) (Photo source: Richard E. Goodman, 2013 AEG Shlemon Specialty Conference).



Destruction caused by flood of downstream town in the aftermath of the Malpasset Dam failure (Photo source: Richard E. Goodman, 2013 AEG Shlemon Specialty Conference).

Videos

Historic news clip reflecting on the Malpasset Dam failure.

FRENCH DAM BREAKS 1959



https://www.youtube.com/watch?v=9_61-wGFicc

News clip summarizing failure of Malpasset Dam produced by British Pathé.

Riviera Disaster (1959)



<https://www.youtube.com/watch?v=ud2P4hPhEtY>

News report discussing aftermath of Malpasset Dam failure published by British Pathé.

Frejus Aftermath (1959)



News report discussing aftermath of Malpasset Dam failure published by British Pathé.

Other Resources

[Delivering Benefits through Evidence: Lessons from Historical Dam Incidents](#)

Author: A. Charles, P. Tedd, & A. Warren
Report published by Environment Agency

[Lessons from Serious Incidents at Seven Arch Dams](#)

Author: G. Sarkaria
Technical paper published by Association of State Dam Safety Officials

[The Traps Behind the Failure of Malpasset Arch Dam, France, in 1959](#)

Author: P. Duffaut
Journal of Rock Mechanics and Geotechnical Engineering

[Risk Analysis for Concrete Arch Dams](#)

Author: U.S. Bureau of Reclamation & U.S. Army Corps of Engineers

Additional Resources not Available for Download

1. Jansen, R. B. (1988). *Advanced Dam Engineering for Design, Construction, and Rehabilitation*. New York: Wiley.
2. Pedro, J.O. (1999). *Arch Dams: Designing and Monitoring for Safety*. New York: Springer.
3. VandenBerge, D., Duncan, J., & Brandon, T. (2011). *Lessons Learned From Dam Failures*. Virginia Polytechnic Institute and State University.
4. Goodman, R. On the Failure of Malpasset Dam. AEG Shlemon Specialty Conference.
5. Goodman, R. Issues with Rock in Engineering for Concrete Dams. AEG Shlemon Specialty Conference.

The traps behind the failure of Malpasset arch dam, France, in 1959

Pierre Duffaut

Abstract

The case of the Malpasset arch dam failure in 1959 has been widely exposed in scientific and technical forums and papers. The focus here is on the many traps which have confused the whole chain of bodies and persons involved, owner, designer, geologist, contractor, up to the state management officers. When the first traps were hidden inside geology, many more appeared, as well geotechnical, technical, fortuitous, and administrative. In addition to such factual factors, human and organizational factors may be today easily identified, when none of them was yet suspected. Both dam safety and rock mechanics benefited from the studies done since the Malpasset case, most of them within one decade.

1. Introduction

On 2 December 1959, the failure of Malpasset dam ([Fig. 1](#)) was a prominent industrial catastrophe in France within the 20th century, only second by number of victims to a coal dust explosion in Courrières mine 53 years before. It was also a clap of thunder in the world dam community as never before any arch dam had failed, as André Coyne had pointed when opening a [symposium](#) on arch dams in 1957 as president of International Commission on Large Dams (ICOLD). It is well known that many more have been built since worldwide, and far higher, without any failure either. Many papers have described the Malpasset case, from the early studies to construction, operation and failure, the expert reports, the trial minutes and many lab and site investigations launched in order to understand what went wrong, ending with five papers

published in 2010 in *Revue Française de Géotechnique* ([Carrière, 2010](#), [Duffaut, 2010](#), [Goquel, 2010a](#), [Goquel, 2010b](#), [Habib, 2010](#)).

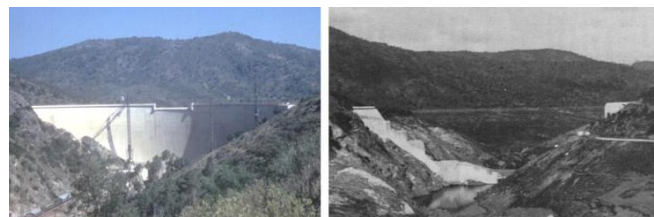


Fig. 1. Malpasset dam, left, at end of construction, summer 1954 (photo COB); right, soon after failure, end 1959 (photo Mary).

No surprise the first traps have been geological ones: for long, igneous and metamorphic rocks had been experienced as impervious enough for reservoirs and strong enough for dam foundations. Here they proved impervious, but failed as foundation. As the author began working in 1948 with EDF, the French authority for Electricity, in the Geology Department, he took part in the studies of many dam sites in France. He is now one of very few living geological engineers (if even anyone worldwide) to have worked in the field of dams at this time, when a great number of sites were investigated, in France and abroad. Neither EDF nor the author had been involved in Malpasset dam before the failure, while they immediately manifested their highest interest in the case. EDF was yet operating many arch dams, and many more were at construction or design stage. To the author, the case may look as a family affair, as his father Joseph Duffaut, had spent his whole career in dams. When Malpasset failed, the author was resident engineer on an arch dam construction site, just completed; his father was the first civil servant sent to the site by the government, the day after, as head of the Dam and Electricity department in the Ministry of Public Works; he then followed all the studies and trial sessions and the author could benefit his early pictures on site as well as his philosophy, "from father to son". After that his career was turned from Geological Engineering into Rock Mechanics.

One knows that most rare accidents derive from many wrong events together instead of only one; many more traps were to be soon discovered in addition to geological ones: geotechnical tests on site and in lab showed unsuspected and very poor properties; technical rules about uplift were not applied to thin dams! Two fortuitous events at the same time confused the local authorities, a worksite downstream and a flash flood. Last, and the more, no independent state control had ever been done on this public project, neither before nor during construction and operation. Since the mid-20th century, partly under pressure from the most hazardous industries, oil, aerospace, and nuclear activities, non-technical factors of accidents safety have been studied more and more and many scientists pointed that complexity is a hazard in itself: they showed how the weight of human and organizational factors could be heavier than factual and technical ones. The Malpasset case can bring them one more example.

The purpose of the paper is to explain how people in charge have been abused by so many traps, while what had been done there up to completion of the dam was correct within the practices of 1950s. So the responsibility of the catastrophe must be shared by many bodies and persons, the last one being a prefect, the local representative of the government, who did not know that a dangerous structure inside his territory was not managed by a competent enough staff. Many dams worldwide have been deeply modified along the years and a few have been put out of service when their responsible manager happened to discover they did not behave as safely as expected. So the memory must be saved of André Coyne and his dam engineering Bureau, (appearing below under acronym COB, Coyne and Bellier), always active

today as Tractebel Engineering France, a member of GDF-SUEZ.

2. What happened

About 15 km from Fréjus, an old Roman city on the Côte d'Azur, along Mediterranean Sea, at a place called Malpasset (a bad pass for passing people), a dam had been designed and built in 1950s to provide irrigation and drink water from Reyran, a very small river. Prof. G. Corroy of Marseilles University delivered the geological report, André Coyne and his Bureau COB designed the arch dam (Fig. 2, Fig. 3) and supervised the whole construction works, made by contractor Ballot. None of them kept any mission from the owner after completion, in spite of the dam having never been formally checked; along the first years its filling up was prevented by lack of expropriation of a fluorite mine upstream of the dam, and later this reservoir was left unused as the water distribution network had not been completed. A geodesy company made four yearly measurements on about 30 targets (Fig. 4), but nobody interpreted the results of the year 1959, which had been transferred lately to the owner.

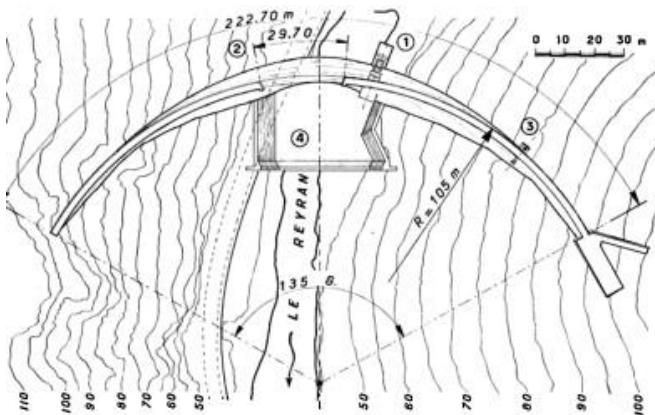


Fig. 2. Site map, contours in meters over sea level (1: bottom gate; 2: surface weir; 3: water intake; 4: stilling basin); at right a gravity thrust block protected from water thrust by a wing wall counteracts the crest arch thrust.

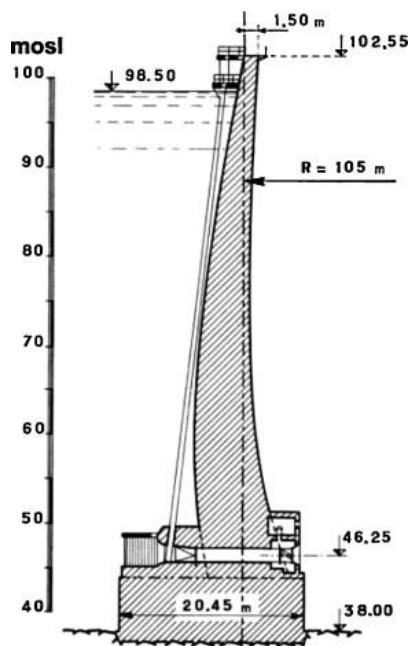


Fig. 3. Highest dam cross section (mosl means meter over sea level). The support of the hollow valve and its control gate explains the widened foundation at this place only. Crest elevation: 102.55 m over sea level; spillway elevation: 100.4 m; normal operation level: 98.5 m; bedrock level: 38 m.

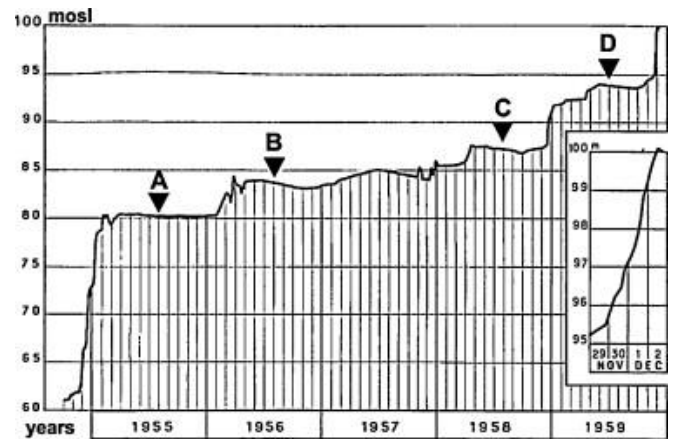


Fig. 4. Graph of the reservoir level along years 1954–1959. The box magnifies the four latest days, and triangles mark the dates of geodesy measurements A–D (after Mary, 1968).

This year it rained a lot in autumn, resulting in the reservoir level increasing over any levels attained before. Contrary to previous years, the bottom gate was not opened to control the level because a motorway bridge was under construction 1 km downstream of the dam and nobody took account of any flow in the river. From November 30 to December 2, the rain intensity was such that the level rose 4.5 m in spite of the reservoir area increasing for each meter more (box in Fig. 4); the "normal" autumn rain had peaked as a sudden flash flood which was close to overflow the weir. In spite of a late opening of the bottom gate, the dam gave off at 23:11 and a huge wave wiped all structures along the valley, up to a small military airport on the seashore, making more than 400 casualties and a lot of destruction including all rail and roadways across the valley.

3. The traps

3.1. Geological traps

The gross site of the reservoir was a narrow section through a small gneiss horst across a wide valley carved in coal measures, a rocky tract for easily damming a big reservoir. At first sight, the rock mass of this old metamorphic horst did not appear different from so many dam sites in other parts of France. After the failure, a flow of 50 million cubic meters of water have cleaned the slopes perfectly from any loose or even weathered material, the rock mass structure appeared very heterogeneous and crisscrossed by joints at any scale and in any direction as noticed by prominent geologist Jean Goguel (Goguel, 2010b) who surveyed the whole site soon after the failure. The geological history of the Estérel massif, now better known, may explain this peculiar structure which nobody had expected.

Only the failure daylighted two features of the rock mass which proved instrumental. A huge block of foundation rock was missing where was the left half of the dam arch, leaving an excavation in a dihedral form limited by two subplane faces, always visible now (top of Fig. 5). Its downstream face is a true fault plane with a thin cover of crushed rock (fresh scratches on the surface proved the whole block had moved upwards). Its upstream face looks as a set of tears along two or more foliation surfaces, without any crushed rock. Neither the fault nor the foliation had been recognized before; the contours on Fig. 2 could have helped to infer the position of the fault, but its strike perpendicular to the valley axis and its dip about 45° upstream would have considered it as perfectly neutral with respect to the thrusts received from the dam; the continuity of rock foliation had not appeared either, within the so heterogeneous structure of the gneiss. So a geometrical trap was in place, waiting for a force susceptible to move the block, which will appear later.



Fig. 5. The most conspicuous features of the site exposed after failure. Top, the "dihedral" excavation with half of the thrust block fallen after the flow (the exploratory adit at right was bored early after the failure to make jack tests in situ); below, a wide crevice is open just upstream of the concrete arch, wider at the base and closing more higher (photos Duffaut, 1960).

One may question why boreholes had not previously located the fault. First, most boreholes investigated the depth to the sound rock, under alluvium in the river bed and under any loose grounds along the valley slopes. Second, it is today difficult to recall that the technology of core recovery was not able to investigate such features. On many dam sites where contour lines accidents suggested a weak zone, their investigation used trenches instead of boreholes. The cleaning action of the flow made the fault path visible on the right bank and daylighted its cross section at either bank toe (Fig. 6).



Fig. 6. Close view of a cross section of the main fault on right bank. The finely crushed borders of the fault zone are well visible, thickness about metric (photo Duffaut, 1960).

At rock matrix scale, some samples (Goguel, 2010b) revealed the rock close to the dihedral contained more *sericite* than elsewhere, a mica like mineral susceptible to increase the deformability and decrease the strength. He wrote: "I think ... the failure is due to the poor mechanical strength of a gneiss which happens to contain dispersed *sericite*" (this observation was not followed with any tests of strength and deformability, and no rock block from the dihedral has been sampled to check this influence). Weathering of the gneiss has been pointed by some experts, but instead of any observation confirming its influence; the absence of any slope slide upstream of the dam during the fast draw-down and the perfect state of the roman aqueduct at mid-height proved the global strength of the slopes.

3.2. Geotechnical traps

There had been no geotechnical investigations before the construction of the dam. Immediately after the failure, several studies were launched, at first on site, by seismic methods and jack tests, and in laboratories on samples taken from the site.

Refraction traverses showed a compact rock (velocity over 4000 m/s) below a shallow zone with velocity closer to 2500 m/s.

Petite sismique (Schneider, 1967): A new short range seismic technology, easy to use on site, confirmed the high deformability of the rock in situ, together with the high compactness of the rock mass. The dynamic modulus derived from both deep refraction traverses and shallow *Petite sismique* was around 1500 MPa, a rather low figure for a dam foundation.

Jack tests (Talobre, 1957): EDF sent immediately a team to perform jack tests in a few small pits and galleries purposely bored. As very few such tests on dam sites were available for comparison, EDF ordered same tests be made on seven sites the same year and Malpasset provided by far the weaker results.

Later the practice became usual on most new sites, as shown in Fig. 7 which gathers the results for 17 sites and confirms the very high deformability of the rock mass, ten times less than that on most sites, hundred times less than that on best sites.

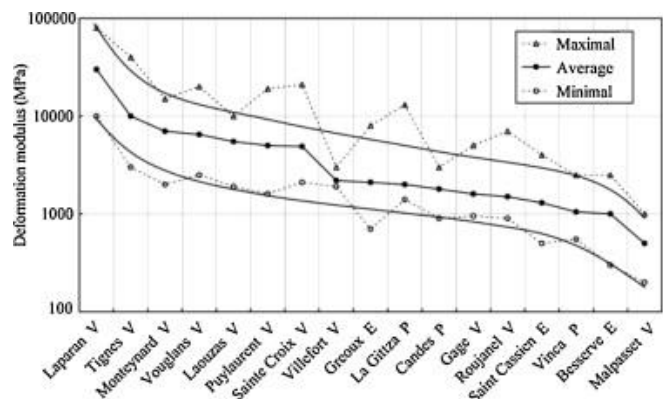


Fig. 7. Deformation modulus measured on 17 dam sites (V: arch; P: concrete gravity; E: rockfill). Modulus scale in MPa, logarithmic; sites classified by decreasing modulus along three curves, maximal, average and minimal values (graph designed by B. Goguel, from EDF data).

Such low deformability was unsuspected and even the Saint Cassien dam site, close to Malpasset on the same rock type had provided results two times more.

Lab tests: Rock samples were sent to various labs, mainly École Polytechnique, Palaiseau (LMS, Laboratoire de

Μεχανικη des solides), École des Mines, Paris-Fontainebleau, and École de Géologie, Nancy. The main set of test results was described and discussed in a thesis work at LMS under supervision of Pierre Habib ([Bernaix, 1967](#)).

Standard uniaxial compressive and tensile tests were performed on cylinders with diameters 10–60 mm and the same height to diameter ratio, 2.0. Strength values did not appear too low in average (58 MPa at dry state, and 42.5 MPa at saturated), but their *scatter* appeared by far wider than usual (coefficient of variation about 0.36), so providing many spots with high deformability. Taking various dimensions, a high scale effect was detected, as seen in [Fig. 8](#). Systematic studies on various rock types showed that scatter and scale effect went together and provided a reliable fracturation criteria.

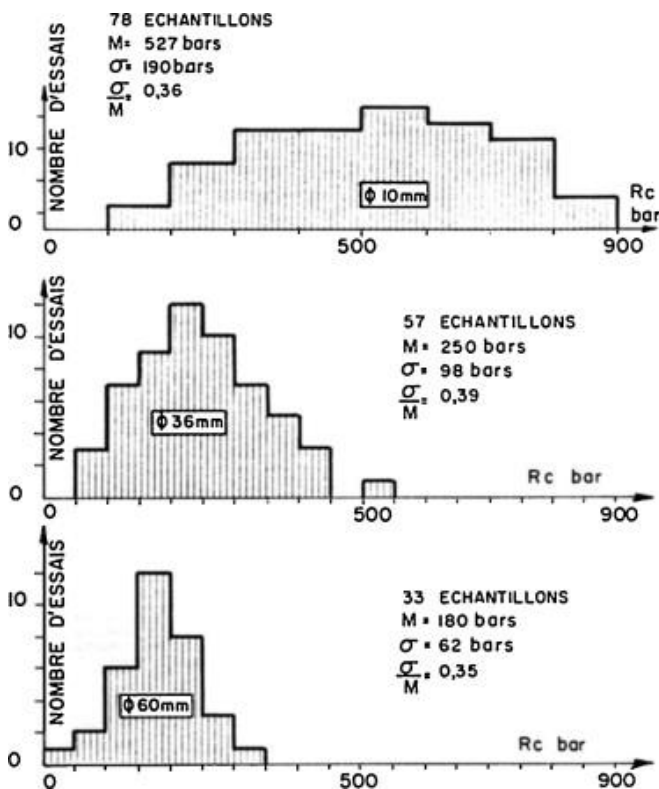


Fig. 8. Distribution of unconfined compressive strength R_c in bar ($=0.1$ MPa) on dry samples (échantillons) collected on the left bank; three sets of cylinders, diameters 10, 36, and 60 mm ([Bernaix, 1967](#)). Comparison between three cases shows the scale effect: maximum strength occurs on smaller cylinders, where scatter also is the highest (vertical axis: number of samples; M : average value; σ : standard deviation).

Actually, all types of classical lab tests were performed, and one more: the permeability being very low, [Habib \(2010\)](#) proposed a new type of test to make measurements without any risk of error due to leaks along the envelope of the sample; thanks to a coaxial hole in the rock cylinder, a radial flow is generated from or to the hole depending if the fluid pressure is applied around or inside. When the flow is centrifuge, the rock is set in a tensile state which makes the permeability increase with the pressure, whatever the rock type; conversely a flow toward the hole creates a compressive state which does not alter the permeability of most rock types; but all samples from Malpasset showed a high sensitivity of the permeability, the more on the left bank: though rather low, the permeability decreased a lot under compression, due to closure of minute cracks. Not any other rock displayed such a behavior.

This unsuspected property, high sensitivity to stress, was then supposed to be the main cause of failure, as the load applied by the dam on the foundation rock induced a deep

“underground dam” against which the uplift pressure could build more and more. Here was the force to move the dihedron. Actually, the high deformability was susceptible to play the same role: when the dam moves downstream under the water thrust, the rock upstream does not follow and a crack opens between the concrete and the rock as seen in [Fig. 5](#) (below). The more deformable the rock mass is, the wider the crack opens, the deeper it extends, so increasing the height of the dam with a hydrostatic thrust increasing as the square of the height. Whichever mechanism prevails, the force on the dihedron is the same.

The anisotropy of the rock mass may provide another more mechanism: [Maury \(1970\)](#) investigated the stress bulb under a foundation which becomes thinner and deeper when the thrust is perpendicular to the stratification or schistosity; this influence was not well known at the time.

3.3. Technical traps

After the failure of Bouzey small gravity dam (eastern France), [Lévy \(1895\)](#) showed that pressure from water seeping below and inside a structure plays as Archimede's thrust on buoying vessels and named it *sous-pressure* (uplift). Most gravity dams were since preserved from it by relief holes; a so-called “drainage curtain” became a corollary of classical tightness curtains, but thin dams were thought immune thanks to the smaller area of their base. Malpasset opened the eyes of dam designers on uplift acting not only below and inside the structure, but also inside the rock mass downstream.

It became clear that any dam is a gravity dam, contrary to the usual classification of dams ([Duffaut, 1992](#)) provided enough ground mass be included in the gross resistant weight against the water thrust.

3.4. Incidental traps

Money inflation: In 1950s, the money in France (and in many more Europe states) was inflating at a high rate. The sum allowed for the project was fixed, the owner was pressed to see the job finished in order to avoid the cost rise and he did not follow a recommendation of the geologist to make some more investigations. This monetary trap has been focused by Jean Goguel at the trial ([Goguel, 2010a](#)).

Bridge worksite: In 1959, a motorway was to be built from Aix-en-Provence to Nice which had to cross the Reyran river about 1 km downstream of the dam: earthworks had begun during summer months and the bridge worksite was glad to benefit a zero discharge in the river thanks to the dam; so the gate was kept close and the level rose higher than ever before, without any extra test or survey.

Flash flood: At the end of November, a flash flood occurred and the level rose dramatically (box in [Fig. 4](#)). One may notice such floods had been neglected from the design stage.

Geodesy contract: One could add the late delivery of the August 1959 measurements: the director of the company in charge of them was called to the trial for having delayed their delivery: he argued the length of calculations plus the summer vacations of his staff. Formally his contract did not ask for any interpretation or comparison with previous results. When the owner received the results ([Fig. 9](#)), nobody had paid attention and they were forwarded to the prefect to be included in the dam files.

Cracks in the stilling basin: No report was produced which confirmed the date, the location and the importance of appeared cracks a few days before the catastrophe in the reinforced concrete of the stilling basin without any schemes and photographs. One wonders that the guard was not specially auditioned on a material element susceptible to alert the staff in charge, at any level, on a disorder susceptible to be a sign of imminent danger. This element reflects the importance

that each member of an organization is aware of its role in the safety of operation. If it is not an unfounded rumor, it is a grave failure of the organization, maybe a grave fault of the guard. At least, the concern of the staff in charge had led them to summon Coyne (and Ballot) at a close date, which has proved too late.

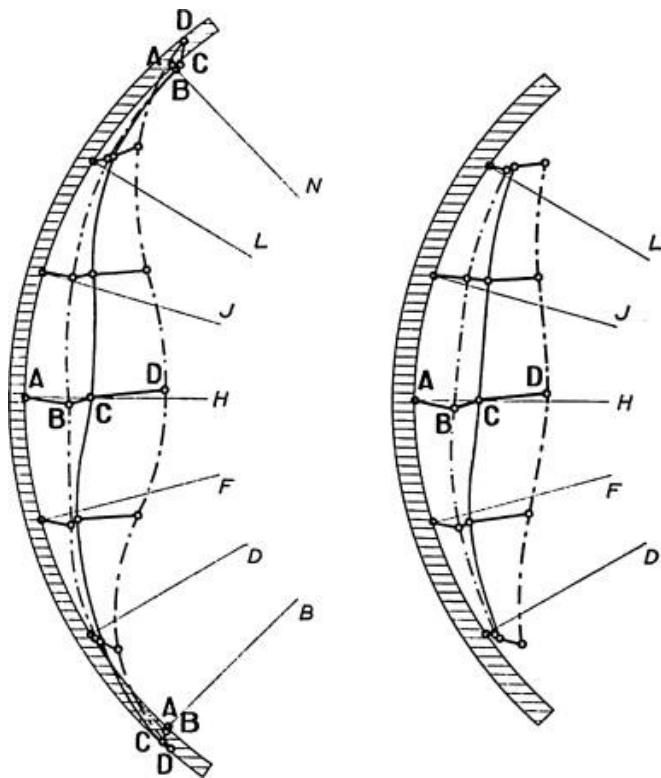


Fig. 9. Displacements of the targets along arches at elevation 78 and 90 m (after [Mary, 1968](#)); bold letters refer to measurement dates ([Fig. 4](#)); other letters name the construction joints between monoliths; the scale applies to target displacements: segments CD, between measurements 1958–1959, show a general move toward the left bank, a fact any professional could have noticed as a change of behavior, long before the latest 5 m rise.

3.5. State management traps

The Var *département*, an administrative level of the State, was the owner, deprived of any dam specialist. It relied on the Engineer for design and for construction supervision but did not ask for any more mission after the end of construction; the formal *réception* (commissioning) did not wait for any test at full level, as was usual but not mandatory, by lack of water and because the property rights of the whole reservoir area had not been bought; the prefect signed it in order to permit full payment of contractors without asking the owner to perform any more surveys.

4. Human and organizational factors

Lack of dialog with more than two persons (the Geologist sent reports but did not meet the Engineer on site). In France, Coyne used to work with EDF, a national company with many experienced engineers, and under permanent supervision of a corps of well trained state engineers. Neither EDF nor this corps were involved in Malpasset.

One may wonder administrative borders be tight against technical information exchange: along the same years a bigger arch dam, Bimont, was being built within 100 km of Malpasset for drink water of Marseilles under the next *département* Bouches-du-Rhône as owner, but not any link appeared between the teams in charge of those dams in spite of both the geologist and the engineer being the same.

And the more one must notice the lack of any control by a third party (which was soon created and made mandatory for all dams over 15 m height).

5. Other catastrophes

Many comparisons may be made with a series of catastrophes within the 20th century and up to now:

1. coal-dust explosion in the Courrières mine in France in 1906, when nobody could think a coal-dust explosion could reach so far;
2. drowning of the British liner Titanic in 1912 after collision with an iceberg: from the officers and all passengers on board, to the general public worldwide, the liner was thought of as non-submersible and the staff denied the cables received about the drift of icebergs;
3. explosion of the English dirigible R101 (1930, near Beauvais, France) during its inaugural flight, operated before completion of the convincing steps of the experimental stage, to fulfill political ambitions: a fault shared with Malpasset and Vajont (see below);
4. deadly Aberfan debris flow in [South Wales](#) in 1966: in spite of many small shallow slides on sterile coal mine heaps, the height has been increased higher than experienced before ([Duffaut, 1982](#));
5. explosion of the American Space Shuttle Challenger (1986) after many warnings about failed [joints](#) in the solid [rocket booster](#) and the decision to maintain the launch to meet political requirements of NASA (aimed to obtaining next budgets);
6. crash of flight AF447 (offshore Brasil, 2009), the staff of which was caught in a tropical tempest and deprived from data from frozen [Pitot tubes](#);
7. Fukushima tsunami induced nuclear accident (2011, Japan), where the local staff was left without any means of action when both water cooling of the reactors and electric power were put out of service by a wave higher than supposed.

Soon after Malpasset, another dam catastrophe occurred in the Dolomites, Northeastern Italy: the fall of Monte Toc slope into the Vajont reservoir on 9 October 1963. It displaced the water from the reservoir, which swept 2000 people in the valley downstream: as the slope was moving slowly along two years, the engineers think they could control the slide through management of the reservoir level, ignoring the lesson of the celebrated Goldau slide, Switzerland, 200 years before, which had suddenly accelerated and destroyed the city ([Heim, 1932](#), [Erismann and Ebele, 2001](#)). Leopold Müller who was in charge of the geotechnical studies focused on the reinforcement of the rock mass through many rock anchors on both banks (which actually proved efficient: [Leonards \(1987\)](#) stated that the Vajont dam withstood a load eight times greater than it was designed to bear). The actual trap was the confidence in the management of the slide in front of a transfer of property from a local company to a State one.

6. Human and organizational factors of catastrophes: "normal accident" theories

In addition to the lack of civil Rock Mechanics, which was to be derived from the studies following the catastrophe, one must notice that social research on major accidents was also in infancy in the fifties: after works on accidents by Patrick Lagadec in France, Charles Perrow in the US, James Reason in UK and many other since, under pressure from high hazardous activities, it is now well understood that nature and industry build together so complex systems than nobody can any longer master all hazardous interactions inside them.

In France, [Lagadec \(1979\)](#) introduced the concept of Major [Technological Hazard](#) and performed reviews of many major accidents. In his famous book, "Normal accidents", [Perrow \(1984\)](#) wrote after the Three Mile Island nuclear accident: "we might stop blaming the wrong people and the wrong factors"; he stated that in complex systems, "multiple and unexpected interactions of failures are inevitable": the accident becomes "normal"! The aerospace industry, NASA at the first place, ordered many studies which benefited to all most hazardous industries, nuclear energy to begin with. These studies have quickly highlighted the importance not only of human functioning but also the influence of organizations as outlined by James Reason "we cannot change the human conditions, but we can change the conditions under which people work" ([Reason, 1990](#)).

7. Conclusions

The geology set the first traps; the mechanical behavior of the rock aggravated the dangerous forces; the practice of drainage only was of rule under thick dams; two fortuitous circumstances, the construction of a bridge and a flash flood, conjugated; all of those traps were in a way preparatory causes. Money inflation, lack of any state control, blindness in front of alarms, and absence of any qualified staff completed the scenery. One should stress as well the technical isolation of André Coyne, instead of the high level of implication of engineers of both EDF and the state in hydro-dams inside France.

It was highly uneasy, either at the trial, some years after, or, some decades later at Purdue University ([Leonards, 1987](#)), and it is yet today uneasy too, half a century later, to discuss how engineers performed in the early fifties; it may look easy to charge them with outrageous transgressions of elementary rules of art, when no such rules did exist at the time: most of the rules enforced today have been derived from the results of the Malpasset case history; within a few years, many had yet become evident. Geological materials are opaque, we cannot see through, so it may be compared with a lock, the mechanism of which is purposely hidden behind a steel plate; in most geotechnical problems the thrust to turn the key is provided by groundwater. While geology may be investigated as much as needed, future events are not predictable, from rain and flood to earthquakes and tsunamis, to worksites, and even societal movements.

For sure the catastrophe has brought many useful teachings: the way dam sites were investigated before construction and the way dams were managed during operation has been since deeply changed worldwide, but my purpose here is to recall what has been done before construction was "normal" at the time, while what has been done after was not.

Acknowledgements

Colleagues of both French committees for Dams and Reservoirs and for Rock Mechanics, Jean-Louis Bordes, Bernard Goguel, Pierre Habib, and younger doctorant Justin Larouzée. Some more valuable information may be found in [Bellier \(1967\)](#), [Londe \(1987\)](#), and [Duffaut \(2011\)](#).

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[Journal of Rock Mechanics and Geotechnical Engineering, Volume 5, Issue 5](#), October 2013, Pages 335-341

<https://www.sciencedirect.com/science/article/pii/S1674775513000723>

Rupture d'un barrage Le 2 décembre 1959 Malpasset [Var] France

[Download the detailed report in .pdf format \(1 Mb\)](#)

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ



International Society for Soil Mechanics and Geotechnical Engineering

ISSMGE News & Information Circular December 2023

https://www.issmge.org/filemanager/article/1198/December_2023_Circular.pdf

1. ISSMGE INCORPORATION

The Secretariat received comments and questions from a small number of Member Societies by the requested date of 24th November. These have been passed onto lawyers with the aim of addressing concerns wherever possible. This may result in some minor changes to the Draft Articles of Association and Draft Regulations. The intention is for the ISSMGE to remain as close to its current form as possible.

2. ISSMGE 1ST HARRY POULOS LECTURE

The ISSMGE Technical Committee 212 Deep Foundations is pleased to announce that Prof. Alessandro Mandolini has been awarded the ISSMGE Harry Poulos Lecture.

Congratulations to Prof. Mandolini on this achievement!

3. ISSMGE FOUNDATION

The next deadline for receipt of applications for awards from the ISSMGE Foundation is the 31st January 2024. Click here for further information on the ISSMGE Foundation.

4. A special issue of the ISSMGE Europe Newsletter is available here (<https://www.issmge.org/news/issmge-europe-newsletter-special-edition-2023>) on the ISSMGE website.

5. CONFERENCES

Member Societies, Technical Committees, Sister Societies and related organisations may add their events directly to the ISSMGE Events database via the link "+ Submit Event" at the top of the EVENTS page

For a complete listing of all ISSMGE and ISSMGE supported conferences, and full information on all events, including deadlines, please go to the Events page: <https://www.issmge.org/events>.

For updated information please refer to that specific event's website.

The following events have been added or amended since the previous Circular:

ISSMGE EVENTS:

2023

SECOND GENERATION OF EUROCODE 7 - GROUND PROPERTIES. LOCATION: Online, Netherlands. DATES: 13-12-2023 - 13.12.2023. ORGANISER: ISSMGE ERTC10, CEN TC250/SC7, and NEN. CONTACT PERSON: Witold Bogusz, EMAIL: witold.bogusz@jacobs.com, WEBSITE: <https://euro-code7-ground-properties.nen-evenementen.nl/>

THE 5TH INTERNATIONAL CONFERENCE ON GEOTECHNICS FOR SUSTAINABLE INFRASTRUCTURE DEVELOPMENT. LOCATION: National Convention Center (NCC), Hanoi, Vietnam. DATES: 14-12-2023 - 15-12-2023. ORGANISER: FECON Corporation, Vietnamese Society for Soil Mechanics and Geotechnical Engineering (VSSMGE), Japan Geotechnical Society (JGS), Thuyloi University (TLU), and Vietnam Petroleum Institute (VP). CONTACT PERSON: Tien-Dung NGUYEN, ADDRESS: FECON, 15th Floor, CEO Tower, HH2-1 Lot, Me Tri Ha Urban Area, Pham Hung Street, Me Tri Ward, Nam Tu Liem District, Hanoi, PHONE: + 84 903 440 978, FAX: + 84 246 269 0484, EMAIL: secretariat@geotechn.vn, WEBSITE: <https://geotechn.vn/>

2024

GEO -CONGRESS 2024. LOCATION: Fairmont Waterfront, Vancouver, BC, Canada. DATES: 25-02-2024 - 28-02-2024. ORGANISER: Geo-Institute of the American Society of Civil Engineering (G-I of ASCE). CONTACT PERSON: ASCE registration, EMAIL: registrations@asce.org, WEBSITE: <https://www.geocongress.org/>

7th International Conference series on Geotechnics, Civil Engineering and Structures (CIGOS). LOCATION: Ho Chi Minh City, Vietnam. DATES: 04-04-2024 - 05-04-2024. ORGANISER: Association of Vietnamese Scientists and Experts (AVSE Global) and University of Architecture Ho Chi Minh City (UAH), CONTACT PERSON: cigos2024@sciencesconf.org, EMAIL: cigos2024@sciencesconf.org. WEBSITE: <https://cigos2024.sciencesconf.org/>

INTERNATIONAL CONFERENCE ON GEOTECHNICAL ENGINEERING (ICGE'24). LOCATION: Hammamet (Tunisia). DATES: 25-04-2024 - 27-04-2024. ORGANISER: The Geotechnical and Geo risk Research Laboratory. CONTACT PERSON: National Engineering School of Tunis, ADDRESS: BP 37 Le Belvédère, EMAIL: contact@icge24.com WEBSITE: <http://www.icge24.com>

INTERNATIONAL FOUNDATION CONGRESS AND EQUIPMENT EXPO. LOCATION: Hyatt Regency Dallas, United States. DATES: 07-05-2024 - 10-05-2024. ORGANISER: DFI, ADSC, Geo Institute of ASCE, PDCA. CONTACT PERSON: Peggy Hagerty-Duffy, ADDRESS: PO Box 93583, PHONE: (469) 359-6000, EMAIL: phd@adsc-iafd.com WEBSITE: <http://ifcee2024.com>

8TH INTERNATIONAL CONFERENCE ON EARTHQUAKE GEOTECHNICAL ENGINEERING (8 ICEGE). LOCATION: Osaka International Convention Centre, Japan. DATES: 07-05-2024 - 10-05-2024. ORGANISER: Japanese Geotechnical Society. CONTACT PERSON: Secretariat of 8th International Conference on Earthquake Geotechnical Engineering, EMAIL: Info8ICEGE@gmail.com, WEBSITE: <https://confit-at-las.jp/guide/event/icege8/top?lang=en>

GEOSHANGHAI 2024. LOCATION: WH MING HOTEL, Shanghai, China. DATES: 26-05-2024 - 29-05-2024. ORGANISER: Tongji University. CONTACT PERSON: Mingliang Zhou, ADDRESS: NO.1239 SIPING ROAD, PHONE: 008613918955481, EMAIL: geoshanghai@tongji.edu.cn, WEBSITE: <http://www.geo-shanghai.org>

UPDATE: 11TH INTERNATIONAL SYMPOSIUM OF GEOTECHNICAL ASPECTS OF UNDERGROUND CONSTRUCTION IN

SOFT GROUND (IS-MACAU 2024). LOCATION: Macao SAR, Macao, China. DATES: 14-06-2024 - 17-06-2024. ORGANISER: University of Macau, LECM and TC204 of the ISSMGE. CONTACT PERSON: ZHENG GUAN, ADDRESS: Faculty of Science and Technology University of Macau, E11 Avenida da Universidade, Taipa, Macau, China, PHONE: +85388229153, EMAIL: ismacau2024@um.edu.mo, WEBSITE: ismacau2024@um.edu.mo

7th INTERNATIONAL CONFERENCE ON GEOTECHNICAL AND GEOPHYSICAL SITE CHARACTERIZATION. LOCATION: Campus Nord UPC, Barcelona, Spain. DATES: 18-06-2024 - 21-06-2024. ORGANISER: UPC-CIMNE. CONTACT PERSON: CIMNE Congress Bureau, ADDRESS: Campus Nord UPC Building C1 - Office C4 C/ Gran Capità, S/N, PHONE: +34 93 405 4694, EMAIL: isc2023secretariat@cimne.upc.edu, WEBSITE: <https://isc7.cimne.com/>

14th INTERNATIONAL SYMPOSIUM ON LANDSLIDES 2024. LOCATION: Le Manège Congress centre, Chambéry, France. DATES: 07-07-2024 - 12-07-2024. ORGANISER: JTC1 and national societies CFMS/CFGI/CFMR/INDURA/IREX/USMB. CONTACT PERSON: Véronique Merrien - François Nicot, EMAIL: contact@isl2024.com, WEBSITE: <https://www.isl2024.com/>

XVIII EUROPEAN CONFERENCE ON SOIL MECHANICS AND GEOTECHNICAL ENGINEERING. LOCATION: Lisbon, Portugal. DATES: 25-08-2024 - 30-08-2024. ORGANISER: SPG. CONTACT PERSON: SPG, ADDRESS: Av. BRASIL, 101, PHONE: 218443859, FAX: (351) 218443021, EMAIL: spg@lnec.pt, WEBSITE: <https://www.ecsmge-2024.com/>

4th INTERNATIONAL CONFERENCE OF INTERNATIONAL SOCIETY FOR INTELLIGENT CONSTRUCTION (ISIC 2024). LOCATION: DoubleTree by Hilton Hotel Orlando at SeaWorld, Orlando, United States. DATES: 10-09-2024 - 12-09-2024. ORGANISER: International Society for Intelligent Construction (ISIC). CONTACT PERSON: Patte Hahn, ADDRESS: 2857 Jolly Road, PHONE: +1 (517) 432-8220, EMAIL: hahnp@egr.msu.edu, WEBSITE: <https://www.is-ic.org/conferences/2024-isic-international-conference/>

NORDIC GEOTECHNICAL MEETING – NGM 2024. LOCATION: Lindholmen Science Park, Göteborg, Sweden. DATES: 18-09-2024 - 20-09-2024. ORGANISER: Swedish Geotechnical Society. CONTACT PERSON: Victoria Svahn ADDRESS: Sveaborgsvägen 16, EMAIL: info@sgf.net, WEBSITE: <http://www.ngm2024.se>

IS-GRENOBLE 2024: INTERNATIONAL SYMPOSIUM ON GEOMECHANICS FROM MICRO TO MACRO. LOCATION: Maison MINATEC, Grenoble, France. DATES: 23-09-2024 - 28-09-2024. ORGANISER: TC105 Geo-Mechanics from Micro to Macro. CONTACT PERSON: Cino Viggiani, EMAIL: cino.viggiani@3sr-grenoble.fr, WEBSITE: <https://is-grenoble2024.sciencesconf.org/>

5H EUROPEAN CONFERENCE ON PHYSICAL MODELLING IN GEOTECHNICS. LOCATION: Deltares, Delft, Netherlands. DATES: 02-10-2024 - 04-10-2024. ORGANISER: Deltares & Delft University of Technology. CONTACT PERSON: Suzanne van Eekelen & Miguel Cabrera, EMAIL: organisation.ecpmq24@gmail.com

XVIII AFRICAN REGIONAL CONFERENCE ON SOIL MECHANICS AND GEOTECHNICAL ENGINEERING. LOCATION: Algiers, Algeria. DATES: 06-10-2024 - 09-10-2024. ORGANISER: ALGERIAN GEOTECHNICAL SOCIETY. CONTACT PERSON: Algeos, ADDRESS: USTHB, Faculty of Civil Engineering BP 32 El-Alia - Bab-Ezzouar, PHONE: (213) 66130954, FAX: (213) 21247224, EMAIL: secretariat18ARC@algeos-dz.com, WEBSITE: <https://algeos-dz.com/18ARC.html>

XVII PANAMERICAN CONFERENCE ON SOIL MECHANICS AND GEOTECHNICAL ENGINEERING. LOCATION: La Serena, Chile.

DATES: 12-11-2024- 17-11-2024. ORGANISER: Chilean Geotechnical Society (SOCHIGE). CONTACT PERSON: Omar Núñez Esper, ADDRESS: San Martín 352, Santiago, EMAIL: info@panamgeochile2024.cl, WEBSITE: <https://panamgeochile2024.cl>

5TH INTERNATIONAL CONFERENCE ON TRANSPORTATION GEOTECHNICS. LOCATION: Sydney Masonic Centre, 66 Goulburn Street, Sydney, NSW 2000, Australia. DATES: 20-11-2024 -22-11-2024. ORGANISER: UTS Transport Research Centre (<https://www.uts.edu.au/research/transport-research-centre>). CONTACT PERSON: Conference Secretariat, ADDRESS: 15 Broadway, EMAIL: ictq2024@uts.edu.au, WEBSITE: <http://www.ictq2024.com.au>

THE 2ND GEOMANDU: GEOTECHNICS FOR SUSTAINABLE INFRASTRUCTURES. LOCATION: Kathmandu, Nepal. DATES: 28-11-2024- 29-11-2024. ORGANISER: Nepal Geotechnical Society. CONTACT PERSON: Mandip Subedi (Dr.); President of Nepal Geotechnical Society, ADDRESS: +977 9851124192, PHONE: +977 9851124192, EMAIL: mandip.subedi@gmail.com, WEBSITE: <https://geomandu.ngeotechs.org/>

2025

5TH INTERNATIONAL SYMPOSIUM ON FRONTIERS IN OFFSHORE GEOTECHNICS (ISFOG). LOCATION: La Cité des Congrès de Nantes, France, DATES: 09-06-2025 - 13-06-2025. ORGANISER: University Gustave Eiffel, CFMS, French Mirror Group of the Technical Committee TC 209. CONTACT PERSON: Sylvie Bretelle, ADDRESS: 1 rue du vieux pont, PHONE: 0785428593, EMAIL: s_bretelle@hotmail.com, WEBSITE: <https://isfog2025.univ-gustave-eiffel.fr/>

2026

21ST INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND GEOTECHNICAL ENGINEERING. LOCATION: Austria Centre, Vienna, Austria. DATES: 14-06-2026 - 19-06-2026. ORGANISER: Austrian Geotechnical Society and Austrian Society for Geomechanics. CONTACT PERSON: Prof. Helmut F. Schweiger, EMAIL: helmut.schweiger@tugraz.at

NON ISSMGE EVENTS

2023

16TH INTERNATIONAL CONFERENCE ON STRUCTURAL AND GEOTECHNICAL ENGINEERING. LOCATION: Triumph Luxury Hotel, New Cairo, Egypt. DATES: 27-12-2023 - 28-12-2023. ORGANISER: Faculty of Engineering- Ain Shams University. CONTACT PERSON: Mohamed Abdelmotaal, ADDRESS: 1 ElSaray street, Waili, EMAIL: ICSGE16@eng.asu.edu.eg, WEBSITE: <https://eng.asu.edu.eg/icsge/overview>

2024

2ND ANNUAL CONFERENCE ON FOUNDATION DECARBONIZATION AND RE-USE. LOCATION: Royal Tropical Institute (KIT), Amsterdam, Netherlands. DATES: 28-05-2024 - 30-05-2024. ORGANISER: KIVI, DFI. CONTACT PERSON: Angelique van Tongeren, ADDRESS: Prinsessegracht 23, PHONE: 0630095962, EMAIL: info@foundationreuse.com, WEBSITE: <https://foundationreuse.com/>

THE THIRD INTERNATIONAL CONFERENCE ON PRESS-IN ENGINEERING 2024, SINGAPORE. LOCATION: University Town, National University of Singapore. DATES: 03-07-2024 - 05-07-2024. ORGANISER: ICPE2024 Organizing Committee and International Press-in Association. CONTACT PERSON: ICPE Organizing Committee/ IPA Secretariat, ADDRESS: 5F, Sanwa Konan Bldg., 2-4-3 Konan, Minato-ku, Tokyo 108-0075, Japan, PHONE: 81-0354611191, FAX: 81-0354611192, EMAIL: tokyo@press-in.org, WEBSITE: <https://2024.icpe-ipa.org/>

5th INTERNATIONAL CONFERENCE ON ENVIRONMENTAL GEOTECHNOLOGY, RECYCLED WASTE MATERIALS AND SUSTAINABLE ENGINEERING. LOCATION: Warsaw University of Life Sciences, Poland, DATES: 04-07-2024 - 06-07-2024, ORGANISER: Warsaw University of Life Sciences, Institute of Civil Engineering. CONTACT PERSON: Aleksandra Jakimiuk, ADDRESS: Nowoursynowska 159 St., EMAIL: egrwse2024@sggw.edu.pl, WEBSITE: <https://iil.sggw.edu.pl/egrwse-2024/>

77TH CANADIAN GEOTECHNICAL CONFERENCE AND THE 16TH JOINT CGS/IAH-CNC GROUNDWATER CONFERENCE. LOCATION: Hotel Bonaventure, Montreal, Canada. DATES: 15-09-2024 - 18-09-2024. ORGANISER: Karma-Link Management Services Ltd. CONTACT PERSON: Emily Fournier, ADDRESS: 2167 166 Street, EMAIL: emily@karma-link.ca, WEBSITE: <https://www.geomontreal2024.ca/>

ISSMGE Europe Newsletter Special Edition 2023

ISSMGE IT Administrator / ISSMGE News & Information Circular / 12-12-2023

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ISSMGE News and Information Circular December 2023

ISSMGE Secretariat / ISSMGE News & Information Circular / 11-12-2023

[ISSMGE NEWS AND INFORMATION CIRCULAR DECEMBER 2023](#)

ISSMGE Interactive Technical Talk Episode 12: Physical Modelling in Geotechnics (TC104)

ISSMGE IT Administrator / [TC104](#) / 12-12-2023

The twelfth episode of International Interactive Technical Talk has just been launched and is supported by TC104. Prof. Ioannis Anastasopoulos, Prof. Cristina Tsuha and Dr. Federico Pisano are discussing with Dr. Marc Ballouz about Physical Modelling in Geotechnics.

In Memoriam: James K. Mitchell, Sc.D, P.E., NAE, NAS, Dist.M.ASCE

ISSMGE IT Administrator / General / 29-12-2023



James (Jim) K. Mitchell passed away peacefully at home in Massachusetts on December 17, 2023. Born in Manchester, N.H., on April 19, 1930. Jim received a B.C.E. degree from Rensselaer Polytechnic Institute in 1951, an S.M. degree from MIT in 1953, and an Sc.D. from MIT in 1956. He worked as a soil engineer at the U.S. Army Engineer Waterways Experiment Station (now part of U.S. Army Engineering Research Development Center) in Vicksburg, Mississippi, in 1955 and spent 1956-1958 as an officer in the U.S. Army Corps of Engineers.

He joined UC Berkeley as an Assistant Professor in the Department of Civil Engineering in 1958, and together with his

senior colleagues H. Bolton Seed and Carl Monismith, he was instrumental in developing a world class teaching and research program in geotechnical and geoenvironmental engineering. He was a consummate teacher and researcher earning the UC Berkeley Distinguished Teaching Award in 1963 and was named as the inaugural Edward G. Cahill and John R. Cahill Professor of Civil Engineering in 1989. His work ethics was unparalleled and by the time he retired from Berkeley, in 1993, he had chaired 61 PhD dissertations and served as a committee member on numerous others. He was dedicated to academic and professional service and at Berkeley he served as the Chair of the Department of Civil Engineering 1979-84 and he also served on numerous Academic Senate Committees. After 35 years of serving as a Faculty member at UC Berkeley, Jim retired in 1993 and joined the faculty at Virginia Tech in 1994 where he held the rank of University Distinguished Professor. He retired from Virginia Tech in 1999, but remained active in guiding research, co-teaching courses, and presenting seminars until very recently. The last student he co-advised completed his Ph.D. in 2021, and Jim has at least one paper that he co-authored that is still in review for a conference that will be held in 2024.

In his research he made many important contributions in the area of soil behavior and soil property evaluation. His PhD work at MIT on the fabric of compacted clay (under Professor T. William Lambe) and early research at Berkeley on compacted clay, soil stabilization, and time-dependent aspects of soil behavior laid the foundation for his career-long focus on soil behavior. That also led to his foray into in-situ testing for the determination of lunar soil properties and trafficability for NASAs Apollo lunar landings. This work led to many further developments and provided much of the underpinning for modern in-situ testing methods now in use. His publication list contains more than 500 journal publications, conference papers, reports, keynotes, and invited lectures over the years. Jims most notable contribution is his book, Fundamentals of Soil Behavior, first published in 1969, he was working on the fourth edition of this text along with co-authors Kenichi Soga, UC Berkeley, and Catherine OSullivan, at the Imperial College London.

Jims many awards include the election to the National Academy of Engineering (1976) and the National Academy of Science (1998), an honor granted to very few civil engineers. From ASCE he received Middlebrooks Award four times (1962, 1970, 1973, 2001), ASCE Normal Medal twice (1972, 1995), the ASCE H. Bolton Seed Medal (2004), the 2006 ASCE OPAL Award in Education, and he was named a Distinguished Member of ASCE (1993). Among his notable lectures were the ASCE Terzaghi Lecture in 1984 and the British Geotechnical Society Rankine Lecture in 1991.

Jim was a great friend and mentor to many of his colleagues and students. Despite his accomplishments, he was humble and always ready to learn something new. He loved the outdoors and music and was an accomplished saxophone player; an avocation that he enjoyed throughout his life. His passing is a loss for all who were fortunate to know him.

More information about the life of Professor Mitchell can be found on the [James K. Mitchell Legacy website](#).





International Society for Rock Mechanics
and Rock Engineering

44th ISRM Online Lecture - 14 December 2023 - Prof. Manchao He

The 44th ISRM online lecture was delivered by **Dr. Manchao He**, from China. The lecture title is: **"Possible strategy for landslide prediction"**. It was broadcasted on December 14th at 10 A.M. GMT, from the [Online Lecture's page](#).



Dr. Manchao He began his academic journey at Changchun College of Geology, China, where he obtained his BSc and MSc degrees in Engineering Geology in 1981 and 1985 respectively. He furthered his education by obtaining a PhD in Engineering Mechanics from China University of Mining and Technology, Beijing, in 1989, followed by a two-year post-doctoral study at the same institution. Then he was granted an honorary doctorate by the University of Mons, Belgium, in

2012.

Since 1993, Dr. Manchao He has been a Professor of Civil Engineering (Geotechnical) at China University of Mining and Technology, Beijing. Later serving as the Director of the State Key Laboratory for Geomechanics and Deep Underground Engineering-Beijing since 2008. He is currently an Academician of Chinese Academy of Sciences (CAS) and Argentine National Academy of Engineering (ANI). He mainly engaged in the research of Rock Mechanics and Engineering, including the prediction of landslides, mining technologies, rockburst mechanism and control, etc. He successfully self-developed a new monitoring system which measures the Newton Force Variation along the slip surface of landslide. It has been applied successfully in many practical projects, which makes a significant contribution to landslide disasters prediction and control. His expertise is highly sought after, leading him to consult on over 200 projects since 1991. He has authored more than 300 technical papers, and has been awarded 4 National Awards, 2 Chinese Outstanding Patented Invention and an International Society for Rock Mechanics and Rock Engineering (ISRM) Technological Innovation Award.

Between 2015 and 2019, Dr. Manchao He served as ISRM Vice President at Large and the Chairman of ISRM Education Fund Committee. And now he is a Fellow of ISRM. In addition, Dr. Manchao He served as the President of Chinese Society for Rock Mechanics and Engineering (CSRME) since 2016 and as the Vice President of International Consortium on Geo-disaster Reduction (ICGdR) since 2022.

The lecture will remain online. As usual, the attendees can ask questions to the lecturer by e-mail during the subsequent five days. [All online lectures are available on this page](#).

News

<https://www.isrm.net>

ARMS13 - abstracts submission deadline extended to 15 December 2023-12-01

The 2024 ISRM International Symposium, ARMS13, will take place in New Delhi, India, 22-27 September 2024.

The deadline for submission of abstracts has been extended to 15 December.

For more information on ARMS13 visit the conference website at <https://arms2024.org>.

5th ICITG - International Conference on Information Technology in Geo-engineering 2023-12-18

The Joint Committee 2 (JCT2) on Representation of Geo-engineering Data of FedIGS cordially invites you to the 5th International Conference on Information Technology in Geo-engineering (5th ICITG)

The conference will take place from 5-8 August 2024 at the Colorado School of Mines, Colorado, USA.

[Click here to download the conference flyer](#)

[Go to the conference site](#)



ASSOCIATION
INTERNATIONALE DES TUNNELS
ET DE L'ESPACE SOUTERRAIN

ITA
AITES
INTERNATIONAL TUNNELLING
AND UNDERGROUND SPACE
ASSOCIATION

News

<https://about.ita-aites.org/news>

ITA 50th Anniversary Photo Contest 07 December 2023

ITA organizes a photo contest whose participation is totally free.

The theme of the contest to celebrate ITA 50th Anniversary

"Tunnels of yesterday and today – 1974-2024"

Amateur and/or professional photographers can participate by presenting a series of photographs

The initiative aims to collect photographs regarding the tunnels and underground spaces built since the 1970's until the infrastructures being built now.

There will be 3 different categories:

- Tunnels in operation
- Tunnels or underground spaces in construction
- Underground spaces

Deadline is January 31st 2024.

download the regulations [Download document](#)

ITA 50th anniversary Sponsoring 07 December 2023

In 2024, the ITA, International Tunnelling and Underground Space Association, will celebrate its 50th Anniversary. The main celebration will take place during the WTC 2024 in Shenzhen, China. During the year additional celebrations will occur in different countries, Member Nations of ITA. This event is a unique opportunity for your company to be even more associated with ITA, supporting all the actions that have been

made in the past and are planned for the coming decades. (see attached)

To celebrate the 50th anniversary, a selection committee is choosing among around 170 infrastructures proposed by ITA Member Nations and stakeholders the 50 iconic projects that represent the development of the tunnelling industry during these 5 decades.

A video and a book on the iconic projects are being prepared. In addition a booklet with the history of ITA will be realized and a photo contest organized.

The video will be presented for the first time during the 50th anniversary celebration, on April 23rd, 2024 in Shenzhen. The "50 iconic projects" book and the ITA History booklet will be distributed to the Member Nations and other ITA Stakeholders.

In Shenzhen a photo exhibition will present the winners of the competition.

Link: [Email contact: olivier.vion@ita-aites.org](mailto:olivier.vion@ita-aites.org)

[Download document](#)

Scooped by ITA-AITES #107, 12 December 2023

[LTA awards CRL2 West Coast station and tunnels contract | Singapore](#)

[Strabag breaks record for longest single TBM drive at Woodsmith project | UK](#)

[TBM Lilia excavates first 1000 Metres on Brenner Base Tunnel | Austria](#)

[Shortcut to Denmark: DB starts rail construction to Fehmarn-belt tunnel | Germany/Denmark](#)

[Milestone for metro's Pink Line: TBM Tunga to make breakthrough today | India](#)

[China unveils world's deepest underground lab hidden 1.5 Miles beneath a mountain to solve the universe's biggest mystery](#)

[How Finland's underground bunkers are used in peacetime](#)

[Unveiling the depths: navigating trends and innovations in underground projects](#)

[High altitude underground metro fully opens | Ecuador](#)

[China's Xinjiang building world's longest highway tunnel in play for regional connectivity](#)



BTS December Lecture: A Christmas Jamboree of Tunnelling

Speakers: David Baggs, Siva Brashanthan, Mikel Goirigolzarri Martinez, Mark Shepherd, Ivor Thomas, Christina Trige

Thursday 14th December 2023, Institution of Civil Engineers, 1 Great George Street, Westminster, London
<https://www.youtube.com/watch?v=etBo-iIBQBg>



This lecture will provide an update on Tunnelling works at TfL's 1.1km long twin-bore Silvertown Road Tunnel, constructed using a single 11.91 m diameter EPB TBM. The two bores are connected through 7No. SCL cross-passages, of which 4 require ground freezing.



Holiday Message from the IGS President

Dear IGS Colleagues,

I hope this message finds you well as we prepare to say farewell to another year. And what a year it's been with, once again, a busy diary of conferences, webinars, education and networking events, and exciting Society developments.



the star attraction.

This year we proudly celebrated a landmark anniversary – 40 incredible years of the IGS. I hope you had time to catch the live webinars and Q&As for the IGS Birthday Week Lectures, or have caught up with them via our [Digital Library](#). It was truly an honor for my Officers and I to speak directly with you in this important year, and I once again thank our volunteer speakers who brought us a rich range of global perspectives with their exclusive lectures, most importantly J.P. Giroud who was unequivocally

The anniversary was a timely reminder of how far we've come as a Society and as an industry and that this drive and ambition must continue into the next decades. Because of this

we have an aggressive agenda at a very important time in our industry, where we must confront the challenges of plugging significant gaps in education about geosynthetics, while preventing misinformation that threatens market growth.

We're already responding in several ways.

Most significantly we launched our [Strategy 2022-2026](#), setting out four powerful goals to strengthen our influence, boost education efforts for professional development, improve opportunities and diversity, and ensure the IGS continues to be financially robust.

We've also developed three outreach projects in a bid to educate working engineering professionals:

- The [IGS Sustainability Calculator](#), a game-changing online tool to help compare the sustainability benefits of using geosynthetics versus other materials.
- The IGS Handbook, a handy reference guide on the range and quality of geosynthetics and their applications. This will also augment the technical curriculum of future training courses.
- IGS Professional Development Courses to drive the highest quality use of geosynthetics from choosing the correct specification, design, and installation to end-of life processing.

All these projects are designed to support our IGS Chapters with technical content they can use to grow their own technical communities.

The IGS leadership has also invested in specific liaison outreach meetings with industry standardization and lobbying groups to foster cooperation and joint efforts where possible. This year I had the privilege to visit IGS individual and corporate members in [China](#), as well as industry bodies and manufacturers, and in turn I was delighted to see a significant delegation from China at the 12th International Conference (12th ICG) in Rome.

After much postponement due to the pandemic, the successes of GeoAfrica in Cairo in February, and the 12th ICG in Rome in September were fine testaments to the hard work and dedication of the organizing Chapters in Egypt and Italy, respectively. During the 12th ICG we held the [IGS General Assembly](#) where our membership ratified long-overdue changes to our dues structure, bringing our Society into the 21st century and fostering a more stable financial future.

It was also where the new [IGS Diversity Task Force](#) held its launch event. It is currently developing guidance to help event organizers make their conferences more diverse. Related to this, the IGS is also focused on energizing our underrepresented communities around the world, with specific outreach efforts under way in China and India.

Talking global, our digital reach continues to grow. We have doubled visitors to the IGS website from 24,000 to 48,000 in the last year, added 1,000 LinkedIn followers this year to around 6,000, and published some 100 stories on our online news page over 2023.

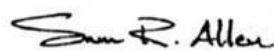
We're also focused on intensifying our communication to our Corporate Members with structural changes to the IGS Corporate Committee serving to include more corporate voices and input into our work.

2024 promises to be another action-packed year with the must-attend [GeoAmericas2024](#) (5th Pan-American Conference on Geosynthetics) in Toronto, Canada, from April 28-May 1, 2024, and several planned IGS Chapter and Technical Committee events around the world.

Above all I'd like to take this opportunity to thank our Chapters, members and partners for all your hard work and con-

tinued support. I cannot think of any other organization such as ours that delivers so much through its volunteers. I wish you and your loved ones a happy and peaceful holiday season, and look forward to catching up with you in 2024.

Yours in Service,



Samuel (Sam) Allen
IGS President
International Geosynthetics Society

Ανακοίνωση Δημοσίευσης Ειδικού Τεύχους (Special Issue) με τίτλο "Soil-Geosynthetic Interaction" στο Int. J. of Geosynthetics and Ground Engineering



Αγαπητοί συνάδελφοι,

Είμαι στην ευχάριστη θέση να σας πληροφορήσω ότι το **Ειδικό Τεύχος (Special Issue)** με τίτλο "**Soil-Geosynthetic Interaction**" (Αλληλεπίδραση Εδάφους-Γεωσυνθετικού), στο οποίο είχα την τιμή να είμαι ο **Επικεφαλής Προσκεκλημένος Υπεύθυνος Σύνταξης (Lead Guest Editor)**, περιλαμβάνεται στο τεύχος Δεκεμβρίου 2023 (Vol. 9, Issue 6) του επιστημονικού περιοδικού **International Journal of Geosynthetics and Ground Engineering (Q1, CiteScore – 3.3, Impact Factor – 2.9)** που εκδίδεται από τον **Springer**. Στην προσκεκλημένη ομάδα σύνταξης συμμετείχε ως Guest Editor και η **Dr. Castorina Silva Vieira**, Αναπληρώτρια Καθηγήτρια του Πανεπιστημίου του Πόρτο, Πορτογαλία.

Το ειδικό αυτό τεύχος, του οποίου το εξώφυλλο επισυνάπτεται, είναι προϊόν σκληρής δουλειάς τους τελευταίους οκτώ μήνες και άπογης συνεργασίας της προσκεκλημένης ομάδας σύνταξης και του Διευθυντή Σύνταξης (Editor-in-Chief) του περιοδικού, **Dr. Sanjay Kumar Shukla**. Περιλαμβάνει συνολικά 14 άρθρα, το **άρθρο της ομάδας σύνταξης (Guest Editorial Article)** και **13 άρθρα υψηλής στάθμης** που έγιναν αποδεκτά για δημοσίευση ύστερα από αυστηρή κρίση.

Το **άρθρο της ομάδας σύνταξης (Guest Editorial Article)**, στο οποίο είμαι **πρώτος συγγραφέας**, είναι ανοικτής πρόσβασης και διαθέσιμο με χρήση του συνδέσμου: <https://link.springer.com/article/10.1007/s40891-023-00511-5>

Η **πλήρης συλλογή των άρθρων** του ειδικού τεύχους είναι διαθέσιμη με χρήση του συνδέσμου: <https://link.springer.com/collections/ddqibbehf>

Ιωάννης Ν. Μάρκου
Καθηγητής
Τομέας Γεωτεχνικής Μηχανικής
Τμήμα Πολιτικών Μηχανικών
Δημοκρίτειο Πανεπιστήμιο Θράκης

News

[Jorge Zornberg Speaks At Greece Conference For Ambassadors Program](#) December 1, 2023

Professor Jorge Zornberg joined delegates in Athens to give a lecture on behalf of the IGS Ambassadors Program. Prof. Zornberg spoke on 'Geosynthetic applications in [Read More »](#)

[Making Diversity Matter At IGS Events](#) December 7, 2023

The IGS is developing guidance and support to help organizers of IGS and IGS-related events make them more diverse. Creating a more diverse IGS, industry [Read More »](#)

[Geotextile Offers Sustainable Construction At Nature Site](#) December 12, 2023

How a biodegradable geotextile helped in the construction of an access road while meeting sustainability demands, is explored in the latest IGS Sustainability Case Study. [Read More »](#)

[IGS Corporate Member Profile: Viganò Pavitex](#) December 14, 2023

*** Share your story! IGS Corporate Members have the chance to share more of the great work they do with a wider audience. Corporate Members [Read More »](#)

[IGS Italy Symposium Deepens Understanding On Landslide Mitigation Using Geosynthetics](#) December 15, 2023

Ten speakers from seven countries shared the latest research on how geosynthetics can mitigate landslides at a special session of the 6th World Landslide Forum [Read More »](#)

[IGSF Grant Makes Lasting Impact On IGS Young Members](#) December 17, 2023

Eight IGS Young Members were supported to attend the 12th International Conference on Geosynthetics (12ICG) in Rome thanks to grants from the IGS Foundation (IGSF). [Read More »](#)

[12th ICG Revisited At Romania 'Echoes' Conference](#) December 18, 2023

Concepts from one of the industry's flagship global conferences got a second life when IGS Romania staged the 'Echoes of the 12th International Conference on [Read More »](#)

[Holiday Message From The IGS President](#) December 18, 2023

Dear IGS Colleagues, I hope this message finds you well as we prepare to say farewell to another year. And what a year it's been [Read More »](#)



Federation of International
Geo-engineering Societies

<https://geoengineeringfederation.org>

FedIGS-Board meeting took place in Salzburg

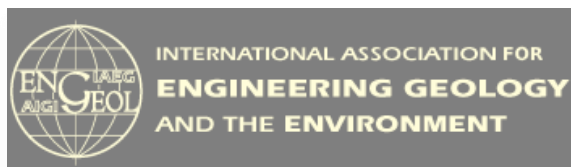
The annual Board meeting of the Federation of the International Geoengineering Societies (FedIGS) took place in Salzburg, Austria, on 9 October 2023, immediately before the 15th ISRM International Congress. FedIGS is a collaborative forum that gathers the IAEG, the IGS, the ISRM and the ISSMGE. FedIGS is currently chaired by Prof. Chungsik Yoo, immediate Past President of the IGS.



The meeting was by all the Presidents and by immediate Past Presidents and Secretaries General of all the member societies. The spirit of collaboration among all present and all the Member Societies was noteworthy. Reports on the activities of the four Member Societies and the reports of the three Joint Technical Committees (JTCs) of FedIGS were presented and discussed. The following main decisions were taken:

- to create a fourth JTC on "Environment and Geo-Engineering Sustainability";
- to prepare a FedIGS "White Paper Policy", targeted to policy makers, presenting suggested global policies directed at needed infrastructures, its requirements and governance, construction and maintenance, under the umbrella of JTC4;
- to formalize the FedIGS Lecture to take place at the international conference of each Member Society, which take place every 4 years.





PAUL MARINOS DISTINGUISHED WORLD TOUR LECTURE CALL FOR NOMINATIONS FOR 2024

Paul Marinos Distinguished World Tour Lecture: a newly established award by the International Association for Engineering Geology & the Environment (IAEG) to commemorate the contributions in the field of Engineering Geology of the Past President & Honorary President of the Association the late Professor Paul Marinos.

The lectureship provides the opportunity for an Engineering Geologist of outstanding merit in Engineering Geology & Environment, to present a series of lectures in a 2 year period to a diverse audience around the world. Candidates should be members of IAEG.



Professor
Paul Marinos
(1944-2021)

A leading figure of the profession as President of IAEG, as an academic & as a technical expert. He endeavored advanced the state-of the art on a variety of applications of Engineering Geology. He promoted IAEG & our profession with hundreds of lectures around the World.

Nomination deadline: 14th of January 2024
More information: www.iaeg.info

ΘΕΣΕΙΣ ΓΙΑ ΓΕΩΤΕΧΝΙΚΟΥΣ ΜΗΧΑΝΙΚΟΥΣ



The University of Manchester

Faculty of Science and Engineering

Characterisation and Modelling of Veined Rocks: Integrity, Deformation, and Fluid Flow

Posted on [December 4, 2023](#) by [Arthur Fanara](#)

Description

The Faculty of Science and Engineering of the University of Manchester is looking for a highly motivated student to undertake an exciting PhD project on fractured/veined rocks. The student will work in parallel with our ongoing EPSRC-funded INFORM project, where we aim to understand the impact of fracture heterogeneity on the mechanical behaviour of rocks.

This PhD project will increase confidence in the design, construction, and operation of a geological disposal facility (GDF), by integrating X-ray CT analysis and laboratory experiments to understand the influence of mineralised fractures (veins) on the integrity, deformation, and fluid flow behaviour of veined rocks that are often ignored or less researched so far. The student will characterise a range of crystalline and clay formations with veins at the nm scale and develop a bespoke hydrothermal fluid experiment to understand vein-forming mechanisms under subsurface conditions and evaluate its implications on the mechanical deformation of veined rocks. The outcome of this project will underpin the ongoing GDF programme, to isolate radioactive wastes that are incompatible with surface disposal permanently in the subsurface. Nuclear power is low-carbon energy. It now provides about 10% of the world's electricity, contributing enormously to global Net Zero emissions. One main disadvantage of nuclear power is that its generation process produces radioactive waste that can remain hazardous for hundreds of thousands of years.

The student will be provided full training on Crystal-CT imaging and analysis and will have access to the UK National X-ray Computed Tomography Facility ([University of Manchester – National X-ray Computed Tomography \(nxct.ac.uk\)](#)) at the University of Manchester. The student will also get access to the world-leading rock deformation lab at Manchester (<https://www.ees.manchester.ac.uk/research/facilities/>). The student will also have opportunities to engage with our excellent project partners from NWS, GFZ, Jacobs, North-eastern University, and our INFORM research team members.

Eligibility

The successful candidates should have, or expect to achieve, at least a 2.1 honours degree and a master's degree (or international equivalent) in a relevant science/engineering discipline (civil, mining, geotechnics, earth sciences, etc.). A track record of international publications as the first author can be a plus to this role.

Funding

This PhD position is fully funded by the University of Manchester (home student fee only). We also welcome enquiries from exceptional international students but need to find ways to cover the fee difference. Apart from this, we also welcome CSC-funded students to join the research team.

Application Deadline: Friday, 5 Jan 2024 (expected start date: 1 April or 1 Sept 2024)

If you are interested, please get in touch with Dr Junlong Shang (shangjunlongcsu@gmail.com), with a CV and a supporting statement by the deadline.

This entry was posted in [Positions](#) by [Arthur Fanara](#). Bookmark the [permalink](#).

<https://alertgeomaterials.eu/2023/12/characterisation-and-modelling-of-veined-rocks-integrity-deformation-and-fluid-flow/>



School of Architecture, Building and Civil Engineering

PhD in Climate change-resilient geotechnical infrastructure

Entry requirements: [2:1+](#)

Fees for 2023-24 (per academic year) fully funded

Full-time (3 years)

Start date: October 2024

Application deadline: 25 February 2024

Project reference: ABCE24/RI3

Location: [Loughborough](#)



Invitation to Apply for NORISK International Master in Risk Assessment and Management

We are pleased to announce the opening of applications for the NORISK International Master in Risk Assessment and Management of Civil Infrastructures.

About NORISK:

The NORISK EMJM ([Norisk | \(m-sc-norisk.org\)](https://m-sc-norisk.org)) is a prestigious Erasmus Mundus Joint Master Course designed to address the critical need for professionals with a solid foundation in risk assessment and management within the context of civil infrastructures. This program stands out for its highly specialized curriculum and multidisciplinary approach.

Program Overview:

Duration: One academic year (60 ECTS)
Dual-degree structure: Master's degree awarded by two partner Universities (30 ECTS each)
Rotating program among esteemed partners

Possibility of being involved within a secondment in several of the Associated Partners

Language of instruction and examinations: English

Full members:

Minho University (Coordinator, Portugal); La Rochelle University (France); Università degli Studi di Padova (Italy); and Universitat Politècnica de Catalunya – BarcelonaTech (Spain)

Key Focus Areas:

The NORISK EMJM emphasizes advanced knowledge and skills in assessment, management, reliability, and risk analysis. Participants will be equipped to address the intricacies of monitoring, digitalization, and intervention on civil infrastructures, with a particular emphasis on sectors such as energy, transport, communications, water, health, defense, national security, banking, and financial services.

Scholarships:

There will be scholarships for excellent students from different geographical regions of 1400EUR/month, covering also the tuition fees. Do not lose this opportunity!

Application Process:

We invite qualified candidates to submit their applications through our online portal: <https://m-sc-norisk.org/applications>. The call for students is currently open, and the deadline for applications is **31st of January of 2024**.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

Για τις παλαιότερες καταχωρήσεις περισσότερες πληροφορίες μπορούν να αναζητηθούν στα προηγούμενα τεύχη του «περιοδικού» και στις παρατιθέμενες ιστοσελίδες.

ISGHS 2024 International Symposium on Geotechnical Aspects of Heritage Structures, 14-16 Feb 2024, Tiruchirappalli, India, www.isghs2024.in, www.igstrichy.org

IEMTA Southeast Asian Conference and Exhibition on Tunneling and Underground Space 2024 (SEACETUS2024), 05 - 07 March 2024, Kuala Lumpur, Malaysia, <https://submit.confday.com/conf/seacetus2024>



7th International Conference Series on Geotechnics, Civil Engineering and Structures (CIGOS)

April 4-5, 2024, Ho Chi Minh City, Vietnam
<https://cigos2024.sciencesconf.org>

The International Conference series on Geotechnics, Civil Engineering and Structures (CIGOS) was initiated in 2010 in Paris and has certainly developed international reputations through its last six editions. CIGOS aims to provide a forum where academics, researchers, designers, and manufacturers can join to present, discuss and promote their professional and high-quality research knowledge and ideas.

The 7th edition, CIGOS 2024 co-organized by the Association of Vietnamese Scientists and Experts ([AVSE Global](http://AVSE-Global)) and the University of Architecture Ho Chi Minh City (UAH) under the auspices of RILEM and TC-309 of ISSMGE, will take place in **Ho Chi Minh City, Vietnam** on **April 4 & 5, 2024**.

CIGOS 2024 welcomes the submission of quality papers from world-wide researchers, practitioners, policymakers and entrepreneurs with the most recent advances in various areas related to the theme of this conference: **"Advances in Planning, Architecture and Construction for Sustainable Development"**. The key goals of CIGOS 2024 are to promote an exchange of ideas, to foster beneficial economic partnership and technological transfers, and to also develop institutional research and education cooperations.

TOPICS

The conference will cover a range of topics, including, but not limited to:

- Planning, Architecture, Industrial Design (PAID)
- Construction, Materials, Structures, Digital Technologies (CMSDT)
- Geosciences, Environment, Energy (GEE)
- Transportation, Infrastructure, Management and Investment (TIMI)

Organiser: Association of Vietnamese Scientists and Experts (AVSE Global) and University of Architecture Ho Chi Minh City (UAH)

Contact person: cigos2024@sciencconf.org
Email: cigos2024@sciencconf.org



www.dfi-events.org/copenhagen2024

DFI Europe and the Danish Geotechnical Society proudly present and International Seminar on Successes and Failures: What did we learn? An opportunity to learn from geotechnical failures and avoid repeating them.

Site visits will be organized on Wednesday 10 April.

Program and lectures' abstracts at <https://www.dfi-events.org/copenhagen2024/program-schedule.html>



EGU General Assembly 2024 / Session NH9.6 - Natural hazards' impact on natural and built heritage and infrastructure in urban and rural zones, 14-19 April 2024, Vienna, Austria & Online, <https://meetingorganizer.copernicus.org/EGU24/session/48709>



**ICGE-2024 - Fourth International Conference
on Geotechnical Engineering-Iraq
and
WICES-2024 - Warith First International Conference
of Engineering Sciences
17-18th April 2024, Karbala, Iraq
[https://wices.org](http://wices.org)**

Fourth International Conference on Geotechnical Engineering-Iraq, 2024 (ICGE-2024) and Warith First International Conference of Engineering Sciences (WICES-2024) will be held on 17-18th April 2024 at Warith Al-Anbiyaa University, Karbala, Iraq. These eminent gatherings are being meticulously organized by the College of Engineering/Warith Al-Anbiyaa University (CEWAU) and the distinguished Iraqi Scientific Geotechnical Society (ISGS) in close collaboration with the world-renowned Peter the Great St. Petersburg Polytechnic University (SPbPU). ICGE-Iraq 2024 and WICES-2024 have a primary mission to serve as a formidable scientific platform, facilitating the presentation and in-depth discussion of the most recent and groundbreaking research and studies within the realm of geotechnical engineering. Furthermore, these conferences encompass a diverse array of related subjects spanning across civil engineering, environmental engineering, and architectural engineering. The conference presents a unique opportunity for both academic and industry professionals to engage in dynamic dialogues, exchange the most recent advancements in their respective fields, and forge invaluable connections. Participants will be able to share innovative insights, establish valuable business and research alliances, and identify prospective global partners for future collaborative endeavors. One of the notable objectives of these conferences is to construct a robust scientific communication bridge, connecting researchers in Iraq and Russia in the field of engineering sciences. This bridge is designed to facilitate the exchange of ideas, experiences, and expertise, promoting collaboration and knowledge sharing on an international scale.

Themes of Conference

- Geotechnical Engineering (GE).
- Structural Engineering (SE).
- Soil Mechanics (SM).
- Soil-Structure Interactions (SSI).
- Soil Dynamics and Earthquakes (SDE).
- Construction Management (CM).
- Water Resources Engineering (WRE).
- Remote Sensing and Sustainability (RSS).
- Environmental Engineering (EE).
- Architectural Engineering (AE).
- Construction Materials and Transportation (CMTE).
- Prosthetics, Orthotics, and Biomedical Engineering (POBE).
- Mechanical Engineering (ME).
- Petroleum Engineering (PE).

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World Tunnel Congress 2024 19 to 25, April, 2024, Shenzhen China, www.wtc2024.cn



**PILING AND
FOUNDATIONS
2024**

23 April 2024, London, United Kingdom

<https://piling.geplus.co.uk/2024/en/page/home>

The **GE Piling and Foundations 2024** conference brings together industry leaders for a day of knowledge sharing, discussion and networking, featuring inspiring keynotes, spot-light project updates, technical case studies and insightful panel debates.

Here are 5 reasons why you can't miss Piling and Foundations 2024:

1. **Learn about the latest innovations in materials, methods and design**, and discover how they will change piling and foundations in the future
2. **Delve into the piling developments on major cross-sector projects**, and learn how they are driving the industry forward
3. **Explore the future projects pipeline** and discuss how the industry can deliver the pipeline, from materials and skills shortages to collaboration and innovation
4. **Find out about the latest advances in offshore piling** and discover how they could influence the onshore sector
5. **Join your peers for a day of learning and networking** at the only event in 2024 focused solely on the piling sector

Piling and Foundations 2024 will gather decision-makers from across the entire piling and foundations sector. Attending organisations include:

- Clients
- Academics
- Tier 1 contractors
- Consulting engineers
- Geotechnical consultants
- Geotechnical contractors
- Suppliers and manufacturers
- Technology providers

Whether you are involved in the procurement, design or installation of piles and foundations, this is an essential event in 2024 for you and your team to learn, share and re-connect with the wider sector to keep up with industry trends and advancements.

Contact

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iCGE'24 International Conference of Geotechnical Engineering, April 25-27, 2024, Hammamet, Tunisia www.icge24.com

GEO AMERICAS 2024 5th Pan-American Conference on Geosynthetics Connecting State of the Art to State of Practice April 28 – May 1, 2024, Toronto, Canada, www.geoamericas2024.org

IFCEE 2024 International Foundation Congress and Equipment Expo, May 7–10, 2024, Dallas, USA <https://web.cvent.com/event/c42dd622-dd91-409f-b249-2738e31c9ef5/summary>

8th International Conference on Earthquake Geotechnical Engineering (8ICEGE), 7–10 May, 2024 Osaka, Japan, <https://confit.atlas.jp/guide/event/icege8/top?lang=en>

GeoShanghai 2024 International Conference on Geotechnical Engineering, May 26 – 29, 2024, Shanghai, China, www.geo-shanghai.org

2nd annual Conference on Foundation Decarbonization and Re-use, May 28–30 2024, Amsterdam, The Netherlands, <https://foundationreuse.com>

IS-Macau 2024 11th International Symposium of Geotechnical Aspects of Underground Construction in Soft Ground, June 14–17, 2024, Macao SAR, China, <https://is-macau2024.skli-otsc.um.edu.mo>

ISC'7 7th International Conference on Geotechnical and Geophysical Site Characterization "Ground models, from big data to engineering judgement", June 18–21, 2024, Barcelona, Spain, <https://isc7.cimne.com>

28th European Young Geotechnical Engineers Conference 2024, 25 to 29 June 2024, Demir Kapija, North Macedonia, <https://eygec2024.net>

WCEE2024 18th World Conference on Earthquake Engineering, June 30 – July 5, 2024, Milan, Italy, www.wcee2024.it

WCEE2024 18th World Conference on Earthquake Engineering, June 30 – July 5, 2024, Milan, Italy, www.wcee2024.it / Session SHR-7: When science meets industry: advances in engineering seismology stemming from engineering practice, olga.ktenidou@gmail.com

3rd ICPE 2024 Third International Conference on Press-in Engineering, 3–5 July 2024, Singapore, <https://2024.icpe-ipa.org>



EGRWSE-2024

5th International Conference on Environmental Geotechnology, Recycled Waste Materials and Sustainable Engineering
July 4–6th, Warsaw, Poland
<https://iil.sggw.edu.pl/egrwse-2024>

Environmental Geotechnology, Recycled Waste Materials and Sustainable Engineering (EGRWSE) is a recurring conference organized since 2018 at renowned research centers such as the UIC in Chicago (USA), NIT in Jalandhar (India) and Dokuz Eylul University (Turkey). These conferences were highly successful events covering cutting-edge research in environmental geotechnics, sustainable engineering, use of recycled materials in infrastructure or presentation of modern technologies implemented for sustainable development in construction, renewable energy and environmental engineering. All engineering fields should incorporate sustainability into

their practice for an improved quality of life. The necessity for environment-friendly technologies in the future will require the expertise of engineers. Therefore, the UNESCO Engineering Initiative (UEI) is working with partners to develop engineering curricula that incorporate sustainability as an overarching theme. EGRWSE-2024 will be the 5th edition of the global conference which will refer to the current problems of civilization related to climate change and will focus on sustainable engineering implementing the Sustainable Development Goals. The conference will also discuss research on the use of recycled materials in construction following the demands of a circular economy.

Themes

WASTE: Solid waste and circular economy

POLLUTION : Geoenvironmental pollution control

GEOINFRASTRUCTURE : Sustainable geoinfrastructure

GEOTECHNICS: Geotechnics for renewable energy

CLIMATE CHANGE: Environmental geotechnics for climate change

Contact us: egrwse2024@sggw.edu.pl



ICEC2024 SECOND INTERNATIONAL CONFERENCE ON EARTHEN CONSTRUCTION, 8–10 July 2024, Edinburgh, United Kingdom, <https://icec2024.eng.ed.ac.uk>, <https://icec2024.sciencesconf.org>

IS Landslides 2024 International Symposium on Landslides "Landslides across the scales: from the fundamentals to engineering applications" & IS Rock Slope Stability 2024, July 8–12th, 2024, Chambéry, France, www.isl2024.com

EUROCK 2024 ISRM European Rock Mechanics Symposium New challenges in rock mechanics and rock engineering July 15–19, 2024, Alicante, Spain, www.eurock2024.com



5th International Conference on Information Technology in Geo-Engineering
August 5–8, 2024, Golden, Colorado, USA
<https://learn.mines.edu/ICITG>

The Joint Committee 2 (JCT2) on Representation of Geo-engineering Data cordially invites you to the 5th International Conference on Information Technology in Geo-Engineering (5th ICITG)

JCT2 is a committee under the Federation of International Geo-Engineering Societies (FedIGS), which is an umbrella organization linking international professional societies in the field of "Geo-Engineering" including the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE),

the International Society for Rock Mechanics and Rock Engineering (ISRM), the International Association for Engineering Geology and the Environment (IAEG), and the International Geosynthetics Society (IGS).

The conference intends to bring together engineers, scientists, researchers, and educators to discuss and review IT advances in geo-engineering and provide a forum for the discussion of future trends. The first four ICITG conferences were organized by: 1) Tongji University, Shanghai, China in 2010; 2) Durham University, Durham, UK together with Tongji University, Shanghai, China in 2014; 3) the University of Minho and the Portuguese Geotechnical Society in Portugal in 2019; and 4) by Nanyang Technological University and National University of Singapore in 2022 (online).

Scope of the conference...

In accordance with the conference objective to promote advances in the development and application of IT in geo-engineering, full papers on the following topics are invited:

- Sensors and Sensing Technologies
- Geotechnical instrumentation
- Data Collection and Transmission
- 3D Geological Modeling
- Information and Communications Technologies
- Digitalization
- Data-Driven Investigation and Modeling
- Big Data and Databases
- Imaging Technology
- Building Information Modeling (BIM)
- Artificial Intelligence and Machine Learning
- Virtual and Augmented Reality
- Intelligent Geomaterials
- Case Studies
- Other Topics Related to Advances in IT in Geo-Engineering

Organizer Contact Address

For more information about the course content, please contact:

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James R. Paden Distinguished Professor
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<https://s3.amazonaws.com/xcdshared/dfi/Media/S324/2024-S3-CFA-20230807.pdf>

The goal of the event is to provide presentations and panel discussions on current technologies, design, research and case studies for challenging slope and landslide repairs, excavation support and slope stabilization projects using deep foundations and ground improvement methods.

Presentations highlighting analysis and performance of excavation support systems in urban areas, and challenging subsurface conditions are encouraged.

Presentation Themes

- Anchored Earth Retention
- Drilled Shafts
- Ground Improvement
- International Grouting
- Landslides and Slope Stabilization
- Information Management Systems
- Risk and Contracts
- Seismic and Lateral Loads
- Slurry Walls
- Soil Mixing
- Subsurface Characterization for Deep Foundations
- Sustainability
- Testing and Evaluation
- Tunneling and Underground

Topics and case studies, including (but not limited to)

- Design
- Rockfall Stabilization
- Slope Nailing and Stabilization
- Challenging Soil and Rock Conditions
- Grouting
- Ground Improvement
- Safe Working Platforms
- Groundwater Effects and Impacts
- Quality Control, Monitoring and Inspection
- Specialty Exploration Methods
- Risk and Contracts, Including Litigation
- Support of Excavation Near Sensitive Structures
- Stabilization Methods in Tunnels

For inquiries, contact:

Deep Foundations Institute
Email: speakers@dfi.org | Subject: DFI S3 2024
Tel: (973) 423-4030



ECSMGE 24 XVIII European Conference on Soil Mechanics and Geotechnical Engineering, 26-30 August 2024, Lisbon, Portugal, www.ecsmge-2024.com

3ο Διεθνές Συνέδριο Αρχαίας Ελληνικής και Βυζαντινής Τεχνολογία, Αθήνα 2024, www.edabyt.gr

ISIC 2024 4th International Conference of International Society for Intelligent Construction, 10 – 12 September 2024, Orlando, United States, www.is-ic.org/conferences/2024-isic-international-conference



12 -13 September 2024, Athens, Greece

Themes

- Earthquake hazard parameters (e.g., ground motion, surface fault movements) for dam safety evaluation
- Measurement of seismic and post-seismic response of concrete and embankment/tailings dams
- Experimental behavior and modeling of dam materials under cyclic loading
- Seismic performance of concrete dams and their impacted area. Case histories, analysis & validation, design
- Seismic performance of embankment/tailings dams and their impacted area. Case histories, analysis & validation, design
- Earthquake safety evaluation of safety-critical dam elements (e.g. spillways, low-level outlets)

For more information, please refer to the following [link](#).



NGM 2024 19th Nordic Geotechnical Meeting, 18th - 20th of September 2024, Göteborg, Sweden, www.ngm2024.se

ISRM International Symposium 2024 and 13th Asian Rock Mechanics Symposium (ARMS13), 22 to 27 September 2024, New Delhi, India, <https://arms2024.org>

IS-Grenoble 2024 Geomechanics from Micro to Macro, September 23-27, 2024, Grenoble, France, <https://is-grenoble2024.sciencesconf.org>

International Symposium on Dams and Earthquakes, 7th Meeting of EWG, September 25-27, 2024, Athens, www.eemf.gr



**92nd ICOLD Annual Meeting &
International Symposium on
Dams for People, Water, Environment and
Development**

29th September – 3rd October, 2024, New Delhi, India
www.icold2024.org

The diligent National Committee of India (INCOLD) will be hosting the 92nd Annual Meeting and International Symposium of ICOLD, offering an exceptional program in a captivating setting. Building upon the successes of previous gatherings organized by INCOLD, including Congresses in 1951 and 1979, as well as the Annual Meeting in 1998, we eagerly anticipate a remarkable and unforgettable ICOLD 2024 92nd Annual Meeting and International Symposium.

The theme of the ICOLD 2024 International Symposium is "Dams for People, Water, Environment & Development," emphasizing the critical role of dams in sustainable development and environmental protection.

The 92nd ICOLD Annual Meeting & Symposium will provide a forum where Policy makers, researchers, engineers, managers, stakeholders, and manufacturers, contractors, working in the field of Energy & Water Resources Management are going to exchange views and experiences to acquaint about the latest innovation, on various aspects of Integrated Reservoir Management, Climate Change adaptation, challenges in Dam Construction and their solution, etc. and other issues related to dam safety.

The event will feature a diverse range of technical sessions, plenary talks, and panel discussions, providing an excellent platform for participants to share experiences, insights, and best practices while fostering mutual learning. Alongside the technical program, there will be ample opportunities for networking and socializing, including cultural events, technical tours, and social activities, enabling you to immerse yourself in the local culture and experience the warm hospitality of the host country.

Symposium Topics

- Dams and People
- Integrated Reservoir Management (Basin Approach)
- Dams and Climate Change Adaptation
- Dams and Renewable Energy
- Dam Engineering and Construction
- Dam Safety Management and Engineering
- Dam Rehabilitation and Improvement
- Environmental and Social Aspects
- Evolving with modern technology for construction of dams

Workshop Topics

- Application of Geosynthetics in Dam Engineering
- Risk Informed Dam Safety Management
- Tailing Dam Safety
- Dam Repairs and Rehabilitation - Deciding Design and Safety Criteria
- Numerical analysis of dams
- Sedimentation Management in Reservoirs for Sustainable Development
- Pumped hydropower Storage - The need to support high penetration of renewable energy

Special Sessions

Innovative Financing of Dam Projects

Contact

ICOLD 2024 Annual Meeting/ Symposium Secretariat
Indian Committee on Large Dams (INCOLD)

Plot No. 4, Institutional Area, CBIP Building, Malcha Marg, Chanakyapuri, New Delhi, India - 110 021 Ph. 91-11-26115984/26116567 Fax: 91-11-26116347 E-mail: contact@incold.co.in, admin@icold2024.org

For information, please contact:

Mr. K.K. Singh, Treasurer, INCOLD and Director (WR), CBIP
Email: kksingh@cbip.org, M: 91-9650998871 Mr. Manish Singh, Manager, Email: manishsingh@cbip.org



5th European Conference on Physical Modelling In Geotechnics, 02 to 04 October 2024, Delft, Netherlands, <https://tc104-issmge.com/ecpmg-2024>

XVIII African Regional Conference on Soil Mechanics and Geotechnical Engineering, 06 ÷ 09 October 2024, Algiers, Algeria, <https://algeos-dz.com/18ARC.html>

RMCC2023 1st International Rock Mass Classification Conference "Rock Mass Classification meets the Challenges of the 21st Century", 30-31 October 2024, Oslo, Norway, www.rmcc2024.com

PANAMGEO CHILE 2024 17th Pan-American Conference on Soil Mechanics and Geotechnical Engineering, 12-17 November 2024, La Serena, Chile, <https://panamge-ochile2024.cl>



CouFrac2024

**The 4th International Conference on
Coupled Processes in Fractured Geological
Media:**

**Observation, Modeling, and Application
November 13-15, 2024, Kyoto, Japan**

<https://www.ec-convention.com/coufrac2024/>

Aim of Conference

Delving into the intricacies of coupled thermal-hydro-mechanical-chemical (THMC) processes within fractured geological media not only provides insights into the earth's evolution but also underscores their pivotal role in myriad near-surface and subsurface activities. These include, but are not limited to, carbon sequestration, energy storage, nuclear waste disposal, geothermal exploration, and oil and gas exploitation. To truly harness and optimize these THMC processes, a blend of numerical modeling and experimental observations is paramount. This conference aims to propel scientific discoveries and refine subsurface engineering practices.

The 4th International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application (CouFrac2024) invites you to Kyoto, Japan, November 13-15, 2024. The conference, which succeeds the first held in Wuhan, China in 2018, the second held in Seoul, Korea in 2020, and the third held in Berkeley, USA in 2022, will focus on new and exciting advances in all areas of coupled processes associated with fractured geological media, including numerical methods, in-situ tests, lab experiments, machine learning, and applications to different activities in the near-surface, subsurface, and critical zone. The conference will be held in a face-to-face format only. We look forward to your participation!

Secretariat Office

Ryota HASHIMOTO, Kyoto University, coufrac2024_office@ec-mice.com

Registration Office

c/o EC Inc. coufrac2024@ec-mice.com



ICTG 2024 5th International Conference on Transportation Geotechnics 2024 "Sustainable and Evolving Technologies for Urban Transport Infrastructure", 20 – 22 November 2024, Sydney, Australia www.ictg2024.com.au



<https://geomandu.ngeotechs.org>

The Nepal Geotechnical Society extends a warm invitation to geotechnical engineers, geoscientists, professionals, and researchers from around the world to participate in "GeoMandu-2024," the second installment of the esteemed "GeoMandu" series organized by the Nepal Geotechnical Society (NGS). This biennial event is scheduled to take place in Kathmandu on November 28th and 29th, 2024, with a central theme of "Geotechnics for Sustainable Infrastructure."

In recent times, the focus of civil engineering advances has shifted towards the creation of sustainable, resilient, and environmentally conscious infrastructure, driven by global dynamics, urbanization, and climate change. Nepal is actively investing in infrastructure development, encompassing roads, hydropower, irrigation, and the establishment of new urban centers. Over the past few decades and in the years to come, significant progress has been made, such as expanding the road network from under 10,000 kilometers to an impressive 45,000 kilometers and increasing hydropower capacity from around 1,000 megawatts to a remarkable 25,000 megawatts. Moreover, plans are in motion for road tunnel transportation, railways, substantial irrigation and water-supply projects, as well as the development of secure and efficient urban environments.

Amidst these ongoing developments, engineers are facing challenges posed by natural disasters and climate-related issues. In this contemporary context, geotechnical engineering emerges as the cornerstone of civil engineering practice. It deals with the behavior of earth materials, specifically soils and rocks, and their interaction with structures. This discipline plays a pivotal role in ensuring the resilience and eco-friendliness of infrastructure.

This conference will serve as a dynamic platform for researchers, engineers, and practitioners to engage in knowledge exchange, disseminate groundbreaking research findings, and collaborate on solutions that will define the next phase of infrastructure development.

We extend our heartfelt invitation to join us amidst the breathtaking landscapes of Nepal as we embark on this in-

spiring journey towards “Geotechnics for Sustainable Infrastructure.” Together, we can contribute to shaping a better, greener, and resilient world for the benefit of future generations.

Conference Objectives

Primarily focusing on the theme of geotechnics for sustainable infrastructure, this international conference is being held to meet the following objectives.

1. **Knowledge Dissemination:** To facilitate the dissemination of the latest research, innovations, and best practices in the field of geotechnical engineering for sustainable infrastructure.
2. **Global Collaboration:** To provide a platform for international collaboration and networking among geotechnical engineers, geoscientists, professionals, and researchers from around the world.
3. **Sustainable Solutions:** To emphasize the role of geotechnical engineering in addressing the challenges of sustainable and resilient infrastructure development, particularly in the context of global dynamics, urbanization, and climate change.
4. **Inspiration and Education:** To inspire and educate participants by showcasing Nepal’s remarkable progress in infrastructure development and how it aligns with the principles of sustainability.
5. **Resilience in Infrastructure:** To explore the critical role of geotechnical engineering in ensuring infrastructure resilience, especially in the face of natural disasters and climate-related challenges.
6. **Long-Term Impact:** To establish a recurring conference series, held every two years, that serves as a consistent forum for advancing the discourse on geotechnical engineering and sustainable infrastructure globally.
7. **Capacity Building:** To foster the growth of knowledge and expertise in geotechnical engineering, contributing to the development of secure and efficient urban environments and infrastructure.
8. **Global Outreach:** To promote global awareness of Nepal’s contributions to the field of geotechnics and its commitment to sustainable infrastructure development.

In summary, the “GeoMandu” conference series aims to promote knowledge sharing, collaboration, and sustainable solutions within the geotechnical engineering community, with a focus on sustainable infrastructure development on a global scale.

Conference Themes

Not restricting fully to the items listed, this international conference is planned to accommodate the following sub themes.

Earthquake Geotechnical Engineering and Seismic Design of Geotechnical Structures: Seismic design of geotechnical structures, Liquefaction, Ground improvement techniques, Microtremor monitoring and damage prediction, Physical and numerical models, Case studies and field survey reports, and GIS technique and hazard/risk mapping

Geotechnical Engineering for Sustainable Transportation System: Road and bridge construction in challenging terrains, Landslide and slope stability for road safety, Sustainable transportation solutions in hilly and mountainous region

Sustainable Foundation Design and Construction: Innovative foundation design for sustainable infrastructure, Ground improvement techniques for challenging soil condi-

tions, foundation engineering for earthquake resilient structures

Geohazards and Climate Change and environmental Geotechnics: Assessing the impact of climate change on geohazards, DRR, Sustainable waste disposal and landfill design

Geotechnology in high altitude: Geotechnical challenges in permafrost regions, and its mitigation, GLOF risk management and prevention, Sustainable infrastructure development in high-altitude, glaciated areas

AI in Geotechnical Engineering: Application of Artificial Intelligence and Machine Learning in Geotechnical Engineering

Tunnel Engineering and Underground Construction: Geotechnical challenges in tunnel design and excavation, Tunnel in urban transport, tunnel construction methods and geological conditions

Ground Improvement: Soil stabilization and ground reinforcement method, Ground improvement for foundation and slope stability, Application of geosynthetics and soil modification



June 9-13, 2025, Nantes, France

<https://isfog2025.univ-gustave-eiffel.fr>

The University Gustave Eiffel is pleased to invite participation in the 5th International Symposium on Frontiers in Offshore Geotechnics (ISFOG) to be held in Nantes, France, on June 9-13, 2025. ISFOG is now in its fifth event and fourth location following the most recent (2022) symposium in Austin, Texas and the first three symposia in Perth, Australia in 2005 and 2010 and Oslo, Norway in 2015.

The Symposium will be held under the auspices of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) represented by the French Committee of Soil Mechanics (CFMS) and organised by a French Mirror Group of the Technical Committee TC 209. This group coordinates research and development actions in the field of offshore geotechnics in France.

ISFOG 2025 will highlight emerging technologies related to offshore renewables, in particular the move to floating wind farms, and focus on worldwide geotechnical challenges encountered by both the oil and gas and wind industries. The 7th Honorary McClelland lecture will be delivered by a prestigious speaker.

Themes

1. Frontier developments for offshore renewable energies
2. Site investigation strategies for fixed offshore windfarms and floating windfarms
3. Geohazards and integrated studies
4. Site characterization and ground modelling

5. Specific issues for carbonate soils, indurated soils and rocks, glauconite
6. Design, standards, risk and reliability
7. Foundations for fixed wind turbines and platforms: mono-piles, piles, gravity bases, buckets, subsea structures, others
8. Anchoring systems: drag and plate anchors, suction anchors and caissons, anchor piles, torpedo piles, gravity anchors, prestressed anchors, mutualised anchor points
9. Pipelines, Risers and Cables
10. Trenching, ploughing, excavation and burial
11. Spudcans : penetration, extraction, interactions
12. Decommissioning of offshore facilities
13. Data Analytics & Machine Learning

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World Tunnel Congress 2025 "Tunnelling into a sustainable future – methods and technologies", 9-15 May 2025, Stockholm, Sweden, www.wtc2025.se



Eurock 2025

ISRM European Rock Mechanics Symposium
Expanding the underground space -
future development of the subsurface
- an ISRM Regional Symposium
16-20 June 2025, Trondheim, Norway

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21st International Conference on
Soil Mechanics and Geotechnical Engineering
14 – 19 June 2026, Vienna, Austria

Organisers:

Austrian Geotechnical Society and Austrian Society for Geomechanics

Contact person: Prof. Helmut F. Schweiger
 Email: helmut.schweiger@tugraz.at



ISFMG 2026 12th International Symposium on Field Monitoring in Geomechanics, August 2026, Indian Institute of Technology Indore, India,
<https://sites.google.com/view/isfm2026/home>



Eurock 2026

Risk Management in Rock Engineering -
an ISRM Regional Symposium
14-19 June 2026, Skopje, R. N. Macedonia

Contact Person Name

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16th International Congress on Rock Mechanics
Rock Mechanics and Rock Engineering
Across the Borders
17-23 October 2027, Seoul, Korea

Scope

The scope of the Congress will cover both conventional and emerging topics in broadly-defined rock mechanics and rock engineering. The themes of the Congress include but not be limited to the following areas:

- Fundamental rock mechanics
- Laboratory and field testing and physical modeling of rock mass
- Analytical and numerical methods in rock mechanics and rock engineering
- Underground excavations in civil and mining engineering
- Slope stability for rock engineering
- Rock mechanics for environmental impact
- Sustainable development for energy and mineral resources
- Petroleum geomechanics
- Rock dynamics
- Coupled processes in rock mass
- Underground storage for petroleum, gas, CO2 and radioactive waste
- Rock mechanics for renewable energy resources
- Geomechanics for sustainable development of energy and mineral resources
- New frontiers & innovations of rock mechanics
- Artificial Intelligence, IoT, Big data and Mobile (AICBM) applications in rock mechanics
- Smart Mining and Digital Oil field for rock mechanics
- Rock Engineering as an appropriate technology

- Geomechanics and Rock Engineering for Official Development Assistance (ODA) program
- Rock mechanics as an interdisciplinary science and engineering
- Future of rock mechanics and geomechanics

Our motto for the congress is “Rock Mechanics and Rock Engineering Across the Borders”. This logo embodies the interdisciplinary nature of rock mechanics and challenges of ISRM across all countries and generations.

Fibre-reinforced concrete, rammed earth formwork build on lessons from ancient history



COURTESY DESTINATION INDIGENOUS — The Nk'Mip Desert Cultural Centre in Osoyoos, B.C., features walls made of rammed earth, an alternative to concrete.

Horse hair, beer, urine, tree bark, sugar — all have been used in ancient concrete mixes to strengthen the enduring building material.

Two-thousand-year-old Roman aqueducts, thousand-year-old Mayan temples and the 2,200-year-old Great Wall of China were all made with mixtures of limestone, other earthen elements and varied, local ingredients.

Today, fly ash, steel fibres, glass and recycled plastic are being tested and used in third millennia concrete mixes.

"We're learning from the past," says Rishi Gupta, a civil engineering professor at the University of Victoria. "We now have modern versions."

For over two decades, Gupta has been researching ways to strengthen concrete, often examining past practices. Today, he's focussed on two distinct methods: Fibre-reinforced concrete and rammed earth (RE).

Builders are well aware of the pitfalls around 20th century concrete, which may have a lifespan of 50 to 100 years.

In the mid-19th century, the addition of steel rebar to reinforce concrete was a great marriage but add salt and the breakdown that occurs in settings like parking garages and roads quickly becomes evident.

Before metal made its way into concrete, animal hair, often horse hair, was used. The hair acted as a fibre and improved concrete by bridging across cracks, similar to staples, Gupta says.

Today, natural and manufactured items are replacing animal hair.

At the University of Victoria, Gupta and his team have been involved in the Idea to Innovation company. One project is the collection of plastic waste from recyclers, initially milk jugs, that is converted into plastic fibres. The fibres are added to concrete.

The concrete has already been successfully used at a portion of sidewalk outside Victoria's Crystal Pool.

BC Transit and the University of Victoria have also made use of concrete with carbon fibres.

Steel has traditionally been used in placements like sidewalks, but research is showing that it's not the best.

"The addition of (plastic) fibres is known to reduce cracking big time," Gupta says.

Along with synthetic fibres, like polypropylene and polyethylene (and HDPE), steel fibres are being used. But the steel is not the rebar of times past. Today, small strands, some the diameter of tin wire and two-inch-long pieces are used.

As well, cellulose from wood bark, pulp and paper waste, wood ash from Prince George's forest industry and fly ash from coal burning are all making their way into concrete mixes.

Much like cooking, a batch of concrete today becomes a blend.

"In every bucket of concrete, add a pinch of fibre," Gupta says.

There are limitations though.

In the case of a 50-storey building, steel would not be removed.

"It's (fibre) great for flat work," Gupta says.

In the case of fire though, a National Research Council study found that at temperatures 400 C and up, concrete with steel explodes because there is no place for moisture to escape, Gupta says.

Synthetic fibres, meanwhile, provide space for the moisture to disperse.

Gupta's second area of expertise is RE construction, which involves compacting earth into a formwork. The formwork allows the RE wall to retain structural integrity while drying. Repetitive placement of earth, rammed with a manual or pneumatic rammer, is done until the desired height of a wall is reached. Typically, the RE is placed in layers.

The composition of the earth can vary, because it's location-related. But it should not have organic content. Sufficient binder is required between the grains of silt, sand, gravels and small stones. Lime or cement can be added to bolster strength.

RE construction has been used in China since around 3000 BC, was broadly used in Europe in the 18th and 19th centuries and was first used in North America in 1556 in Florida, when a soil and seashell mix was compacted in heavy formwork.

Today, Gupta says modern RE has added cement to provide stability. The percentage of cement is dependent on the local soil.

"Ideally, you would dig out the soil to build the foundation and use it for walls," Gupta says.

He likens the creation of RE to the 100 Mile Diet, using local ingredients from within 100 miles to produce a finished product.

And because the RE is manually removed from the form each time, no two sections look the same.

At the University of Victoria, the well-known First Peoples House has RE walls.

The Van Dusen Visitor Centre in Vancouver features two RE walls made with soil, chalk, lime and pigment to create sinuous, earth-tone walls.

Other B.C. locations that are ramming earth to make structures include a pump station/washroom on the Gorge Waterway in Victoria and more than a dozen homes on Salt Spring Island, Gupta says.

At the Osoyoos Indian Band Reservation, the Nk'Mip Desert Cultural Centre is the largest insulated RE wall in the world at 80 metres long, 5.5 metres high and 600 millimetres thick. The thermal resistance is R33, there are few control joints and very minimal non-structural cracking.

Gupta says RE construction would be well-suited to remote Indigenous communities and perhaps a better option than current housing choices.

"When rammed earth is used, you get architectural marvels," Gupta says.

(Shannon Moneo / Daily Commercial News by Construction Connect, December 1, 2023, <https://canada.constructconnect.com/dcn/news/technology/2023/12/fibre-reinforced-concrete-rammed-earth-formwork-build-on-lessons-from-ancient-history>)



Ventnor cliffs at risk of further movement after landslide



Huge chunks of the cliffs have come away in the landslip at Ventnor

An area of the Isle of Wight coast where a stretch of cliff collapsed is at risk of further landslides, a council has warned.

Residents from 20 homes on Leeson Road, Ventnor, had to leave after the vast collapse on Sunday night.

Isle of Wight Council said stress fractures had been detected in the surrounding coastal area.

The road and footpaths between Shanklin and Ventnor, on the south-east coast of the island, have been closed.

One resident said: "It is a huge, huge landslip - I have never seen anything like it in the 40 years we've been here."

"There have been slips during that time... but nothing on the scale of this one, it is absolutely huge."



Homes were left perilously close to the edge after the collapse on Sunday

Natasha Dix, from Isle of Wight Council, said: "The amount of land that has moved is very significant, it has dropped in a way that we have not seen for a very long time."

"There are stress fractures that move across much of the coastal area here which tells us there's likely to be some smaller movements outside of this very large landslide."

Aerial photos captured by Island Echo showed the extent of the massive landslide which has left [nearby homes teetering on the edge](#).

Residents who are out of their homes are being allowed to return to their properties for "short periods of time only" between 10:00-16:00 GMT, the council said.



A council helpline for residents affected has been set up

The authority added the affected properties were being monitored by security staff.

A council helpline for residents affected has been set up on 01983 823111.

The authority is urging people to stay away from the Bonchurch area while the impact of the landslide is assessed.

Drivers are being diverted from Ventnor, via Wroxall, and from Shanklin, via Whiteley Bank.

(BBC, 12 December 2023, <https://www.bbc.com/news/uk-england-hampshire-67689522>)

Bonchurch: a very large landslide on the Isle of Wight

On 10 December 2023 a large landslide occurred at Bonchurch on the Isle of Wight in the south of England. This coastal failure occurred after a long period of heavy rainfall. There are two very good local news articles about this failure – first, [the Island Echo has an excellent piece that includes](#)

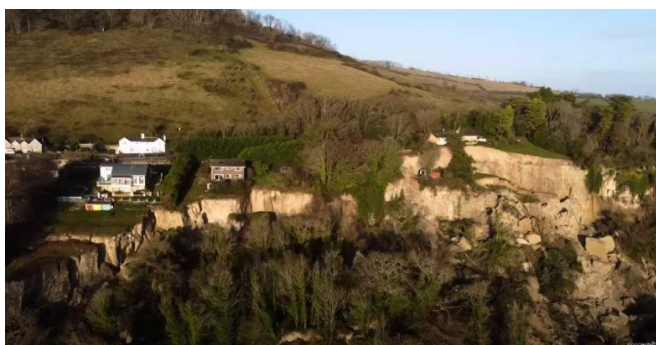
[photographs and a video of the aftermath of the landslide](#). Second, [On the Wight has a more reflective analysis](#), including quotes from the local authority leaders responsible for slope safety.

[The drone footage of the landslide is on Youtube](#), and should be visible below:-



https://www.youtube.com/watch?v=v_32yV7xvII

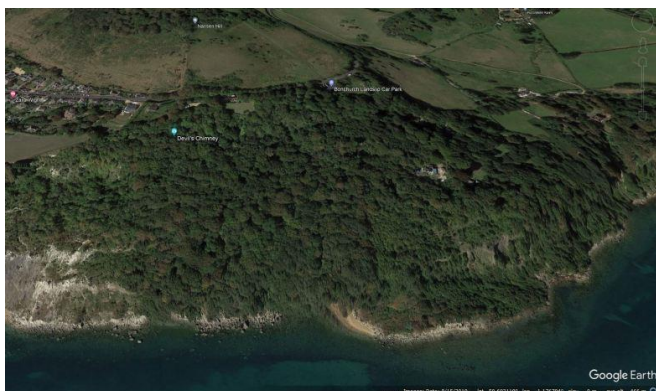
The footage shows that this large failure has threatened a number of buildings and one of the key roads into Bonchurch and the larger town of Ventnor. The still from the video below gives a sense of the overall scale of the landslide, and the proximity to local houses and a café (the white building at the crown of the landslide):-



The aftermath of the 10 December 2023 landslide at Bonchurch on the Isle of Wight. Still from a video posted to Youtube by the Island Echo.

No properties have been destroyed, but 20 have been evacuated and the road is closed.

That a landslide should occur at this point is not a surprise. Indeed, this area is called "Upper Landslip" on the Ordnance Survey map. The location is at [50.60609, -1.17846]. This is Google Earth perspective view of the site:-



Google Earth perspective view of the site of the 10 December 2023 landslide at Bonchurch on the Isle of Wight.

Note the name of the carpark in the upper right corner of the image.

Bonchurch lies at the eastern end of the Ventnor landslide complex, the largest urban landslide site in Western Europe. This complex was studied in detail by my PhD student, [Dr Jon Carey, who is now the University of Birmingham](#). His PhD thesis is available on the [University of Durham website](#).

There is an intriguing section of the [On the Wight report from yesterday](#):-

Only one road in and out?

In a separate incident at the Graben (where Ocean View Road meets Newport Road), Natasha [Dix, from the Isle of Wight Council] said access between lower and Upper Ventnor will close later this afternoon.

A new dip in the road has been reported ([Southern Water report a damaged sewer](#)) and although this is an ongoing issue, it will be closed and then assessed by Island Roads. The road will then remain closed until it's deemed safe to reopen.

That will leave just Whitwell Road as the only access to and from Ventnor.

Source: <https://onthewight.com/only-one-road-in-an-out-of-ventnor-following-largest-landslide-in-20-years/>

I discussed the Ventnor Graben in a post about a paper that we wrote about the movement of the Ventnor landslide complex ([Carey et al. 2014](#)). The Graben is an extensional structure of the large landslide complex that sits under the town. This landslide moves during periods of prolonged wet weather when the groundwater level becomes high. Displacement rates are typically slow, so the risks to life and property are low, but this does seem to indicate a wider pattern of movement in the Ventnor landslide complex at the moment.

Reference

Carey, J.M., Moore, R. and Petley, D.N. 2014. [Patterns of movement in the Ventnor landslide complex, Isle of Wight, southern England. Landslides](#). doi: <http://dx.doi.org/10.1007/s10346-014-0538-1>

<https://eos.org/thelandslideblog/bonchurch>

(Dave Petley / THE LANDSLIDE BLOG, 12 December 2023, <https://eos.org/thelandslideblog/bonchurch>)



An interesting failure of an engineered slope in Puchong, Malaysia

The landslide on 16 December 2023 during an intense rainstorm has led to the evacuation of nine houses.

On 16 December 2023 [an interesting failure occurred on an engineered slope at Taman Wawasan in Puchong, Malaysia](#). The location of the slope is [3.0378, 101.6215]. The failure removed the roadway in front of a set of residential properties, leading to the immediate evacuation of 29 people from nine houses.

The [Malaysian Public Works Department, JKR](#), has released this drone image of the aftermath of the landslide:-



Drone image of the aftermath of the landslide at Taman Wawasan, Puchong, Malaysia. Image courtesy of JKR.

As the image above shows, the landslide has run out into a water treatment works. The Google Earth image below shows the site in 2004, when there was much less vegetation on the slope than is the case now:-



Google Earth image from 2004 of the site of the landslide at Taman Wawasan, Puchong, Malaysia.

News reports indicate that the landslide occurred at about 7.30 pm following about two hours of intense rainfall. Whilst some cars were damaged, no-one was injured in the landslide. The Google Earth image appears to include a structure running across the slope – possibly a drainage channel – so this would be an interesting place to start in terms of understanding the landslide (although there is a range of possible causes, of course).

There is now emergency works underway at the site to install sheet piles to stabilise the slope in the short term.

(Dave Petley / THE LANDSLIDE BLOG, 18 December 2023, <https://eos.org/thelandslideblog/puchong-1>)



The downstream impacts of the 4 October 2023 GLOF in Sikkim, India

A series of posts on the Save the Hills blog has highlighted the severe downstream impacts of the Glacial Lake Outburst Flood.

The 4 October 2023 Glacial Outburst Flood (GLOF) in Sikkim was triggered by a landslide into a glacial lake, that in turn triggered an overtopping event that generated the appalling

debris flow and flood. I have previously highlighted the amazing work that Praful Rao of the [Save the Hills blog](#) has undertaken to document the impact of the flood between Teesta Bazar and NHPC's Teesta Low Dam Project. He has now posted a further three fascinating articles that document damage along other sections of the Teesta River, first, at Chunthang and its vicinity; second, at Singtam; and third, along the NH10 road. All three are remarkable records of the high level of damage – I strongly recommend that you take a look.

The first documents damage along the line of the Teesta River, but it is especially interesting in that it was the site of the 60 metre high Teesta III dam, which collapsed during the flood. Praful has posted an image of the remains of the dam:-



Drone image of the Teesta III dam in Sikkim, taken from Chungthang town looking downstream. [Image by Praful Rao of Save the Hills.](#)

Clearly the dam has been completely destroyed, but note also the size of the boulder lodged on the left side of the structure.

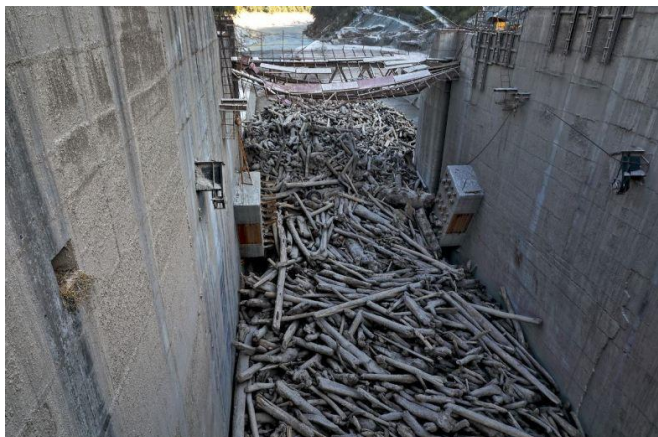
The view in the other direction is equally as remarkable:-



Drone image from the site of the Teesta III dam in Sikkim, looking towards Chungthang town. [Image by Praful Rao of Save the Hills.](#)

The scale of the destruction portrayed in the image is clear. There are many more of this area on the Save the Hills site.

Meanwhile, the Teesta stage VI dam at Sirwani, Singtam in Sikkim has also suffered huge amounts of damage. The image below appears to show severe damage to the infrastructure of the dam and a large amount of timber debris having been deposited:-



Drone image of damage to the Teesta VI dam in Sikkim.

[Image by Praful Rao of Save the Hills.](#)

Praful also highlights [damage to the NH10 highway](#), a key arterial route for Sikkim, and the issues that this has caused. The image below shows damage to just one section of the road:-



Drone photo of NH10 (a key arterial route for Sikkim), opposite Melli bazaar. [Image by Praful Rao of Save the Hills.](#)

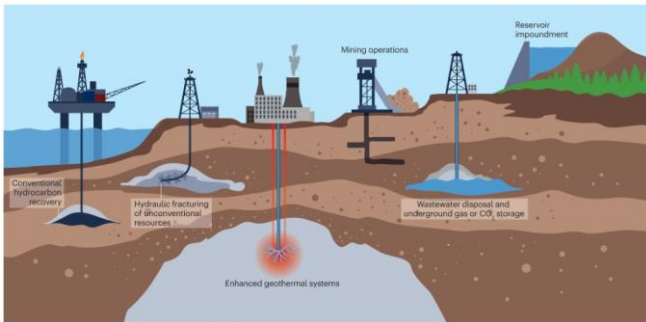
The scale of the challenges that this area now faces is very stark.

Finally, as Praful has pointed out in his most recent post, the next monsoon season is starting to hove into view. There is much to be done to be ready for another long period of heavy rainfall.

(Dave Petley / THE LANDSLIDE BLOG, 22 December 2023, <https://eos.org/thelandslideblog/4-october-2023-glof>)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ & ΑΝΤΙΣΕΙΣΜΙΚΗ ΜΗΧΑΝΙΚΗ

The physical mechanisms of induced earthquakes



Mohammad J. A. Moein, Cornelius Langenbruch, Ryan Schultz, Francesco Grigoli, William L. Ellsworth, Ruijia Wang, Antonio Pio Rinaldi & Serge Shapiro

Abstract

Anthropogenic operations involving underground fluid extraction or injection can cause unexpectedly large and even damaging earthquakes, despite operational and regulatory efforts. In this Review, we explore the physical mechanisms of induced seismicity and their fundamental applications to modelling, forecasting, monitoring and mitigating induced earthquakes. The primary mechanisms of injection-induced earthquakes considered important for creating stress perturbations include pore-pressure diffusion, poroelastic coupling, thermoelastic stresses, earthquake interactions and aseismic slip. Extraction-induced earthquakes are triggered by differential compaction linked with poroelastic effects and reservoir creep. Secondary mechanisms include reducing the rock mass strength subject to stress corrosion, dynamic weakening and cohesion loss. However, constraining the maximum magnitude, M_{\max} , of a potential earthquake on the basis of physical process understanding is still challenging. Common M_{\max} theories are based on injection volume as the single source of strain, which might not be efficient in seismically active regions. Alternative time-based M_{\max} models have the potential to explain why some induced earthquake events tap into tectonic strain and lead to runaway ruptures (in which the rupture front extends beyond the perturbed rock volume). Developments in physics-based forecasting and potential future success in mitigation of induced-seismic risk could help increase the acceptance of emerging energy technologies such as enhanced geothermal systems and underground gas storage during the sustainable transition.

Key points

- Induced earthquakes are primarily triggered by stress perturbations that destabilize pre-existing critically stressed faults. However, industrial operations can also reactivate faults that were not initially critically stressed.
- The major triggering mechanism of injection-induced seismicity is pore-pressure diffusion, which reduces the normal stress acting on fractures and fault planes. The

main mechanism of extraction-induced seismicity is poroelasticity, which affects the stress field in the surrounding rock formations and can trigger earthquakes.

- The occurrence of large-magnitude-induced earthquake events supports the hypothesis that the maximum earthquake magnitude is likely controlled by regional tectonics. Particularly, in seismically active regions, the tectonic source of strain often controls the extent of rupture on critically stressed faults.
- Fluid injection volume is not the only controlling parameter of maximum earthquake magnitude, and other factors such as the time elapsed from beginning of fluid extraction or injection (the triggering time) might have a substantial role. Triggering time is likely related to the time required to perturb the stress or strength of pre-existing faults.
- Accurate estimates of maximum magnitude can be aided when an inventory of pre-existing critically stressed faults, detailed in situ stress information and a physical understanding of the processes that control the rupture dynamics are available.
- Experiments in in situ underground laboratories with extensive monitoring systems and well-characterized rock mass provide a unique opportunity to test the methodological advances in managing seismicity and the effectiveness of numerical models at resolving coupled processes.

[Nature Reviews Earth & Environment](#) volume 4, pages 847–863 (2023)

(<https://www.nature.com/articles/s43017-023-00497-8>)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Octopus DNA seems to confirm scientists' theory about a long-standing geological mystery



The octopuses used in the study were collected from the seabed around Antarctica. Nerida Wilson/University of Western Australia

A study of octopus DNA may have solved an enduring mystery about when the rapidly melting West Antarctic ice sheet last collapsed, unlocking valuable information about how much future sea levels may rise in a warming climate.

The innovative research focused on the genetic history of the Turquet's octopus (*Pareledone turqueti*), which lives on the seafloor across the Antarctic, and what it could reveal about the geology of the region over time.

Tracing past encounters across the species' various populations suggested the most recent collapse of the ice sheet occurred more than 100,000 years ago during a period known as the Last Interglacial — something geoscientists suspected but had not been able to confirm definitively, according to the [study published Thursday](#) in the journal Science.

"This project was exciting because it offers a brand-new perspective to solve a long-standing question in the geoscience community," said lead study author Sally Lau, a postdoctoral research fellow at James Cook University in Australia.

"DNA of living animals today contains all the information about their ancestors (in the) past, so it's like a time capsule," she said.

The research team arrived at its findings by sequencing the DNA of 96 Turquet's octopuses that had been collected by institutions around the world and through fishing bycatch over the years. The oldest samples dated to the 1990s, but when sequenced, their genes provided what was essentially a detailed family tree going back millions of years.

Octopus family tree

The DNA analysis enabled researchers to understand whether different populations of Turquet's octopuses had interbred and at what point that interbreeding had happened.

"It's like doing a 23andMe on the octopus," Lau said, referring to the genetic testing company. "This information gets

passed down from parents to children and grandchildren and so on."

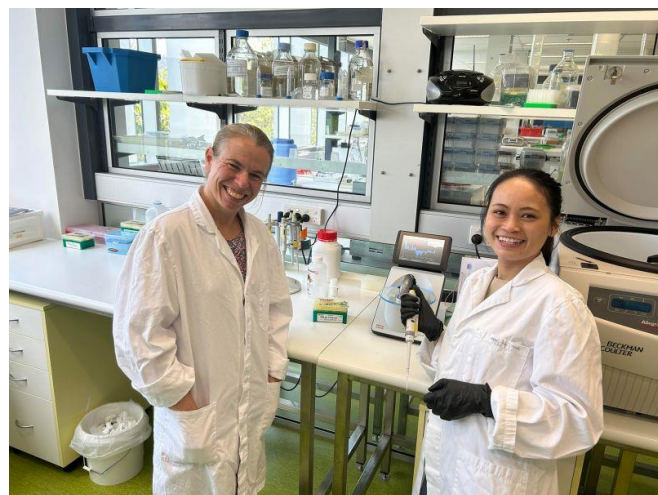
Today, populations of Turquet's octopus in the Weddell, Amundsen and Ross seas are separated by the continent-size West Antarctic ice shelves and can't intermingle.

However, the study suggested that there was last genetic connectivity between these populations around 125,000 years ago, during the Last Interglacial, when global temperatures were similar to today's.



The team studied genetic information from Turquet's octopus, which is pictured above. Dave Barnes/British Antarctic Survey

This finding indicated the West Antarctic ice sheet had collapsed during this time — an event that would have inundated coastal regions but opened up ice-bound areas on the seafloor that the octopuses would be able to occupy, ultimately encountering and breeding with members of Turquet's populations that were once geographically separated from one another.



Sally Lau (right), a postdoctoral research fellow at James Cook University in Australia, and Jan Strugnell, professor and director of the Centre for Sustainable Tropical Fisheries and Aquaculture at James Cook University, lead the research. Joe Perkins

"What makes the WAIS important is that it is also Antarctica's current biggest contributor to global sea level rise. A complete collapse could raise global sea levels by somewhere be-

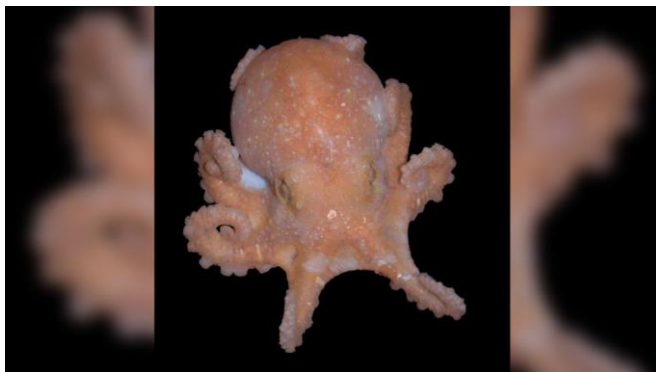
tween 3 and 5 metres,” said study author Jan Strugnell, professor and director of the Centre for Sustainable Tropical Fisheries and Aquaculture at James Cook University, in a statement. Strugnell first came up with the idea to use genomic methods to investigate whether the ice sheet had collapsed during the Last Interglacial.

“Understanding how the WAIS was configured in the recent past when global temperatures were similar to today, will help us improve future sea level rise projections,” she said.

Why octopuses?

The team chose this species of octopus for the study because the animals are relatively immobile — they can only crawl along the seafloor, which means they’re more likely to breed within their genetically distinct local populations. By contrast, a fast-moving marine species such as krill would have more homogenous DNA, blurring out historical genetic connections, Lau said.

Plus, the biology of the Turquet’s octopus was relatively well-studied, and scientists understand its DNA mutation rate and generation time, which are crucial for accurate molecular dating, Lau added.



Using octopus genomics is an “an innovative and exciting way” to address an important question about historical climate change, one expert said. Louise Allcock

[Previous studies](#) involving species of crustacean and marine mollusk had detected a biological signature of ice shelf collapse with direct connectivity between the Ross and Weddell seas, Lau noted. But the new Turquet octopus study was the first with enough high-resolution data and an adequate sample size to understand whether that genetic connectivity was driven by the collapse of the ice sheet or a much more gradual movement of octopuses around its edges.

Lau said that her team’s genetic approach couldn’t reveal exactly when the ice sheet collapsed or how long that event took. However, with fresh octopus samples and more advanced DNA analysis techniques, it might be possible to resolve those questions in the future.

“We’d love to continue using DNA as a proxy to explore other parts of Antarctica with poorly understood climate history,” she said. “We’re constantly looking for new species to test these science questions.”

‘Pioneering’ study

In a commentary published alongside the study, Andrea Dutton, a professor in the department of geoscience at the University of Wisconsin-Madison, and Robert M. DeConto, a professor at the School of Earth and Sustainability at the University of Massachusetts Amherst, called the new research “pioneering.”

They noted that while geological evidence had been mounting that the icy expanse of the West Antarctic ice sheet may have

collapsed during the Last Interglacial period, “each study’s findings have come with caveats.”

Bringing an entirely different data set to bear on this urgent issue “posed some intriguing questions, including whether this history will be repeated, given Earth’s current temperature trajectory,” they added.

Using octopus genomics was “an innovative and exciting way” to address an important question about historical climate change, said Douglas Crawford, a professor of marine biology and ecology at the University of Miami who wasn’t involved in the research.

“This is a careful study with sufficient sample size and carefully vetted set of genetic markers,” he added.

“It takes a challenging hypothesis and uses a totally independent data set that (ultimately) supports WAIS collapsed,” he said via email.

(Katie Hunt / CNN, Thu December 21, 2023 <https://edition.cnn.com/2023/12/21/world/octopus-dna-west-antarctic-ice-sheet-climate-scen>)

Genomic evidence for West Antarctic Ice Sheet collapse during the Last Interglacial

Sally C. Y. Lau, Nerida G. Wilson, Nicholas R. Golledge, Tim R. Naish, Phillip C. Watts, Catarina N. S. Silva, Ira R. Cooke, A. Louise Allcock, Felix C. Mark, Katrin Linse, and Jan M. Strugnell

Editor’s summary

How the West Antarctic Ice Sheet (WAIS) responded to warmer climates in the geologic past has obvious relevance to our understanding of what its future could be as global temperatures rise due to human activities. Using genetic analyses of a type of circum-Antarctic octopus, *Pareledone turqueti*, Lau *et al.* showed that the WAIS collapsed completely during the last interglacial period, when global sea levels were 5 to 10 meters higher than today and global average temperatures were only about 1°C warmer (see the Perspective by Dutton and DeConto). The implication of this finding is that major WAIS collapse and the consequent rise in sea level could be caused even by the minimal temperature rises projected for stringent climate change mitigation. —H. Jesse Smith

Abstract

The marine-based West Antarctic Ice Sheet (WAIS) is considered vulnerable to irreversible collapse under future climate trajectories, and its tipping point may lie within the mitigated warming scenarios of 1.5° to 2°C of the United Nations Paris Agreement. Knowledge of ice loss during similarly warm past climates could resolve this uncertainty, including the Last Interglacial when global sea levels were 5 to 10 meters higher than today and global average temperatures were 0.5° to 1.5°C warmer than preindustrial levels. Using a panel of genome-wide, single-nucleotide polymorphisms of a circum-Antarctic octopus, we show persistent, historic signals of gene flow only possible with complete WAIS collapse. Our results provide the first empirical evidence that the tipping point of WAIS loss could be reached even under stringent climate mitigation scenarios.

Science, 21 Dec 2023, Vol 382, Issue 6677, pp. 1384-1389, DOI: [10.1126/science.ade0664](https://doi.org/10.1126/science.ade0664)

Ένα απροσδόκητο φυσικό φαινόμενο στα Ιμαλάια καθυστερεί τις επιπτώσεις της κλιματικής αλλαγής



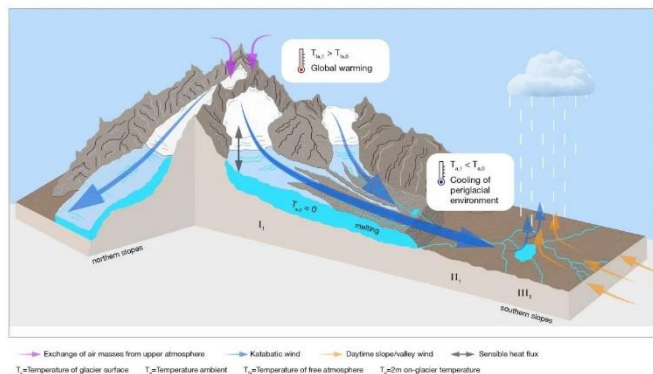
Ο κλιματικός σταθμός Pyramid International Laboratory/Observatory κατέγραψε τις μεταβολές θερμοκρασίας που - δημιουργούν ψυχρούς καταβατικούς ανέμους στα Ιμαλάια (Franco Salerno/The Institute of Science and Technology Austria)

Οι παγετώνες στα Ιμαλάια λιώνουν με ταχείς ρυθμούς, αλλά μια νέα μελέτη έδειξε ότι ένα απροσδόκητο φαινόμενο στην ψηλότερη οροσειρά του κόσμου θα μπορούσε να συμβάλει στην επιβράδυνση των επιπτώσεων της παγκόσμιας κλιματικής κρίσης.

Όταν η **αύξηση της θερμοκρασίας** πλήττει ορισμένες μάζες πάγου σε μεγάλο υψόμετρο, προκαλείται μια αναπάντεχη αντίδραση που στέλνει **ισχυρούς ψυχρούς ανέμους στις πλαγιές**, σύμφωνα με τη μελέτη που δημοσιεύθηκε στις 4 Δεκεμβρίου στο περιοδικό **Nature Geoscience**.

Η αύξηση της θερμοκρασίας δημιουργεί μεγαλύτερο θερμοκρασιακό χάσμα μεταξύ του περιβάλλοντος αέρα πάνω από τους παγετώνες των Ιμαλαίων και του ψυχρότερου αέρα που έρχεται σε άμεση επαφή με την επιφάνεια των παγωμένων μαζών, εξήγησε η Φραντσέσκα Πελιτσιότι, καθηγήτρια παγετωνολογίας στο **Ινστιτούτο Επιστήμης και Τεχνολογίας της Αυστρίας** και επικεφαλής συγγραφέας της μελέτης.

«Αυτό οδηγεί σε αύξηση της στροβιλώδους ανταλλαγής θερμότητας στην επιφάνεια του παγετώνα και σε ισχυρότερη ψύξη της αέριας μάζας της επιφάνειας» σημείωσε.



Το γράφημα απεικονίζει τον ψυχρό αέρα που δημιουργείται από την άνοδο της θερμοκρασίας γύρω από τους παγετώνες,

Καθώς ο ψυχρός, ξηρός επιφανειακός αέρας ψύχεται και γίνεται πυκνότερος, βυθίζεται. **Η μάζα του αέρα ρέει από τις πλαγιές προς τις κοιλάδες**, προκαλώντας ψύξη στις κατώτερες περιοχές των παγετώνων και στα γειτονικά οικοσυστήματα.

Με τον πάγο και το χιόνι από την οροσειρά να **τροφοδοτούν 12 ποτάμια** που παρέχουν γλυκό νερό σε σχεδόν **2 δισεκατομμύρια ανθρώπους σε 16 χώρες**, είναι σημαντικό να μάθουμε αν οι παγετώνες των Ιμαλαίων μπορούν να διατηρήσουν αυτό το αυτοσυντηρούμενο ψυχτικό αποτέλεσμα, καθώς η περιοχή αντιμετωπίζει μια πιθανή άνοδο της θερμοκρασίας τις επόμενες δεκαετίες.

Ερευνώντας τους καταβατικούς ανέμους

Ωστόσο, ακόμη και η παρουσία αυτών των ψυχτικών ανέμων δεν είναι αρκετή για να αντιμετωπίσει πλήρως την αύξηση των θερμοκρασιών και το **λιώσιμο των παγετώνων** λόγω της κλιματικής αλλαγής. Ο Τόμας Σο, ο οποίος συμμετέχει στην ερευνητική ομάδα μαζί με την Πελιτσιότι, δήλωσε ότι ο λόγος για τον οποίο αυτοί οι παγετώνες λιώνουν παρόλα αυτά με ταχείς ρυθμούς - μια έρευνα του περασμένου Ιουνίου έδειξε ότι **οι παγετώνες στα Ιμαλάια έλιωσαν 65% ταχύτερα τη δεκαετία του 2010 σε σύγκριση με την προηγούμενη δεκαετία** - είναι πολύπλοκος.

«Η ψύξη είναι τοπική, αλλά ίσως ακόμη δεν επαρκεί για να ξεπεραστεί ο ευρύτερος αντίκτυπος της κλιματικής υπερθέρμανσης και να διατηρηθούν πλήρως οι παγετώνες», δήλωσε ο Σο.

Η Πελιτσιότι εξήγησε ότι η γενική **έλλειψη δεδομένων σε περιοχές με μεγάλο υψόμετρο** σε όλο τον κόσμο είναι αυτή που οδήγησε την ομάδα μελέτης να επικεντρωθεί στη χρήση των μοναδικών αρχείων επίγειας παρατήρησης σε έναν σταθμό στα Ιμαλάια.

Ο κλιματικός σταθμός **Pyramid International Laboratory/Observatory** βρίσκεται σε παγετώδες **υψόμετρο 5.050 μέτρων** κατά μήκος των νότιων πλαγιών του όρους Έβερεστ. Το παρατηρητήριο καταγράφει λεπτομερή μετεωρολογικά δεδομένα εδώ και σχεδόν **30 χρόνια**.

Είναι αυτά τα δεδομένα που χρησιμοποίησε η ομάδα της Πελιτσιότι για να καταλήξει στο συμπέρασμα ότι η αύξηση της θερμοκρασίας προκαλεί αυτό που ονομάζεται **καταβατικοί άνεμοι**.

Οι ψυχροί άνεμοι, που δημιουργούνται από τον **αέρα που ρέει προς τα κάτω**, εμφανίζονται συνήθως σε ορεινές περιοχές, συμπεριλαμβανομένων των Ιμαλαίων.

«Οι καταβατικοί άνεμοι είναι ένα κοινό χαρακτηριστικό των παγετώνων των Ιμαλαίων και των κοιλάδων τους, και πιθανότατα συνέβαιναν πάντα», δήλωσε η Πελιτσιότι. «Αυτό που παρατηρούμε όμως είναι μια **σημαντική αύξηση της έντασης και της διάρκειας των καταβατικών ανέμων**, και αυτό οφείλεται στο γεγονός ότι οι θερμοκρασίες του περιβάλλοντος αέρα έχουν αυξηθεί σε έναν κόσμο που θερμαίνεται».

Ένα άλλο πράγμα που παρατήρησε η ομάδα ήταν οι **υψηλότερες συγκεντρώσεις όζοντος σε επίπεδο εδάφους** σε συνδυασμό με τις χαμηλότερες θερμοκρασίες. Αυτά τα στοιχεία αποδεικνύουν ότι οι καταβατικοί άνεμοι **λειτουργούν σαν αντλία** που είναι σε θέση να μεταφέρει κρύο αέρα από το υψηλότερο υψόμετρο και τα ατμοσφαιρικά στρώματα προς τα κάτω στην κοιλάδα, εξήγησε η Πελιτσιότι.

Απώλειες παγετώνων σε Ασία και Ευρώπη

Στα κεντρικά Ιμαλάια, κατά μέσο όρο, οι παγετώνες **έχουν αραιώσει περίπου 9 μέτρα** τις τελευταίες δύο δεκαετίες. Αυτό είναι πολύ χαμηλότερο από τους παγετώνες στην **Ευ-**

ρώπη, οι οποίοι έχουν αραιώσει περίπου **20 μέτρα** κατά την ίδια χρονική περίοδο, αλλά μεγαλύτερο από άλλες περιοχές στην Ασία (για παράδειγμα στην οροσειρά Καρακορούμ) ή στην περιοχή της Αρκτικής.



Ο κλιματικός σταθμός Pyramid International Laboratory/Observatory βρίσκεται σε παγετώδες υψόμετρο 5.050 μέτρων κατά μήκος των νότιων πλαγιών του όρους Έβερεστ (Franco Salerno/The Institute of Science and Technology Austria)

Η κατανόηση του πόσο καιρό αυτοί οι παγετώνες **είναι σε θέση να αντισταθμίσουν τοπικά τις επιπτώσεις της υπερθέρμανσης του πλανήτη** θα μπορούσε να είναι ζωτικής σημασίας για την αποτελεσματική αντιμετώπιση του μεταβαλλόμενου κόσμου μας.

«Πιστεύουμε ότι **οι καταβατικοί άνεμοι είναι η αντίδραση των υγιών παγετώνων στην άνοδο της παγκόσμιας θερμοκρασίας** και ότι το φαινόμενο αυτό θα μπορούσε να βοηθήσει στη διατήρηση του μόνιμου πάγου και της περιβάλλουσας βλάστησης», δήλωσε ο συν-συγγραφέας της μελέτης Νικολά Γκουιενόν, ερευνητής στο Εθνικό Συμβούλιο Ερευνών της Ιταλίας.

Με πληροφορίες από: [Scientists uncover a surprising phenomenon in the Himalayas that might be slowing the effects of climate change](https://www.nature.com/articles/s41561-023-01331-y) by Allison Chinchar

(CNN Greece, Τετάρτη, 13 Δεκεμβρίου 2023, <https://www.cnn.gr/perivallon/story/396130/enaprosdokito-fysiko-fainomeno-sta-imalaia-kathysterei-tis-epiptoseis-tis-klimatikis-allagis>)

Local cooling and drying induced by Himalayan glaciers under global warming

Franco Salerno, Nicolas Guyennon, Kun Yang, Thomas E. Shaw, Changgui Lin, Nicola Colombo, Emanuele Romano, Stephan Gruber, Tobias Bolch, Andrea Alessandri, Paolo Cristofanelli, Davide Putero, Guglielmina Diolaiuti, Gianni Tartari, Gianpietro Verza, Sudeep Thakuri, Gianpaolo Balsamo, Evan S. Miles & Francesca Pellicciotti

Abstract

Understanding the response of Himalayan glaciers to global warming is vital because of their role as a water source for the Asian subcontinent. However, great uncertainties still exist on the climate drivers of past and present glacier changes across scales. Here, we analyse continuous hourly climate station data from a glacierized elevation (Pyramid station, Mount Everest) since 1994 together with other ground observations and climate reanalysis. We show that a decrease in maximum air temperature and precipitation occurred during the last three decades at Pyramid in response to global warming. Reanalysis data suggest a broader occurrence of this effect in the glacierized areas of the Himalaya. We hypothesize that the counterintuitive cooling is caused by enhanced sensible heat exchange and the associated increase in glacier katabatic wind, which draws cool air downward from higher elevations. The stronger katabatic winds have also lowered the elevation of local wind convergence, thereby diminishing precipitation in glacial areas and negatively affecting glacier mass balance. This local cooling may have partially preserved glaciers from melting and could help protect the periglacial environment.

[Nature Geoscience](https://www.nature.com/articles/s41561-023-01331-y) volume 16, pages1120–1127 (2023)

(<https://www.nature.com/articles/s41561-023-01331-y>)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Specification for tunnelling (Fourth edition)

British Tunnelling Society, UK

The ebook edition of this title is Open Access and freely available to read online. Specification for Tunnelling, Fourth edition is a standard industry document for tunnelling contracts and forms the basis of tunnelling specifications for projects throughout the world.

It reflects current industry best practice and considers technological advancements over the last ten years.

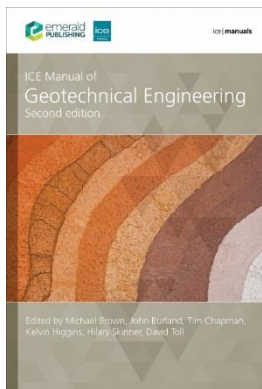
It also investigates a range of new topics. Since the publication of the third edition in 2010, the British tunnelling industry has completed several major projects both domestic and abroad.

This updated fourth edition captures the many advances made in the field of tunnelling and the lessons learned on these projects through a comprehensive review of all content by subject matter experts.

The importance of sustainability and the increased market share of low CO₂e materials have been reflected by removal of prescriptive requirements and a strong emphasis on performance-based specification.

All references to codes, standards and other design documents have been comprehensively updated. Drafted by an expert editorial committee and supported by multiple rounds of industry-wide peer reviews, the Specification for Tunnelling in its fourth edition will continue to be the de facto standard reference work for tunnelling in the UK and world-wide.

(ICE Publishing, 13.12.2023)



ICE Manual of Geotechnical Engineering, (2-volume set)

**Tim Chapman, Hilary Skinner,
D G Toll, Kelvin Higgins,
Mike Brown, John Burland**

ICE Manual of Geotechnical Engineering, Second edition (2 volume set) brings together an exceptional breadth of material to provide a definitive reference on geotechnical engineering solutions. Written and edited by leading specialists, now revised and updated with the latest guidelines and references, each chapter provides contemporary guidance and best practice knowledge for civil and structural engineers in the field. It considers the higher importance attached to the effects of construction on the environment and society.

Key features in this wide-ranging update include

- comprehensive reference for the core geotechnical engineering principles
- theoretical principles and practical techniques in geotechnical engineering
- uncertainties that may arise during the process of ground investigation
- topic-focused chapters, including problematic soils, foundations, earthworks and retaining structures
- fundamental principles of site investigation, design and construction processes.

This 2 volume set includes Volume I & Volume II covering fundamental geotechnical principles and concepts, problematic soils and their issues and site investigation. This knowledge is extended to inform design, construction processes and verification in Volume II.

Part of the *ICE Manuals series*, *ICE Manual of Geotechnical Engineering, Second edition* is an essential guide and invaluable reference for practising civil and structural engineers, engineering geologists, architects, designers, consultants and contractors.

(ICE Publishing, 17 Nov 2023)



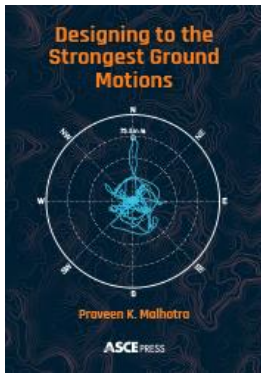
Guide to Pavement Technology Part 1: Introduction to Pavement Technology

Publication no: AGPT01-23

Guide to Pavement Technology Part 1: Introduction to Pavement Technology provides general information regarding the purpose and function of pavements, pavement types and their components, pavement materials, the types of pavements commonly in use today and an introduction to the fundamentals of pavement behaviour. A brief description of the other nine parts of the guide is also presented. The development of road pavements in Australasia is briefly discussed in a commentary.

https://austroads.com.au/publications/pavement/agpt01/media/AGPT01-23_Guide_to_Pavement_Technology_Part_1_Introduction_to_Pavement_Technology.pdf

(Austroads, 22 December 2023)



Designing to the Strongest Ground Motions

Praveen K. Malhotra, Ph.D., P.E.

Designing to the Strongest Ground Motions determines the strongest ground motions from data, rather than predictions, and discusses the

design of structures to withstand the strongest ground motions. Future ground motions are highly uncertain, but the response of structures to future ground motions will not be uncertain if structures are designed to the strongest ground motions. Uncertainty is not an option in the design of structures whose collapse can be catastrophic.

Topics include

- Characteristics of collapse-inducing ground motions, including energy-demand and cyclic-demand,
- Strongest ground motions from > 200,000 instrument-year of recorded data worldwide,
- Comparison between predicted and recorded ground motions,
- Seismic characteristics and analysis of structures, including seismic-toughness and cyclic-capacity,
- Practical nonlinear analysis of structures,
- Role of aftershocks and number of cycles in seismic design, and
- Collapse-proof, rather than collapse resistant, seismic design.

Through this book, Dr. Malhotra provides valuable insights and new ways of thinking for structural and geotechnical engineers, architects, seismologists, insurers, regulators, educators, and policymakers.

(American Society of Civil Engineers, 2023)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



<https://isrm.net/newsletter/show/247>

Κυκλοφόρησε το Τεύχος 64 του ISRM Newsletter - December 2023 με τα ακόλουθα περιεχόμενα:

- [President's Inaugural Message](#)
- [ISRM Past President Eda Quadros - in memoriam](#)
- [Election and inauguration of the new Board 2023-2027](#)
- [44th ISRM Online Lecture by Prof. Manchao He](#)
- [New ISRM Fellows inducted during the ISRM Congress 2023](#)
- [2023 ISRM Council, Board and Commission meetings took place in Salzburg](#)
- [ISRM International Symposium 2024 and ARMS13 - Abstract submission deadline extended to 15 January 2024](#)
- [ISRM Award winners were announced](#)
- [Eurock2024, Alicante, Spain, 15-19 July 2024](#)
- [FedIGS-Board meeting took place in Salzburg](#)
- [Extracted thoughts from my corner in the JSRM Newsletter - by Ömer Aydan](#)



IGS NEWSLETTER – December 2023

Κυκλοφόρησε το IGS Newsletter της International Geosynthetic Society με τα ακόλουθα περιεχόμενα:

Helping the world understand the appropriate value and use of geosynthetics

www.geosyntheticssociety.org/newsletters

- IGS Council: Call For Candidates Term 2024 - 2028 [Nomination Guidelines](#)
- 12th ICG Revisited At Romania 'Echoes' Conference [READ MORE](#)
- Making Diversity Matter At IGS Events [READ MORE](#)
- IGSF Grant Makes Lasting Impact On IGS Young Members [READ MORE](#)
- IGS Italy Symposium Deepens Understanding On Land-slide Mitigation Using Geosynthetics [READ MORE](#)
- Jorge Zornberg Speaks At Greece Conference For Ambassadors Program [READ MORE](#)
- 10 Questions With... Hamza Mridakh [READ MORE](#)

- Geotextile Offers Sustainable Construction At Nature Site [READ MORE](#)



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Κυκλοφόρησε το Τεύχος 6 του Τόμου 30 (Δεκεμβρίου 2023) του Geosynthetics International της International Geosynthetic Society με τα ακόλουθα περιεχόμενα:

[Geogrid-anchored sheet pile walls; a small-scale experimental and numerical study](#), B. Wittekoek, S. J. M. van Eekelen, J. Terwindt, M. Korff, P. G. van Duijnen, O. Detert, A. Bezuijen, 30(6), pp. 561–583

[Investigation of the blast-resistance performance of geotextile-reinforced soil](#), S.-C. Tseng, K.-H. Yang, Y.-K. Tsai, F.-C. Teng, 30(6), pp. 584–601

[Centrifuge model and numerical studies of strip footing on reinforced transparent soils](#), X. Guo, J. Chen, J. Xue, Z. Zhang, 30(6), pp. 602–627

[Mechanisms controlling the hydraulic conductivity of anionic polymer-enhanced GCLs](#), A. Norris, J. Scalia IV, C. D. Shackelford, 30(6), pp. 628–650

[Behavior of geocell reinforced bed under vibration loading: 3D numerical studies](#), H. Venkateswarlu, A. Hegde, 30(6), pp. 651–670



www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/51/issue/6

Κυκλοφόρησε το Τεύχος 6 του Τόμου 51 (Δεκεμβρίου 2023) του Geotextiles and Geomembranes της International Geosynthetic Society με τα ακόλουθα περιεχόμενα:

[Editorial Board](#), Page ii

[Special issue "Digital imaging techniques in geosynthetic applications"](#), Gali Madhavi Latha, Toshifumi Mukunoki, Page 1

[A simplified analysis of a configuration of geosynthetic reinforcement in GRPS embankments](#), Wei Guo, Yunbao Huang, Yuxiao Ren, Pages 2-16

[Internal erosion and permeability of Na CMC-treated and PAM-treated geosynthetic clay liners](#), Hakki O. Ozhan, Aykut Erkal, Pages 17-27

[Assessment of geomembrane strain from pond liner bubbles](#), H.M.G. Eldesouky, R. Thiel, R.W.I. Brachman, Pages 28-40

[Diffusion of volatile organic compounds \(VOCs\) through elastomeric bituminous geomembranes \(BGMs\)](#), A.M. Arif, F.B. Abdelaal, Pages 41-55

[Reinforcement effect and mechanism analysis of dredged sludge treated by alternating prefabricated radiant drain vacuum preloading method](#), Huayang Lei, Jiankai Li, Shuangxi Feng, Anyi Liu, Pages 56-72

[Shear strength of HDPE smooth geomembrane/bentonite-polymer geosynthetic clay liner interface](#), Hanrui Zhao, Kuo Tian, Pages 73-86

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2023 – 2026)

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