Αυτό που λείπει από τους ξενιτεμένους μας…

ΕΛΛΗΝΙΚΗ ΕΠΙΣΤΗΜΟΝΙΚΗ ΕΤΑΙΡΕΙΑ ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ & ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

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ΠΕΡΙΕΧΟΜΕΝΑ

Αν και δεν έχει τελειώσει ακόμη το νέο αεροδρόμιο Daxing International στα περίχωρα του Πεκίνου εντυπωσιάζει από την παρουσίαση που έγινε για τους δημοσιογράφους.

Gordon Dam in Tasmania, Australia

New Croton reservoir in Westchester County, New York

ΑΦΙΕΡΩΜΑ ΣΤΑ ΦΡΑΓΜΑΤΑ – ΑΣΦΑΛΕΙΑ ΦΡΑΓΜΑΤΩΝ

Dam Safety: Review of Geophysical Methods to Detect Seepage and Internal Erosion in Embankment Dams

Ken Y. Lum and Megan R. Sheffer

Social MediaTools

Several non-intrusive geophysical methods are available to facilitate early detection of seepage, piping, and internal erosion in embankment dams. A review of these methods shows where they can be applied and indicates work needed to further improve the use of each.

Internal erosion is the second largest cause of failure of earthfill dams worldwide. Damages resulting from internal erosion can lead to expensive remediation. Typical dam safety surveillance consists of visual inspections supported by limited instrumentation. However, internal erosion can become quite advanced before the problem is detected via these means. Recently, interest has grown regarding the use of non-intrusive geophysical techniques to facilitate early detection of anomalous seepage, piping, and internal erosion.

To date, the use of geophysical methods to investigate seepage in dams has produced mixed results, partly because the application of these methods is not well-understood and partly because false positives cannot be tolerated. Although geophysical anomalies are easily detected, often what these anomalies represent and their implications are not clear. The application of geophysical methods to dams is in its early stages, and adapting geophysical techniques to geotechnical investigations and dam safety surveillance requires more refinement to answer specific engineering questions.

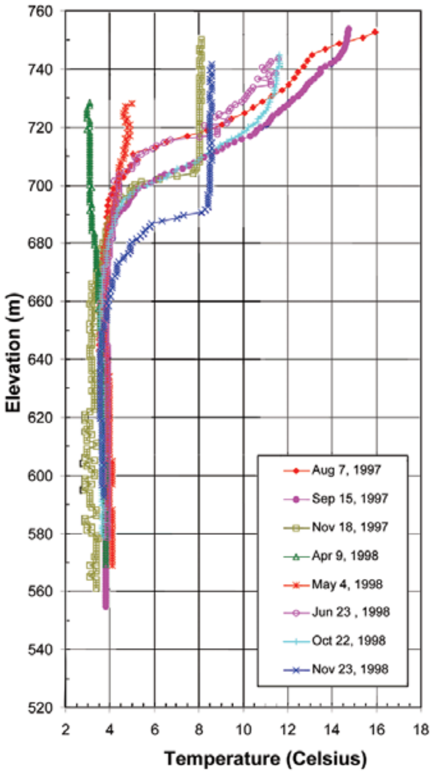
These needs prompted the launch of a collaborative research project under the auspices of CEATI's Dam Safety Interest Group (DSIG) to study the current state-of-practice regarding geophysical methods applied to embankment dams. The objective of this project was to evaluate, adapt, and/or develop some of the most promising geophysical techniques as investigation and monitoring tools to detect seepage and internal erosion.

Four techniques were selected for additional research and development:

Temperature measurement

Temperature measurement makes use of natural seasonal temperature variations to locate areas of preferential seepage. Temperature in the saturated part of an embankment dam primarily is governed by the temperature of the water seeping from the reservoir. However, the air temperature from above and geothermal heat flow from below also influence temperature distribution in the dam. Geothermal heat flow is relatively constant, but air and reservoir temperatures vary seasonally and create temperature "waves" that penetrate the dam. Conductive air temperature variations typically penetrate about 10 meters below the dam surface along the crest and downstream slopes. Upstream, reservoir water exhibits seasonal fluctuations that are influenced by stream inflows and mixing. Stratification often exists in large reservoirs, and variations up to about 20 degrees Celsius (C) can occur in the upper tens of meters of the reservoir, with little seasonal fluctuation at depth. Figure 1 shows the effect of seasonal fluctuations on a vertical temperature profile measured in a deep reservoir in northern British Columbia.

Detection of concentrated seepage through an embankment dam generally relies on measuring the attenuating temperature pulse at a given location as the reservoir water seeps through the embankment. Temperature fluctuations can be used to identify higher-permeability zones that could indicate damage. Zones of high temperature variation indicate an area of higher seepage flow than areas with a lower temperature variation. For interpretation, it is critical to monitor and understand the temperature cycles at all depths in the reservoir adjacent to the dam.



The top elevation of these vertical temperature profiles, measured in the reservoir impounded by a dam in British Columbia, corresponds with the reservoir level. Seasonal fluctuations in temperature that are evident in the upper 60 meters of the reservoir facilitate the detection of higher-permeability zones in the embankment damn.

The temperature within an embankment dam can be measured at discrete points by using thermistors (such as those integrated into vibrating wire piezometers) or by profiling the water column inside standpipe piezometers or existing casings. Distributed temperature measurements using optical fibers bring the promise of improved spatial coverage and enable monitoring with an accuracy of 0.01 to 0.1 C at spacings of about 1 meter over a continuous fiber of 10 kilometers or more. Costs of readout units are US$25,000 to US$75,000 (depending on specification requirements).

Data can be interpreted qualitatively or quantitatively. As part of the DSIG research project, a user-friendly time lag software package called DamTemp was enhanced. This software has the capability to use measured temperatures to identify and estimate the seepage flows in a zone of potential damage.

As an extension to the DSIG research work, practical guidance for temperature data measurement and evaluation procedures have been documented in a field manual.[1]

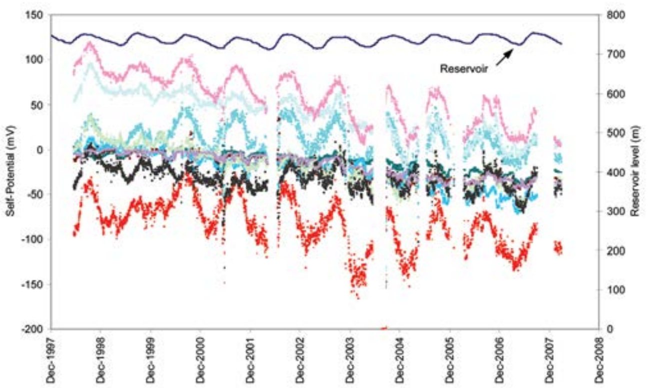
With significant advances in temperature monitoring and interpretation tools over the past two decades, temperature measurements are rapidly gaining acceptance as a useful method for monitoring seepage in embankment dams. This is particularly true in Sweden and other European countries.

Self-potential method

Self-potential (SP) is a passive technique that measures naturally occurring electrical potentials in the ground. This is the only one of these four geophysical techniques that responds directly to fluid flow. Water flowing through the pore space of soil generates electrical current flow. This electrokinetic phenomenon is called streaming potential and gives rise to SP signals that are of primary interest in dam seepage studies.

Field data acquisition

SP is measured by determining the voltage across a pair of non-polarizing electrodes using a high-impedance voltmeter. This inexpensive and deceptively simple data acquisition procedure requires special care and attention in order to reliably interpret and correct for sources of electrical noise that can mask the signal of interest. All noise sources – including time-varying telluric currents associated with solar and atmospheric activity, stray currents, and the corrosion of buried metal – must be recognized and measured. These noise sources can mask the relatively small signals associated with seepage anomalies. For this reason, telluric measurements and magnetic surveys should be carried out to assist in interpreting the SP data. Typically, SP anomalies on the order of tens of millivolts are associated with seepage anomalies of interest, although anomaly amplitudes largely depend on site-specific conditions.



Each of these self-potential profiles from a dam in British Columbia corresponds to potential difference measured between a given electrode and a base electrode positioned at the center of the dam crest. There is a strong correlation between the self-potential data and seasonal reservoir levels.

The objectives of the survey and the nature of site conditions dictate the choice of SP survey configuration and layout. Distance between electrodes typically ranges from several meters to tens of meters, depending on the resolution required. Unlike other geophysical techniques, pre-assembled sets of SP survey equipment are not commercially available, and widely accepted data quality-control standards and procedures had not been established for the SP method. As a result of this research, guidance on obtaining high-quality SP data in support of dam seepage investigations has been comprehensively documented in an SP field data acquisition manual.[2]

SP data interpretation

Interpretation of SP measurements to infer seepage patterns and concentrated seepage flows ranges from simple qualitative to more advanced quantitative numerical modeling approaches.

Zones of preferential flow can be inferred qualitatively using patterns in the electrical potential distribution. Interpretation of seepage-related features is aided by taking the difference between two data sets collected at different pool levels. This process reduces the influence of non-seepage sources – such as electrical potential fields associated with buried metal pipes and concrete rebar – and thus facilitates the identification of seepage-related anomalies. Distinct anomalies can be interpreted using simple geometric source modeling to estimate the location and depths of seepage-induced electrical current sources. This information can be used in conjunction with other site information to further delineate the extent and cause of the seepage, or to help guide more detailed investigations.

The current state-of-the-art in SP data interpretation is application of more advanced numerical modeling techniques to interpret characteristics of the hydraulic regime from the SP data. A three-dimensional (3D) forward modeling software package called SP3D was developed as part of the DSIG project. This program enables an interpretation of hydraulic head patterns from the geophysical data using a 3D seepage model of the dam. This level of data interpretation requires estimates of the hydraulic conductivity, electrical resistivity, and cross-coupling coefficient of the embankment materials.

A lack of available data on the electrical resistivity and cross-coupling coefficient of well-graded soils prompted a laboratory study to measure these parameters. A unique apparatus was developed to perform streaming potential and resistivity measurements on the same soil specimen to derive the cross-coupling coefficient. Both unidirectional and cyclic flow methods were used to perform streaming potential measurements. The cyclic method was shown to be a valid test method and the most efficient technique for measuring the streaming potential coupling coefficient in soils.

The influence of soil and fluid properties on the cross-coupling coefficient was investigated for typical embankment soils. The results show that this coefficient does not vary considerably in saturated soils as compared to other properties such as electrical resistivity.[3] This suggests that practitioners may not need to characterize the cross-coupling coefficient to the same degree as electrical resistivity for practical SP field data interpretation.

Practical guidelines for interpreting SP data resulting from dam seepage investigations have been developed.[4]

Figure 2 illustrates the temporal var-iations evident in an SP data set collected using an array of electrodes installed along the crest of a dam in British Columbia. This monitoring array was deployed to obtain information about the seasonal SP time variation within the dam and to assess the long-term performance of the prototype system. The data shown in Figure 2 are all referenced to a common base station at the center of the dam crest. The SP signals vary with changes in the seepage flow through the dam as the reservoir level cycles.

Electrical resistivity

The direct current resistivity method has well-established data acquisition and interpretation techniques for standard survey configurations. The method uses pairs of electrodes to inject current into the ground and measure the resulting electrical potential distribution. Its application to dam seepage investigations is two-fold. The method may be used to monitor spatial and/or temporal variations in electrical resistivity in response to changing soil conditions caused by internal erosion and anomalous seepage. The method also may be used to characterize the electrical resistivity of the subsurface for the purposes of interpreting SP data.

Inverse modeling methods are preferred for interpreting an electrical resistivity distribution from the geophysical data. The interpretation of electrical resistivity data acquired using a single line of electrodes along the crest of an embankment poses a challenge due to the sloping geometry of the dam. Two-dimensional interpretations may misrepresent the true resistivity at depth. However, monitoring applications are not adversely affected as the focus of these investigations is to detect changes in resistivity with time, which may be linked to the development of internal erosion in the core of the embankment.

A report is available that provides detailed, practical guidance on resistivity survey design and equipment, data acquisition, and data interpretation for embankment dams.[5]

Embankment and reservoir conditions are dynamic. Fluctuations in pool levels, seasonal temperatures, and total dissolved solids all affect the electrical properties of the embankment, particularly its electrical resistivity. Long-term monitoring affords an increased sensitivity to temporal changes and enables more effective identification of local changes that may be linked to the development of internal erosion. In long-term monitoring applications, a large amount of data is collected and processed, such that efficient data handling becomes a special requirement. Case histories of long-term monitoring measurements in Sweden, using electrical resistivity, temperature, and SP methods, are available. These case histories illustrate the significant effect of seasonal variations on the measured data and provide insight for the design and installation of permanent monitoring arrays.[6]

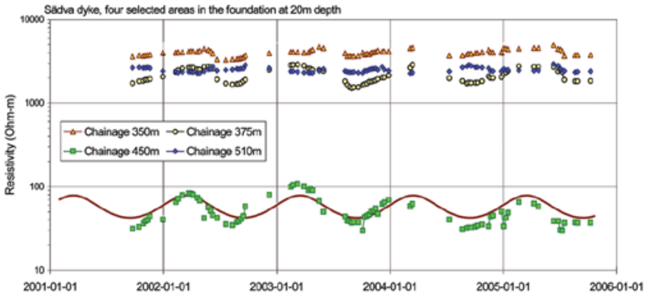


Figure 3 shows temporal and spatial variations in resistivity interpreted from data collected using a long-term monitoring array of electrodes installed along the crest of a dam in Sweden. Values of resistivity at a depth of 20 meters below the crest have been interpreted from the raw data measured from the array at four stations along the dam crest. The lower resistivity and higher variation evident in the profile at location (chainage) 450 meters indicates the presence of an eroded zone.

Seismic methods

Common seismic techniques include refraction, reflection, downhole, and cross-hole methods. With all these techniques, the time required for seismic energy to propagate from its source to a receiver is measured. If the length of the travel path is known, the velocity of the seismic energy can be derived. The seismic velocity can be used to garner information about soil stiffness and density. In dam seepage applications, internal erosion can cause low-stress conditions, which can manifest as zones of low seismic velocity.

Cross-hole seismic tomography has been used to better define the configuration of sinkholes at WAC Bennett Dam in northern British Columbia. Results suggested that a through-dam seismic configuration not requiring drill holes also might be capable of detecting sinkholes and/or zones of internal erosion. This procedure makes use of the geometry of the dam to image conditions beneath the crest by propagating seismic waves from the upstream to the downstream slope, or vice versa.

Two types of body waves can propagate through a medium. Compressional or P-waves relate to changes in the volume of a medium. Shear or S-waves relate to the distortional changes of a medium. (Surface waves, such as Rayleigh and Love waves, exist in an elastic half-space but are less commonly exploited for geotechnical purposes.)

Generally, shorter wavelength sources provide better resolution, thus S-waves are preferred for geotechnical applications. However, S-waves tend to attenuate more rapidly than P-waves, and it is more difficult to generate high-energy S-waves. Seismic vibrator sources (e.g. Vibroseis) have been shown to generate and propagate S-wave energy across distances of more than 120 meters in a zoned earthfill dam.

Interpretation of through-dam data can range from simple to complex. In the common station gather approach, the travel path is assumed to be a straight line between source and receiver. The simplicity of this interpretation is at the cost of resolution, and only the average velocity between the source and receiver is obtained. For repeat testing or ongoing monitoring, this may be sufficient to detect a change in condition. If a change is detected, more sophisticated data interpretation and more comprehensive field testing could be initiated.

The seismic velocities measured from the field testing can be used to infer density, stress, and saturation conditions.[7] It is interesting to note that P-waves should not have been capable of detecting the sinkholes at WAC Bennett Dam due to their longer wavelength. However, P-wave testing clearly detected an anomaly, which was interpreted and confirmed as a zone of lower stress surrounding the sinkholes.

Considerations

Geophysical methods are useful as non-destructive remote sensing tools that can provide information over large volumes as compared to point measurements. However, the anomalies of interest that are associated with internal erosion in embankment dams often are very small. The effectiveness of geophysical techniques to detect changes in seepage conditions is improved through repeating surveys or adopting a long-term monitoring approach. In addition, application of more than one geophysical technique will provide added confidence in the interpretation and detection of anomalous features.

The CEATI study showed that complex inter-relationships exist between various parameters such as water content, porosity, total dissolved solids, mineralogy, temperature, electrical resistivity, coupling coefficient, and SP.[8] Not recognizing some of the fundamental relationships and carrying out a one-time survey without supporting information could lead to misleading and often disappointing results.

Geophysical techniques applied to the detection of seepage and internal erosion in embankment dams are at various stages of development. Temperature appears to be one of the most-developed and best-understood techniques. With the recent advances in improved accuracy and resolution in measuring temperatures along fiber optic cables, there are exciting possibilities.

For dam safety applications, SP and resistivity methods generally appear to hold more promise than seismic methods as non-intrusive techniques applied at the surface of a dam. However, in specific settings, cross-hole seismic techniques could prove indispensable.

Although the understanding of the SP and resistivity methods as applied to embankment dams has come a long way in recent years, more research is required before these techniques can enter into standard practice and be applied with confidence on a routine basis. It is imperative that the dam owner and practicing engineer recognize the limitations and the care required in planning, executing, and interpreting the results. Geophysical data interpretation is non-unique and should be constrained by incorporating all available site information and integrating the interpretation of complementary data sets. Thus, strong cooperation between the geophysicist and engineer is essential to improve the interpretation and usefulness of the results.

Notes

1. Johansson, S., and P. Sjodahl, "A Guide to Temperature Measurements for Seepage Investigation and Monitoring of Embankment Dams," T062700-0214, CEATI, Montreal, Quebec, Canada, 2009.

2. Corwin, R.F., "Self-Potential Field Data Acquisition Manual," T992700-0205B, CEATI, Montreal, Quebec, Canada, 2005.

3. Sheffer, M.R., "Laboratory Testing of the Streaming Potential Phenomenon in Soils for Application to Embankment Dam Seepage Investigations," T992700-0205B/2, CEATI, Montreal, Quebec, Canada, 2005.

4. Corwin, R.F., "Interpretation of Self-Potential Data for Dam Seepage Investigations," T992700-0205B/3, CEATI, Montreal, Quebec, Canada, 2007.

5. Dahlin, T., P. Sjodahl, and S. Johansson, "A Guide to Resistivity Investigation and Monitoring of Embankment Dams," T992700-0205B/4, CEATI, Montreal, Quebec, Canada, 2008.

6. Johansson, S., J. Friborg, T. Dahlin and P. Sjodahl, "Long-term Resistivity and Self-Potential Monitoring of Embankment Dams – Experiences from Hãllby and Sãdva Dams, Sweden," T992700-0205C, CEATI, Montreal, Quebec, Canada, 2005.

7. Gaffran, P., and M. Jeffries, "A Study of Through-Dam Seismic Testing at WAC Bennett Dam," T992700-0205E, CEATI, Montreal, Quebec, Canada, 2005.

8. Johansson, S., J. Friborg, J. Claesson, T. Dahlin, G. Hellstrom, and B. Zhou, "A Parameter Study for Internal Erosion Monitoring," T992700-0205A, CEATI, Montreal, Quebec, Canada, 2005.

CEATI's geophysical methods research

In 1999, a group of dam owners, engineers, and geophysicist from Canada, the U.S., and Europe met to evaluate the state of practice and identify research needs in the use of geophysical methods. Participants in the "Internal Diagnostics for Embankment Dams" workshop identified temperature, self-potential (SP), resistivity, and seismic techniques as having the greatest potential for identifying anomalous seepage and deteriorating conditions within embankment dams. This lead to initiation of the CEATI Dam Safety Interest Group (DSIG) research project, "Investigation of Geophysical Methods for Assessing Seepage and Internal Erosion in Embankment Dams." The project was sponsored by BC Hydro, Elforsk AB, Great Lakes Power Ltd., Hydro-Quebec, Manitoba Hydro, New Brunswick Power Generation Corp., New York Power Authority, Ontario Power Generation, and the U.S. Department of the Interior's Bureau of Reclamation.

Results of the research project are documented in nine reports.

Two computer programs also were developed for interpreting temperature and SP data.

For additional information about the CEATI Dam Safety Interest Group, participation in the group, or obtaining the geophysics reports and software, contact Chris Hayes, (1) 514-866-5370; E-mail: chris@ceatech.ca.

Ken Lum, a principal engineer at BC Hydro, is project manager for CEATI's research project. Megan Sheffer, a senior engineer at BC Hydro, is a principal investigator in the study.

This article has been evaluated and edited in accordance with reviews conducted by two or more professionals who have relevant expertise. These peer reviewers judge manuscripts for technical accuracy, usefulness, and overall importance within the hydroelectric industry.

(Hydro Review, Vol. 29, Issue 2, March 2010, http://www.hydroworld.com/articles/hr/print/volume-29/issue-2/articles/dam-safety-review.html)

GEOTECHNICAL JOURNALS

Monthly Review of Geotechnical Journals - July to August

The first article of this series, I think, was very welcomed by geotechnical community. Thus, I have prepared the 2nd article more willingly. Due to my increased attention, I have read more papers to broaden the topics, however, I have encountered so many not-good papers in the journals that I really like. I decided not to share these papers and negative comments. 20 papers are presented below.

Squeglia, N., Stacul, S., Abed, A. A., Benz, T., & Leoni, M. (2018). m-PISE: A novel numerical procedure for pile installation and soil extraction. Application to the case of Leaning Tower of Pisa. Computers and Geotechnics, 102, 206-215.

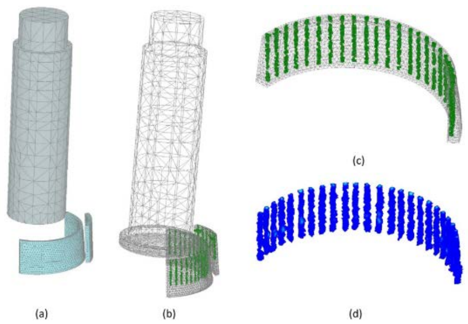
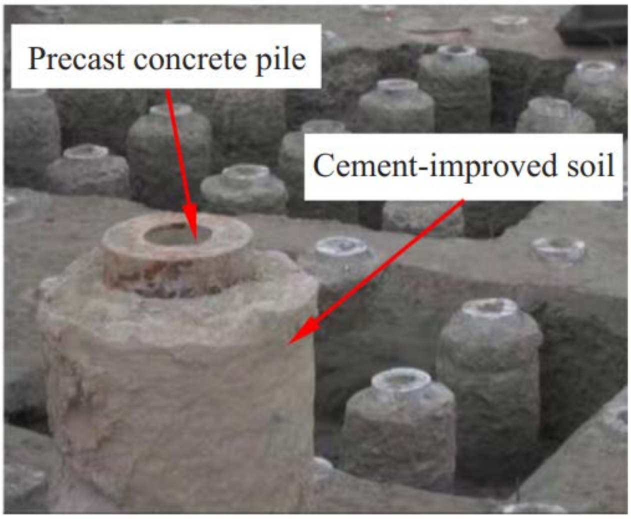


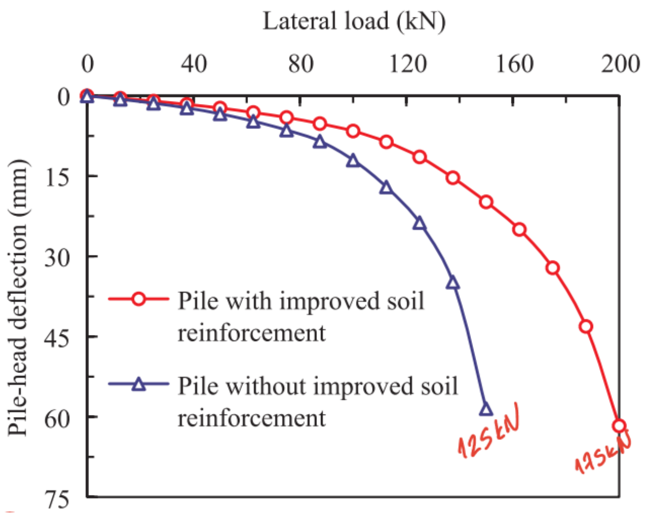
Fig. 8. Micropiles modelling: (a) Used FE cluster; (b) Micropiles location; (c) Gauss points activated for the micropiles; (d) Applied volumetric strain

The leaning tower of Pisa. Maybe one of the most analyzed case history. This paper deals with a unique approach developed specifically for Pisa Tower, but may be applied for other large deformation problems. For a case like Pisa Tower, you have around 3m deformation. So, imagine that, your construction starts at 1173 (so does your FE model) and you model micropiles at 1995. Where do you put your micropiles at the initial configuration? You have to mesh, and you have to mesh undeformed shape of the ground. Lets say you have performed an analysis and found the meshes that your micropile passes through after 3m deformation. But, what if deformations are not homogenous? So, the developed m-PISE method uses Gauss points in the FEM to overcome this issue. Instead of defining a micropile or extraction tube in undeformed shape, they choose the Gauss points at the location of micropile in deformed shape and they introduce their micropile to those points. This is such a painful process, but they overcome these issues very well.

Wang, A., Zhang, D., & Deng, Y. (2018). Lateral response of single piles in cement-improved soil: numerical and theoretical investigation. Computers and Geotechnics, 102, 164-178.



To improve lateral resistance of prestressed concrete pipe piles, these precast piles are inserted directly into freshly constructed Deep Cement Mix (DCM) columns. Authors investigate this behavior with field and numerical analyses results. To summarize their results: -Do not use elastic concrete model, use Concrete Damage Plasticity (CDP) model, or else your concrete will not crack and will behave stiffer than it is. -Lateral capacity of DCM improved pile will be 40% higher than unimproved pile. Also, 20% less bending moment and 20-30% increase in lateral soil resistance. Lastly, they combine API 2007 and Zhang 2001 p-y methods to describe p-y of DCM improved pile response. Actually, the combined API-Zhang p-y method matches really well with their numerical analyses.



Behnia, M., Shahraki, A. R., & Moradian, Z. (2018). Selecting Equivalent Strength for Intact Rocks in Heterogeneous Rock Masses. Geotechnical and Geological Engineering, 36(4), 1975-1989.

Determining UCS of heterogenous rocks is not easy. Authors describe two methods in the literature: Marions & Hoek's 2001 method and Laubscher 1977 method. They compared the results of their laboratory tests and PFC of Itasca analyses. Results show that Laubscher method gives reasonable estimates of the average UCS of heterogenous rocks. Of course, there are some issues with their models. For example, simplification of ratio of weak/stronger volume is not easy and effect of orientation and location of weak parts are not studied. In fact, their model assumes weak zone is horizontal.

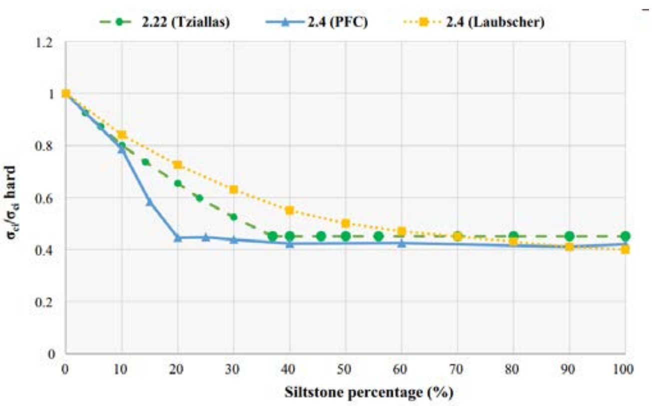
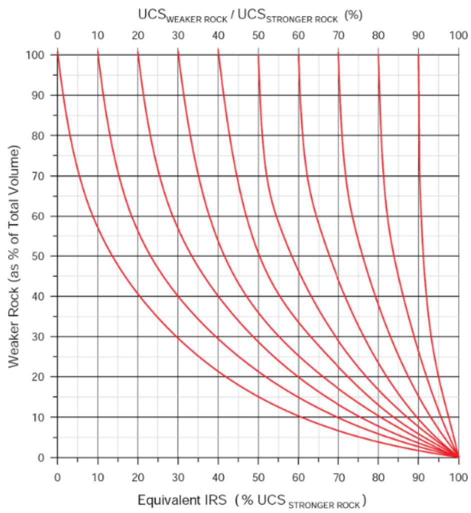


Fig. 3 Laubscher's chart: evaluating an equivalent IRS value in heterogeneous rock samples of intact rock (Laubscher 1977)

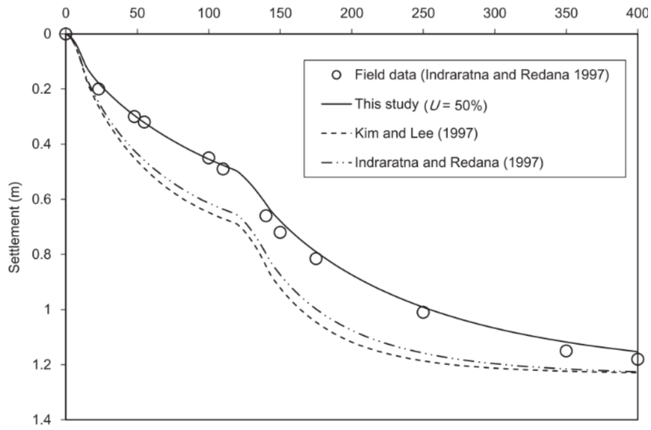


[Xu, S. Y., Kannangara, K. P. M., & Taciroglu, E. (2018). Analysis of the stress distribution across a retaining wall backfill. Computers and Geotechnics, 103, 13-25.]

This is a tough one. They built the new dice method on their previous articles that develop log-spiral-Rankine (LSR) method. Dice method is basically a meshing process for the log-spiral method, meshes called dices. They also present their flow chart for a full implementation of the process. So, if you write the code, please share it. Because their comparison with FEM results are very promising.

[Nguyen, B. P., Yun, D. H., & Kim, Y. T. (2018). An equivalent plane strain model of PVD-improved soft deposit. Computers and Geotechnics, 103, 32-42.]

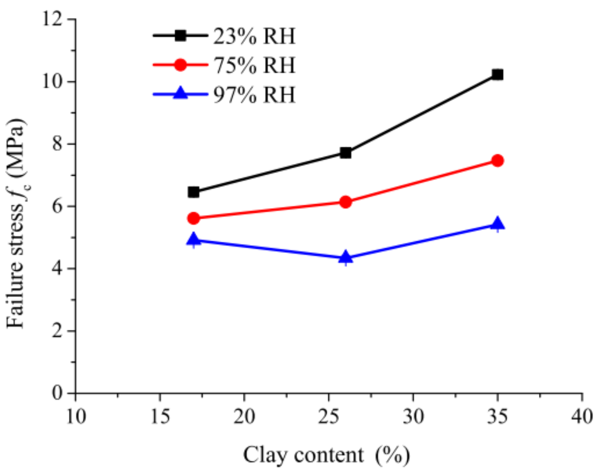
Authors have developed a 2D plain strain modeling technique for PVDs including smear effect and well resistance. Their formulas are quite simple and similar to previous formulas used for PVDs and stone columns. They have compared their results with two case histories and proposed approach yields better results than others. Due to its simplicity, application to practical projects is very easy. There are some problems with matching excess pore pressures, but authors' explanation that clogged piezometers show a residual pore pressure makes sense due to constant residual excess pore pressure.



[Dong, Y. P., Burd, H. J., & Houlsby, G. T. (2018). Finite element parametric study of the performance of a deep excavation. Soils and Foundations.]

I have read Dong's PhD thesis with great interest when it was published, it was very informative and well written. I also enjoyed authors' 2016 Geotechnique paper. However, this paper is only based on the parametric analyses of a deep excavation. As authors state in the paper, there are many other papers that deal with the same parameters, and their results do not contradict with authors' results. Parameters are operational stiffness of the retaining wall (Eoperation/Eassumed), thermal effects and shrinkage, interface effects, construction joints in diaphragm wall, stiffness and strength of soil (!). I should be fair, I would just read the paper and move on, if I didn't recognize the names. But with great names, "comes greater responsibility."

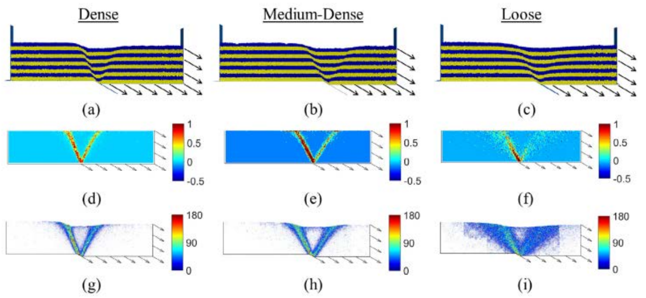
[Xu, L., Wong, K. K., Fabbri, A., Champiré, F., & Branque, D. (2018). Loading-unloading shear behavior of rammed earth upon varying clay content and relative humidity conditions. Soils and Foundations.]



(c) 600 kPa

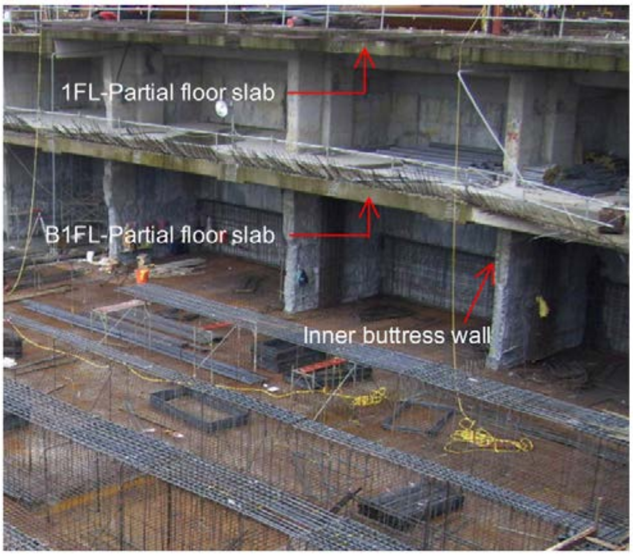
This paper investigates the effect of two parameters on the strength and stiffness of the soil mix: Relative humidity and clay content. Increasing RH, decreases matric suction, thus decreases stiffness and strength. Increasing clay content increases the strength, however, increase in strength due to clay is lower at higher RH. Authors explain this very well: Clay binds the sand particles and increases the strength, however, for a significant increase in strength, these binds should also have significant strength. But with higher RH we know that suction decreases and thus strength decreases. So, clay binds are less strong in higher RH, therefore, increasing clay content does not do much for higher RHs. There is I think one problem: Authors assumed same optimum moisture content for all clay contents. I don't have the data, but this should not be true and may affect the results. If I get an explanation from the authors, I will edit the post. Also, I will not open an another chapter, but there is another paper by Umaharathi et. al.

Garcia, F. E., & Bray, J. D. (2018). Distinct element simulations of earthquake fault rupture through materials of varying density. Soils and Foundations.

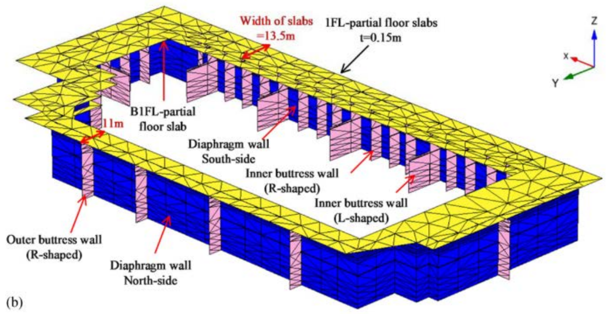


Garcia and Bray performed DEM analyses to simulate fault rupture through dense, medium dense and loose soils. Their results match with site observations. Loose soils do not allow a distinct rupture, but instead it spreads the effect. But denser soils show a clear rupture line. They also emphasize the advantages of DEM over other numerical methods for fault mechanisms.

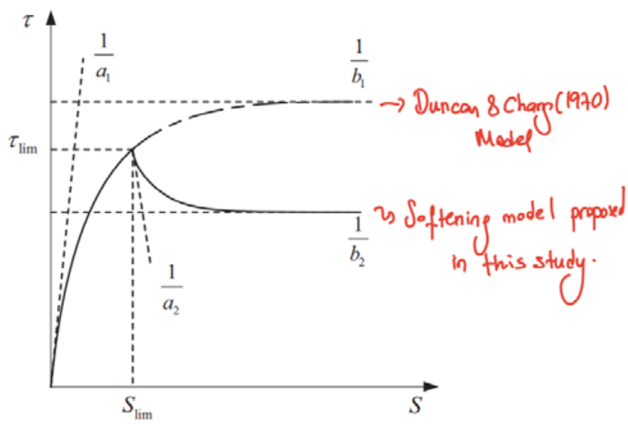
Lim, A., & Ou, C. Y. (2018). Performance and Three-Dimensional Analyses of a Wide Excavation in Soft Soil with Strut-Free Retaining System. International Journal of Geomechanics, 18(9), 05018007.



I have a special interest for Ou's works after reading his excellent book "Deep Excavation." In this study, they introduce a brave excavation design in Taiwan. 9.2m deep excavation in a soil where SPTs are still around 10 at 30m depth is supported by diaphragm wall with buttress walls and partial floor slabs. Maximum lateral displacement is cantilever shaped 0.55% * H, which is higher than most of the limits. No information on the neighboring buildings, however, 27mm vertical displacement outside the excavation is observed. Also, toe of the wall is shifted to excavation by 50% of the maximum deflection, which proves the need of jet grout or DSM support for passive resistance. They also performed 3D FEM sensitivity analyses of each component. Their strut-free BW and partial floor system reduced the displacements from the cantilever case by 82.5%. Also, buttress wall length adopted in the design was 4.8m, however, if the BW length is increased to excavation depth, wall deflections would be reduced by 30%, which would lower the displacements to below 0.4%*H. Very nice paper, I always envy the bold designs.



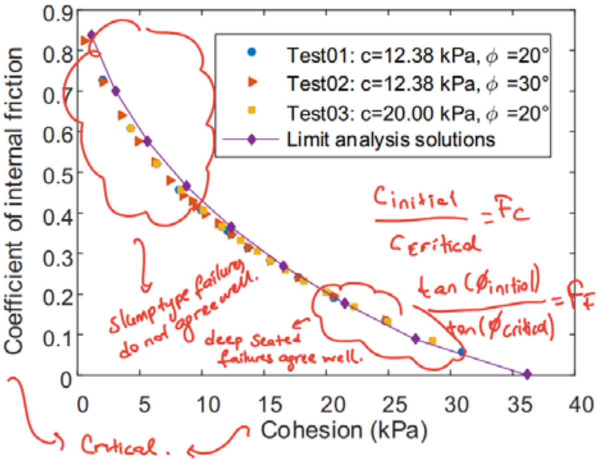
Xu, X., Wang, X., Cai, C. & Yao, W. (2018). Improved Calculation Method of Super-Long Pile in Deep Soft Soil Area. International Journal of Geomechanics, 18(10), 04018117.



Authors have improved traditional hyperbolic model by Duncan & Chang 1970 to account for softening of skin friction in upper parts of very long piles. They calculate a limit settlement based on a limit strength of pile skin friction. Below the limit settlement same hyperbolic model is used that proposed by Duncan & Chang. When the settlement exceeds this limit settlement (and as we know, settlements are higher at the upper parts of the pile, thus this softening behavior is more important for upper parts) the skin friction of the pile softens. Comparison with field tests yields very close results.

Wu, S., Xiong, L., & Zhang, S. (2018). Strength Reduction Method for Slope Stability Analysis Based on a Dual Factoring Strategy. International Journal of Geomechanics, 18(10), 04018123.

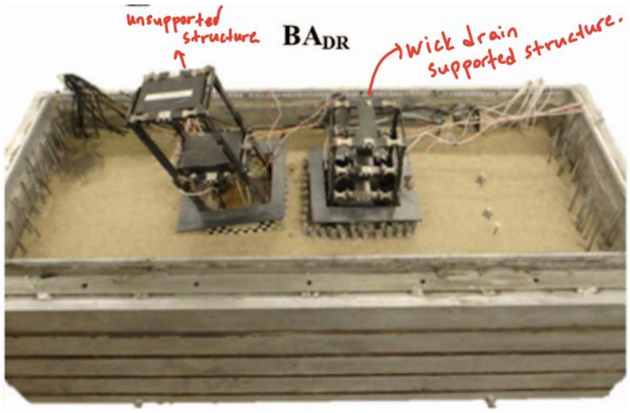
Authors have presented a nice review of Dual Factoring Strategy which is a variation of traditional strength reduction method. Unlike traditional SRM, this method uses different reduction factors for c and tan(Ø). They show that current DFS methods are still conservative for low c values that cause surface failures, but agree well with deep seated failures. However, it should be stated that comparisons are performed with LEM and associated case. We know that from Tschuchnigg et. al. (2015) that dilatancy angle greatly affects both location of the failure surface and factor of safety. Still, this paper paves the way for Dual Factoring Strategy. Anyone who deals with landslides probably feel that equal reduction of two different parameters is just mathematically easy, but I don't think this is practically valid. For example, small drained cohesions dissipate faster than friction angles.



Baziar, M.H., Rafiee, F., Lee, C. J. & Azizkandi, A. S. (2018). Effect of Superstructure on the Dynamic Response of Nonconnected Piled Raft Foundation Using Centrifuge Modeling. International Journal of Geomechanics, 18(10), 04018126.

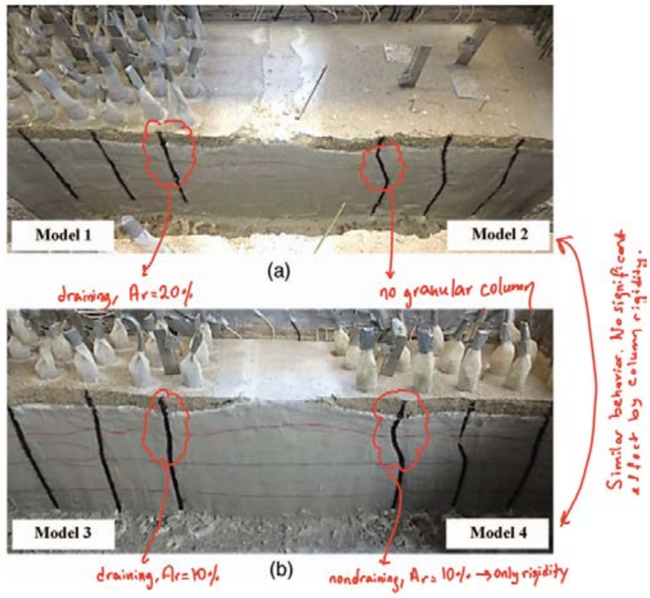
Baziar et. al. compared the different superstructure types for disconnected pile foundations using centrifuge tests under seismic conditions. They showed that effect of superstructure is not significant for disconnected pile foundations. Also, cushion layer decreased the horizontal deformations as much as connected traditional piled raft foundations without significant bending moments due to earthquake loading.

Kirkwood, P., & Dashti, S. (2018). Considerations for the Mitigation of Earthquake-Induced Soil Liquefaction in Urban Environments. Journal of Geotechnical and Geoenvironmental Engineering, 144(10), 04018069.



Kirkwood and Dashti have published two papers in JGGE. Both of them centrifuge tests. So, if you have a centrifuge, go ahead. Their first paper deals with the effects of wick drains to mitigate liquefaction and interaction with neighboring unsupported buildings. They emphasize the importance of consideration of neighboring buildings in urban environments since results may be devastating. (See the image.)

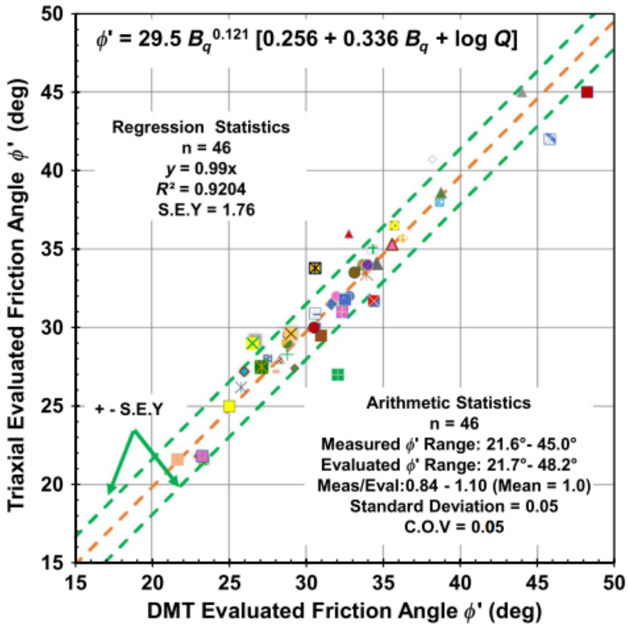
Badanagki, M., Dashti, S., & Kirkwood, P. (2018). Influence of Dense Granular Columns on the Performance of Level and Gently Sloping Liquefiable Sites. Journal of Geotechnical and Geoenvironmental Engineering, 144(9), 04018065.



Authors have presented 3 centrifuge tests that consider area ratio of 0, 10 and 20%. They also covers one of the 10% area ratio granular columns with latex to simulate only shear reinforcement. They have concluded that effect of shear reinforcement is very low comparing to drainage. Due to model conditions, they couldn't simulate the increase in soil density due to installation.

Note: Dashti and others from Colorado Boulder have presented very similar paper to their wick drain paper presented above. In the same issue. So, in JGGE's last two issues, Dashti has three papers. I will not include the third one here.

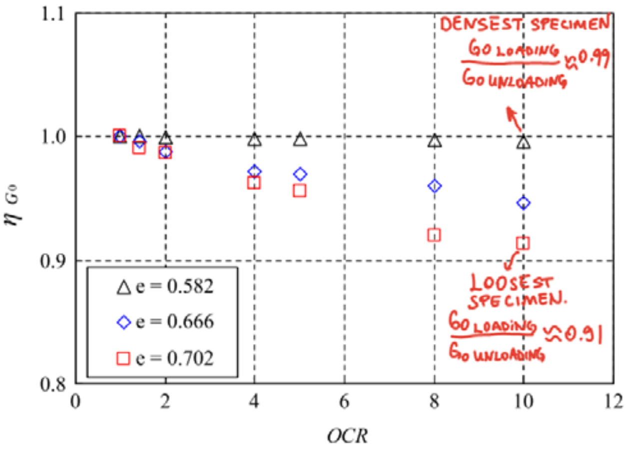
Mayne, P. W., & Ouyang, Z. (2018). Effective Stress Strength Parameters of Clays from DMT. Geotechnical Testing Journal, 41(5).

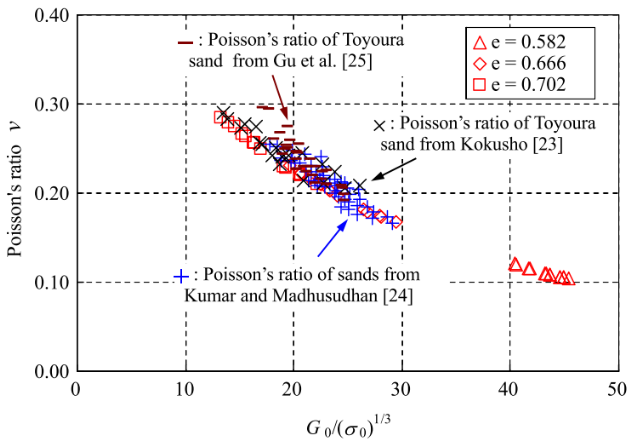


Authors have converted Norwegian Institute of Technology method to predict effective friction angle usign CPTu to DMT.

They have defined two parameters Bq and Q based on the results of DMT. Formula and comparison of the formula with their database are presented in the graph. Keep in mind, in case of a DMT data.

Gu, X., & Yang, S. (2018). Why the OCR may reduce the small strain shear stiffness of granular materials?. Acta Geotechnica, 1-6.

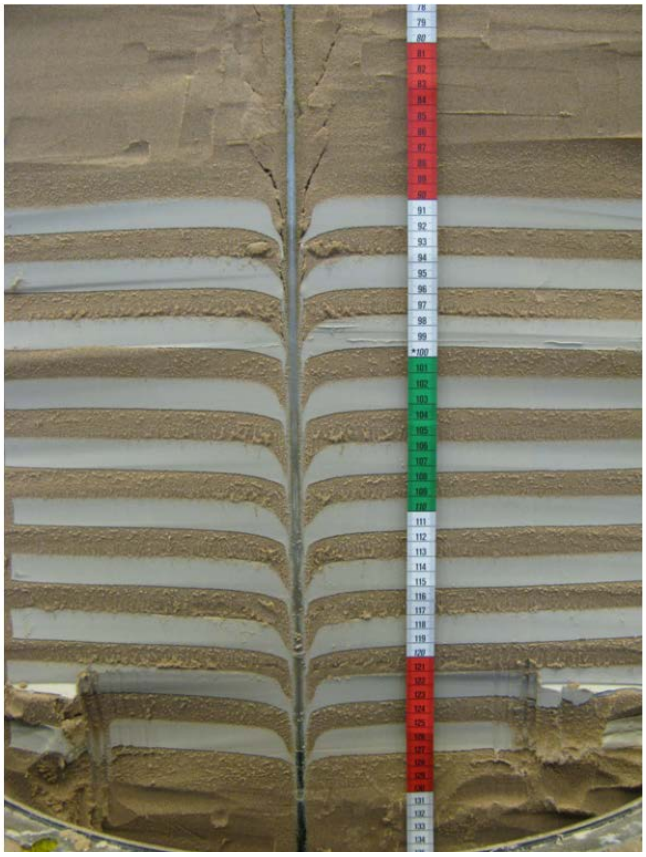




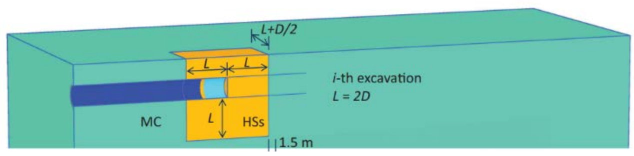
Authors, in their short paper, have used DEM to reproduce the laboratory tests that observe decreasing G0 with increasing OCR. During unloading, observed G0 is less than loading for most sands. Authors have presented their results using nG0 which is G0 during loading divided by G0 during unloading. Also, they observed that, poisson ratio decreases with increasing confining pressure instead of constant poisson ratio. They presented their result in a curve with presented laboratory test results in literature.

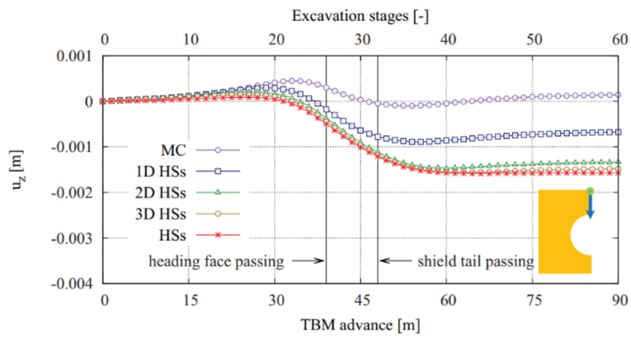
Van der Linden, T. I., De Lange, D. A., & Korff, M. (2018). Cone penetration testing in thinly inter-layered soils. Proceedings of the Institution of Civil Engineers-Geotechnical Engineering, 171(3), 215-231.

Authors have presented model experiments on CPT measurements for thin interlayers effects. One result that I have enjoyed is the increase of cone resistance before the sand layers. The reason behind this can be seen in the image. Cone, as expected, drags the thin layers with it. They also compared Dutch method and Vreugdenhil methods. They state that resistance of each layers, layer thickness and number of layers are effective in the correction. For thicker layers, corrections are smaller than 1.5 is found, but for thinner layers corrections increase significantly.



Lavasan, A. A., Zhao, C., & Schanz, T. (2018). Adaptive constitutive soil modeling concept in mechanized tunneling simulation. International Journal of Geomechanics, 18(9), 04018114.





Lavasan et. al. presented an adaptive modeling technique for tuneling simulations. They propose that as TBM advances, we can change a cuboid with 5D side length (2D+D+2D is the best solution as given in the paper. D is the tunnel diameter.) material property from MC to HSs, instead of modeling with HSs the entire model. Time saving strategy works well for given studies. However, while selecting the E, authors have chosen depth dependent MC model from 35 to 100 MPa, but constant E50=35 MPa for HSs. These models do not represent the same soil conditions. But, the technique is very effective. Authors state that axial force of the linings are strongly affected by soil model, but shear and bending are not. Also, they evaluate uncertainties too. Assuming 10% COV for MC model parameters and 20% COV for G0 and threshold shear strain, they conclude that, MC model does not sufficiently model the behavior and adaptive modeling technique can decrease the COV of the results while keeping the results close to HSs model.

Takahashi, H., Morikawa, Y., Fujii, N., & Kitazume, M. (2018). Thirty-seven-year investigation of quicklime-treated soil produced by deep mixing method. Proceedings of the Institution of Civil Engineers-Ground Improvement, 1-13.

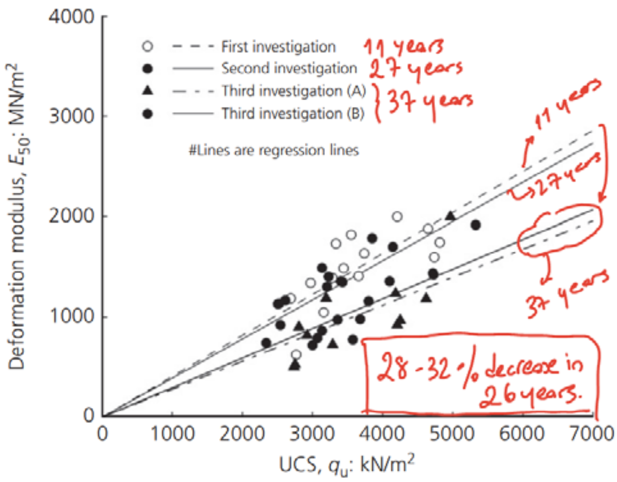


Figure 16. Deformation modulus and UCS

Researchers have presented their results on the 37 year long case study on deep soil mixing with quicklime. Shortly, their observations show that UCS remains same, but deformation modulus decreases significantly. Also, deterioration depth measured with needle penetration test (penetrometer?) and it is also increasing with time. After 37 years, mean was 28mm.

Li, Z., Soga, K., & Kechavarzi, C. (2018). Distributed fibre optic sensing of a deep excavation adjacent to pre-existing tunnels. Géotechnique Letters, 1-7.

Authors have compared distributed fibre optic sensing with inclinometers in London Clay in a real case history. Their results are quite similar with comparison to inclinometers.

(Berk Demir, July 25, 2018, https://www.linkedin.com/pulse/monthly-review-geotechnical-journals-july-august-berk-demir-1e/?published=t)

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

SOCIETY FOR EARTHQUAKE AND CIVIL ENGINEERING DYNAMICS

Seismic classification of buildings and tax breaks: The 2017 Italian guidelines, London

The need for urgent and systematic actions to reduce the seismic risk of the Italian building stock is evident from the fact that even relatively small earthquakes are able to induce significant damage. This highlights the extremely high vulnerability of Italian constructions, most of which are ancient stone or masonry structures, or have been erected in the absence of proper seismic provisions.

In order to significantly improve the scenario, huge financial resources are required. Hence, since funds to investment are limited, an evaluation of the seismic risk of Italian buildings is of paramount importance in order to quantify the required resources, to plan investments and to define prioritization strategies for the seismic risk mitigation.

In 2013 the Ministry of Infrastructures formed a work group, headed by ISI, (the Italian Society of Earthquake Engineering), with the task of defining a method for the Seismic Classification of Buildings. In 2014 the work group submitted to the Italian Minister a draft of the guidelines for a new seismic performance classification framework based on expected annual losses (EAL) which was the basis for the Seismic Risk Classification introduced in Italy in February 2017.

The Classification has a structure similar to the Energy Performance Classification of Buildings and allows to rank the buildings in 7 classes (from A to G). To stimulate the adoption of risk mitigation measures, together with the Seismic Classification, the Italian government has introduced an interesting tax deduction scheme where the amount of deductible costs is based on the level of seismic risk reduction achieved through retrofitting works. The seminar will illustrate both the Italian Seismic Classification of Buildings approach, and the tax deduction scheme that accompanies it.

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Speakers

Paolo Riva

University of Bergamo & Italian Society of Earthquake Engineering

Paolo Riva is a Professor of Structural Engineering at the Department of Engineering and Applied Sciences of the University of Bergamo, where, from 2009 to 2015 he served as Dean of Engineering. Amongst other courses, Riva teaches Seismic Design of RC and precast concrete structures. This subject is related to his research interests, which include nonlinear analysis of RC structures, seismic behaviour of RC structures with particular emphasis on the behaviour of structural walls and of precast concrete elements, and seismic retrofitting of existing structures. In these and other topics, Prof. Riva has authored and co-authored more than 250 papers in International journals and conference proceedings.

During his career, Riva coordinated and collaborated in several national and international research and design projects. Currently, since March 2016 he is a Member of CEN-TC229 'Precast Concrete Products' and Liaison of CEN TC229 to CEN TC250-SC8 'Eurocode 8: Earthquake resistance design of structures'. Since March 2017 he is Convenor of TG 'Cladding and Infill Panels' of CEN TC250-SC8.

In addition, Riva serves as Vice-President of ISI which is the Italian Society of Earthquake Engineering (ISI - Ingegneria Sismica Italiana). This role allowed him to be involved in the process for the definition of the Italian guidelines for the seismic classification of buildings that have been issued in February 2017.

Lecture / Watch online, London, 26 September 2018, 18:00 - 20:00

https://www.ice.org.uk/events?etypes=15

ΠΡΟΣΦΟΡΑ ΕΡΓΑΣΙΑΣ

DTU

Danish Technical University
Department of Civil Engineering

Από την συνάδελφο και μέλος της ΕΕΕΕΓΜ Βαρβάρα Ζαννιά λάβαμε το παρακάτω ηλ.μη.:

The Section for Geotechnics and Geology in the Department of Civil Engineering (DTU Byg) invites applications for an Assistant/Associate Professor in Geotechnical Engineering.

http://www.dtu.dk/english/About/JOB-and-CAREER/vacant-positions/job?id=1960b82b-4e7a-4567-a171-bb4fd156d190

I would be grateful if you could forward this announcement to any good eligible candidate, who would be interested in working with us at DTU.

Kind regards,

Varvara Zania
Associate Professor
DTU Civil Engineering

Technical University of Denmark
Department of Civil Engineering
Nordvej
Building 119, Room 163
2800 Kgs. Lyngby
Direct +45 45255092
vaza@byg.dtu.dk
http://www.geotechnics.byg.dtu.dk/

DTU

Assistant or Associate Professor in Geotechnics

The Department of Civil Engineering (DTU Civil Engineering) invites applications for an Assistant/Associate Professor position in the Section for Geotechnics and Geology.

DTU Civil Engineering is composed of six sections with the Section for Geotechnics and Geology focusing on geotechnical engineering and geology including infrastructure design and development of geological energy resources and raw materials.

We seek an established researcher within the broad field of geotechnics having a proven publication record and experience in collaboration with the industry.

The assistant or associate professorship is a permanent entry-level faculty position.

Research will be performed in the field of geotechnics

The section for Geotechnics and Geology is engaged in research for infrastructure projects in Denmark and Greenland, so upcoming projects can address various topics of engineering design in soils and rocks such as foundation, embankments, and permafrost related problems.

Responsibilities and tasks

The Department is looking for a flexible and enthusiastic candidate, who will take part in developing a soil mechanics research platform for collaboration with civil- and petroleum engineers, geologists and geophysicists. In particular, it is expected that the successful candidate will be able to contribute to one or more of the following fields:

- Soil mechanics
- Rock mechanics
- Geotechnical engineering

Dissemination of research results is expected through scientific publications, interdisciplinary collaborative projects at national and international level, and services to public administrations and the industry.

Furthermore, the candidate is expected to seek and achieve external funding.

Educational responsibilities include among other things classroom teaching/lecturing at both Lyngby and Ballerup Campus as well as supervision of individual or group projects, and supervision of M.Sc. students, PhD students, and postdocs.

The educational responsibilities will to the extent possible be related to the research focus area, however flexibility is required and it is expected that the candidate will be able to cover and contribute to a wide spectrum of topics within basic geotechnics on both bachelor and master level.

Please note that the expected teaching on undergraduate level is primarily to be in Danish and on postgraduate level (M.Sc. or PhD) it is required to be in English. For international candidates, DTU offers Danish language courses for the purpose of being able to teach in Danish within the first 2-3 years.

The position is based at Lyngby Campus with many teaching duties at Ballerup Campus as well as short teaching duties at Sisimiut Campus.

Administrative duties include academic assessment work on all levels.

The candidate is expected to operate within an interdisciplinary research team as well as actively collaborate with other research groups at DTU, e.g. environmental engineering, structural engineering or building energy.

THURSDAY 16 AUG 18

Apply for this job

Apply no later than 26 September 2018
Apply for the job at DTU Civil Eng by completing the following form.

https://ssl1.peoplexs.com/Peoplexs22/CandidatesPortalNoLogin/ApplicationForm.cfm?PortalID=946&VacatureID=1000215&CustomerCode=DTU1

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

Για τις παλαιότερες καταχωρήσεις περισσότερες πληροφορί-ες μπορούν να αναζητηθούν στα προηγούμενα τεύχη του «πε-ριοδικού» και στις παρατιθέμενες ιστοσελίδες.

CRETE 2018 6th International Conference on Industrial & Hazardous Waste Management, 4-7 September 2018, Chania, Crete, Greece, www.hwm-conferences.tuc.gr

Hydropower Development 2018, 5 - 6 September 2018, Zurich, Switzerland, www.wplgroup.com/aci/event/hydropower-development-europe

EUCEET 2018 - 4th International Conference on Civil Engineering Education: Challenges for the Third Millennium, 5-8 September 2018, Barcelona, Spain, http://congress.cimne.com/EUCEET2018/frontal/default.asp

SAHC 2018 11th International Conference on Structural Analysis of Historical Constructions "An interdisciplinary approach", 11-13 September 2018, Cusco, Perú http://sahc2018.com

26th European Young Geotechnical Engineers Conference, 11 - 14 September 2018, Reinischkogel, Austria, www.tugraz.at/en/institutes/ibg/events/eygec

11th International Conference on Geosynthetics (11ICG), 16 - 20 Sep 2018, Seoul, South Korea, www.11icg-seoul.org

CHALK 2018 Engineering in Chalk 2018, 17-18 September 2018, London, U.K., www.chalk2018.org

International Conference on Geotechnical Engineering and Architecture URBAN PLANNING BELOW THE GROUND LEVEL: ARCHITECTURE AND GEOTECHNICS, 19-21 September 2018, Saint Petersburg, Russia, http://tc207ssi.org

International Symposium on Energy Geotechnics SEG - 2018, 25-28 September 2018, Lausanne, Switzerland https://seg2018.epfl.ch

1st International Conference TMM_CH Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage, 10-13 October, Athens, Greece, www.tmm-ch2018.com

HYDRO 2018 - Progress through Partnerships, 15-17 October 2018, Gdansk, Poland, www.hydropower-dams.com/hydro-2018.php?c_id=88

GEC - Global Engineering Congress Turning Knowledge into Action, 22 - 26 October 2018, London, United Kingdom, www.ice.org.uk/events/global-engineering-congress

ISEV 2018 CHANGSHA The 8th International Symposium on Environmental Vibration and Transportation Geodynamics & the 2nd Young Transportation Geotechnics Engineers Meeting, October 26–28, 2018, Changsha, China, www.isev2018.cn

8th International Congress on Environmental Geotechnics "Towards a Sustainable Geoenvironment", 28 October to 01 November 2018, Hangzhou, China, www.iceg2018.org

ARMS10 - 10th Asian Rock Mechanics Symposium, ISRM Regional Symposium, 29 October - 3 November 2018, Singapore, www.arms10.org

UNSAT Oran 2018 4ème Colloque International Sols Non Saturés & Construction Durable, 30-31 October 2018, Oran, Algeria, www.unsat-dz.org

Energy and Geotechnics The First Vietnam Symposium on Advances in Offshore Engineering, 1-3 November 2018, Hanoi, Vietnam, https://vsoe2018.sciencesconf.org

ACUUS 2018 16th World Conference of Associated Research Centers for the Urban Underground Space "Integrated Underground Solutions for Compact Metropolitan Cities", 5 – 7 November 2018, Hong Kong, China, www.acuus2018.hk

ISRBT2018 International Seminar on Roads, Bridges and Tunnels - Challenges and Innovation, 9-15 November 2018, Thessaloniki, Greece, http://isrbt.civil.auth.gr

International Symposium Rock Slope Stability 2018, 13-15 November, 2018, Chambéty, France, www.c2rop.fr/symposium-rss-2018

GeoMEast 2018 International Congress and Exhibition: Sustainable Civil Infrastructures, 24 - 28 November 2018, Cairo, Egypt, www.geomeast.org

AR AUSROCK The Fourth Australasian Ground Control in Mining Conference, 28–30 November 2018, Sydney, Australia, http://ausrock.ausimm.com

Second JTC1 Workshop on Triggering and Propagation of Rapid Flow-Like Landslides, 03-05 December 2018, Hong Kong, Email: ceclarence@ust.hk

13th Australia New Zealand Conference on Geomechanics 2019, 01 ÷ 03-04-2019, Perth, Australia, http://geomechanics2019.com.au

AFRICA 2019 Water Storage and Hydropower Development for Africa, 2-4 April 2019, Windhoek, Namibia, www.hydropower-dams.com/pdfs/africa19.pdf

IICTG 2019 2nd International Intelligent Construction Technologies Group Conference "Innovate for Growth, Collaborate for Win-Win", 23-04-2019 - 25-04-2019, Beijing, China, www.iictg.org/2019-conference

WTC2019 Tunnels and Underground Cities: Engineering and Innovation meet Archaeology, Architecture and Art and ITA - AITES General Assembly and World Tunnel Congress, 3-9 May 2019, Naples, Italy, www.wtc2019.com

2019 Rock Dynamics Summit in Okinawa, 7-11 May 2019, Okinawa, Japan, www.2019rds.org

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The ***4th Joint International Symposium on Deformation Monitoring*** **(JISDM)** will be held in **Athens**, **Greece** from **15** to **17 May**, **2019**.

JISDM carries the 40 year tradition of the **FIG** and **IAG** joint symposia in the field of deformation monitoring and more recently the active sponsorship of **ISPRS**. The symposium aims to connect research in deformation measurement / techniques, analysis and interpretation with advanced practice. Bringing together leading experts from the academia, the industry and representatives from public authorities along with promising young scientists, the symposium is an excellent forum for scientific discussion and interaction.

Main Topics

The symposium welcomes contributions in all aspects of deformation monitoring in geodesy and geomatics, including but not limited to:

METHODS

Static and dynamic modeling of deformations, QC/QA and optimization techniques in deformation analysis, Photogrammetric and computer vision methods, Point cloud based spatio-temporal monitoring, Artificial intelligence and augmented reality for deformation monitoring, Innovative algorithms and data processing techniques.

SENSORS

Optical systems and total stations, GNSS-based monitoring, Laser scanning and LiDAR systems, Camera-based monitoring, Ground and spaceborne radar, Fiber-optics and geotechnical sensors.

INTEGRATION AND AUTOMATION

Sensor fusion, Geo-sensor networks, UAV and miniaturized sensors for change detection and SHM, New and low-cost sensors for deformation monitoring, Web-based smart sensing and monitoring solutions.

APPLICATIONS

Local and regional geodynamics, Deformation monitoring for construction engineering, Structural health monitoring, Vibration monitoring and dynamics, Big and tall structures monitoring, Monitoring of cultural heritage, Monitoring of geohazards, Ground settlements and landslides, Bridge and tunnel applications, Dam and mining applications, Metrology and industrial applications.

EDUCATION AND POLICIES

Educational aspects in deformation monitoring, Safety, health and environmental issues, Project management for deformation monitoring, Standardization and data exchange policies, Economic and social implications of deformation monitoring works.

Contact

ARTION Conferences & Events
Official Conference Organizer - PCO for the 4th Joint International Symposium on Deformation Monitoring (JISDM 2019)
E. info@jisdm2019.survey.ntua.gr
T. 2310257819 (Congress Line), 2310272275
W. http://jisdm2019.survey.ntua.gr

Underground Construction Prague 2019, June 3–5, 2019, Prague, Czech Republic, www.ucprague.com

VII ICEGE ROMA 2019 - International Conference on Earthquake Geotechnical Engineering, 17 - 20 June 2019, Rome, Italy, www.7icege.com

ICONHIC2019 - 2nd International Conference on Natural Hazards and Infrastructure, 23-26 June 2019, Chania, Crete Island, Greece, https://iconhic.com/2019/conference

IS-GLASGOW 2019 - 7th International Symposium on Deformation Characteristics of Geomaterials, 26 - 28 June 2019, Glasgow, Scotland, UK, https://is-glasgow2019.org.uk

cmn 2019 -Congress on Numerical Methods in Engineering, July 1 - 3, 2019, Guimarães, Portugal, www.cmn2019.pt

The 17th European Conference on Soil Mechanics and Geotechnical Engineering, 1st - 6th September 2019, Reykjavik Iceland, www.ecsmge-2019.com

3rd International Conference "Challenges in Geotechnical Engineering" CGE-2019, 10-09-2019 - 13-09-2019, Zielona Gora, Poland, www.cgeconf.com

14th ISRM International Congress, 13-18 September 2019, Iguassu Falls, Brazil, www.isrm2019.com

3rd ICTITG International Conference on Information Technology in Geo-Engineering, Sep. 29-02 Oct., 2019, Guimarães, Portugal, www.3rd-icitg2019.civil.uminho.pt

11th ICOLD European Club Symposium, 2 - 4 October 2019, Chania Crete – Greece, www.eurcold2019.com

4ο Πανελλήνιο Συνέδριο Αντισεισμικής Μηχανικής και Τεχνικής Σεισμολογίας *20 Χρόνια Μετά…*, Αθήνα, 4-6 Οκτωβρίου, 2019, www.eltam.org

XVII African Regional Conference on Soil Mechanics and Geotechnical Engineering
07-10 October 2019, Cape Town, South Africa

The South African Institution of Civil Engineering cordially invites all our colleagues from Africa and beyond to attend the 17th African Regional Conference on Soil Mechanics and Geotechnical Engineering.

Hosted in one of the continent's most iconic cities, this conference will serve practitioners, academics and students of all geotechnical backgrounds. The conference will take place at the Cape Town International Convention Centre (CTICC) offering world class conferencing facilities in the heart of South Africa's mother city and will offer extensive opportunities for Technical Committee Meetings, Workshops, Seminars, Exhibitions and Sponsorships. Exciting Technical Visits, including tours to the famous Robben Island, await.

The 7th African Young Geotechnical Engineers' Conference (8 – 10 October 2019) will commence on 8 October 2019, the day following the African Regional Conference (ARC) opening. The conference venue will be shared with the ARC delegates to initiate dialogue between junior and senior engineers while young geotechnical engineers acquaint themselves with the industry standards, new geotechnical developments and resources available to further their careers. The YGE conference provides an approachable audience within a vibrant environment where young presenters under the age of 35 are encouraged to exercise their presentation and technical writing skills on a continental platform.

Organiser: SAICE
Contact person: Dr Denis Kalumba
Email: denis.kalumba@uct.ac.za

☙ ❧

XVI Asian Regional Conference on Soil Mechanics and Geotechnical Engineering, 21 - 25 October 2019, Taipei, China www.16arc.org

XVI Panamerican Conference on Soil Mechanics and Geotechnical Engineering, 18-22 November 2019, Cancun, Quintana Roo, Mexico, http://panamerican2019mexico.com/panamerican

☙ ❧

YSRM2019 - The 5th ISRM Young Scholars' Symposium on Rock Mechanics
and
REIF2019 - International Symposium on Rock Engineering for Innovative Future

Future Initiative for Rock Mechanics and Rock Engineering
– Collaboration between Young and Skilled Researchers/Engineers –
1-4 December 2019, Okinawa, Japan
www.ec-pro.co.jp/ysrm2019/index.html

On behalf of the Japanese Society for Rock Mechanics, we are pleased to hold "YSRM 2019: The 5th ISRM Young Scholars' Symposium on Rock Mechanics & REIF 2019: International Symposium on Rock Engineering for Innovative Future". The purpose of this symposium is to promote the exchange of newly invented technology among young and skilled researchers/engineers and to aid in the passing on of this technology and future developments to the younger generations. Today, the problems to be solved in rock mechanics and rock engineering are very complicated and globalized. Thus, researchers and engineers with a variety of experiences and different expertise need to address the problems in a cooperative environment. In addition, the applications of new technologies, such as AI, ICT, and IoT, are also highly anticipated in the field of rock mechanics and rock engineering. In view of these goals, international interaction between the younger generations and more experienced generations should be very meaningful. The themes of this symposium include innovative technology, conventional and unconventional energy, construction design, environmental issues, disaster management, and earth sciences. We hope that many young and skilled researchers/engineers will attend this symposium from all over the world, participate in deeply meaningful discussions, and create new global research connections.

Topics

Innovative Technologies

AI, ICT, IoT, Computational Methods, Exploration Methods, etc.

Conventional and Unconventional Energy

Engineering of Oil, Natural Gas, Geothermal and other Mining Resources, etc.

Investigation and Testing, Design, Construction, Measurements and Maintenances

Site Characterization, Tunnels and Underground Spaces, Dam Foundations,
Field Measurements, Back Analysis, Maintenance, etc.

Environmental Issues

Global Warming, Carbon Dioxide Capture and Storage, Radioactive Waste Disposal, THMC Coupling, etc.

Natural Disasters and Mitigation of Geo-hazards

Earthquakes and Rock Dynamics, Risk and Hazard Management, Disaster Mitigation, Subsidence, Slope Stability, etc.

Earth Sciences and Engineering Geology

Seismology, Volcanology, Rock Properties, Geophysical Prospecting, Remote Sensing, etc.

Secretariat Office

Hideaki YASUHARA, Ehime University

Registration Office

c/o EC PRO Inc.
ysrm2019@ec-pro.co.jp
Tel. +81-11-299-5910

☙ ❧

14th Baltic Sea Geotechnical Conference 2020
25 ÷ 27 May 2020, Helsinki, Finland

Organiser: Finnish Geotechnical Society
Contact person: Leena Korkiala-Tanttu
Email: leena.korkiala-tanttu@aalto.fi
Website: http://www.ril.fi/en/events/bsgc-2020.html
Email: ville.raassakka@ril.fi

☙ ❧

Nordic Geotechnical Meeting
27-29 May 2020, Helsinki, Finland

Contact person: Prof. Leena Korkiala-Tanttu
Address: SGY-Finnish Geotechnical Society,
Phone: +358-(0)50 312 4775
Email: leena.korkiala-tanttu@aalto.fi

EUROCK 2020
Hard Rock Excavation and Support
June 2020, Trondheim, Norway

Contact Person: Henki Ødegaard, henki.oedegaard@multi-consult.no

Geotechnical Aspects of Underground Construction in Soft Ground
29 June to 01 July 2020, Cambridge, United Kingdom

Organiser: University of Cambridge
Contact person: Dr Mohammed Elshafie
Address: Laing O'Rourke Centre, Department of Engineering, Cambridge University
Phone: +44(0) 1223 332780
Email: me254@cam.ac.uk

16th International Conference of the International Association for Computer Methods and Advances in Geomechanics – IACMAG
29-06-2020 ÷ 03-07-2020, Torino, Italy

The 16th International Conference of the International Association for Computer Methods and Advances in Geomechanics (15IACMAG) will be held in Turin, Italy, 29 June - 4 July 2020. The aim of the conference is to give an up-to-date picture of the broad research field of computational geomechanics. Contributions from experts around the world will cover a wide range of research topics in geomechanics.

Pre-conference courses will also be held in Milan and Grenoble.

Contact Information

Contact person: Symposium srl
Address: via Gozzano 14
Phone: +390119211467
Email: info@symposium.it, marco.barla@polito.it

www.eurogeo7.org

We are pleased to invite you to the 7th EuroGeo conference, to be held in Warsaw, Poland in 2020. Poland is a country with more than a thousand years of recorded history and has a strong European identity. The country was first to free itself from communist domination in 1989 and is now fully democratic and a member of the European Union. Poland is a leader in infrastructure development in the region, which has resulted in many extraordinary projects. Warsaw, with its central location, is an ideal base for exploring the country. Today, the city is a dynamic cultural and business centre, with strong links not only to Western Europe but also to the East. PSG-IGS, a Polish Chapter of IGS is young but thriving organization successfully cooperating with several chapters within Central Europe. It is an honour to host such a prestigious conference in Warsaw and we sincerely believe that the sessions will prove to be a success. Come to Warsaw, bring your family and enjoy your stay in our capital and help us to make this Conference not only scientifically profitable but also an unforgettable event.

Contact: eurogeo7inpoland@gmail.com

6th International Conference on Geotechnical and Geophysical Site Characterization
07-09-2020 ÷ 11-09-2020, Budapest, Hungary
www.isc6-budapest.com

Organizer: Hungarian Geotechnical Society
Contact person: Tamas Huszak
Address: Muegyetem rkp. 3.
Phone: 0036303239406
Email: huszak@mail.bme.hu
Website: http://www.isc6-budapest.com
Email: info@isc6-budapest.com

5TH World Landslide Forum Implementation and Monitoring the USDR-ICL Sendai Partnerships 2015-2015, 2-6 November 2020, Kyoto, Japan, http://wlf5.iplhq.org

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Istanbul building in spectacular collapse after heavy rains

Στο προηγούμενο τεύχος παρουσιάσαμε άρθρο και video από την κατάρρευση κτιρίου στην Κωνσταντινούπολη. Στην παρακάτω ανάρτηση στο LinkedIn βλέπουμε το τι προηγήθηκε της κατάρρευσης του κτιρίου, καθώς και τις σχετικές απόψεις του τούρκου μηχανικού Sertan Uzun, Internal Auditor at BOTAŞ:

No footing, deep excavation exceeding base of the retaining wall, poor supports, poor anchorage... It could be described as "Poor Engineering", if there were one single correct application. This is "No Engineering". For the ones who do not know this incident: The building seen on the left collapsed yesterday, in Istanbul; within hours after this footage was taken. No casualties, fortunately.

Είναι χαρακτηριστικοί οι ήχοι της θραύσης των αγκυρίων, λίγο πριν από την εκτόξευση των κεφαλών τους, καθώς, βέβαια, και αυτοί της θραύσης των αντηρίδων.

(2 Αυγούστου 2018, https://www.linkedin.com/feed/update/activity:6427780315623882752/)

☙ ❧

Sinkholes & Collapsing Roads, They Can Strike At Any Time!

Crazy footage of collapsing roads and huge sinkholes. You wouldn't want to caught out by any of these!

7 Ιουλ 2018,
https://www.youtube.com/watch?v=9pQycZiRBv0

☙ ❧

World's Most DANGEROUS and Dramatic Sinkholes!

Here is a list of the deepest and scariest sinkholes in the world! These terrifying and strange pits are absolutely mysterious and seemingly created out of nowhere. Check out the Great Blue Hole, Dragon Hole, Siberian Holes, Heavenly Pit, Agrico Gypsum stack and more!

10 Σεπ 2016,
https://www.youtube.com/watch?v=9pQycZiRBv0

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Εφιαλτική προειδοποίηση για φονικό σεισμό στην Κωνσταντινούπολη

Για **ισχυρό σεισμό** στην **Κωνσταντινούπολη**, που **μπορεί να στοιχίσει τη ζωή ως και 30.000 ανθρώπων,** προειδοποιεί ο επικεφαλής της Αρχής Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών της Τουρκίας (AFAD), Μουράτ Νουρλού.

«**Το σενάριό μας λέει ότι το βόρειο ρήγμα της Ανατολίας, στη Θάλασσα του Μαρμαρά, μπορεί να δώσει έναν σεισμό μεγέθους 7,5 Ρίχτερ, προκαλώντας το θάνατο 26.000-30.000 ανθρώπων**», προειδοποίησε ο Νουρλού, σύμφωνα με δημοσίευμα της εφημερίδας **Hurriyet**, υπενθυμίζοντας πως η Τουρκία είναι μία από τις πιο σεισμικές περιοχές του πλανήτη.

Η **εφιαλτική πρόβλεψη** του Νουρλού διατυπώθηκε σε ημερίδα που διοργάνωσε η Αρχή Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών της Τουρκίας σε συνεργασία με τον δήμο Κωνσταντινούπολης, στη διάρκεια της οποίας έγινε γνωστό πως η AFAD επεξεργάζεται **σχέδιο έκτακτης ανάγκης για την περίπτωση σεισμού στην τουρκική μεγαλούπολη.**

«Το κλειδί στη διαχείριση μιας καταστροφής και μιας κρίσης, είναι να είσαι προετοιμασμένος για τα χειρότερα. **Με βάση το σενάριό μας για την Κωνσταντινούπολη, σε έναν πιθανό σεισμό, ως και 60.000 άνθρωποι μπορεί να τραυματιστούν σοβαρά. Περίπου 44.802 κτήρια θα υποστούν ζημιές, ενώ 2,4 εκατομμύρια άνθρωποι θα μείνουν χωρίς στέγη**», τόνισε ο Νουρλού, προειδοποιώντας και για το **ενδεχόμενο να σημειωθεί τσουνάμι.**

«Τα δημόσια όργανα, οι δήμοι και η Αρχή Διαχείρισης Εκτάκτων Αναγκών και Καταστροφών, **προετοιμαζόμαστε για έναν σεισμό** και στο πλαίσιο αυτό έχουμε σχεδιάσει ένα σύνολο 150.000 προσωρινών καταφυγίων», είπε ο ίδιος.

Εξίσου ανησυχητική ήταν και η τοποθέτηση του καθηγητή Σουκρού Ερσόι, σύμφωνα με τον οποίο **το χειρότερο σενάριο μιλά για σεισμό 7,7 βαθμών της κλίμακας Ρίχτερ στην περιοχή.**

«Υπάρχει μια σειρά από ρήγματα στην Τουρκία που θα μπορούσαν να δώσουν ισχυρούς σεισμούς. Όμως, επικεντρωνόμαστε στην περιοχή του Μαρμαρά, καθώς σε αυτή την περιοχή, που αποτελεί και το οικονομικό κέντρο της χώρας, υπάρχουν πολλά κτήρια, πολλοί άνθρωποι», είπε χαρακτηριστικά, εξηγώντας ότι για αυτό το λόγο **ένας σεισμός στην συγκεκριμένη περιοχή θα πρέπει να θεωρείται θέμα εθνικής ασφαλείας.**

Σημειώνεται πως το παρατηρητήριο Καντιλί του πανεπιστημίου του Βοσπόρου έχει καταγράψει **περισσότερες από 5.000 σεισμικές δονήσεις φέτος**, σύμφωνα με το τουρκικό πρακτορείο ειδήσεων Ανατολή.

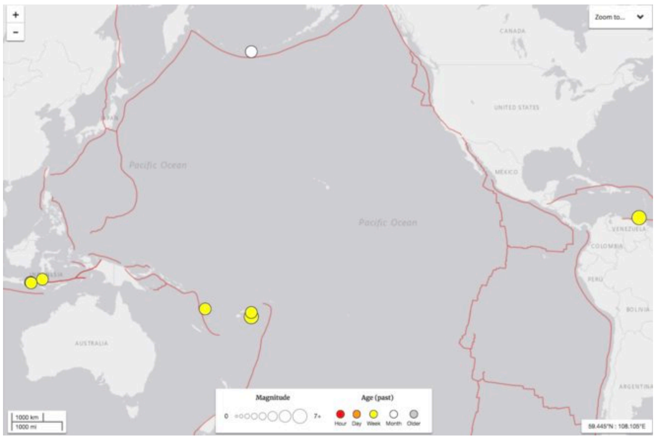
Το Παρατηρητήριο, που παρακολουθεί τη σεισμική δραστηριότητα μέσω ενός δικτύου 240 σταθμών, καταγράφει περί τους 10.000 σεισμούς στην Τουρκία κάθε χρόνο. Ενδεικτικά αναφέρεται πως **από το 1900 ως το 2017 σημειώθηκαν στην Τουρκία 10.503 σεισμικές δονήσεις πάνω από 4 Ρίχτερ.**

Υπενθυμίζεται ότι σαν σήμερα π**ριν από 19 χρόνια έγινε ο χειρότερος σεισμός στην πρόσφατη ιστορία της Τουρκίας.** Είχε μέγεθος 7,5 Ρίχτερ και επίκεντρο την περιοχή του Μαρμαρά, την πιο πυκνοκατοικημένη περιοχή της Τουρκίας και **προκάλεσε το θάνατο 17.480 ανθρώπων**. Από την ισχυρή σεισμική δόνηση, που είχε **διάρκεια 45 δευτερολέπτων**, καταστράφηκαν 285.000 κτήρια, 600.000 άνθρωποι έμειναν άστεγοι, ενώ οι κοινωνικές και οικονομικές «πληγές» που προκάλεσε χρειάστηκαν πολλά χρόνια για να επουλωθούν.

(Newsroom , CNN Greece, Παρασκευή, 17 Αυγούστου 2018, https://www.cnn.gr/news/kosmos/story/143037/efialtiki-proeidopoiisi-gia-foniko-seismo-stin-konstantinoypoli)

☙ ❧

Tons of Major Quakes Have Rattled the World Recently. Does That Mean Anything?



The Ring of Fire around the Pacific Ocean has experienced eight earthquakes that were magnitude 6.5 or greater over a period of three weeks.

This August is shaping up to be a pretty shaky month, thanks to several large earthquakes across the globe. These earthquakes have spurred reports that California is more likely to experience a catastrophic earthquake, colloquially known as "the big one," very soon. But experts say that's not how earthquakes work.

In the past three weeks, there have been eight earthquakes that were magnitude 6.5 or greater. That's 40 percent of the major quakes that have happened so far this year, according to the U.S. Geological Survey (USGS). Yesterday morning (Aug. 22), a magnitude-6.2 earthquake occurred about 170 miles (273 kilometers) off the coast of Oregon, along the Blanco Fractal Zone (separate from the San Andreas Fault in California), USGS reported**.**

But don't worry — the occurence of these earthquakes doesn't suggest that there's a higher chance now, compared with any other time, that California will experience a major earthquake.

"I have not heard of any seismologists who fear that California is about to experience 'the big one,'" said Jascha Polet, a seismologist at California State Polytechnic Universi-ty, Pomona. "In the past few days, there have been more large earthquakes (globally) than on average, but that will happen in any random distribution," Polet told Live Science in an email.

Seven of this month's eight monster shakers occurred around the Ring of Fire, or the Circum-Pacific Belt. This region is the horseshoe-shaped border of the Pacific Ocean where about 90 percent of the world's earthquakes occur, according to the USGS. California is included on the eastern side of the ring, and so far, the state has been spared significant earthquake activity in the past few months. In the past 30 days, the largest quake was a magnitude 4.5, which occurred July 25, 65 miles (105 km) off the coast of northern California.

Although there are regions, such as the Ring of Fire that are more prone to seismic activity than others, earthquakes are discrete events that occur randomly and independently of one another over time. The recent increase in seismic activity after an apparent lull is exactly what seismologists expect. "In a random distribution, there will be periods of low and high activity," Polet said.

Major earthquakes can shift the underlying stress on that particular fault, which, in turn, may change the likelihood of later quakes in the area around the fault. For instance, large earthquakes typically result in aftershocks, or smaller earthquakes in the same area of the main earthquake. "These aftershocks will decrease in size and frequency as time goes by and the fault settles in," said Kasey Aderhold, a seismologist with the Incorporated Research Institutions for Seismology, a nonprofit research organization. "The larger the earthquake, the longer it takes to settle back down to the usual background seismic activity," she said. Aderhold also explained that the largest earthquakes, like the magnitude-9.1 Tohoku earthquake off the coast of Japan will have aftershocks for years to come.

California has a history of experiencing large earthquakes, such as the magnitude-7.8 earthquake that rocked San Francisco in 1906 and the magnitude-6.9 Loma Prieta earthquake in 1989 that caused 63 deaths and thousands of injuries, according to the USGS. Because many years have passed without a major California quake, some news outlets have speculated that the chance of a devastating quake occurring in California is higher now, considering the recent increase in earthquake events around the Ring of Fire.

"We have had other large earthquakes that did not trigger the 'big one,'" Aderhold told Live Science in an email. For example, she said, "the 2004 [magnitude] 9.2 Sumatra earthquake made everywhere on Earth move by at least 1 centimeter [0.4 inches]," but there was no West Coast "big one." Aderhold also pointed to the 2011 magnitude-9.1 Tohoku earthquake off the coast of Japan and the 2017 magnitude-8.2 Chiapas, Mexico, earthquake, neither of which spurred a large earthquake in California.

According to the USGS, the southern California area experiences about 10,000 earthquakes every year, although most are so small that people don't even feel them. But this doesn't mean Californians shouldn't be prepared for more destructive earthquakes.

The USGS predicts that, within the next 30 years, the probability of at least one magnitude-6.7 or higher earthquake is 60 percent in the Los Angeles area and 72 percent in the San Francisco Bay area.

"The bottom line is that a large and potentially damaging earthquake will occur in California and other locations in the world, and communities should continue to review and improve their preparations and plans," Aderhold said. "Big earthquakes elsewhere are a good reminder."

The USGS recommends setting aside emergency supplies such as a first-aid kit, medications and a fire extinguisher. You can find the full list of items, and other helpful tips for earthquake preparedness, on the USGS website.

(Kimberly Hickok, Reference Editor / LIVESCIENCE, August 23, 2018, https://www.livescience.com/63412-california-big-quake.html?utm_source=ls-newsletter&utm_medium=email&utm_campaign=20180823-ls)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Πως λιώνουν οι τεκτονικές πλάκες κάτω από τη Σαντορίνη

Σύμφωνα με τη μελέτη, από το βάθος των 56-69 χιλιομέτρων ο μανδύας της Γης λειώνει, δημιουργώντας τήγματα που συγκεντρώνονται σε ένα προσωρινό μαγματικό θάλαμο

Χάρη σε μια σύγχρονη επιστημονική μέθοδο που χρησιμοποιήθηκε για πρώτη φορά στην Ελλάδα, Έλληνες και ξένοι γεωεπιστήμονες κατάφεραν να «φωτίσουν» τις διαδικασίες που λαμβάνουν χώρα κάτω από τη Σαντορίνη, αλλά και γενικότερα στο σημείο σύγκρουσης της αφρικανικής με την ευρασιατική τεκτονική πλάκα. Η γεωχημική τεχνική επιτρέπει να βγουν χρήσιμα συμπεράσματα για το πώς λιώνουν οι πλάκες, καθώς η πρώτη καταβυθίζεται κάτω από τη δεύτερη.

Η διεθνής ομάδα επιστημόνων, με επικεφαλής τον επίκουρο καθηγητή Ιωάννη Μπαζιώτη του Γεωπονικού Πανεπιστημίου Αθηνών, που έκανε τη σχετική δημοσίευση στο περιοδικό Lithos, εφάρμοσε την πρωτοποριακή γεωχημική μέθοδο έρευνας στα πετρώματα της Σαντορίνης.

«Σκοπός της μελέτης αυτής», όπως δήλωσε ο κ. Μπαζιώτης «ήταν να έρθουν σε επαφή δύο μεγάλοι, και συνάμα διαφορετικοί μεταξύ τους, κλάδοι της επιστήμης της Γεωλογίας. Ο κλάδος της Πετρολογίας-Γεωχημείας, μέσω της μελέτης της χημείας των πετρωμάτων, μας οδήγησε στο να απαντήσουμε ερωτήματα που απασχολούν το κλάδο της Γεωφυσικής-Σεισμολογίας».

Η Ελλάδα, μία κατ' εξοχήν σεισμογενής χώρα, οφείλει την υψηλή σεισμικότητά της κυρίως στη σύγκλιση δύο τεκτονικών πλακών, συγκεκριμένα στην υποβύθιση της Αφρικανικής τεκτονικής πλάκας κάτω από την αντίστοιχη Ευρασιατική. Γι' αυτό, όπως λέει ο Έλληνας γεωεπιστήμονας, ο οποίος προ μηνών είχε συμμετάσχει σε αποστολή της NASA στην Ανταρκτική, «η κατανόηση του μηχανισμού ενός σεισμού στην πιο ενεργή σεισμικά περιοχή της Ευρώπης συνδέεται με την κατανόηση της συμπεριφοράς της ζώνης υποβύθισης της τεκτονικής πλάκας της Αφρικής μέσω της ανάλυσης των γεωφυσικών-σεισμολογικών δεδομένων».

Όπως τόνισε στο ΑΠΕ-ΜΠΕ, «είναι εξαιρετικά σημαντικό ότι υπήρξε συμφωνία μεταξύ των εκτιμώμενων συνθηκών που υπολογίστηκαν από τα πετρολογικά-γεωχημικά μοντέλα της νέας εργασίας, με τα υφιστάμενα γεωφυσικά δεδομένα που έχουν ήδη προκύψει από τοπικές σεισμικές καταγραφές».

Η πλέον πρόσφατη μεγάλη έκρηξη της Σαντορίνης συνέβη τον 16ο ή 17ο αιώνα π.Χ. Σύμφωνα με τον κ.Μπαζιώτη, «μέλημα των επιστημόνων ήταν ανέκαθεν η αποκρυπτογράφηση της «καρδιάς» του ηφαιστείου της Σαντορίνης, αυτής της καρδιάς που στην περίπτωση του ανθρώπινου σώματος τροφοδοτεί με αίμα όλα τα ζωτικά όργανα, ενώ στην περίπτωση του ηφαιστείου τροφοδοτεί με μάγμα την επιφάνεια της γης. Που βρίσκεται όμως ο μαγματικός θάλαμος της Σαντορίνης στον οποίο αποθηκεύεται το μάγμα; Και ποιές διαδικασίες προηγούνται της συγκέντρωσης του μάγματος στο θάλαμο;»

Στα ερωτήματα αυτά επιχείρησε να απαντήσει η νέα μελέτη στην οποία συμμετείχαν ερευνητές από το Τμήμα Γεωχημείας της Υπηρεσίας της Ιαπωνίας για τις Επιστήμες της Γης και της Θάλασσας (Japan Agency for Marine-Earth Science and Technology), το Τμήμα Γεωλογικών και Πλανητικών Επιστημών του Ινστιτούτου Τεχνολογίας της Καλιφόρνια (Caltech) των ΗΠΑ και το Ινστιτούτο Ορυκτολογίας του γερμανικού Πανεπιστημίου του Μίνστερ.

Οι επιστήμονες πήραν δείγματα από τα ηφαιστειακά πετρώματα στην επιφάνεια της Σαντορίνης και τα ανέλυσαν με πλήθος τεχνικών ως προς τα θεμελιώδη συστατικά τους (ορυκτά) και τη γεωχημεία τους (κύρια στοιχεία και ιχνοστοιχεία). Στη συνέχεια, χρησιμοποιώντας -για πρώτη φορά στην Ελλάδα- ένα ειδικό γεωχημικό μοντέλο που αναπτύχθηκε από τον ιάπωνα καθηγητή Jun-Ichi Kimura, προχώρησαν σε προσομοίωση της συμπεριφοράς των κύριων στοιχείων και των ιχνοστοιχείων.

Με τον τρόπο αυτό, προέκυψε η εκτίμηση ότι η τεκτονική πλάκα της Αφρικής απελευθερώνει ρευστά από ένα βάθος περίπου 145 χιλιομέτρων. Αυτό το βάθος ταυτίζεται με εκείνο που προκύπτει από τη μελέτη των σεισμικών δεδομένων (σεισμοί ενδιάμεσου βάθους), σκιαγραφώντας έτσι την ανώτερη επιφάνεια της υποβυθιζόμενης τεκτονικής πλάκας της Αφρικής κάτω από την Ευρασιατική.

Στη συνέχεια, τα ρευστά που απελευθερώνονται από το βάθος των 145 χιλιομέτρων, ακολουθούν μία σχεδόν κατακόρυφη πορεία προς τα πάνω σε μικρότερα βάθη, φθάνοντας μέχρι το βάθος περίπου των 56-69 χιλιομέτρων. Αυτό το βάθος, το οποίο προέκυψε από τα γεωχημικά μοντέλα, βρίσκεται σε αρμονία με τη σεισμικότητα που παρατηρείται στα 70 χιλιόμετρα (το κατώτερο όριο των σεισμών μικρού βάθους) και αποδίδεται στο όριο λιθόσφαιρας-ασθενόσφαιρας.

Σύμφωνα με τη μελέτη, από το βάθος των 56-69 χιλιομέτρων ο μανδύας της Γης λειώνει, δημιουργώντας τήγματα που συγκεντρώνονται σε ένα προσωρινό μαγματικό θάλαμο. Κάποια στιγμή αυτά αρχίζουν να ανεβαίνουν σε μικρότερα βάθη και να συγκεντρώνονται στο μαγματικό θάλαμο κάτω από το ηφαίστειο της Σαντορίνης, ο οποίος βρίσκεται σε εκτιμώμενο βάθος 0,7 χιλιομέτρων, πριν τελικά αυτά εξαχθούν στην επιφάνεια κατά τη διάρκεια μιας έκρηξης του ηφαιστείου.

Ο Δρ. Μπαζιώτης τόνισε πως «με τη μελέτη μας, χρησιμοποιώντας πετρολογικά και γεωχημικά δεδομένα, συμβάλλουμε στη βαθύτερη κατανόηση της λειτουργίας της ζώνης υποβύθισης στον ελληνικό χώρο. Επιπλέον, η μεθοδολογία που ακολουθήθηκε, μπορεί να εφαρμοστεί γενικότερα σε οποιοδήποτε αντίστοιχο σύστημα ζώνης υποβύθισης και σύγκλισης τεκτονικών πλακών της Γης, με απώτερο σκοπό μία εν τω βάθει κατανόηση της δομής ενός συστήματος ζώνης υποβύθισης».

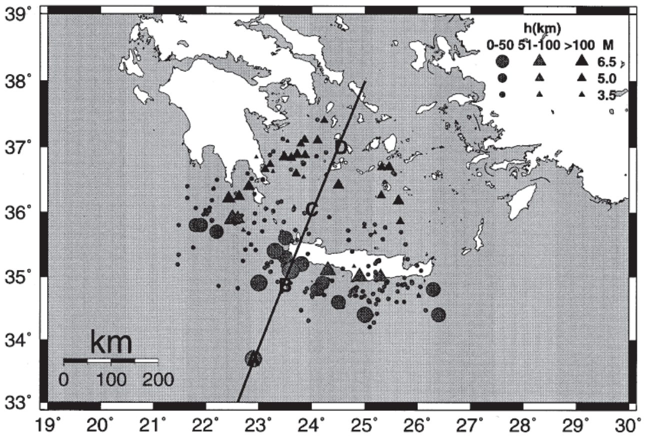
(in.gr, 8 Αυγούστου 2018, http://www.in.gr/2018/08/08/tech/pos-lionoun-oi-tektonikes-plakes-kato-apo-ti-santorini/)

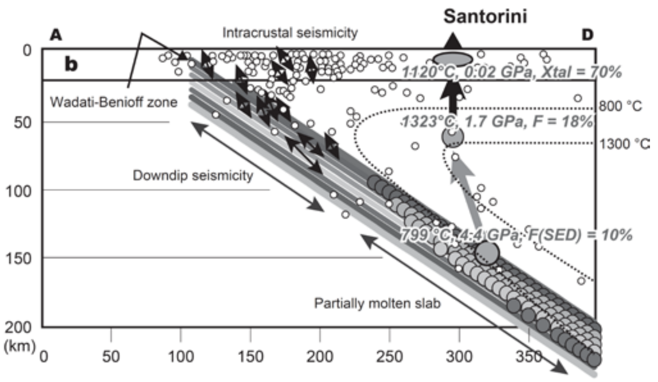
Geophysical source conditions for basaltic lava from Santorini volcano based on geochemical modeling

Ioannis Baziotis, Jun-Ichi Kimura, Avgoustos Pantazidis, Stephan Klemme, Jasper Berndt and Paul D.Asimow

Abstract

Santorini volcano sits ~145 km above the Aegean Wadati-Benioff zone, where the African plate subducts northward beneath Eurasia. There are only a few localities in the whole Aegean where basaltic lavas primitive enough to constrain mantle processes beneath the Aegean arc can be found; in this work we analyzed one such locality, a basalt lava from the southern part of Santorini. We apply a suite of petrological tools (PRIMACALC2 and ABS5) in sequence to estimate magma chamber conditions, primary magma composition, mantle melting conditions, and slab dehydration conditions. Back-calculation modeling based on major-element chemistry yields shallow magma chamber conditions of $P = 0.02$ GPa, fO_2 = QFM + 2, and ~1 wt% H_2O in the primary magma. The estimated major element composition of this primary magma then leads to estimated mantle melting conditions of 2.1 GPa, 1353 °C, and $F = 8\%$; whereas a more precise estimate derived from trace element modeling implies 1.7 GPa, 1323 °C, and $F = 18\%$. Furthermore, the trace element model implies a slab flux derived from 4.6 GPa (~150 km slab depth). The estimated slab depth, magma segregation conditions, and magma chamber depth are all consistent with seismic observations, supporting slab dehydration in the seismically imaged steep slab interval and flux melting in a relatively hot mantle wedge.





https://www.sciencedirect.com/science/article/pii/S0024493718302664

Ευχαριστούμε πολύ τον καθηγητή κ. Μπαζιώτη για την διάθεση των παραπάνω σχημάτων και ευχαρίστως παραθέτουμε στοιχεία για το εργαστήριο και την ερευνητική δραστηριότητά του, όπως ο ίδιος τα κοινοποίησε στο περιοδικό:

Στο εργαστήριο υπάρχει ο μόνος ηλεκτρονικός μικραναλυτής στην Ελλάδα. Διαθέτει 4 Wavelength Dispersive System (WDS) και 1 Energy Dispersive System (EDS). Αποτελεί ένα -υψηλής τεχνολογίας σύστημα- ποσοτικής χημικής ανάλυσης για μία πληθώρα υλικών (ορυκτά, πετρώματα, εδάφη, φυτά, σύνθετα υλικά κ.α.) που σχετίζονται με πολλαπλές εφαρμογές. Ήδη, στον ένα χρόνο λειτουργίας του οργάνου, έχουν προκύψει 10 επιστημονικές δημοσιεύσεις σε έγκριτα επιστημονικά περιοδικά, ενώ έχουν πραγματοποιηθεί και πληθώρα αναλύσεων για ιδιωτικά έργα.

Σημειώνω τα ακόλουθα:

1. Η εγκατάσταση του JEOL-JXA 8900 Superprobe το έχει καταστήσει, όχι μόνο το **μοναδικό αντίστοιχο σύστημα** Ηλεκτρονικής Μικροανάλυσης **στον Ελλαδικό** χώρο και **Βαλκανικό Χώρο**. Εργαστήρια με το ίδιο σύστημα Ηλεκτρονικής Μικροανάλυσης βρίσκονται στην Αμερική (π.χ. NASA, Cornell University, University of Alberta κ.α.) και στην Ευρώπη (π.χ. University of Frankfurt, University of Freiberg).

2. ***Πολλαπλές αναλυτικές ιδιότητες:*** Το JEOL-JXA 8900 Superprobe είναι ένα αναλυτικό όργανο το οποίο πραγματοποιεί χημικές αναλύσεις, ενσωματώνοντας τον κανόνα «πολλά-σε-ένα». Για παράδειγμα, ένα αναλυτικό όργανο όπως το Ηλεκτρονικό Μικροσκόπιο Σάρωσης, που συνήθως βρίσκεται εγκατεστημένο σε Ελληνικά Πανεπιστήμια και Ινστιτούτα μελέτης Υλικών, μπορεί να πραγματοποιήσει χαμηλής ακρίβειας χημικές αναλύσεις και να λάβει καλές φωτογραφίες της δομής, του προς μελέτη, υλικού. Με το προτεινόμενο σύστημα Ηλεκτρονικού Μικροαναλυτή, οι δύο προαναφερθείσες δυνατότητες όχι μόνο ενσωματώνονται στο ίδιο όργανο αλλά και μεγιστοποιείται η απόδοσή τους (εξαιρετικά υψηλής ακρίβειας χημικές αναλύσεις πολύ καλής ποιότητας φωτογραφίες της δομής του υλικού).

3. Συνοψίζοντας τα πλεονεκτήματα του εν λόγω οργάνου, σε σχέση με τα συστήματα ηλεκτρονικής μικροσκοπίας είναι τα εξής:

i. Επί τόπου (in-situ) χημικές αναλύσεις ακριβείας
ii. Χημικές αναλύσεις που επιτυγχάνονται σε πολύ μικρές περιοχές (διάμετρος από <1 μm έως μερικά μm) χωρίς να καταστρέφουν το υλικό (π.χ. ιατρικά υλικά, ορυκτά, πετρώματα, μέταλλα, φυτά, οστά, πίνακες ζωγραφική κ.α.)
iii. Ανάλυση πληθώρας χημικών στοιχείων από το βόριο έως το ουράνιο
iv. Υψηλή ακρίβεια
v. Επίτευξη πολύ χαμηλών ορίων ανιχνευσιμότητας (~ 50 ppm)
vi. Χάρτες χημικών στοιχείων με διακριτική ικανότητα 0,2 μm
vii. Μικρός χρόνος ολοκλήρωσης χημικής ανάλυσης (μερικά λεπτά – εξαρτάται από τις συνθήκες λειτουργίας και το πρόγραμμα μέτρησης που ακολουθεί ο εκάστοτε χρήστης).

Για πληροφορίες επικοινωνήστε με τον κ. Ιωάννη Μπαζιώτη στα τηλέφωνα 2105294155/6975967914 ή στο email: ibaziotis@aua.gr

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Satellite Finds Highest Land Skin Temperatures on Earth

David J. Mildrexler, Maosheng Zhao, and Steven W. Running

The location of the hottest spot on Earth has undoubtedly been an interesting curiosity for centuries. Even with the advent of the instrumental temperature record around the year 1850, the location of the hottest spot on Earth has continued to be the subject of debate and controversy. In 1913, the weather station at Furnace Creek in Death Valley National Park, California, measured an air temperature of 56.7°C (134.1°F) and claimed the title of "hottest place on Earth." Nine years later in El Azizia, Libya, an air temperature of 57.8°C (136°F) was recorded on land owned by an Italian farmer and the title of the "hottest place on Earth" moved from the United States to Libya. The 1922 air temperature measurement from El Azizia has never been surpassed.

In reality, finding the hottest spot on Earth based on scattered site-based air temperature measurements is a limited approach due to the poor spatial coverage of the instruments where measurements are taken compared with Earth's expansive barren deserts where the hottest conditions occur. The World Meteorological Organization (WMO) has approximately 11,119 weather stations on Earth's land surface collecting surface temperature observations (ftp://ftp.ncdc.noaa.gov/pub/data/gsod/2010). When compared to the 144.68 million km2 of land surface, that's one station every 13,012 km2. The Earth's hot deserts, such as the Sahara, the Gobi, the Sonoran, and the Lut, are climatically harsh and so remote that Satellite Finds Highest Land Skin Temperatures on Earth by Davi d J. Mildrexler, Maosheng Zhao, and Steven W. Running access for routine measurements and maintenance of a weather station is impractical. The majority of Earth's potentially hottest spots are simply not being directly measured by ground-based instruments. Satellites provide a continuous view of Earth's surface, allowing equal observation of the most remote areas and the most accessible. However, satellites do not measure the near-surface air temperature; instead they measure the radiometric surface temperature, or skin temperature, a different physical parameter.

RADIOMETRIC LAND SURFACE TEMPERATURE AND AIR TEMPERATURE. Around the same time that the Death Valley record air temperature was measured, an analysis of the temperature conditions of air and soil was conducted in the desert near Tucson, Arizona. At 1:00 p.m. LT on 21 June 1915, a maximum soil temperature of 71.5°C (160.7°F) was measured 0.4 cm below the soil surface. The corresponding air temperature measured 4 ft above the ground was 42.5°C (108.5°F). Other studies that have observed extreme maximum surface temperatures and air temperatures near the time of the observed surface temperature have found differences of even greater magnitude.

Physical considerations indicate that the most extreme maximum temperatures will occur at baresoil surfaces under full solar illumination and low wind speed, where the soil is dry and has a very low albedo and low thermal conductivity. The satellitebased land surface temperature (LST) measures the radiation emitted by the top of the land surface (i.e., radiometric LST) and can be likened to skin temperature, or the temperature a person would feel if touching the land surface. It measures directly where the highest temperatures on Earth's surface manifest, on the ground. By comparison, standard weather station air temperature is measured 1.5 m above the ground level with sensors protected from radiation and adequately ventilated. Because air is such a poor heat conductor, the radiometric LST in midsummer can be 30°–50°C higher than the air temperature. Imagine the searing heat of beach sand (i.e., LST) on a hot summer day, when standing in shade or water is the only way to avoid burning your feet, compared to the air temperature 1.5 m above the sand.

THE AQUA/MODIS INSTRUMENT AND LST DATA. As part of NASA's Earth Observing System (EOS), two MODIS instruments have been launched to provide information for global studies of atmosphere, land, and ocean processes. The first instrument was launched on 18 December 1999 on the morning platform called *Terra*, and the second was launched on 4 May 2002 on the afternoon platform called *Aqua*. The strengths of the MODIS instruments are global coverage, high geolocation accuracy, high radiometric resolution, and accurate calibration in the visible, near-infrared, and thermal bands. The MODIS LST products have been validated within 1 K at multiple validation sites in a relatively wide range of surface and atmospheric conditions. Locations where the most extreme maximum surface temperatures occur can have greater uncertainty (≈ 2 K) due to saturation of the thermal channels used to derive the surface emissivity. We use LST from the *Aqua*/MODIS sensor because it has the additional advantage of an afternoon overpass (1:30 p.m. LT each day) that retrieves LSTs close to the maximum daily temperature of the land surface.

The *Aqua*/MODIS Climate Model Grid (CMG) data used to create global maps of annual maximum LST have a spatial resolution of 0.05° (approximately 5.6 km at the equator) and is aggregated from 1-km LST data. Due to this averaging, the *Aqua*/MODIS LST is likely underestimating the most extreme maximum surface temperatures, and surface energy balance simulations indicate that conditions exist for surface temperatures between 90° and 100°C.

With an automated algorithm based on the 0.05°-resolution *Aqua*/MODIS LST data, we have been tracking the maximum LST globally and pinpointing the location of the hottest spot on Earth since 2003. The highest LST recorded at each grid cell during any 8-day period over an annual cycle is extracted and combined into one image. It is well known that the highest surface temperatures on Earth occur in bare-soil environments. Therefore, to reveal the hottest spot on Earth we focused on barren areas and sparsely vegetated open shrublands. This eliminates wildfire in vegetated areas from being mistaken for an extremely high LST, a problem that is also minimized by the integration of 1-km pixels across the CMG gridcell. Next, we selectively screened out all pixels on the global land surface below an incrementally increased threshold until, finally, only one place remained. Here we present the hottest spot on Earth annually from 2003 to 2009 (Fig. 1).

THE HOTTEST SPOT ON EARTH. The Lut Desert, located in southeast Iran, has long been regarded as one of the hottest places on Earth. Numerous studies have examined the relationship between the expression of severe thermal temperature across this hyperarid landscape and the unique natural physical characteristics of the Lut, such as the wind-sculpted megayardangs and the vast areas of closely packed rock fragments known as desert pavement. The Lut Desert was determined to be the hottest spot on Earth in two of three years previously evaluated with the *Aqua*/MODIS satellite LST data.

Here we found that the Lut Desert had the highest surface temperature on Earth in 2004 (68.0°C; 154.4°F), 2005 (70.7°C; 159.3°F), 2006 (68.5°C; 155.3°F), 2007 (69.0°C; 156.2°F), and 2009 (68.6°C; 155.5°F)—five of the seven years analyzed in this study. The Lut is the only place on

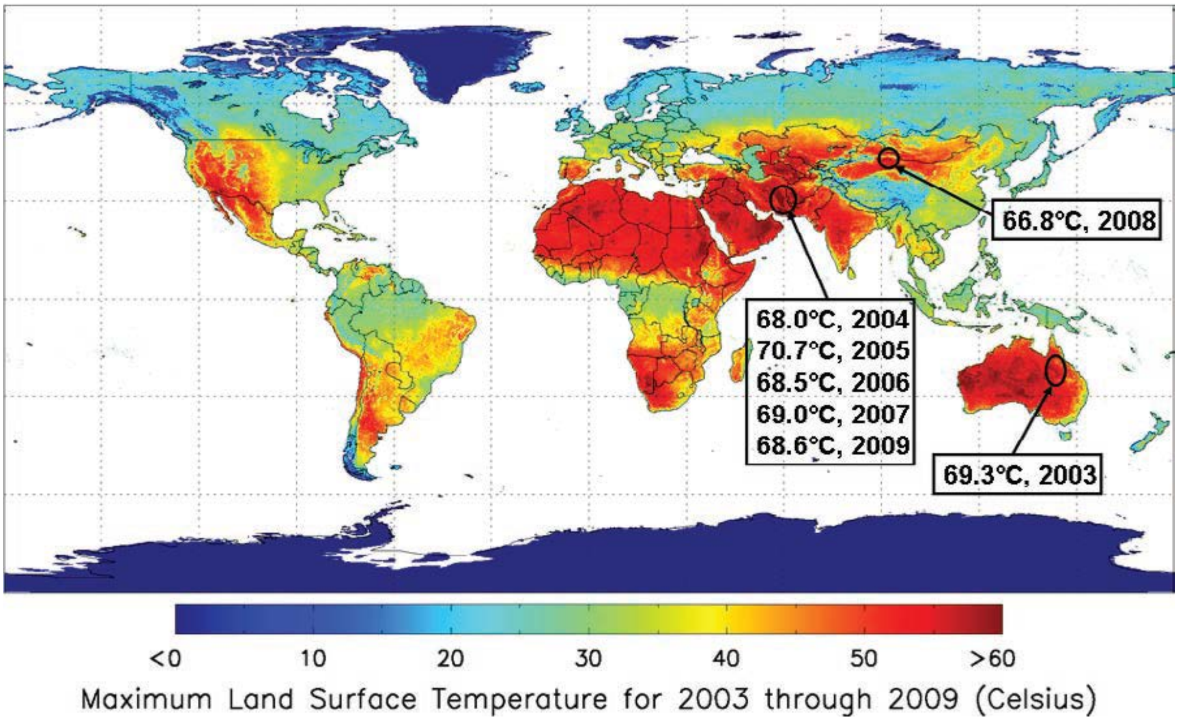


Fig. 1. Global maps of annual maximum LST based on high-resolution satellite data provide a powerful tool for continuously monitoring the most extreme LSTs. The highest LSTs (in red) are found in Earth's deserts. Grasslands, shrublands, and savannas (in orange and yellow) transition into the cooler LSTs of forests (in green and light blue). Dark blue areas are predominantly covered with year-round ice and include some high-elevation mountain ranges.

Earth to have a surface temperature above 70°C (158°F), and it regularly has the largest contiguous area of surface temperatures above 65°C of anywhere on Earth (Fig. 2). For comparison, the highest LST measured at the pixel corresponding to the location of the Furnace Creek weather station in Death Valley from 2003 to 2009 was 62.7°C (144.9°F) in 2005, 8°C cooler than the Lut Desert (70.7°C).

In 2003, a scorching temperature of 69.3°C (156.7°F), the second highest temperature of the 7-yr dataset, was detected in the province of Queensland, Australia. Australia is the driest inhabited continent on Earth, with vast arid lands where annual maximum LSTs routinely exceed 60°C. Since 1995, a large region of Australia has been gripped by the most severe drought in living memory, the so-called "Big Dry." In 2002 and 2003, the drought conditions were especially severe due to the 2002 El Nino–Southern Oscillation (ENSO). Record-low rainfall coupled with high evaporation rates due to widespread maximum temperature anomalies resulted in extreme conditions in southeast and northeast Australia, including the highest LST on Earth.

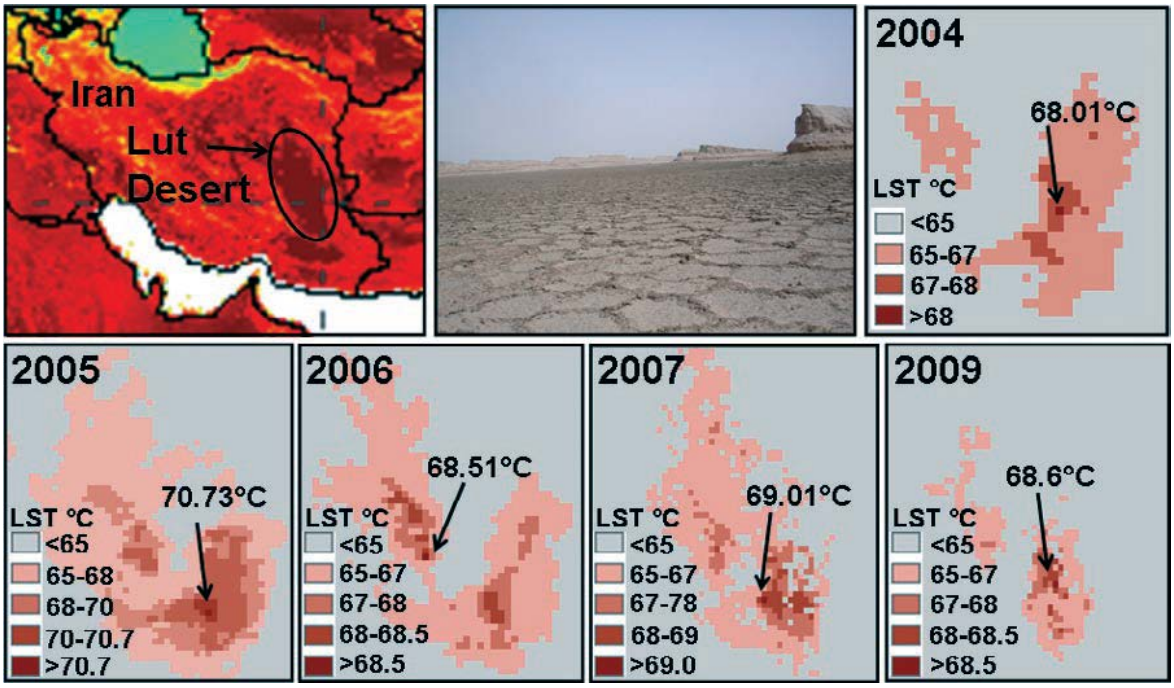


Fig. 2. The Lut Desert has an areal extent of about 80,000 km2 and contains several geomorphic distinctions, such as the highest megayardangs on Earth. Large areas of the Lut Desert regularly exceed 65.0°C, and the hottest spot on Earth was detected in the Lut five out of seven years. (Photograph by Jafar Sabouri.)

In 2008, the highest LST on Earth of 66.8°C (152.2°F) was recorded in the Turpan Basin of the Xinjiang Uygur Autonomous Region of northwest China. Flaming Mountain, a series of stone peaks that stretches approximately 100 km across the Turpan Basin and is dominated by dark red sandstone that heats up to extremely high temperatures in the midafternoon sun, has long been regarded as the hottest place in China. At midday in the summer, as the blazing hot air currents rise off the mountain, Flaming Mountain is said to look like a huge flying red dragon setting off fires.

A century ago, few could have imagined that the location of the hottest spot on Earth varied between different continents over a relatively short time period. This analysis shows just that, indicating that in addition to site physical characteristics, climatic variations play a role in where the hottest spot on Earth will be in a given year.

GLOBAL DISTRIBUTION OF ANNUAL MAXIMUM COMPOSITE LST. Annual maximum LST is directly related to vegetation density, and changes in surface temperature resulting from land-cover changes comprise an important aspect of climate change that needs to be better quantified. Spatially continuous global maps of annual maximum LST provide the means to visually assess the patterns of the highest temperatures across both large-scale natural vegetation density gradients—such as the transition from the tropical rain forests of the Congo to the Sahara Desert—and relatively small-scale landcover changes due to irrigation in a semiarid desert. Annual histograms of the maximum LST for each 0.05° pixel illustrate their distribution and frequency across the global land area (Fig. 3). Based on seven years of data, the histograms show low interannual variability and display a trimodal distribution with three distinct spikes. The maximum LST spike between 50° and 60°C represents Earth's hot deserts. These barren or sparsely vegetated areas routinely have high LSTs in midsummer. The central spike, ranging between 20° and 35°C, is primarily due to forests, and highlights their important role in regulating maximum LST across Earth's surface through transpirational cooling. The lowest temperature spike, between -30° and 0°C, represents Earth's ice-covered polar regions. Savannas and grasslands tend to occupy the 35°–50°C range, with grasslands exceeding 50°C in very arid areas. Agricultural areas such as croplands occupy a broad maximum LST range (~25°–50°C) due to sustained direct human interaction.

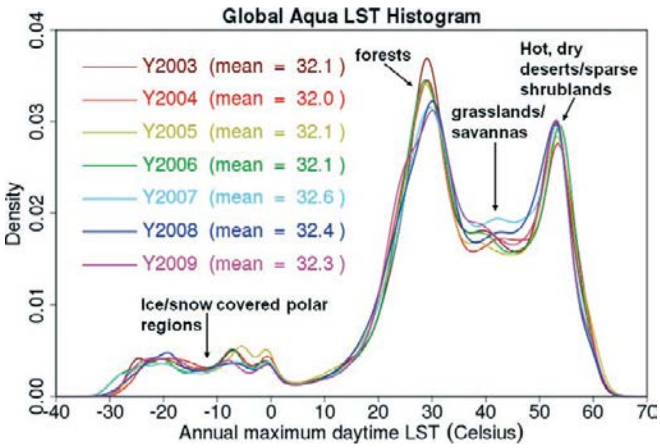


Fig. 3. Histograms of global annual maximum LST capture the unique influence of different land-cover types on the expression of maximum LST (1°C interval; multiply density by 100 to get percent of global land area). Tracking shifts in the distribution of these annual histograms over decades could provide a new integrated measure of energy balance components and land-cover change, and a different means to monitor biospheric change.

The cryosphere is undergoing ignificant transformations due to climate change, but large uncertainties remain in part due to the limited monitoring of the large ice mass by surface-based measurements. Tracking the annual maximum LST histogram for ice-covered regions might provide a new way to detect large-scale ice-warming trends. With continuous spatial coverage, maximum LST has the additional advantage of occurring in clear-sky conditions, whereas minimum LST occurs in the winter, when cloud cover is common. Skin temperature cannot be observed in cloudy conditions, making a continuous global map of minimum LST unreliable. Ice surface emissivities have higher uncertainties than areas covered by vegetation, but smaller than some areas of bare soils (Zhengming Wan, personal communication, 19 January 2007). In Antarctica, the highest annual LSTs are incredibly cold (-30°–0°C). For comparison, the highest air temperature ever recorded at the Vostok Research Station in Antarctica is -12.2°C on 11 January 2002. As ice sheets are exposed to warmer conditions, pools of water accumulate on the surface, and retreating ice exposes bare ground. These changes result in a darker, less reflective surface with higher surface temperatures and, over time, commensurate shifts in the annual maximum LST histogram for ice-covered regions.

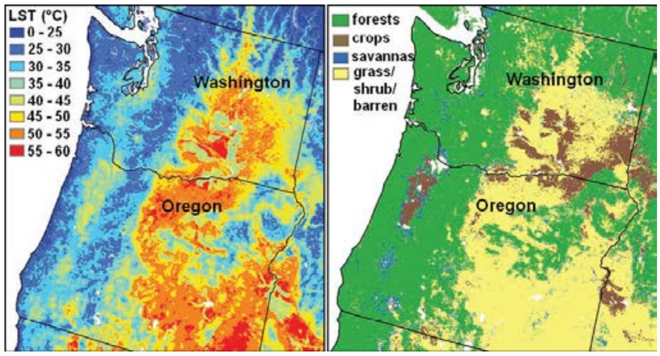


Fig. 4. The expression of annual maximum LST across the Pacific Northwest shows strong association with land-cover type, and spatially illustrates the histogram distribution shown in Fig. 3 for forests, savannas, croplands, grasslands, shrublands, and barren areas.

The expression of maximum LST and its close association with a given area's land-cover type is spatially examined across the Pacific Northwest (Fig. 4). Forests show a very close association with maximum LSTs in the 20°–35°C range on both the wet, west side of Oregon and Washington and on the relatively dry east side. Savannas tend to occupy the edge of forested areas and have a maximum LST range between 30° and 45°C. Croplands show strong association with maximum LST between 35° and 50°C. The effect of irrigation lowering the maximum LST relative to the surrounding non-irrigated native grass and shrub areas is visible in eastern Washington and Oregon. Arid grasslands, sparse shrublands, and barren areas show a strong association with maximum LSTs between 45° and 60°C. Human-induced land-use changes (e.g., deforestation, degradation of semiarid areas, clearing for agriculture, changes in the irrigated land area, afforestation, and widespread urbanization), coupled with changes in large-scale natural disturbances (e.g., wildfires, hurricanes, insect outbreaks, droughts), will alter these surface temperatures and the distribution of the annual maximum LST histogram. Long-term perturbations of the local land-surface energy balance resulting from disturbances like wildfire are clearly distinguishable from the adjacent undisturbed areas. Annual maximum composite LST data coupled with a vegetation index is now used to provide large-scale, automated disturbance mapping.

As more years of data accumulate, the dataset presented in Fig. 3 could become a new type of integrative global change measurement. The annual maximum LST histogram merges into a single metric important biophysical and biogeographical factors of the Earth system that are usually measured individually. These contributing factors can include 1) intensification of extreme maximum surface temperatures; 2) changes in land cover; 3) changes in albedo; 4) surface–atmosphere energy fluxes; 5) changes in ecosystem disturbance regimes; 6) air temperature; and 7) atmospheric aerosol concentrations. However the potential for change in each of these factors varies tremendously and unpredictably in time and space. This integrative measurement is strongly influenced by the biogeographic patterns of Earth's ecosystems, providing a unique comparative view of the planet every year such that changes in any component of the trimodal distribution are detectable. For example, changes that result in the lower tail of the distribution shifting from -30° to -20°C would indicate a major change in the cryosphere. Likewise, if we see the central spike for forests becoming progressively smaller and the spike that represents deserts becoming larger, further research could focus on determining the causality. This potentially valuable annual maximum LST metric is automated and easy to produce for continued global monitoring of the highest temperatures on Earth.

ACKNOWLEDGMENTS. This effort was sponsored by the NASA Earth Sciences Division MODIS Project (NNX08AG87A).

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(AMERICAN METEOROLOGICAL SOCIETY, July 2011, pp. 855-860, DOI:10.1175/2011BAMS3067.1)

Τα πραγματικά θύματα μιας φυσικής καταστροφής περισσότερα από τα επίσημα

Σύμφωνα με μια νέα έρευνα για τον τυφώνα «Μαρία» στο Πουέρτο Ρίκο

Τα επίσημα θύματα του τυφώνα «Μαρία», ενός τροπικού κυκλώνα που έπληξε το Πουέρτο Ρίκο στις 20 Σεπτεμβρίου 2017, είναι 64. Όμως, σύμφωνα με μια νέα αμερικανική επιστημονική έρευνα, στην πραγματικότητα τα θύματα της φυσικής καταστροφής μπορεί να φθάνουν τα 1.139.

Πού οφείλεται αυτή η τεράστια διαφορά ανάμεσα στους δύο αριθμούς; Στο ότι, όπως αναφέρουν οι ερευνητές του Πολιτειακού Πανεπιστημίου της Πενσιλβάνια και του Πανεπιστημίου του Τέξας, συνήθως σε μια φυσική καταστροφή λαμβάνονται υπόψη μόνο τα άμεσα θύματα του φαινομένου και όχι τα έμμεσα, δηλαδή όσα θα πεθάνουν το επόμενο διάστημα από αιτίες σχετικές με το συμβάν. Στην περίπτωση του συγκεκριμένου τυφώνα ως θύματα θεωρήθηκαν οι 64, των οποίων το πιστοποιητικό θανάτου ανέγραφε τον τυφώνα ως την αιτία του θανάτου.

Οι ερευνητές, με επικεφαλής τον αναπληρωτή καθηγητή Αλέξις Ραούλ Σάντος, που έκαναν τη σχετική δημοσίευση στο επιστημονικό έντυπο Journal of American Medical Association-JAMA, δήλωσαν ότι πέρα από όσους πεθαίνουν τη μέρα του περιστατικού, όπως συνέβη στον τυφώνα «Μαρία», υπάρχουν πρόσθετοι θάνατοι τους επόμενους μήνες, οι οποίοι επίσης θα πρέπει να αποδοθούν στη φυσική καταστροφή.

Μόνο έτσι, όπως δήλωσε ο Σάντος, «θα έχουμε μια καλύτερη ιδέα της πραγματικής ζημιάς και θα αποφύγουμε την επανάληψη της ιστορίας, χρησιμοποιώντας την εμπειρία μας, προκειμένου να αναθεωρήσουμε τα ισχύοντα πρωτόκολλα, τις πολιτικές και τις διαδικασίες διαχείρισης εκτάκτων περιστατικών».

Οι ερευνητές υπολόγισαν ότι μεταξύ Σεπτεμβρίου-Νοεμβρίου 2017 υπήρξαν 1.075 ακόμη θάνατοι σχετικοί με τον τυφώνα, πέρα από τους 64 επίσημους νεκρούς. Μόνο από τον Δεκέμβριο και μετά φάνηκε πλέον οι πρόωροι θάνατοι να επανέρχονται στα φυσιολογικά προ τυφώνα επίπεδά τους.

Όπως ανέφερε ο Σάντος, συνήθως υποτιμάται η αφανής επίπτωση μιας φυσικής καταστροφής στην υγεία. «Όταν μια περιοχή πλημμυρίζει και μένει χωρίς ρεύμα, αυτό δεν είναι πια ασφαλές περιβάλλον για μια γιαγιά που κάνει αιμοκάθαρση ή για κάποιον που έχει κρίση άσθματος και χρειάζεται θεραπεία. Δεν είναι μόνο οι άνθρωποι που πνίγονται ή πεθαίνουν σε μια κατολίσθηση, αλλά και όσοι πεθαίνουν επειδή δεν έχουν πρόσβαση σε βασικές ανάγκες».

Οι ερευνητές επεσήμαναν ότι ο συνολικός αριθμός των άμεσων και έμμεσων θυμάτων δεν μπορεί παρά να είναι μια εκτίμηση. Είναι ενδεικτικό ότι μια άλλη μελέτη του Πανεπιστημίου Χάρβαρντ, η οποία είχε δημοσιευθεί στο New England Journal of Medicine προ μηνών, ακολουθώντας διαφορετική μεθοδολογία από τη νέα έρευνα, είχε ανεβάσει τα εκτιμώμενα θύματα του τυφώνα «Μαρία» – άμεσα και έμμεσα- σε 4.000 έως 5.000.

Από την πλευρά της, η κυβέρνηση του Πουέρτο Ρίκο έχει αναθέσει σε ερευνητές της Σχολής Δημόσιας Υγείας του Πανεπιστημίου Τζορτζ Ουάσιγκτον, οι οποίοι χαίρουν παγκοσμίου κύρους, να κάνουν τη δική τους εκτίμηση για τα θύματα, η οποία ακόμη αναμένεται.

(in.gr, 3 Αυγούστου 2018, http://www.in.gr/2018/08/03/tech/ta-pragmatika-thymata-mias-fysikis-katastrofis-perissotera-apo-ta-episima/)

Use of Death Counts from Vital Statistics to Calculate Excess Deaths in Puerto Rico Following Hurricane Maria

Alexis R. Santos-Lozada, PhD; Jeffrey T. Howard, PhD

The official death toll for Hurricane Maria, which devastated Puerto Rico on September 20, 2017, has remained at 64 since December 29, 2017. Accurate estimates of deaths from environmental disasters are important for informing rescue, recovery, and policy decisions.

Using preliminary death counts through October 2017, excess deaths related to the hurricane were estimated at 1085.[1] However, other estimates suggest that the number of excess deaths may be as high as 4645.[2] The variance in estimates is due to differences in methodology. The official government death toll includes only deaths in which documentation of "hurricane-related" as the cause of death appears on the individual's death certificate and does not account for indirect deaths, including from infectious disease outbreaks or lack of services (such as electricity, water, and medical care). Estimates of excess deaths address both direct and indirect deaths and typically use either death counts from government agencies[1] or surveys,[2] which are susceptible to larger margins of error. We calculated the number of excess deaths following Hurricane Maria through December 2017, using death counts from vital statistics records, updating a previous estimate.[1]

Methods

Monthly death counts, from January 2010 through December 2017, including previously unavailable death counts for January through December 2017, were obtained from the Puerto Rico vital statistics system to calculate excess deaths in Puerto Rico following Hurricane Maria; this system has a 99% coverage rate based on previous analyses.[3] Because these data are deidentified aggregate counts of deceased individuals, this study is considered to be research not involving human subjects as defined by US regulation (45 CFR 46.102[d]).

Consistent with prior studies,[4,5] death counts from vital records from 2010 through 2016 were used to establish expected monthly deaths (mean), and historical ranges of natural variability (95% CIs). For September through December 2017, we used the difference between number of deaths from vital statistics records and the upper 95% CI bound as a measure of excess mortality. The upper 95% CI limits were calculated as:

$$\bar{x} + t_{[1-\alpha/2n-1]} \frac{s}{\sqrt{n}}$$

where $\bar{x}$ is the mean value, t is the 2-sided value of the student *t*-distribution, α is the alpha level (.05), n is the number of observations (n = 7), and s is the standard error of the mean. The 1-sample *t* test was used to calculate 95% CIs around the excess death estimates. Analyses were conducted using SAS (SAS Institute), version 9.4.

Results

The expected numbers of deaths were 2396 in September, 2407 in October, 2416 in November, and 2697 in December.

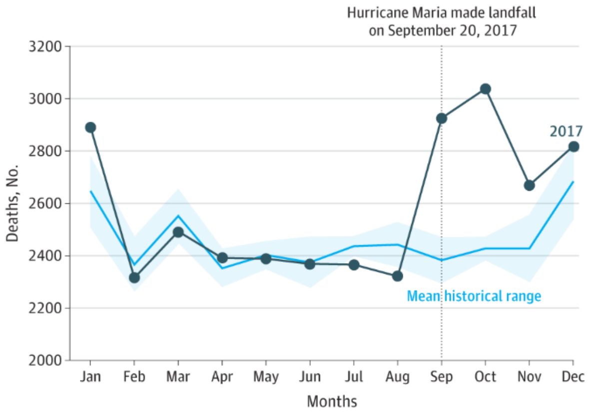
Table. Historical Patterns of Deaths, 2017 Death Counts, and Estimated Excess Deaths in Puerto Rico[a]

Month	2010-2016 Historical Patterns of Deaths, Mean (95% CI)	2017 Death Counts	Excess Deaths (95%CI)[b]
January	2636 (2485-2739)	2894	
February	2397 (2255-2495)	2315	
March	2520 (2439-2681)	2494	
April	2302 (2261-2434)	2392	
May	2382 (2343-2466)	2390	
June	2306 (2261-2494)	2369	
July	2435 (2413-2481)	2367	
August	2433 (2370-2550)	2321	
September	2396 (2297-2469)	2928	459 (425-593)
October	2407 (2380-2476)	3040	564 (531-597)
November	2416 (2299-2555)	2671	116 (50-182)
December	2697 (2543-2824)	2820	

[a] Source: Puerto Rico vital statistics system, 2010-2016 and actual counts from 2017.

[b] Excess deaths are the difference between the upper limit of the CI and the count for each month following Hurricane Maria.

The upper bounds (95% CIs) for the same months were 2469, 2476, 2555, and 2824, respectively, whereas the actual numbers of deaths were 2928, 3040, 2671, and 2820. There were 1139 (95% CI, 1006-1272) excess deaths: 459 (95% CI, 425-593) in September, 564 (95% CI, 531-597) in October, and 116 (95% CI, 50-182) in November. Although August and July experienced lower numbers of deaths than expected, September and October had higher numbers of deaths than expected, the number of deaths decreased in November, and by December had returned to a level within historical variation.



Discussion

Based on death records following Hurricane Maria, the estimated hurricane-related mortality burden of 1139 excess deaths through December 2017 was higher than the official death toll of 64. The estimate is conservative, because the expected number of deaths used the upper 95% CI and did not consider the population denominators, which were decreasing. The strength of the present approach is that it is based on death counts from vital statistics records and is consistent with previous estimates[1] and methods.[4,5] The primary limitation of the study is that the specific cause of each individual death is not known; thus only an aggregate number of deaths in excess of historical variation can be estimated. Another recent study[2] suggested that there were 4645 excess deaths (95% CI, 783-8498), but it was based on a survey that underestimated prehurricane mortality, overestimated posthurricane mortality, and had a large CI, indicating a high level of uncertainty. Future studies would benefit from careful analysis of deaths from vital records rather than surveys.

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Section Editor: Jody W. Zylke, MD, Deputy Editor.

(JAMA Network, Published online August 2, 2018. doi:10.1001/jama.2018.10929, https://jamanetwork.com/journals/jama/fullarticle/2696479)

Προ καιρού ρωτήσαμε τον καθηγητή Γεωλογίας του ΑΠΘ Σπύρο Παυλίδη κατά πόσο η ηφαιστειακή δραστηριότητα, η οποία είναι ιδιαίτερα αυξημένη εφέτος, επηρεάζει το κλίμα / την κλιματική αλλαγή και μας παρέπεμψε στην παρακάτω δημοσίευση.

Platinum is key in ancient volcanic related climate change

Supervolcanoes are one of Mother Nature's deadliest phenomena, and when they erupt, they can change the climate of the entire planet.

To get a glimpse for how future catastrophic volcanic events might alter our lives, scientists at the University of Cincinnati dug deep into the past to find new evidence for volcanic related climate change.

The results of the study are published in the July issue of Scientific Reports titled "Positive platinum anomalies at three late holocene high magnitude volcanic events in Western Hemisphere sediments."

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Reference

Kenneth Barnett Tankersley, Nicholas P. Dunning, Lewis A. Owen, Warren D. Huff, Ji Hoon Park, Changjoo Kim, David L. Lentz, Dominique Sparks-Stokes. Positive Platinum anomalies at three late Holocene high magnitude volcanic events in Western Hemisphere sediments. Scientific Reports, 2018; 8 (1) DOI: 10.1038/s41598-018-29741-8

Note: The above post is reprinted from materials provided by University of Cincinnati.

(Geology Page, August 4, 2018, http://www.geologypage.com/2018/08/platinum-is-key-in-ancient-volcanic-related-climate-change.html)

Platinum rain

UC interdisciplinary research team looks at platinum for clues to stay ahead of volcanic-related climate change.

Explosive volcanoes like Mount St. Helens in 1980, blow materials including platinum up and into the atmosphere. UC scientists use traces of platinum and chronometric dating technology to determine how far stratospheric winds have carried dangerous ash from ancient high magnitude volcanoes, some causing devastating climate change.

Supervolcanoes are one of Mother Nature's deadliest phenomena, and when they erupt, they can change the climate of the entire planet.

To get a glimpse for how future catastrophic volcanic events might alter our lives, scientists at the University of Cincinnati dug deep into the past to find new evidence for volcanic-related climate change.

The results of the study are published in the July issue of Scientific Reports, part of the Nature Publishing Group titled "Positive platinum anomalies at three late holocene high magnitude volcanic events in Western Hemisphere sediments."

"We looked at platinum particles as an indicator for how far volcanic ash has traveled," says Kenneth Tankersley, UC associate professor of anthropology and geology and lead author on the study.

"The age of the sediment containing the platinum allowed our interdisciplinary team of anthropologists, geologists, geographers and biologists to directly pinpoint radical change in climate for eight different Western hemisphere archaeological sites to three major catastrophic volcanoes from the beginning of the little ice age and medieval warming. The most recent one dated to the 18th century."

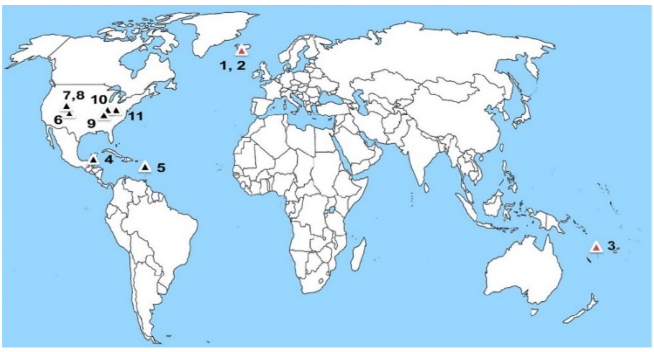
UC associate professor Kenneth Tankersley and anthropology graduate student Dominique Sparks-Stokes look for fine platinum particles among sediment samples from archeological sites affected by high magnitude volcanic events thousands of miles away.

Why is this important? Tankersley says the researchers hope studies like this can help the world better prepare for the next major eruption. As he says, "It's not '**if**' these catastrophic volcanic events will return, it's '**when**.'"

"Can you imagine a year or even a decade with no summer? This happened consistently throughout the past 10,000 years."

Kenneth Barnett Tankersley, UC associate professor of anthropology and geology

For example, Tankersley explains the Eldgjá eruption of (CE 934) as producing so much dust in the atmosphere, it filtered enough sun and heat to lower global temperatures significantly for a couple of years. What ensued were severe winters contributing to famine, epidemics and loss of many lives. Over 900 years later a volcanic event on Krakatoa –– an island in the northeast India Ocean as part of the Indonesian archipelago –– caused Cincinnati to have an extremely cold winter and a very cool summer in the late 1800s.



Map showing volcanic centers (red triangles) for late Holocene high-magnitude eruptions (black triangles) for Laki volcanic system (#1), Eldgjá volcanic fissure (#2) and Kuwae volcano (#3). Study sites for platinum (black triangles) include: Temple Reservoir tank, Tikal, Guatemala (#4); Nonsuch Bay, Antigua (#5); Chaco Canyon, New Mexico (#6); Albert Porter Pueblo, Colorado (#7); Wallace Ruin, Colorado (#8); Big Bone Lick, Kentucky (#9); Wynema, Ohio (#10); and Great Serpent Mound, Ohio (#11).

Not all explosive volcanic eruptions result in the global distribution of particle spread, such as the most recent Kilauea volcano in Hawaii. However, according to Tankersley, there is a definite link between significant changes in climate conditions outside regular climate cycles and the high magnitude volcanic events explored in this research.

Platinum value

A key player in this investigation is platinum. According to

the researchers, the rare element doesn't occur naturally on the Earth's surface. It only occurs after a cosmic impact like a meteor, asteroid or a slice of a comet hits the earth.

Or, as in this case, platinum is revealed when volcanic ash spews fountains of incandescent lava and cow-pie shaped molten rock bombs. The resulting ash clouds contain fine platinum particles, evidence for the far-reaching effects of major volcanic eruptions.

The study looked at sediment samples from eight Western hemisphere archaeological sites in the Ohio valley, the American southwest, the Caribbean and the Maya Lowland in Guatemala.

The interdisciplinary researchers from across UC's campus and Kongju National University were able to successfully connect the radical climate change patterns from each of those sites to one or more of three high magnitude volcanic events including the Eldgjá volcano (CE 934) and the Laki volcano (CE 1783) in Iceland and Kuwae volcano in the island of Vanuatu off the coast of Australia (CE 1452).

All three catastrophic volcanic eruptions happened within the last 1,000 years or the late Holocene –– the geological period we live in currently.

"Being a woman in STEM at the University of Cincinnati has been a great experience. Even though I feel there is a long way to go in order to see more women in STEM programs at UC, I can tell that the university departments have done everything in their power to encourage representation for women. This type of support really affirms my love for anthropology and archaeology, and aligns our mutual passions."

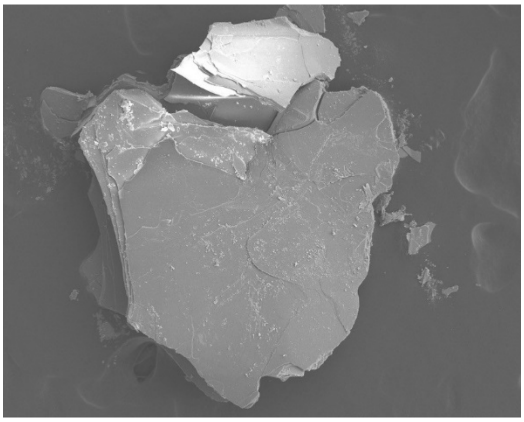
Dominique Sparks-Stokes

Dating sediment

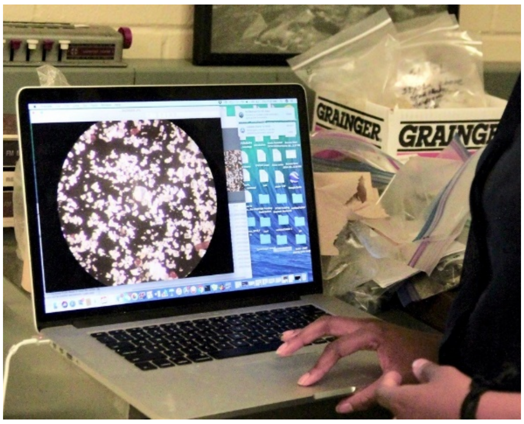
Among UC's research team is first-year anthropology grad student Dominique Sparks-Stokes who retrieved deep sediment samples from two of the Ohio Valley sites and identified botanical remains for radiocarbon dating.

After teasing out carbonized plants from the deep core samples, Sparks-Stokes and the researchers were able to count the number of carbon atoms –– a process Tankersley says helps geochronologists put a precise date on where they are within the core.

In the lab, Sparks-Stokes works on trays filled with sandy colored dust and flakes. “See those tiny sparkling particles in this dust that looks like shiny sand? Much of that shiny material is quartz, feldspar and mica from volcanic dust preserved in the baked pottery.



SEM micrograph of the volcanic mineral biotite, found in ancient pottery from the Hopewell site at Shawnee Lookout.



Microscopic view of platinum particles found within sediment samples from ancient archeological sites.

“We have perfect conditions in these pocketed and protected environments where winds have little effect from erosion,” adds Sparks-Stokes, referring to the sinkholes in Serpent Mound and the Wynema site in the Ohio Valley areas.

“We dated the preserved sediments containing platinum and compared those dates to Western Hemisphere volcanic activity from the same era and associated that with erratic climate change patterns during that time as a result of those volcanic events.”

Identifying platinum particles within ancient volcanic ash is the first step. Dating the sediment using geochronology is the next, which is where UC geologist Lewis Owen comes in.

“In addition to radiocarbon dating, Owen added his optically stimulated luminescence expertise to a suite of scientific technology we call chronometric dating,” notes Tankersley. “We compared these findings to our typologically and temporally distinctive artifacts, which allowed us to pin down volcanic events that were already known from those epochs in time.”

UC geography professor Nicholas Dunning collecting sediment samples from Chaco Canyon, New Mexico.

UC geology professor Lewis Owen collecting sediment samples from Big Bone Lick, Kentucky, archaeological site.

UC student Marcy Taylor collecting sediment samples from the Wynema archaeological site in Mariemont, Ohio.

Between a rock and a "hot" place

Regular volcanoes eject millions of cubic feet of ash and debris over an entire state. But as Tankersley points out, supervolcanoes can devastate a whole continent, and half of the Earth's supervolcanoes happened in North America.

The last high magnitude eruption created a mini ice age that led to dramatic climate change. The greatest impact from another catastrophic event would come months after the explosion, however, as the deadliest result of these events is not so much the ash that falls to the ground but the gases that stay in the air, adds Tankersley.

"Explosive volcanoes blow materials up into the stratosphere," explains research team member Warren Huff, UC professor emeritus of geology. "The explosion releases sulfur dioxide gas, which converts into sulfuric acid aerosol droplets that then travel through the earth's atmosphere on wind currents.

"More than 200 million tons of sulfur dioxide, thrust into the air and spread worldwide by the stratospheric winds, can produce a veil covering the earth cutting out much of the sunlight. When the shade dims the heat from the sun for long periods of time the earth cools down."

Volcanologists currently find an active supervolcano brewing under 3,400 square miles of protected wilderness in Northwest Wyoming's Yellowstone National Park. It has exploded several times between 2.1 million years and 830,000 years ago.

UC professor emeritus of geology Warren Huff illustrates the stratospheric wind pattern from an aerial view of Rabaul volcano in Papua, New Guinea, 1994.

Volcanic ash, containing mineral particles, sulfuric acid and dangerous gases travel through stratospheric wind currects, leaving their finger prints thousands of miles away.

Researchers involved in the study include:

Kenneth Tankersley & Dominique Sparks-Stokes, Departments of Anthropology and Geology; Nicholas Dunning & Changjoo Kim, Department of Geography; Lewis Owen & Warren Huff, Department of Geology and David L. Lentz, Department of Biology, University of Cincinnati; Ji Hoon Park, Department of Geography Education, Kongju National University, Chungcheongnam-do, South Korea.

"The concentrations of platinum from well-dated and well-stratified late Holocene sites provide an opportunity for more vigorous scientific evaluations of the impact of future high magnitude volcanic eruptions on climate change and society."

Kenneth Barnett Tankersley

Acknowledgements:

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5 Deadliest Volcano Eruptions In Human History
https://www.youtube.com/watch?v=u-ha1K9jj9E

(Melanie Schefft / UC Magazine, July 26, 2018, https://magazine.uc.edu/editors_picks/recent_features/platinum1.html)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Five tips for a Project Manager Beginner

Liliya Levandovska
Senior Project Manager

Just yesterday you were involved in several specific tasks for various projects and now your supervisors entrust you to manage your own? Or perhaps your project idea received funding and now you have a chance to realize it?

Congratulations! You are at the start of a very exciting and challenging journey. And it is never smooth even for experienced project managers.

That is why we collected some tips that might help you navigate through the first months of project management until you establish your own planning and implementation style and strategy.

1. Know your documentation: study **all relevant project and funding programme documents** to have a full overview of project activities planned as well as administrative and legal requirements for project implementation and reporting.

It is a good idea to have the Grant Agreement and the Submitted Proposal handy at all times.

Certainly, in the beginning, you might need to refer back to the documents often and double check every detail, but later you will know all the rules by heart!

2. Be confident and assume leadership and responsibility; however, never take things personally. The project you are managing is not (only) your personal ambition, it is a joint EU-funded work of the project consortium and it is in everyone's interest to make it successful. When making independent decisions, consider their impact on partners, on overall task implementation and extrapolate the efficiency of your proposed solutions.

3. Think realistically and strategically: proper **task division** is crucial for a successful project, therefore, delegate internal tasks wisely, provide clear guidelines and **set realistic timelines** for task completion.

If a deliverable is due by the end of the month, do not wait until the last week, assuming that your colleagues/partners will draft it (even if they've done it before).

Plan ahead, excel in your time management skills: have a clear overview (printed out and pinned to a wall in your office) when deliverables are due, when meetings and events are scheduled and how much time is needed for the completion of technical and IT tasks.

4. Communication is key: if partners have (legitimate) concern about your management decisions, **communicate** with them, know their reservations and **propose alternatives**. Organize regular meetings and discussions with your colleagues. Remember, the team you oversee now, supported you yesterday.

Do not be shy to **ask for support** from your senior colleagues, as you can always rely on their experience and accumulated knowledge.

5. Be proactive and motivating, serve as an example for the team you manage! Don't stress out in challenging situations and don't look for excuses fif your management decisions affected project results. **Offer solutions** and help instead, **learn from best practices** and try solving the issue again!

"You'd be surprised the headaches you can avoid by addressing these four simple questions before beginning a project."

(euro media, 11 July 2018, https://www.eutrainingsite.com/blog/post/318/five-tips-for-a-project-manager-beginner?utm_source=SendBlaster&utm_medium=email&utm_term=%2D&utm_content=%2D&utm_campaign=201808%2DC)

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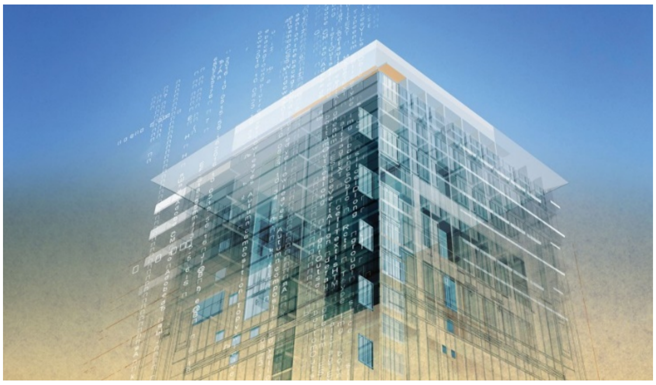
Digging into BIM Data

Steve Cimino for AIA Architect

As building information modeling software has evolved, firms are looking beyond the visualization elements to the data within.



Once cutting-edge technology, building information modeling (BIM) software like Autodesk's Revit, Bentley's GenerativeComponents, and Nemetschek's Vectorworks is now standard fare in architecture firms. How standard? According to AIA's biannual report "The Business of Architecture 2016," 96 percent of large firms, 72 percent of midsized firms, and 28 percent of small firms utilize one or more BIM software programs. (The 2018 edition of this report will be released this month.)

Just as BIM has gained purchase in the past decade, it has also grown in its value to firms—particularly in the data it offers.

"When I started down this path 10 years ago, BIM was mostly 3D and graphical," says Natasha Luthra, virtual design and construction director of emerging technologies at Jacobs and 2018 chair of AIA's Technology in Architectural Practice (TAP) Advisory Group. "Now it's about the intelligent data associated with the design. If there was a product that wasn't 3D but was highly intelligent and data-focused, we'd lean toward that."

Luthra became invested in the technology side of architecture when a small firm in Chicago made learning Revit a prerequisite to getting hired. She's risen among the ranks in that specialty ever since, putting aside her training as an architect to bridge the gap between designers and technologists.

"It has been my belief that you need someone who understands architecture to help other architects through the tech side of things," she says. "Otherwise it's impossible to get the maximum amount of use out of the tools at our disposal."

Those tools have certainly grown in recent years, with virtual and augmented reality being hailed as the next big thing, and artificial intelligence on the tip of everyone's tongue. But beyond all the fancy buzzwords, there has been BIM. With software from Autodesk and Bentley becoming ubiquitous in firms, there are now reams of data on every project developed and delivered. Traditionally, those data have benefited contractors, saving them time in the field. But now firms are scraping data from their models and combing through them to figure out how it can enrich their practices.

"Saying you should use BIM is not a thing anymore," says Ryan Johnson, AIA, an associate at Clark Nexsen and a member of the TAP Advisory Group. "We're well over that hump. We shouldn't be talking about why we should use BIM; we should be discussing how we can benefit more from it."

Those discussions aren't just internal. Though more data can help streamline processes and give firms insight into energy efficiency and other calculable metrics, it can also be used to strengthen bonds with long-term clients. These days, if a client has a problem or a concern, the solution can often be found within the numbers.

"I don't think 'better design' is what you use BIM for," Luthra says. "You need to talk to your clients and find out what they're looking for, then go back to the data and find out what's there. The advantage of doing that, especially with small firms, is having a relationship with the client that lasts longer than the time it takes to design the building. You want to be a partner for the entire life cycle of the building. That's the real value of BIM."

Asking and Answering

Ken Sanders, FAIA, agrees. As managing principal at Gensler, he's involved in numerous aspects of the business, including the firm's incubator labs for new ideas and co-leading the team responsible for design resilience. But technology has always been a passion of his, and he grasps how data can help answer questions that more firms—and some clients—are starting to ask.

"What's of increased interest to us is, 'Are people using, say, workplace designs as we thought they would?'" he says. "And as sensors become less expensive, how can we configure them to watch and learn how spaces are actually being used by their occupants? This can apply to a retail or hospitality project as well; we want to find out how customers and guests engaged with the environment around them, beyond anecdotal storytelling about what somebody saw or what a perceived problem might be."

Gensler worked on roughly 10,000 projects in 2017, which means no one person can know all the details of each design. Even more so, Sanders recognizes that, though training and instincts can take an architect quite far, data can reveal hidden truths that would otherwise go unnoticed.

"Sometimes the data confirm what you already believe," he says, "and sometimes you discover something unexpected. Either way, we want to use that information to help our clients and us make better design decisions. When you work on a project, you're not done after it gets built and everyone moves in. Especially at Gensler—where so much of our work is repeat business for large-scale clients—we can start to leverage what we're learning every time we deliver a project and make use of that knowledge on the next one."

Prepare for the Inevitable

"The machines are coming," Luthra says. "We've seen this in so many other industries. Cars and airplanes are being built without a lot of hand-holding or design input. We need to get to a point where people are more important than an algorithm."

A huge step toward that point is mining, organizing, and making use of data provided by BIM software. Not all clients recognize its worth, especially non-developers—"No one ever asks us to send over an Excel file with the data we're using," Johnson notes—but it's also not the client's job to be that savvy. It's the job of the architect.

"The client contracts us to come up with the best design we can," Luthra says. "And, as architects, what do we want to be? Do we want to make the pretty pictures and leave? Or do we want to be the master builders, the master executors? That's where BIM can take us."

Steve Cimino is a Los Angeles-based writer and editor with a focus on architecture and design.

(AIA Architect, August 01, 2018, https://www.architect-magazine.com/aia-architect/aiafuture/digging-into-bim-data_o)

Top 10 Heaviest Concrete Structures in the World

How Much Does Your Concrete Structure Weigh?

Bill Gates can now add to the list of his many accomplishments the title of architecture critic, having recently written a piece for the online publisher Quartz. Called "Have you hugged a concrete pillar today?" the review is based upon "Making the Modern World: Materials and De-materialisation," by his favourite author, historian Vaclav Smil.

Smil's book details how we use the most basic materials to build and fuel our civilizations, and raises questions about how we will continue to consume in the future. It includes a host of beautiful illustrations that clearly and succinctly hammer home points.

In his intro, Gates mentions that his car contains "around 2,600 pounds of steel, 800 pounds of plastic, and 400 pounds of light metal alloys." These numbers break down the seemingly frivolous nature of objects into the real environmental impact they create.

One of the main materials discussed in the book is concrete. China used more concrete in the last three years than the United States used in the last 100; a staggering statistic, considering the rate of urbanization that it implies. In pursuit of understanding concrete better, we found some examples and gave them the same treatment. How many pounds does the concrete in your building weigh?

Three Gorges Dam, China
144,309,356,753.51 pounds of concrete

This controversial hydropower dam is located on the Yangtze River.

Petronas Twin Towers, Kuala Lumpur, Malaysia
848,878,569.099 pounds of concrete

The Petronas were at one point the tallest buildings in the world, and are some of the heaviest, thanks to concrete foundations that go 120 meters deep.

Burj Khalifa, Dubai, UAE
238,747,095.768 pounds of concrete

The Burj Khalifa is currently the tallest building in the world.

King Fahd Causeway, Saudi Arabia & Bahrain
1,856,921,867.98 pounds of concrete

The King Fahd Causeway is a 17-mile-long road connecting Saudi Arabia and Bahrain.

Grande Dixence Dam, Switzerland
31,832,946,341.227 pounds of concrete

This is the tallest concrete dam in the world.

Grand Coulee Dam, Washington State
47,749,419,512.94 pounds of concrete

Grand Coulee is located on the Columbia River and is the largest concrete structure in the United States.

Wilshire Grand, Los Angeles
82,000,000 pounds of concrete

This supertall tower will be the tallest building on the West Coast upon completion.

The Venetian Hotel, Las Vegas
85,183,118 pounds of concrete

The Venetian is part of the largest 5-diamond hotel and resort complex in the world.

The dome of the Pantheon, Rome
9,997,964 pounds of concrete

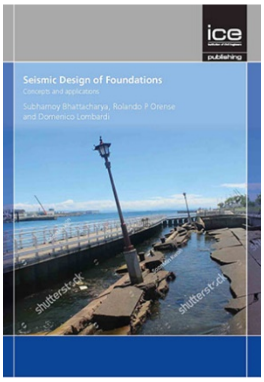
This classic was one of the earliest Roman concrete buildings.

The Pentagon, Washington DC
1,764,507,448.36 pounds of concrete

As the HQ of the US Department of Defence, the Pentagon was fortified with incredibly heavy concrete walls.

(Matt Shaw / Construction Chat, http://www.construction-chat.co.uk/articles/heaviest-concrete-structures-in-the-world/?utm_content=75898700&utm_medium=social&utm_source=linkedin)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Seismic Design of Foundations: Concepts and applications

Subhamoy Bhattacharya, Rolando P. Orense and Domenico Lombardi

With easy-to-understand explanations of the basic concepts, *Seismic Design of Foundations* examines recent and worldwide research outputs and post-earthquake reconnaissance case studies and offers practical means of applying them to the real world. Each case study also provides worked examples of new and innovative findings that reveal background information behind the codes of practice in various parts of the world as well as the lessons learned from recent large-scale earthquakes.

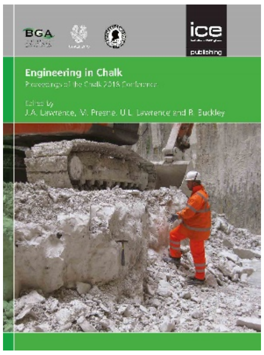
Seismic Design of Foundations presents state-of-the-art information which will be ideal for any student studying postgraduate civil engineering or structural engineering as well as researchers working in the field of seismic design.

This book aims to

- assimilate latest state-of-the-art research from Europe, Japan and New Zealand
- break down and explain the codes of practice into easy-to-understand concepts
- showcases worked examples at the end of each chapter highlighting the concepts covered
- includes case studies from all over the world including Italy, Greece, India and Taiwan amongst others.

Seismic Design of Foundations presents state-of-the-art information which will be ideal for any student studying postgraduate civil engineering or structural engineering as well as researchers working in the field of seismic design.

(ICE Publishing, 17 December 2018)



Engineering in Chalk: Proceedings of the Chalk 2018 Conference

British Geotechnical Association (BGA)

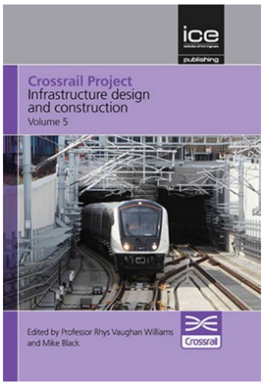
This volume contains the proceedings of a major two-day international conference on Engineering in Chalk, organised by the British Geotechnical Association (BGA), with support from the Engineering Group of the Geological Society (EGGS). Bringing together the knowledge and experience gained in the last three decades the papers in this collection present research and case histories to provide a definitive up to date perspective on a wide range of technical themes relating to Engineering in Chalk.

The papers reflect the themes of the conference which include

- earthworks
- foundations and piling
- geological hazards
- offshore engineering
- site investigation/characterisation
- in situ and laboratory testing
- tunnelling
- case histories of construction and engineering
- water and the environment
- future engineering issues.

This volume covers a wide range of topics which are of direct relevance to all who work within the broad field of geotechnical engineering, including consultants contractors, academics, materials suppliers, equipment manufacturers, and the owners and operators of infrastructure, and structures and facilities.

(ICE Publishing, 05 September 2018)



Crossrail Project: Infrastructure Design and Construction - Volume 5

Crossrail, Rhys Vaughan Williams and Mike Black

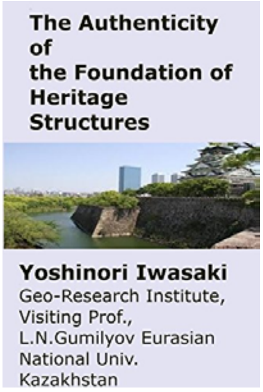
The construction of the Crossrail project began at North Dock in Canary Wharf in May 2009 and it has been one of the largest single infrastructure investments undertaken in the UK to date. Consisting of 21 kilometres of new twin-bore tunnels and 10 new world-class stations in central London connecting to upgraded lines, the line will provide essential new services to the east and west of the UK capital.

Crossrail Project: Infrastructure Design and Construction - Volume 5 contains 21 new papers submitted to Crossrail's Technical Papers Competition. Contributions have come from consultants, contractors, suppliers and third-party stakeholders all of whom have been involved in the Crossrail project. The papers cover a variety of disciplines including fire safety, sustainability, engineering design, reliability and many more.

As part of the legacy of the Crossrail project, it is important for the organisation to share its experiences and best practices with the rest of the industry and to showcase the skills of the personnel involved and the successful delivery of each phase of works. This fifth volume continues Crossrail's dissemination of that experience as the project itself nears completion with the official launch due in 2018.

Crossrail Project: Infrastructure Design and Construction – Volume 5 offers a valuable source of reference for current practices in design and construction of large-scale underground projects.

(ICE Publishing, 14 September 2018)



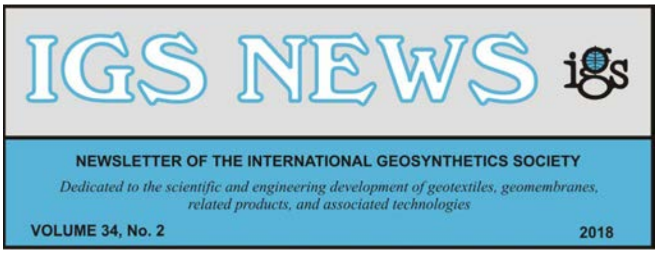
The authenticity of the foundation of heritage structures (English Edition)

Yoshinori Iwasaki

As a general report for session 4c on “Preservation of Historic Sites,” the author likes to review the activities of UNESCO as general trend and those of the International Society of Soil Mechanics and Foundation/Geotechnical Engineering on the conservation of old buildings and historical heritage.

(ODONTA PRESS, September 20, 2017)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



www.geosyntheticssociety.org/wp-content/uploads/2018/08/IGS-News-Vol34-Issue2.pdf

Κυκλοφόρησε το Τεύχος 2 του Τόμου 34 των IGS NEWS της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

https://www.icevirtuallibrary.com/toc/jgein/25/2

Κυκλοφόρησε το Τεύχος 2 του Τόμου 25 (Απρίλιος 2018) του περιοδικού GEOSYNTHETICS INTERNATIONAL με τα παρακάτω περιεχόμενα:

Effects of a very low pH solution on the properties of an HDPE geomembrane, L. Zhang, A. Bouazza, R. K. Rowe, J. Scheirs, 25(2), pp. 118–131

Testing and analytical modeling of two-dimensional geotextile tube dewatering process, C. R. Ratnayesuraj, S. K. Bhatia, 25(2), pp. 132–149

Optimal design of piled embankments with basal reinforcement, P. Jelušič, B. Žlender, 25(2), pp. 150–163

Deterministic and random FEM analysis of full-scale unreinforced and reinforced embankments, N. Luo, R. J. Bathurst, 25(2), pp. 164–179

Numerical study of earth pressure reduction on rigid walls using EPS geofoam inclusions, H. Kim, A. F. Witthoeft, D. Kim, 25(2), pp. 180–199

Optimal reliability based design of V-shaped anchor trenches for MSW landfills, K. V. N. S. Raviteja, B. M. Basha, 25(2), pp. 200–214

Field and laboratory time-dependent behaviors of geotextiles in reinforced soil walls, R. Plácido, F. H. M. Portelinha, M. M. Futai, 25(2), pp. 215–229

Evaluation of predictions of nonwoven geotextile pore size distribution under confinement, E. M. Palmeira, H. L. Trejos Galvis, 25(2), pp. 230–241

Large-scale tests to assess the efficiency of a geosynthetic reinforcement over a cavity, B. F. G. Tano, G. Stoltz, S. S.

Coulibaly, J. Bruhier, D. Dias, F. Olivier, N. Touze-Foltz, 25(2), pp. 242–258

https://www.icevirtuallibrary.com/toc/jgein/25/3

Κυκλοφόρησε το Τεύχος 3 του Τόμου 25 (Ιούνιος 2018) του περιοδικού GEOSYNTHETICS INTERNATIONAL με τα παρακάτω περιεχόμενα:

Experimental study on behaviour of encased stone column with tyre chips as aggregates, T. Mazumder, A. K. Rolaniya, R. Ayothiraman, 25(3), pp. 259–270

Numerical simulation of the deformation response of geosynthetic reinforced soil mini-piers, Y. Zheng, P. J. Fox, J. S. McCartney, 25(3), pp. 271–286

Effects of temperature rise on load-strain-time behaviour of geogrids and simulations, T. Chantachot, W. Kongkitkul, F. Tatsuoka, 25(3), pp. 287–303

Rubber powder–polymer combined stabilization of South Australian expansive soils, A. Soltani, A. Deng, A. Taheri, M. Mirzababaei, 25(3), pp. 304–321

Experimental study on vibration reduction by using soilbag cushions under traffic loads, G. Y. Ding, J. L. Wu, J. Wang, H.

Prediction of creep behaviour from load relaxation behaviour of polymer geogrids, N. Nuntapanich, W. Kongkitkul, F. Tatsuoka, P. Jongpradist, 25(3), pp. 334–349

Direct shear testing of GCLs at elevated temperature and in a non-standard solution, C. A. Bareither, M. Soleimanian, S. Ghazizadeh, 25(3), pp. 350–368

https://www.icevirtuallibrary.com/toc/jgein/25/4

Κυκλοφόρησε το Τεύχος 4 του Τόμου 25 (Αύγουστος 2018) του περιοδικού GEOSYNTHETICS INTERNATIONAL με τα παρακάτω περιεχόμενα:

Monotonic and cyclic shear behaviour of geomembrane-sand interface, W. J. Cen, H. Wang, Y. J. Sun, L. S. Wen, 25(4), pp. 369–377

Influence of anchorage angles on pull-out resistance of geotextile wrap around anchorage, Y. Xu, D. J. Williams, M. Serati, 25(4), pp. 378–391

Enhanced bentonites for containment of inorganic waste leachates by GCLs, J. Scalia IV, G. L. Bohnhoff, C. D. Shackelford, C. H. Benson, K. M. Sample-Lord, M. A. Malusis, W. J. Likos, 25(4), pp. 392–411

Closely spaced rectangular footings on sand over soft clay with geogrid at the interface, S. Saha Roy, K. Deb, 25(4), pp. 412–426

Numerical evaluation of the effect of differential settlement on the performance of GRS-IBS, A. Ardah, M. Y. Abu-Farsakh, G. Z. Voyiadjis, 25(4), pp. 427–441

Reliability-based design optimization of geosynthetic-reinforced soil walls, M. G. C. Santos, J. L. Silva, A. T. Beck, 25(4), pp. 442–455

Dynamic properties of sand-EPS bead mixtures, R. M. El-Sherbiny, S. H. Ramadan, M. A. El-Khouly, 25(4), pp. 456–470

Effect of fiber reinforcement on shear strength and void ratio of soft clay, M. Mirzababaei, A. Arulrajah, A. Haque, S. Nimbalkar, A. Mohajerani, 25(4), pp. 471–480

https://www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/46/issue/4

Κυκλοφόρησε το Τεύχος 4 του Τόμου 46 του περιοδικού Geotextiles and Geomembranes με τα παρακάτω περιεχόμενα:

Original Research Articles

3D effects of turning corner on stability of geosynthetic-reinforced soil structures, Fei Zhang, Yufeng Gao, Dov Leshchinsky, Shangchuan Yang, Guangyu Dai, Pages 367-376

Interfacial properties of geocell-reinforced granular soils, Gholamhosein Tavakoli Mehrjardi, Fariba Motarjemi, Pages 384-395

Centrifuge model studies on the stability of fibre-reinforced cemented paste backfill stopes, X.W. Yi, G.W. Ma, A. Fourie, Pages 396-401

Back-analysis of geotechnical parameters on PVD-improved ground in the Mekong Delta, H. Hiep, S.G. Chung, Pages 402-413

Comparative flexural performance of compacted cement-fiber-sand, Pitthaya Jamsawang, Thanawan Suansomjeen, Piti Sukontasukkul, Pornkasem Jongpradist, Dennes T. Bergado, Pages 414-425

Radiation dose and antioxidant depletion in a HDPE geomembrane, Kuo Tian, Craig H. Benson, Youming Yang, James M. Tinjum, Pages 426-435

Liquid limit based assessment of geosynthetic clay liners subject to hydration and hydraulic conductivity testings, Tuğçe Özdamar Kul, A. Hakan Ören, Pages 436-447

Experimental study on settlement and scour characteristics of artificial reef with different reinforcement type and soil type, Dae-Ho Yun, Yun-Tae Kim, Pages 448-454

Assessment of consolidation-induced VOC transport for a GML/GCL/CCL composite liner system, Hefu Pu, Jinwei Qiu, Rongjun Zhang, Junjie Zheng, Pages 455-469

A performance-based approach to design reinforced-earth retaining walls, D. Gaudio, L. Masini, S. Rampello, Pages 470-485

Earth pressure coefficients for reinforcement loads of vertical geosynthetic-reinforced soil retaining walls under working stress conditions, Lei Wang, Huabei Liu, Chunhai Wang, Pages 486-496

Energy efficiency of fibre reinforced soil formation at small element scale: Laboratory and numerical investigation, Erdin Ibraim, Jean-Francois Camenen, Andrea Diambra, Karolis Kairelis, … Nilo Cesar Consoli, Pages 497-510

Influence of geotextile arrangement on seismic performance of mid-rise buildings subjected to MCE shaking, Ruoshi Xu, Behzad Fatahi, Pages 511-528

Barrier permeation properties of EVOH thin-film membranes under aqueous and non-aqueous conditions, Rebecca S. McWatters, R. Kerry Rowe, Pages 529-541

Reduction of subgrade fines migration into subbase of flexible pavement using geotextile, Behnoud Kermani, Ming Xiao, Shelley M. Stoffels, Tong Qiu, Pages 377-383

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2015 – 2018)

ΕΕΕΕΓΜ

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Πολυτεχνειούπολη Ζωγράφου
15780 ΖΩΓΡΑΦΟΥ

Τηλ. 210.7723434
Τοτ. 210.7723428
Ηλ-Δι. secretariat@hssmge.gr ,
geotech@central.ntua.gr
Ιστοσελίδα www.hssmge.org (υπό κατασκευή)

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» Εκδότης: Χρήστος Τσατσανίφος, τηλ. 210.6929484, τοτ. 210.6928137, ηλ-δι. ctsatsanifos@pangaea.gr, editor@hssmge.gr, info@pangaea.gr

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