ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

Τα Νέα της Ε Ε Ε Ε Γ Μ

133

Αρ. 133 – ΔΕΚΕΜΒΡΙΟΣ 2019

Καλά Χριστούγεννα
Ευτυχισμένο Νέο Έτος

Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

ΑΡΘΡΑ

Motorway Rockfill Embankments

Anastasios Mouratidis[1] and Apostolis Ritsos[2]

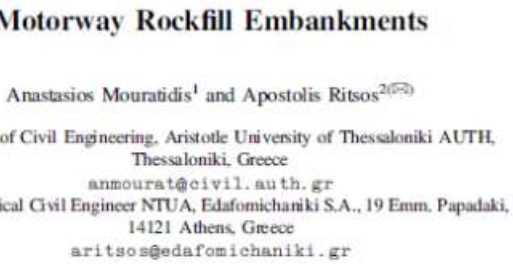
[1] School of Civil Engineering, Aristotle University of Thessaloniki AUTH, Thessaloniki, Greece, anmourat@civil.auth.gr

[2] Geotechnical Civil Engineer NTUA, EDAFOMICHANIKI S.A., 19 Emm. Papadaki, 14121 Athens, Greece, aritsos@edafomichaniki.gr

ABSTRACT: The construction of Rockfill Embankments, although considered as a process of low difficulty, it presupposes the compliance of the design study with rigorous specifications. In this regard, a meticulous and systematic method of construction is required to ensure the optimum performance of this type of geostructure. In this paper, some basic requirements concerning the design and construction of rockfill embankments, as well as some engineering recommendations for a successful construction, are presented and commented. Advantages and weaknesses of rockfill embankment, in comparison to the traditional earthfill structures are also illustrated and the relevant fields of application are defined. Finally, a case study, dealing with the construction of a high motorway geostructure, consisting of crushed rock material at its lowest part and of reinforced earthfill at the top, is briefly presented.

ISSN 2366-3405 ISSN 2366-3413 (electronic)
Sustainable Civil Infrastructures
ISBN 978-3-030-34183-1 ISBN 978-3-030-34184-8 (eBook)
https://doi.org/10.1007/978-3-030-34184-8

Το άρθρο δημοσιεύθηκε στα πρακτικά του συνεδρίου 3rd GeoMEast 2019 International Congress – Sustainable Thoughts in Ground Improvement and Soil Stability (https://www.geomeast.org).



Motorway Rockfill Embankments

Anastasios Mouratidis[1] and Apostolis Ritsos[2]

[1] School of Civil Engineering, Aristotle University of Thessaloniki AUTH, Thessaloniki, Greece
anmourat@civil.auth.gr
[2] Geotechnical Civil Engineer NTUA, Edafomichaniki S.A., 19 Emm. Papadaki, 14121 Athens, Greece
aritsos@edafomichaniki.gr

Abstract. The construction of Rockfill Embankments, although considered as a process of low difficulty, it presupposes the compliance of the design study with rigorous specifications. In this regard, a meticulous and systematic method of construction is required to ensure the optimum performance of this type of geostructure. In this paper, some basic requirements concerning the design and construction of rockfill embankments, as well as some engineering recommendations for a successful construction, are presented and commented. Advantages and weaknesses of rockfill embankment, in comparison to the traditional earthfill structures are also illustrated and the relevant fields of application are defined. Finally, a case study, dealing with the construction of a high motorway geostructure, consisting of crushed rock material at its lowest part and of reinforced earthfill at the top, is briefly presented.

https://www.springer.com/gp/book/9783030341831

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ

International Society for Soil Mechanics and Geotechnical Engineering

ISSMGE News & Information Circular December 2019

1. **New webinar: Dr. Scott McDougall - "Landslide Runout Analysis Current Practice and Challenges." –** Launch date 10 December 2019 12:00pm GMT

To view Dr. McDougall's webinar please go to: https://www.issmge.org/education/recorded-webinars/landslide-runout-analysis-current-practice-and-challenges

Previously recorded webinars are available from: https://www.issmge.org/education/recorded-webinars

2. **Tables of Giroud et al. (1972-1973)**

The French Society (CFMS) is happy to announce the online publication of "Tables pour le calcul des fondations par Giroud et al. (1972-1973) – Édition numérique". Please go to: http://www.geotech-fr.org/publications/tables-de-giroud.

3. **Proceedings from the XVI Pan-American Conference on Soil Mechanics and Geotechnical Engineering (XVI PCSMGE 2019) now available in open access.**

The Innovation and Development Committee of ISSMGE is pleased to announce that through the initiative of Dr. Norma Patricia López Acosta on behalf of the XVI PCSMGE Organizing Committee, the 356 papers from the proceedings and the invited lectures volumes of XVI Pan-American Conference on Soil Mechanics and Geotechnical Engineering (XVI PCSMGE) held in Cancun, Mexico, on November 17-20, 2019 are available in the online library here: https://www.issmge.org/publications/online-library

Detailed acknowledgements for the XVI Pan-American Conference on Soil Mechanics and Geotechnical Engineering (XVI PCSMGE) can be found on the ISSMGE online library acknowledgements section.

4. **ISSMGE Awards**

Member Societies are hereby called to submit nominations for ISSMGE awards for the 20th International Conference on Soil Mechanics and Geotechnical Engineering to be held in Sydney, Australia, in September 2021. Nominations should be submitted to the Secretary General by the closing date of 1 July 2020. For more information and guidelines for the nomination of the various awards please click here.

5. **TC Guidelines – update**

An updated set of Guidelines for the ISSMGE Technical Committees and Honour Lectures are now available from the website - https://www.issmge.org/filemanager/article/390/Guidelines_for_ISSMGE_Technical_Committees_revised_Nov19.pdf

6. **ISSMGE Online Library – Open Access.**

The ISSMGE Online library (https://www.issmge.org/publications/online-library) is in continuous development – please note the following additions:

17th African Regional Conference on Soil Mechanics and Geotechnical Engineering;
17th European Conference on Soil Mechanics and Geotechnical Engineering, Australia New Zealand conference series back catalogue.

7. **TC306 Geo-Engineering Education Survey - A message from the Officers of TC306**

Dear ISSMGE member,

If you are an instructor in a civil engineering department, please contribute to a TC306 Geo-Engineering Education survey. The title of the survey is "What Geotechnical Engineering Educational Material can we dream of?"

If you have very limited time but don't want to miss the opportunity to contribute, just jump to Question 11 (the only required): Please imagine and describe the "educational material of your dreams".

You will find the questionnaire here: https://www.surveymonkey.com/r/TC306

Best regards,
Marina Pantazidou and Michele Calvello
(Chair and Secretary of TC306)

8. **Are We Overdesigning? A survey of international practice**

A joint initiative by the CAPG, the YMPG, TC2015 - Safety and Serviceability and TC304 - Risk. The survey is intended to assess the consistency of calculation models and design methods for a variety of geotechnical structures, and where possible, to compare the results with full scale tests and reliability analyses. To participate in the survey please go to https://www.issmge.org/news/are-we-overdesigning-a-survey-of-international-practice.

9. **Bulletin**

The latest edition of the ISSMGE Bulletin (Volume 13, Issue 5, Oct 2019) is available from the website from:

https://www.issmge.org/publications/issmge-bulletin/vol-13-issue-5-october-2019.

10. **ISSMGE Foundation**

The next deadline for receipt of applications for awards from the ISSMGE Foundation is the 31st January 2020. Click here for further information on the ISSMGE Foundation.

11. **Conferences**

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

ISSMGE Events

The following are events that have been added since the previous Circular:

4TH EUROPEAN CONFERENCE ON PHYSICAL MODELLING IN GEOTECHNICS - 15-03-2020 - 17-03-2020

Luleå Technical University, Sweden; Language: English; Organiser: Luleå Technical University - Jan Laue; Contact person: Per Gunnvard; Address: LTU Laboratorievägen; Phone: +46920493582; Email: per.gunnvard@ltu.se; Website: http://www.ltu.se/ecpmg; Email: jan.laue@ltu.se

SIXTH GEOCHINA INTERNATIONAL CONFERENCE 2021 - 19-07-2021 - 21-07-2021

NanChang, China; Language: English; Organiser: East China Jia Tong University in Cooperation with Chinese Ministry of Education, GeoChina Civil Infrastructure Association, University of Oklahoma; Contact person: Dr. Dar Hao Chen; Address: Texas Transportation Institute; Email: d-chen@tti.tamu.edu; Website: http://geochina2021.geoconf.org/; Email: geochina.adm@gmail.com

Proceedings from the 17th European Conference on Soil Mechanics and Geotechnical Engineering available in open access

https://www.issmge.org/news/proceedings-from-the-17th-european-conference-on-soil-mechanics-and-geotechnical-engineering-available-in-open-access

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

WS2020 Winter School - From research to practice in geotechnical engineering, 12 – 17 January 2020, Ascona, Switzerland, https://geotechnics.ethz.ch/ws2020.html

ISSPDS-Edinburgh 2020 2nd International Symposium on Seismic Performance and Design of Slopes, January 18–22, 2020, Edinburgh, UK, www.isspds.eng.ed.ac.uk

Igs TC-B GEOREINFORCEMENT - GeoReinforcement Developments, Advancements, Durability, Performance and Innovative Applications, 20 – 21 January 2020, Barcelona, Spain, www.geosyntheticssociety.org/tc-reinforcement-tc-barriers-workshops-in-barcelona

Igs TC-B GEOBARRIER - GeoBarrier Developments, Advancements, Durability, Performance and Innovative Applications, 22 – 23 January 2020, Barcelona, Spain, www.geosyntheticssociety.org/tc-reinforcement-tc-barriers-workshops-in-barcelona/#squelch-taas-tab-content-0-1

International Conference on Geotechnical Engineering – Iraq, 19 - 20 February 2020, Baghdad, Iraq, http://issmfe.org/international-iraqi-geotechnical-conference

ASIA 2020 Eighth International Conference and Exhibition on Water Resources and Renewable Energy Development in Asia, 10 - 12 March 2020, Kuala Lumpur, Malaysia, www.hydropower-dams.com/asia-2020

GeoAmericas2020 4th Pan American Conference on Geosynthetics, 26-29 April 2020, Rio de Janeiro, Brazil, www.geoamericas2020.com

WTC 2020 ITA-AITES World Tunnel Conference, 15-21 May 2020, Kuala Lumpur, Malaysia, www.wtc2020.my

14th Baltic Sea Geotechnical Conference 2020 Future Challenges for Geotechnical Engineering, 25 ÷ 27 May 2020, Helsinki, Finland, www.ril.fi/en/events/bsgc-2020.html

Nordic Geotechnical Meeting Urban Geotechnics, 25-27 May 2020, Helsinki, Finland, www.ril.fi/en/events/ngm-2020.html

ICED 2020 First International Conference on Embankment Dams: Dam Breach Modeling and Risk Disposal, 5 – 7 June 2020 in Beijing, China, http://iced-2020.host30.voosite.com

EUROCK 2020 Hard Rock Excavation and Support, 13-19 June 2020, Trondheim, Norway, www.eurock2020.com

DFI Deep Mixing 2020, 15 to 17 June 2020, TBD, Gdansk, Poland, www.dfi.org/DM2020

XIII International Symposium on Landslides - Landslides and Sustainable Development, June 15th – 19th 2020, Cartagena, Colombia, www.scg.org.co/xiii-isl

EGRWSE 2020 - 3rd International Conference on Environmental Geotechnology, Recycled Waste Materials and Sustainable Engineering, 18-20 June 2020, Izmir, Turkey, www.egrwse2020.com

GEE2020 International Conference on Geotechnical Engineering Education 2020, June 24-25, 2020, Athens, Greece, www.erasmus.gr/microsites/1168

E-UNSAT 2020 4th European Conference on Unsaturated Soils - Unsaturated Horizons, 24-06-2020 ÷ 26-06-2020, Lisbon, Portugal, https://eunsat2020.tecnico.ulisboa.pt

10th International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground
29 ÷ 30 June 2020, Cambridge, United Kingdom
www.is-cambridge2020.eng.cam.ac.uk

ISSMGE Technical Committee TC204 is hosting the 10th International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground (IS-Cambridge 2020) to be held in Cambridge, United Kingdom from June 29th to July 1st, 2020.

TC204 of the ISSMGE was first established in 1989 as TC28 and has made major commitments towards collecting information concerning the geotechnical aspects of the design, construction and analysis of deep excavations, tunnels and large underground structures in the urban environment. The first symposium was held in New Delhi in 1994 and eight more symposia were held in London (1996), Tokyo (1999), Toulouse (2002), Amsterdam (2005), Shanghai (2008), Rome (2011), Seoul (2014) and Sao Paulo (2017). TC204 decided to hold a tenth in Cambridge in 2020. The 10th symposium will be organised by TC204 of ISSMGE and the Geo-technical Research Group at the University of Cambridge.

The IS-Cambridge 2020 symposium will include themes in line with the terms of reference of TC204 such as tunnelling in soft ground, deep excavations, field monitoring, physical and numerical modelling, the effect of ground movements on existing structures and mitigation measures. The symposium will act as a platform to disseminate the most recent research and field developments in the design and construction of underground excavations in soft ground through keynote lectures and technical presentations.

Conference Themes

The themes for the Cambridge symposium, in line with the

terms of reference of Technical Committee TC204, are as below.

- Field case studies
- Physical and numerical modelling of tunnels and deep excavations in soft ground
- The effect of underground construction activities on existing structures
- Design and application of ground improvement for underground construction
- Sensing technologies and monitoring for underground construction in soft ground
- Ground movements, interaction with existing structures and mitigation measures
- Seismic response of underground infrastructure in soft ground

Contact us

Information provided by: ifm-events@eng.cam.ac.uk

16th International Conference of the International Association for Computer Methods and Advances in Geomechanics – IACMAG - CHALLENGES and INNOVATIONS in GEOMECHANICS, 01-07-2020 ÷ 04-07-2020, Torino, Italy, www.symposium.it/en/events/2020/16th-international-conference-of-iacmag?navbar=1

7th ICRAGEE International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, 13 – 16 July 2020, Bengaluru, India, http://7icragee.org

3rd International Conference on Geotechnical Engineering (ICGE – Colombo -2020), 10 - 11 August 2020, Colombo, Sri Lanka, http://icgecolombo.org/2020/index.php

ISFOH 2020 4th International Symposium on Frontiers in Offshore Geotechnics, 16 – 19 August 2020, Austin, United States, www.isfog2020.org

2020 CHICAGO International Conference on Transportation Geotechnics, August 30 - September 2, 2020, Chicago, Illinois, USA, http://conferences.illinois.edu/ICTG2020

EUROGEO WARSAW 2020 7th European Geosynthetics Congress, 6-9 September 2020, Warsaw, Poland, www.eurogeo7.org

37th General Assembly of the European Seismological Commission, 6 to 11 September 2020, Corfu, Greece, www.escgreece2020.eu

6th International Conference on Geotechnical and Geophysical Site Characterization "Toward synergy at site characterisation", 7 ÷ 11 September, Budapest, Hungary, www.isc6-budapest.com

CRETE 2020 7th International Conference on Industrial and Hazardous Waste Management, 15th ÷ 18th September 2020, Chania, Crete, Greece, http://hwm-conferences.tuc.gr.

27th European Young Geotechnical Engineers Conference and Geogames

17 – 19 September 2020, Moscow, Russia

https://t.me/EYGEC2020

Organiser: Russian Society for Soil Mechanics, Geotechnics and Foundation Engineering

Contact person: PhD Ivan Luzin

Address: NR MSUCE, 26 Yaroslavskoye shosse
Phone: +7-495-287-4914 (2384)
Email: youngburo@gmail.com

ICEGT-2020 2nd International Conference on Energy Geotechnics, September 20-23, 2020, La Jolla, California, USA, https://icegt-2020.eng.ucsd.edu/home

EUROENGEO 3RD EUROPEAN REGIONAL CONFERENCE OF IAEG, 20-24 September 2020, Athens, Greece, www.euroengeo2020.org

Fourth International DAM WORLD Conference, 21-25th September 2020, Lisbon, Portugal, https://dw2020.lnec.pt

3rd International Symposium on Coupled Phenomena in Environmental Geotechnics, October 29th – 30th, 2020, Kyoto, Japan, https://cpeg2020.org

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

Fourth GeoMEast©2020 International Underground Structures Conference (IUSC), 8-12 November 2020, Cairo, Egypt, http://underground.geomeast.org

10th International Conference on Scour and Erosion (ICSE-10), November 15-18, 2020, Arlington, Virginia, USA, www.engr.psu.edu/xiao/ICSE-10 Call for abstract.pdf

GeoAsia 2021

7th Asian Regional Conference on Geosynthetics

March 1-4, 2021, Taipei, Taiwan

MSL-2021

The 1st Mediterranean Symposium on Landslides
SLOPE STABILITY PROBLEMS IN STIFF CLAYS AND FLYSCH FORMATIONS
7-9 June2021, Naples, Italy

Topics

Landslides represent a relevant problem for most of the countries overlooking the Mediterranean. This trivial consideration should prompt researchers, professionals, and stakeholders in this region to form closer relationships and engage themselves in a continuous exchange of data and ideas to find common strategies of landslide risk mitigation.

A common problem concerns the stability of slopes in hard fissured soils, weak rocks and flysch deposits, which are widespread all over the region, posing major problems to the development of these areas.

It is evident that the behavior of such a wide and complex class of materials, spreading across large areas in this corner of the world, cannot be interpreted simply through the basic laws of the Soil or Rock Mechanics. With the goal in mind of urging people living on the Mediterranean to join their efforts, we decided to organize a Mediterranean Symposium on Landslides (MSL) in Napoli in June, 2021, hoping that this initiative will be the first of a series of similar periodic events.

Sessions

I. Geological Setting, Triggers and Mechanisms

II. Investigations, Monitoring and Analysis

III. Remedial Measures, Landslide-Structure / Infrastructure Interaction

Contact

Chairman of the Technical Committee:
Prof. Luca Comegna
Email: luca.comegna@unicampania.it

EUROCK TORINO 2021 - ISRM European Rock Mechanics Symposium Rock Mechanics and Rock Engineering from theory to practice, 21-25 June 2021, Torino, Italy, http://eurock2021.com

SYDNEY ICSMGE 2021 20th International Conference on Soil Mechanics and Geotechnical Engineering, 12-17 September 2021, Sydney, Australia, www.icsgme2021.org

LATAM 2021 – IX Latin American Rock Mechanics Symposium Challenges in rock mechanics: towards a sustainable development of infrastructure, 20-22 September 2021, Asuncion, Paraguay, https://larms2021.com

3rd European Conference on Earthquake Engineering & Seismology, 19 – 24 June 2022, Bucharest, Romania, https://3ecees.ro

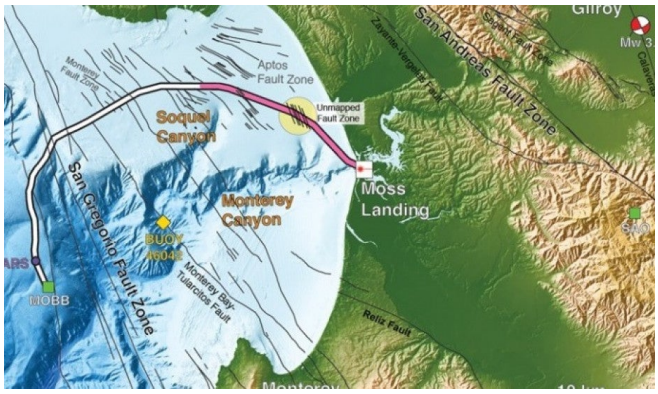
UNSAT2022
8th International Conference on Unsaturated Soils
June or September 2022, Milos island, Greece

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Υποθαλάσσια καλώδια οπτικών ινών σε ρόλο σεισμογράφων

Τα καλώδια οπτικών ινών, τα οποία μεταφέρουν πληροφορίες με τη μορφή φωτός, δεν είναι καλά μόνο για το γρήγορο «κατέβασμα» αρχείων, αλλά και για την ανίχνευση σεισμών, ακόμη και μέσα στη θάλασσα, αναφέρει το ΑΠΕ-ΜΠΕ. Ερευνητές στις ΗΠΑ, για πρώτη φορά στον κόσμο, δοκίμασαν με επιτυχία ένα υποθαλάσσιο τηλεπικοινωνιακό καλώδιο οπτικών ινών σε ρόλο δικτύου σεισμογράφων.

Η δοκιμή, που έγινε στον Κόλπο του Μοντερέι της Καλιφόρνια στον Ειρηνικό Ωκεανό, έδειξε ότι τα υποθαλάσσια καλώδια οπτικών ινών πράγματι μπορούν να ανιχνεύσουν σεισμούς και ρήγματα κάτω από το βυθό, συνεπώς στο μέλλον θα μπορούσαν να αξιοποιηθούν ευρύτερα από τους γεωλόγους και τους σεισμολόγους.



Οι ερευνητές των πανεπιστημίων Καλιφόρνια-Μπέρκλεϊ και Ράις του Τέξας, καθώς επίσης του Εθνικού Εργαστηρίου Μπέρκλεϊ και του Ερευνητικού Ινστιτούτου MBARI, που έκαναν τη σχετική δημοσίευση στο περιοδικό «Science», ανέφεραν ότι, καθώς τα καλώδια οπτικών ινών αποτελούν πλέον ένα παγκόσμιο υποθαλάσσιο τηλεπικοινωνιακό δίκτυο, θα βοηθήσουν μελλοντικά τους επιστήμονες να μελετούν τόσο τους υποθαλάσσιους σεισμούς, όσο και τις σεισμογενείς γεωτεκτονικές δομές βαθιά κάτω από τη θάλασσα.

Η νέα τεχνολογία της «φωτονικής σεισμολογίας» (Distributed Acoustic Sensing), που είναι ευαίσθητη ακόμη και σε αλλαγές της τάξης των νανομέτρων (δισεκατομμυριοστών του μέτρου), χρησιμοποιεί την αποστολή παλμών φωτός λέιζερ για να ανιχνεύει σε συνεχή βάση τις παραμικρές κινήσεις κατά μήκος των καλωδίων των οπτικών ινών.

Το τετραήμερο πείραμα στον Κόλπο του Μοντερέι μετέτρεψε ένα καλώδιο οπτικών ινών μήκους 20 χιλιομέτρων στο ισοδύναμο ενός δικτύου 10.000 σεισμογράφων τοποθετημένων στο βυθό σε βάθος 100 μέτρων. Οι ερευνητές ανίχνευσαν έναν σεισμό μεγέθους 3,5 βαθμών, καθώς και άγνωστα έως τώρα υποθαλάσσια ρήγματα. Είχε προηγηθεί ανάλογο πείραμα νωρίτερα φέτος με καλώδιο οπτικής ίνας μήκους 22 χιλιομέτρων στην ξηρά, κοντά στο Σακραμέντο της Καλιφόρνια.

Ελάχιστοι σεισμογράφοι υπάρχουν σήμερα στις θάλασσες της Γης, με συνέπεια το 70% της επιφάνειας της να μην διαθέτει καθόλου ανιχνευτές σεισμών. «Υπάρχει τεράστια ανάγκη για σεισμολογία στο βυθό. Οποιοδήποτε όργανο, ακόμη κι αν καλύπτει μόνο έως 50 χιλιόμετρα από την ακτή, θα είναι πολύ χρήσιμο», δήλωσε ο επικεφαλής ερευνητής Νέιτ Λίντσεϊ.

Το υποθαλάσσιο καλώδιο που χρησιμοποιήθηκε για το πρωτοποριακό πείραμα, είχε τοποθετηθεί στον βυθό το 2009 και μετατράπηκε σε σεισμογραφικό δίκτυο στη διάρκεια μιας συντήρησης πέρυσι, όταν τέθηκε εκτός του τηλεπικοινωνιακού δικτύου. «Πρόκειται πραγματικά για μια έρευνα στα σύνορα της σεισμολογίας. Είναι η πρώτη φορά που κάποιος χρησιμοποίησε υποθαλάσσια καλώδια οπτικών ινών για να ανιχνεύσει σεισμικά ωκεανογραφικά σήματα και να κάνει απεικόνιση των υποθαλάσσιων ρηγμάτων. Ένα από τα τυφλά σημεία στο σεισμογραφικό δίκτυο παγκοσμίως είναι ακριβώς οι ωκεανοί», τόνισε ο καθηγητής γεωφυσικής Τζόναθαν Έιτζο-Φράνκλιν.

Ο τελικός στόχος των ερευνητών είναι να χρησιμοποιήσουν το πυκνό δίκτυο οπτικών ινών σε όλο τον κόσμο τόσο στην ξηρά όσο και στη θάλασσα (πάνω από δέκα εκατομμύρια χιλιόμετρα) ως ευαίσθητο καταγραφέα της κίνησης της Γης και ειδικότερα των σεισμών, ιδίως στις περιοχές που έχουν ελλείψεις σεισμογράφων. Γι' αυτό, θα ακολουθήσουν νέα πειράματα με καλώδια οπτικών ινών σε μεγαλύτερα βάθη και σε επικλινή βυθό.

(Η ΚΑΘΗΜΕΡΙΝΗ, 02.12.2019,
https://www.kathimerini.gr/1054373/article/epikairothta/episthmh/ypo8alassia-kalwdia-optikwn-inwn-se-rolo-seismografwn

Λεπτομέρειες στη συνδρομητική σελίδα του ΑΠΕ-ΜΠΕ.
https://www.amna.gr/home/article/412361/Kalodio-optikon-inon-egine-diktuo-seismografon-stin-Kalifornia

Σύνδεσμος για την επιστημονική δημοσίευση:
https://science.sciencemag.org/cgi/doi/10.1126/science.aay5881)

Illuminating seafloor faults and ocean dynamics with dark fiber distributed acoustic sensing

Nathaniel J. Lindsey, T. Craig Dawe and Jonathan B. Ajo-Franklin

Marine observations with optics

Placing sensors on the seafloor is difficult, but a sensor network has huge potential for observing processes occurring both below and above the seafloor. Lindsey *et al.* measured acoustic vibrations collected by attaching a laser to the Monterey Accelerated Research System's subsea optical fiber during a maintenance period (see the Perspective by Jousset). Acoustic waves were monitored by changes in laser light along the cable. The observations from just a few days allowed mapping of an unknown fault system and detection of several dynamic processes in the water column above.

Abstract

Distributed fiber-optic sensing technology coupled to existing subsea cables (dark fiber) allows observation of ocean and solid earth phenomena. We used an optical fiber from the cable supporting the Monterey Accelerated Research System during a 4-day maintenance period with a distributed acoustic sensing (DAS) instrument operating onshore, creating a ~10,000-component, 20-kilometer-long seismic array. Recordings of a minor earthquake wavefield identified multiple submarine fault zones. Ambient noise was dominated by shoaling ocean surface waves but also contained observations of in situ secondary microseism generation, post–low-tide bores, storm-induced sediment transport, infragravity waves, and breaking internal waves. DAS am-

plitudes in the microseism band tracked sea-state dynamics during a storm cycle in the northern Pacific. These observations highlight this method's potential for marine geophysics.

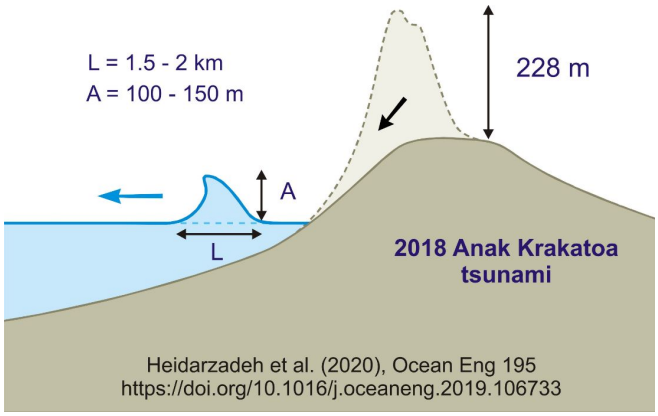
(*Science* 29 Nov 2019: Vol. 366, Issue 6469, pp. 1103-1107, DOI: 10.1126/science.aay5881, http://www.sciencemag.org/about/science-licenses-journal-article-reuse)

Tsunami triggered by 2018 Anak Krakatoa eruption reached 100 m (328 feet), new study finds

New research shows that the fatal 2018 volcanic eruption of Anak Krakatoa in Indonesia sent a tsunami at least 328 feet (100 m) high, which could have resulted in widespread devastation had it traveled on another path. The researchers say this study is important for coastal communities living near volcanoes as it is the first to show that such a big wave could be generated by the 2018 Anak Krakatoa eruption.

More than 400 people were killed in December 2018 when Anak Krakatoa exploded and partially collapsed in the ocean, unleashing a wave westward towards Sumatra island which was between 5 to 13 m (16 to 43 feet) high when it made landfall less than an hour later.

However, this new study from Brunel University London and the University of Tokyo has shown that the calamity could have been significantly worse had the wave that started between 328 to 492 feet (100 to 150 m) went towards closer shores.



"When volcanic materials fall into the sea they cause displacement of the water surface," said lead author Dr. Mohammad Heidarzadeh, an assistant professor of civil engineering at Brunel. "Similar to throwing a stone into a bathtub-- it causes waves and displaces the water."

He continued, "In the case of Anak Krakatoa, the height of the water displacement caused by the volcano materials was over 100 m (328 feet)."

The height of the wave immediately shrunk due to the joint effects of gravity pulling the mass of water downward and the friction created between the tsunami and the ocean floor. It was still more than 262 feet (80 m) when it slammed an uninhabited island nearby.

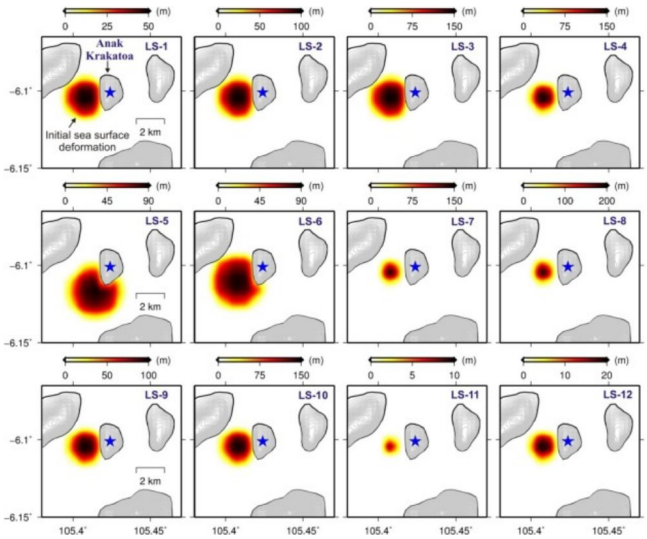
"Fortunately, nobody was living on that island," said Heidarzadeh. "However, if there was a coastal community close to the volcano-- say, within 5 km (3 miles)-- the tsunami height would have been between 50 and 70 m (164 and 230 feet) when it hit the coast."

As a context, Heidarzadeh cited the 1883 Krakatoa eruption which produced a tsunami that hit land at a maximum height of 42 m (138 feet), killing at least 36 000 at a time when coastal areas were less populated.

Researchers used sea-level data from five locations near Anak Krakatoa for the new analysis to justify computer models that simulated the tsunami's movements-- from the volcano's collapse to the landfall.

"The measurements were done by wave gauges operated by the government of Indonesia," Heidarzadeh said. "We used that real data to make sure that our simulations are consistent with reality-- it's extremely important to validate computer simulations with real-world data."

Indonesia is one of the countries in the world that are vulnerable to tremors and tsunamis. The nation was hit by two deadly waves in 2018-- one was unleashed by Krakatoa and one by a landslide off of Sulawesi coast that killed more than 2 000.



The movement of the tsunami wave following the volcano's collapse. Image credit: Heidarzadeh, et al.

In the present, Heidarzadeh will be working with the Indonesian Institute of Sciences (LIPI) and Agency for the Assessment & Application of Technology (BPPT) to map the country's eastern ocean floor and develop a new tsunami resilience plan, funded by The Royal Society.

Reference

"Numerical modeling of the subaerial landslide source of the 22 December 2018 Anak Krakatoa volcanic tsunami, Indonesia" - Heidarzadeh, M. et al - Ocean Engineering - DOI: 10.1016/j.oceaneng.2019.106733

Abstract

The eruption of the Anak Krakatoa volcano (Indonesia) in December 2018 produced a destructive tsunami with maximum runup of 13 m killing 437 people. Since the occurrence of this rare tsunami, it has been a challenge as how to model this tsunami and to reconstruct the network of coastal observations. Here, we apply a combination of qualitative physical modeling and wavelet analyses of the tsunami as well as numerical modeling to propose a source

model. Physical modeling of a volcano flank collapse showed that the initial tsunami wave mostly involves a pure-elevation wave. We identified initial tsunami period of 6.3–8.9 min through Wavelet analysis, leading to an initial tsunami dimension of 1.8–7.4 km. Twelve source models were numerically modelled with source dimensions of 1.5–4 km and initial tsunami amplitudes of 10–200 m. Based on the qualities of spectral and amplitude fits between observations and simulations, we constrained the tsunami source dimension and initial amplitude in the ranges of 1.5–2.5 km and 100–150 m, respectively. Our best source model involves potential energy of 7.14 × 1013–1.05 × 1014 J equivalent to an earthquake of magnitude 6.0–6.1. The amplitude of the final source model is consistent with the predictions obtained from published empirical equations.

(Julie Celestial / THE WATCHERS, December 7, 2019, https://watchers.news/2019/12/07/tsunami-triggered-by-2018-anak-krakatoa-eruption-reached-328-feet-100-m-new-study-finds/)

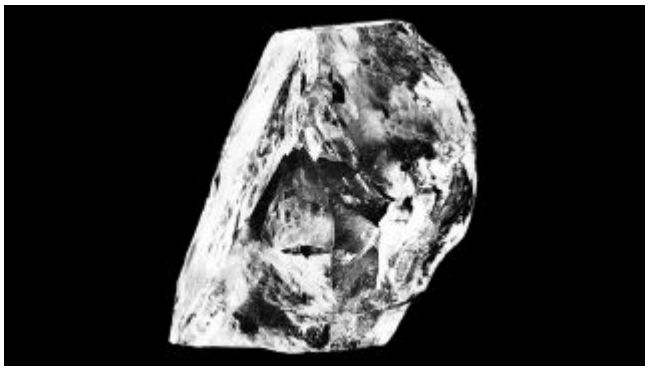
Highlights

- Initial tsunami wave is a pure-elevation wave based on our physical modeling.
- The dominant tsunami period is 6.3–8.9 min giving tsunami length of 1.8–7.4 km.
- Final tsunami source has a length of 1.5–2.5 km and amplitude of 100–150 m.
- Our model has energy of 7.14×10^{13}–1.05×10^{14} J equivalent to M 6.0 earthquake.

(https://www.sciencedirect.com/science/article/pii/S0029801819308431?via%3Dihub)

Diamonds Buried 400 Miles Below Surface Could Explain Mysterious Earthquakes

What's driving Earth's deepest earthquakes? Diamonds may hold answers.



The Cullinan diamond was mined in Premier Mine in South Africa in 1905. The same mine has yielded superdeep diamonds, which could hold secrets to the quakes occurring in the mantle's transition zone.

SAN FRANCISCO — Deep under Earth's surface, earthquakes rumble in the mantle's transition zone, the area that divides the upper mantle from the lower. Liquid in the mantle is thought to play a part in driving those deep earthquakes, but until now, no smoking gun could prove that fluid was present at those depths.

Now, scientists think they may have found evidence of fluid in an unlikely place: inside superdeep diamonds.

While most diamonds crystallize at depths of 87 to 124 miles (140 to 200 kilometers), superdeep diamonds are found as far as 373 to 497 miles (600 to 800 km) below the surface. Inside these gems forged at depth are tiny flaws, or inclusions, made by fluids. These flaws reveal that liquid is likely flowing in the mantle layers where the diamonds formed.

It's this liquid that interests scientists studying the deep Earth, geochemist Steven Shirey, a senior research scientist at the Carnegie Institution for Science in Washington, D.C., told Live Science at the annual meeting of the American Geophysical Union (AGU). That's because the location and movement of these fluids might be the key to understanding deep earthquakes, Shirey said.

In new research, presented at the AGU meeting on Tuesday (Dec. 10), Shirey and his colleagues modeled the movement of fluid at depth using information about the spots where these diamonds formed in the mantle.

In creating these models, the scientists are hoping to connect the dots among fluid movement into the deep mantle, diamond formation "and the physical rupture properties of the rocks in that region" of the mantle-transition zone, Shirey said. As a next step, researchers need to "relate the currents of those fluids to deep-focus earthquakes," he explained.

Deep earthquakes are energetic, frequent and "a very interesting manifestation of plate tectonics — kind of as deep as we can see plate tectonics," Shirey said.

Just what happens at that frontier of plate tectonics "turns out to be a very interesting planetary question," he said.

(Mindy Weisberger - Senior Writer / LIVESCIENCE, 16 December 2019, https://www.livescience.com/superdeep-diamonds-earthquakes.html)

Deep Focus Earthquakes, Deep Slab Fluids, and Superdeep Diamonds

Steven B Shirey, Lara S Wagner, Michael J Walter, Peter E van Keken, Graham Pearson

Abstract

The mechanism to generate deep focus earthquakes that occur in slabs in the mantle transition zone remains an unsolved problem. While fluids are the likely cause of earthquakes at intermediate depths by fluid-related earthquake tiggering, previous geochemical studies [1] and thermal modeling [2] suggest substantial slab dehydration by the transition zone. The role of fluids in deep earthquake generation depends critically on the ability of subducting slabs to retain and transport fluids. We present a new analysis of thermal structures of subducted slabs that reach transition zone depths. We use published phase relations for serpentinized peridotite and temperatures calculated at the depth of the slab Moho (assumed to be 7 km below the top of the slab). There is a remarkable correlation between the absence of deep earthquakes in warm slabs that are predicted to dehydrate at shallow depths versus the presence of deep earthquakes in cool slabs that are predicted to transport water to the transition zone. Cool slabs retain water in dense hydrous magnesium silicate phases until

they stall in the transition zone, warm up, and dehydrate. The presence of water-rich fluids in the transition zone is confirmed by the superdeep diamonds that crystallize there. These diamonds form in veins or cracks from supercritical fluids or metallic liquids and have a subducted-slab affinity based on their carbon isotopic compositions and inclusion mineralogies [3]. Many inclusions either retain water or display fluid jackets with water break-down products such H_2 or CH_4 [3]. The demonstrated presence of fluids in diamonds combined with a mechanism to transport and release the water indicates that dehydration-related processes are the likely cause of deep focus earthquakes. [1] Dixon *et al*. (2002) Nature **420**, 385-389. [2] van Keken *et al*. (2011) JGR **116**, B01401. [3] Pearson *et al*. (2014) Nature **507**, 221-224; Smith *et al.* (2016) Science **354**, 1403-1405; Smith *et al*. (2018) Nature **560**, 84-87.

(AGU100 FALL MEETING, San Francisco, California, 9-13 December 2019, V23H-0196, https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/522475)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Radar Uncovers Viking Ship Buried on Norway Farm

The remains of a Viking ship have been discovered on a farm near a medieval church at Edøy, on the island of Smøla, in Norway.

The ship, which is 52 to 56 feet (16 to 17 meters) long, appears to be part of a burial mound, suggesting that it was used to bury someone important, said its discoverers, archaeologists Manuel Gabler and Dag-Øyvind Engtrø Solem, both with the Norwegian Institute for Cultural Heritage Research (NIKU).

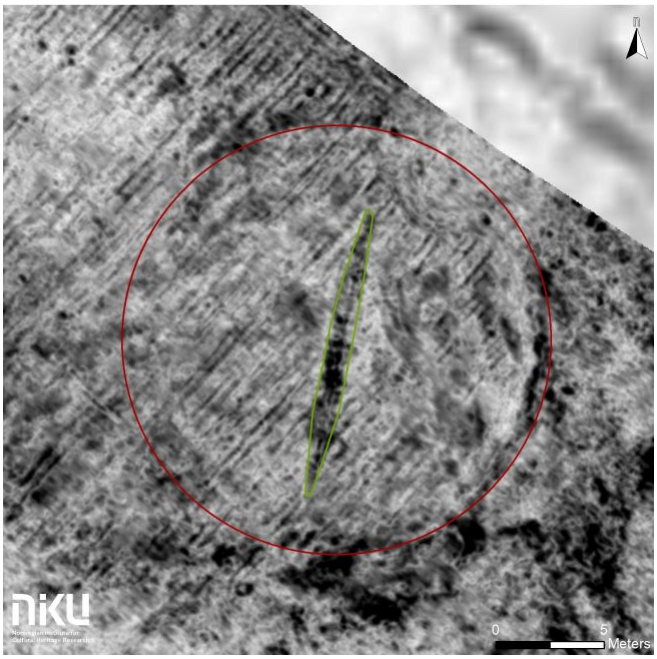
They don't know if there is a skeleton or multiple skeletons inside the boat.

The archaeologists used high-resolution georadar mounted on a cart to make the discovery. In fact, it was almost by chance they spotted the ship's outline.

The ship was found near this medieval church by archaeologists using georadar mounted on a cart.

The georadar revealed two houses, highlighted here in orange, near the ship. They are likely part of a settlement.

"We had actually finished the agreed-upon area, but we had time to spare and decided to do a quick survey over another field. It turned out to be a good decision," Manuel Gabler, an archaeologist with NIKU, said in a statement.



The remains of a Viking ship that was 52 to 56 feet (16 to 17 meters) long were found near a medieval church at Edøy, on the island of Smøla in Norway.

The ship dates back more than 1,000 years to the time of the Vikings or even a bit earlier, Knut Paasche, head of the Department of Digital Archaeology at NIKU and an expert on Viking ships, said in a statement.

Radar images had enough resolution to make out what was left of the fore and aft, which had been nearly destroyed in the past by farming plows. The hull seems to be in good shape, according to a news report by Ars Technica. The radar also revealed the remains of two houses, likely part of a Viking settlement, but the archaeologists aren't sure of the structures' age. Archaeologists and local authorities hope to do a larger survey of the area around the ship burial. It's not certain when the ship itself will be excavated, although it won't be done in the near future, said a spokesperson for NIKU.

The survey at Edøy was done as a collaboration between Møre and Romsdal County, Smøla municipality and NIKU. The Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology helped develop the georadar technology used in the survey.

(Owen Jarus - Live Science Contributor / LIVESCIENCE, 4.12.2019, https://www.livescience.com/viking-ship-georadar-norway.html)

The 'slow earthquakes' that we cannot feel may help protect against the devastating ones

Earthquakes are sudden and their shaking can be devastating. But about 20 years ago, a new type of earthquake was discovered. We cannot feel them, and geologists still know very little about them, such as how often they occur.

Unlike regular earthquakes, which can cause visible damage, slow earthquakes cannot be felt at the Earth's surface.

Regular earthquakes occur when rock underground breaks along a fault—a crack in the Earth's crust that commonly forms a boundary between tectonic plates—and slips at a speed of about a metre per second.

Previously, it was thought that unless there's an earthquake, faults move very slowly, at fingernail growth rate. Then, better earthquake-detection instruments revealed that there is a whole range of slip speeds in between. These are known as slow earthquakes and can last days, months or sometimes even years.

"Earth movement accelerates but it doesn't accelerate to the point where it makes an earthquake that can be felt on the surface," said Dr. Ake Fagereng, a geologist at Cardiff University in the UK.

There are still many questions to be answered about slow earthquakes though. How they happen, for example, still isn't clear, as well as what the repercussions might be.

Dr. Fagereng and his colleagues are especially interested in slow earthquakes' relationship to regular ones and the conditions that give rise to these events, which they are investigating as part of a project called MICA. "If we can figure that out, then we can hopefully also get at whether those conditions can change so that an earthquake speeds up," said Dr. Fagereng.

In addition to drilling into an offshore area in New Zealand that experiences slow earthquakes, the team has been visiting regions in Japan, Namibia, Cyprus and the UK that would have experienced them in the past. Since they occur deep below the surface of the Earth, which is hard to study, the researchers have chosen areas that were once at the appropriate depths and conditions but have been brought to the surface over time due to erosion and uplift.

"We are looking for structures that formed (as a result of slow earthquakes) and what they tell us about how the rocks accommodated that slip," said Dr. Fagereng.

Creep

Their theory is that slow earthquakes occur when creep—tiny, continuous movements in a fault—accelerates throughout the fault zone, which can be several kilometres thick. Their field observations showed that a fault can be made up of different rock types of varying strength, such as solid basalt and granite and weaker clay-rich sediment. They suspected that stronger rocks start to fracture as creep speeds up due to weaker rocks moving around them but couldn't explain exactly why.

Using information from their fieldwork, they've now developed a mathematical model to reproduce their theory and describe some of the physics behind it. A mixture of rocks with different deformation styles—such as breaking or bending—seems to be key. A proportion of creeping weak rock is required, as well as locally high enough pressure to cause some rock to rupture.

"A possibility for these slow earthquakes is that you have a thick creeping zone with embedded stronger (rock) bits," said Dr. Fagereng.

The team is planning to follow up with more field observations to refine their model. They still can't explain why slow earthquakes occur at particular locations, for example, and why they are much more predictable than regular earthquakes, often occurring at set intervals.

Dr. Fagereng thinks that findings from the project could help improve earthquake and tsunami forecasting. Last year, researchers found the first evidence of a slow earthquake preceding a regular earthquake in an area west of Fairbanks, Alaska, in the US. But the link between the two types of tremors isn't well understood. In some cases, slow earthquakes could also alleviate stress that would otherwise build up and cause a larger earthquake.

"We're hoping to get somewhere on what the relation is between slow earthquakes and regular earthquakes," said Dr. Fagereng. "And then that could potentially feed into models for what size earthquake you can get in different regions."

Lab experiments could also shed light on the physics of slow earthquakes. Dr. Nicolas Brantut from University College London in the UK and his colleagues are using bespoke machines that can deform rock samples at high pressures and temperatures to mimic conditions deep below the surface of the Earth.

Exposed areas of rock on Kyushu Island, southern Japan, are among those being studied by researchers for evidence of past slow earthquakes.

Brittle-plastic transition

His team is particularly interested in the brittle-plastic transition, a region about 10 to 15 kilometres below the surface where the behaviour of rocks changes. Above this zone they are brittle, whereas beneath it they flow due to the high temperature and pressure which increase with depth. "The brittle part is where you have earthquakes," said Dr. Brantut.

However, slow earthquakes seem to occur in the brittle-plastic zone, based on seismological observations. In many

cases, they also take place at the same temperature and pressure conditions found in this region. But so far, slow slip events have typically been modelled based on the frictional forces at a fault without taking into account the peculiarities of the brittle-plastic transition zone where rocks start to flow.

"The interactions between friction mechanisms and plastic flow mechanisms are not understood well enough to rule them out as mechanisms for slow earthquakes," said Dr. Brantut.

As part of the RockDEaF project, Dr. Brantut and his team are investigating the motion of rocks at the brittle-plastic transition. They are replicating the conditions in this region on pieces of rock centimetres long to see whether they fracture or flow. "We want to understand how these mechanisms compete with each other," said Dr. Brantut.

Simulating

So far, the team has examined the brittle-plastic transition by simulating a fault in the Earth's crust in a block of marble. They investigated the behaviour of the rock at different pressures and were expecting to find a sharp transition between brittle and plastic behaviour.

However, they were surprised to find that both behaviours occurred simultaneously under a wide range of pressure conditions. "This is something that I think nobody has realised before," said Dr. Brantut. "The fact that we can have both friction and deformation in a continuum at the same time."

Dr. Brantut thinks that results from the project could help pin down where slow earthquakes could occur by determining the conditions and properties of rock that are required.

But they could also provide new clues about the depths at which regular earthquakes originate. Temperature below the surface of the Earth increases as a function of depth, which is typically an increase of 10°C to 40°C per kilometre in the crust. An earthquake's lowest point of origin is thought to coincide with depths that reach 600°C, since rocks become supple when they surpass this temperature and therefore can't fracture and generate an earthquake. However better understanding of the transition in rock behaviour should help determine if temperature is the deciding factor.

"We should understand more about what really controls how deep we can expect earthquakes to propagate," said Dr. Brantut.

(Sandrine Ceurstemont, Horizon: The EU Research & Innovation Magazine December 10, 2019, https://phys.org/news/2019-12-earthquakes-devastating.html)

Μπορεί να προβλεφθεί μια έκρηξη ηφαιστείου;

Το ερώτημα που γεννάται είναι το εξής: Μπορούμε, και αν ναι σε ποιο βαθμό, να προβλέπουμε μια έκρηξη ηφαιστείου και το πόσο σοβαρή θα είναι αυτή;

Συνολικά 6 άνθρωποι έχουν χάσει τη ζωή τους, ενώ οκτώ εξακολουθούν να αγνοούνται -και σύμφωνα με την αστυνομία είναι πιθανότατα νεκροί- τη στιγμή που περισσότεροι από 30 τραυματίστηκαν από την έκρηξη του ηφαιστείου του νησιού Γουάιτ, το οποίο είναι ένα από τα πιο ενεργά της Νέας Ζηλανδίας.

Η λίστα των νεκρών θα μπορούσε να είναι κατά πολύ μικρότερη, εάν στο σημείο δεν βρισκόντουσαν τουρίστες. Οι εν λόγω τουρίστες βρίσκονταν εκεί, παρά την πρόσφατη αύξηση του δραστηριότητας του ηφαιστείου.

Ωστόσο, η πρωθυπουργός της χώρας Τζασίντα Άρντερν δήλωσε ότι υπάρχουν ερωτήματα που πρέπει να απαντηθούν και ότι η κυβέρνηση θα ερευνήσει το περιστατικό

Μάλιστα, σύμφωνα με τοπικά ΜΜΕ, τις τελευταίες εβδομάδες υπήρχαν προειδοποιητικά σημάδια. Τον περασμένο μήνα το επίπεδο συναγερμού για το εν λόγω ηφαίστειο αυξήθηκε σε «μέτρια έως αυξημένη ηφαιστειακή αναταραχή».

Παρ᾽όλα αυτά η άμεση έκρηξη του ηφαιστείου φαίνεται έπιασε τις αρχές… στον ύπνο.

Έτσι το ερώτημα που γεννάται είναι το εξής: Μπορούμε, και αν ναι σε ποιο βαθμό, να προβλέπουμε μια έκρηξη ηφαιστείου και το πόσο σοβαρή θα είναι αυτή;

Το συγκεκριμένο ερώτημα δεν μπορεί να απαντηθεί με ένα «ναι» ή ένα «όχι».

Αυτό διότι είναι πάρα πολύ δύσκολο να γνωρίζουμε πότε θα μπορούσε να συμβεί μια έκρηξη, ειδικά όταν ένα ηφαίστειο έχει υπάρξει αδρανές για πολλά χρόνια.

Από την άλλη πλευρά, υπάρχουν κάποια σημάδια που υποδεικνύουν στους επιστήμονες ότι… κάτι συμβαίνει. Πρόκειται για πιθανούς σεισμούς και εκπομπές αερίων.

Για παράδειγμα, ένα σημάδι, το οποίο θα έκανε τους επιστήμονες να κρούουν τον κώδωνα του κινδύνου, είναι να παρατηρήσουν μια αυξημένη εκροή αερίου από τις ηφαιστειακές οπές.

Ωστόσο και πάλι είναι σχεδόν αδύνατο να προβλεφθεί αν η έκρηξη θα συμβεί σε μία ώρα, σε ένα μήνα ή ακόμα και πολύ αργότερα.

Ο χρονικός ορίζοντας μπορεί να γίνει λίγο πιο ξεκάθαρος όσο

περισσότερα δεδομένα έχουν οι ηφαιστειολόγοι για ένα συγκεκριμένο ηφαίστειο.

Για καλή μας τύχη τα περισσότερα ηφαίστεια τείνουν να δίνουν αυτές τις ενδείξεις εβδομάδες ή ακόμα και μήνες πριν μια πιθανή έκρηξη. Ωστόσο, υπάρχουν και ορισμένες εκρήξεις που είναι πολύ πιο ξαφνικές και απροσδόκητες.

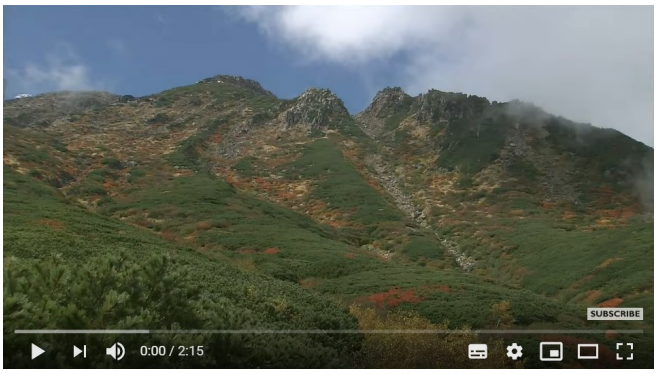
Είναι, επίσης, πολύ δύσκολο να ερευνήσουμε τις εκρήξεις όταν τα ηφαίστεια έχουν παραμείνει αδρανή για πολύ μεγάλο χρονικό διάστημα ή ήταν ενεργά πριν από την εισαγωγή της σύγχρονης τεχνολογίας παρακολούθησης.

Το 1991, περίπου 5.000 ζωές σώθηκαν μετά από εντολή εκκένωσης της περιοχής γύρω από το όρος Pinatubo στις Φιλιππίνες.

Για να παρθεί η απόφαση εκκένωσης και απομάκρυνσης τόσου κόσμου χρειάστηκε να παρακολουθήσουν την αυξανόμενη δραστηριότητα για περίπου 10 εβδομάδες, στις οποίες περιλαμβάνονταν μια σειρά μικρότερων εκρήξεων.

Ήταν μια από τις μεγαλύτερες εκρήξεις του περασμένου αιώνα.

Σε άλλες περιπτώσεις, ωστόσο, όπως η έκρηξη του Mount Ontake στην Ιαπωνία το 2014, ήρθε τόσο ξαφνικά που δεν πρόλαβε να σημάνει καν συναγερμός.



Video: Japan volcano shoots rock & ash on Mount Ontake - BBC News
https://www.youtube.com/watch?time_continue=4&v=aQtkoLxqUNQ&feature=emb_logo

(Rescue teams in Japan have resumed their search for survivors of a volcanic eruption on Saturday. At least 31 people are believed to have died when Mount Ontake shot plumes of rock and ash into the air. Hundreds of hikers were on the volcano at the time of the eruption. Most walked down to safety but others were trapped. Rupert Wingfield-Hayes reports.)

Παράλληλα, υπήρξαν και φορές που άνθρωποι απομακρύνθηκαν άσκοπα από μια περιοχή, ενώ τελικά δεν έγινε καμία έκρηξη.

Συμπερασματικά, η αποτελεσματικότητα των εθνικών οργανισμών παρακολούθησης ηφαιστείου ποικίλει ανάλογα με το επίπεδο τόσο των πόρων, όσο και της εμπειρογνωμοσύνης.

(Πάνος Καισσαράτος / in.gr, 11 Δεκεμβρίου 2019, https://www.in.gr/2019/12/11/tech/mporei-na-provlefthei-mia-ekriksi-ifaisteiou/)

Anak Krakatau Volcano Incredible Drone Footage after Collapse & Major Eruption

https://www.youtube.com/watch?time_continue=35&v=I-3A4GR-VnU&feature=emb_logo

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Global Temperature Trends From 2500 B.C. To 2040 A.D.

Cliff Harris[1] and Randy Mann[2]
[1] Climatologist [2] Meteorologist

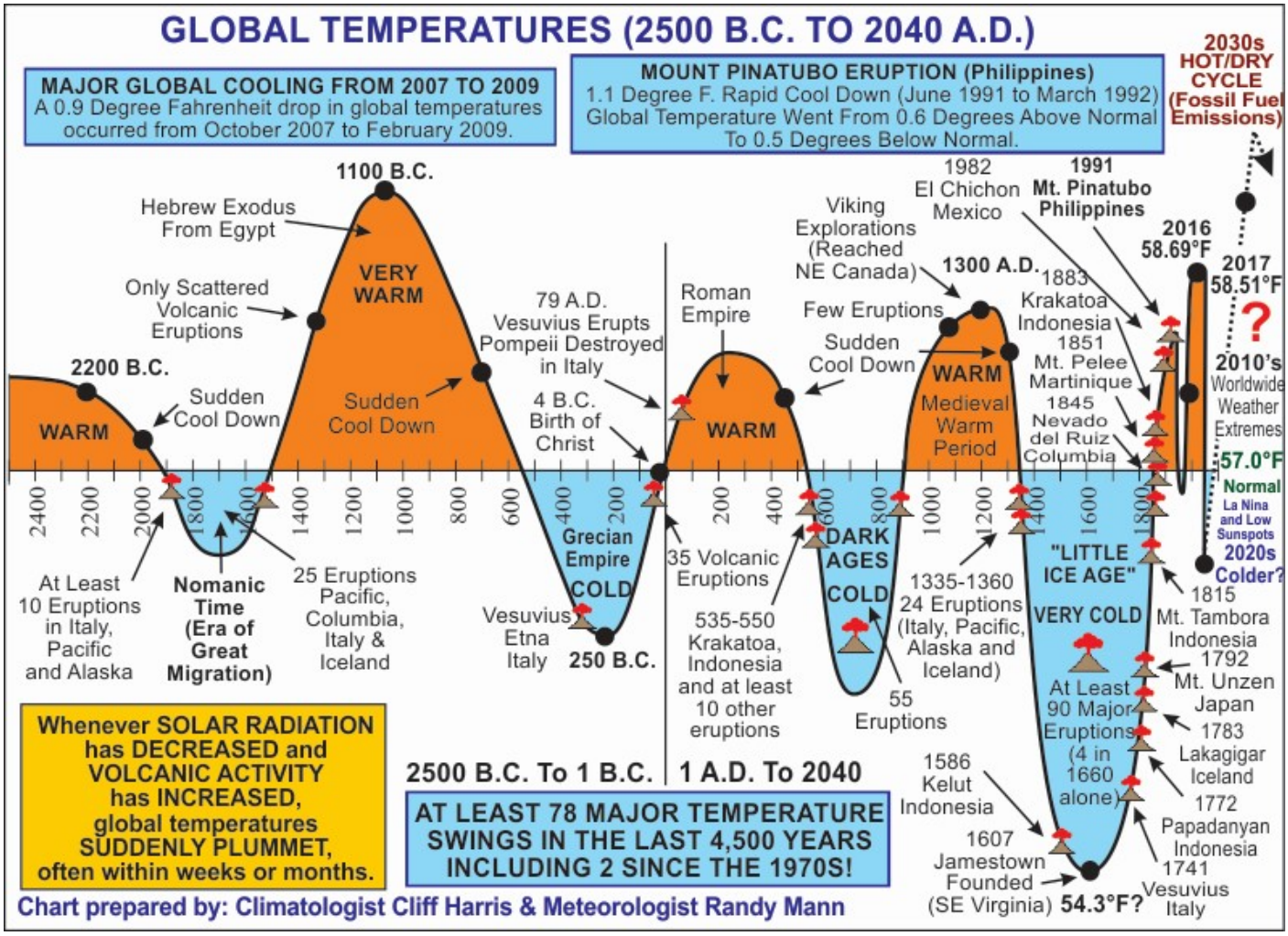
Until late 2006, global temperatures were more than a degree Fahrenheit warmer when compared to the 20th Century average. From August of 2007 through February of 2008, the Earth's mean temperature dropped to near the 20th Century average of 57 degrees. Since that time, land and ocean readings have rebounded to the highest levels in recorded history in 2016 with a temperature of 58.69 degrees Fahrenheit. For 2017, the global temperature was 58.51 degrees Fahrenheit.

We, Climatologist Cliff Harris and Meteorologist Randy Mann, believe in rather frequent climate changes in our global weather patterns. Geologic evidence shows our climate has been changing over millions of years. The warming and cooling of global temperatures are likely the result of long-term climatic cycles, solar activity, sea-surface temperature patterns and more. However, Mankind's activities of the burning of fossil fuels, massive deforestations, the replacing of grassy surfaces with asphalt and concrete, the "Urban Heat Island Effect" are likely creating more harmful pollution. Yes, we believe we should be "going green" whenever and wherever possible.

Our planet seems to be in a cycle of constant change. According to an article by the National Oceanic and Atmospheric Administration (NOAA) on Climate.gov in August, 2014, our planet likely experienced its hottest weather millions of years ago. One period, which was probably the warmest, was during the Neoproterozic around 600 to 800 million years ago. Approximately 56 million years ago, our planet was in the Paleocene-Eocene Thermal Maximum as global mean temperatures were estimated as high as 73 degrees Fahrenheit, over 15 degrees above current levels. Ocean sediments and fossils indicate that massive amounts of carbon dioxide were released into the atmosphere.

By contrast, evidence shows there have been at least five major ice ages on Planet Earth. One of the most well-documented and largest, occurred from 850 to 630 million years ago, is called the Cryogenian period. Glacial ice sheets likely reached all the way the equator producing a "Snowball Earth." Scientists believe that this massive ice age ended due to increased underground volcanic activity and, perhaps, a much warmer solar cycle.

One reason scientists believe that the Earth's temperature reached a record level in 2016 was the very strong El Nino in the waters of the south-central Pacific Ocean that formed in 2015. El Nino is the abnormal warming of ocean waters that often leads warmer air temperatures and less snowfall during the winter seasons.



In 2007-08, a moderately strong La Nina, the cooler than normal sea-surface temperature event, combined with extremely low solar activity (storms on the sun), resulted in a period of global cooling and record snowfalls across many parts of the northern U.S., Europe, Asia and the Former Soviet Union. The same type of situation, perhaps more severe, could occur again in the early 2020s, especially if we see a strong La Nina combined with very low solar activity.

Climate scientists are not completely certain why ocean waters suddenly warm up and cool down over a period of months or years. The warming of sea-surface temperatures may be due, at least in part, to increased underwater volcanic activity. Researchers are constantly finding new active underwater volcanoes and thermal vents that may be contributing to the warmer temperatures.

Recently, scientists discovered at least three to six times more heat-spewing thermal vents along the seafloors where tectonic plates are pulling apart. In 2003, at least nine hydrothermal vents along the Gakkel Ridge in the Arctic Ocean were found. Arctic ice has been melting at a steady pace in recent years and may be due to the warmer than normal ocean waters. In April 2015, an underwater volcano known as the Axial Seamount, about 300 miles off the coast of Oregon, erupted for a month and added 88 billion gallons of molten rock to the ocean floor.

Since the 1950s, data suggests that ocean temperatures have been getting warmer. According to research at the University of Alabama in 2013, climate models indicate "a natural shift to stronger warm El Nino events in the Pacific Ocean might be responsible for a substantial portion of the global warming recorded during the past 50 years."

By contrast to the Arctic ice melt, glaciers have been thickening in Antarctica's eastern interior. That portion of the continent was experiencing increased snowfall and had a gain of about 100 billion tons of ice per year from 1991 to 2008. But, there has been loss of glacier mass in Antarctica's western region.

From the late 1940s through the early 1970s, a climate research organization called the Weather Science Foundation of Crystal Lake, Illinois, determined that the planet's warm, cold, wet and dry periods were the result of alternating short-term and long-term climatic cycles. These researchers and scientists also concluded that the Earth's ever-changing climate likewise has influenced global and regional economies, human and animal migrations, science, religion and the arts as well as shifting forms of government and strength of leadership.

Much of this data was based upon thousands of hours of research done by Dr. Raymond H. Wheeler and his associates during the 1930s and 1940s at the University of Kansas. Dr. Wheeler was well-known for his discovery of various climate cycles, including his highly-regarded "510-Year Drought Clock" that he detailed at the end of the "Dust Bowl" era in the late 1930s.

One of the most recent cold periods was "The Little Ice Age," a 500-Year plus span that extended from the early 1300s to the mid 1800s. During that time, there was little solar activity, or solar storms, which scientists refer to as the "Maunder Minimum." There were also numerous volcanic eruptions in the 1800s like Krakatoa and Mt. Tambora. In 1815, Mt. Tambora has a major eruption which was the largest recorded one in human history. The explosion sent thousands of tons of ash and dust into the atmosphere re-

sulting in the lowering of Earth's temperature by several degrees and numerous extremes. The event also led to a "year without a summer" in 1816 across parts of northern Europe and U.S. as snow was reported in each month of the year, including the summer season.

During the early 1970s, our planet was in the midst of a colder and drier weather cycle that led to concerns of another "Little Ice Age." Inflationary recessions and oil shortages led to rationing and long gas lines at service stations worldwide. Since that time, global temperatures have steadily climbed to the levels they are today. But, there were several interruptions of this global warming cycle. In June, 1991, Mt. Pinatubo erupted in the Philippines leading a temporary drop of about one degree of the Earth's average temperature. In the late 2000s, a strong La Nina and very low solar activity helped to send our planet's average temperature down to near the 20th Century average of 57 degrees before rebounding in the early 2010s.

The Weather Science Foundation also predicted, based on these various climate cycles, that our planet would turn much warmer and wetter by the early 2000s, resulting in general global prosperity. They also said that we would be seeing widespread weather "extremes." There's little doubt that most of their early predictions came true.

In 2016 alone, data from NOAA shows that over 200,000 heat, cold and precipitation records were broken across the globe. Nearly 60 percent of the records were warm, about 28 percent were precipitation and snow and the rest were cold. However, in early 2017, some of the coldest weather in recorded history was seen across northern U.S., Europe, Asia and Siberia in Russia where one station in early January 2017 went to -81 degrees Fahrenheit.

Dr. Wheeler also discovered that approximately every 102 years, a much warmer and drier climatic cycle affects our planet. The last such "warm and dry" peak occurred in 1936, at the end of the infamous "Dust Bowl" period. During that time, extreme heat and dryness, combined with a multitude of problems during the "Great Depression," made living conditions practically intolerable.

Assuming we get a new and very strong cooler La Nina sea-surface temperature pattern along with extremely low solar activity, we may see a brief cool down of the Earth's temperature around the early 2020s. The next "warm and dry" climatic phase is scheduled to arrive in the early 2030s, probably peaking around 2038. It's quite possible we could see an average global temperature near 60 degrees, assuming there isn't a major volcanic eruption to disrupt this cycle.

Based on current data, this new warmer cycle could produce even hotter and drier weather patterns than we saw during the late 1990s and early 2000s. We also believe that our prolonged cycle of wide weather "extremes," the worst in at least 1,000 years, will continue and perhaps become more severe in the years to come.

We should remember, that the Earth's coldest periods have usually followed excessive warmth. Such was the case when our planet moved from the Medieval Warm Period between 900 and 1300 A.D. to the sudden "Little Ice Age," which peaked in the 17th Century. Since 2,500 B.C., there have been at least 78 major climate changes worldwide, including two major changes in just the past 40 years. In terms of upcoming cooling and warming periods, only time will tell.

Global temperature chart was complied by Climatologist Cliff Harris that combined the following resources:
"Climate and the Affairs of Men" *by Dr. Iben Browing.* "Climate...The Key to Understanding Business Cycles...The Raymond H. Wheeler Papers. *By Michael Zahorchak* Weather Science Foundation Papers in Crystal Lake, Illinois.

(March 10, 2018, http://www.longrangeweather.com/global_temperatures.htm?fbclid=IwAR2cdKr8vXx4qW6o12s4AW9b71bN4zb6CUHw4sW-EwWsymmoPr3iOghEZsQ)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

An Obituary to Common Sense

Today we mourn the passing of a beloved old friend, Common Sense, who has been with us for many years.

No one knows for sure how old he was, since his birth records were long ago lost in bureaucratic red tape. He will be remembered as having cultivated such valuables lessons as:

- Knowing when to come in out of the rain;
- Why the early bird gets the worm;
- Life isn't always fair;
- And maybe it was my fault.

Common sense lived by simple, sound financial policies (don't spend more than you can earn) and reliable strategies (adults, not children, are in charge).

His health began to deteriorate rapidly when well-intentioned but overbearing regulations were set in place. Reports of a 6-year-old boy charged with sexual harassment for kissing a classmate; teens suspended from school for using mouthwash after lunch; and a teacher fired for reprimanding an unruly student, only worsened his condition.

Common Sense lost ground when parents attacked teachers for doing the job they themselves had failed to do in disciplining their unruly children.

It declined even further when schools were required to get parental consent to administer sun lotion or an aspirin to a student; but could not inform parents when student became pregnant and wanted to have an abortion.

Common Sense lost the will to live as the churches became businesses; and criminals received better treatment than the victims.

Common Sense took a beating when you couldn't defend yourself from a burglar in your own home and the burglar could sue you for assault.

Common Sense finally gave up the will to live, after a woman failed to realize that a steaming cup of coffee was hot. She spilled a little in her lap, and was promptly awarded a huge settlement.

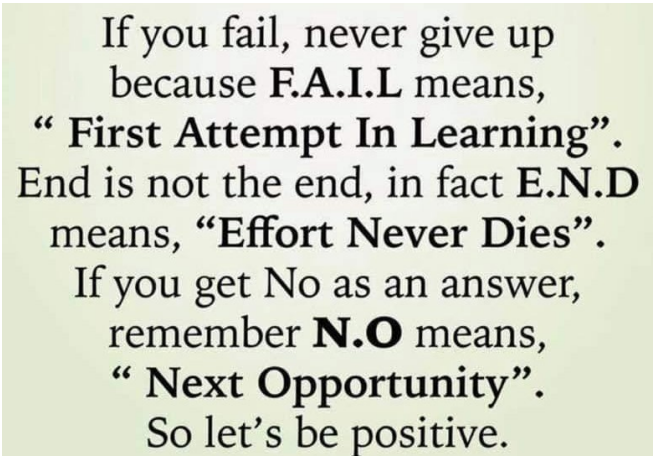
Common Sense was preceded in death,
- by his parents, Truth and Trust,
- by his wife, Discretion,
- by his daughter, Responsibility,
- by his son, Reason.

He is survived by his 5 stepchildren;
- I Know My Rights
- I Want It Now
- Someone Else Is To Blame
- I'm A Victim

- Pay Me For Doing Nothing

Not many attended his funeral because so few realized he was gone. If you still remember him, pass this on. If not, join the majority and do nothing).

(An Obituary printed in the London Times – αλιεύτηκε από την Μαριάννα Τσατσανίφου).



Dr. A.P.J. Abdul Kalam of feel LIFE
Read more quotes from A.P.J. Abdul Kalam

"To avoid the shortcomings associated with present practice requires first of all expert translation of the findings of Geology into physical and mechanical terms. Next it requires the evaluation of the existing geologic conditions; and finally to assume for the design of the structure the most unfavourable possibilities.

Terzaghi 1929

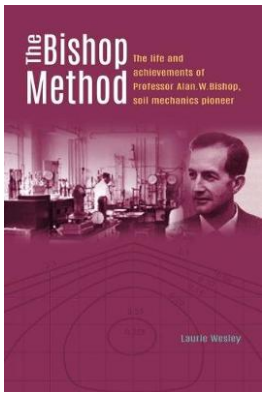
"The understanding of real behaviour is more important than accurate calculation … Better prediction … is only possible when reality is modeled."

Peter Vaugham

34th Rankine Lecture, 1994

(από την παρουσίαση του Ομότιμου Καθηγητού ΕΜΠ Παύλου Μαρίνου στην συνεδρία κατά την διάρκεια του 8ου Πανελληνίου Συνεδρίου Γεωτεχνικής Μηχανικής ΕΔΑΦΟΜΗΧΑΝΕΥΟΜΕΝΟΙ ΓΙΑ ΔΕΚΑΕΤΙΕΣ**)**

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



The Bishop Method:
The life and achievements of Professor Alan Bishop, soil mechanics pioneer

Laurie Wesley

Bishop is undoubtedly one of the most widely-known names in the soil mechanics, or geotechnical engineering, community today, alongside the `founding father', Karl Terzaghi. This is mainly due to the method Bishop devised for estimating the stability of soil slopes; it became known as The Bishop Method and immortalised his name. However, Bishop's contributions to the development of soil mechanics were far wider and of greater significance than his slope stability `method'. His colleague, Professor Skempton, makes this very clear in his contribution to the Bishop eulogy published in Geotechnique in 1988.

...It was a great privilege and the best of good luck to be associated for nearly 40 years with one of the finest intellects in our subject ... his work in this field brought about a highly beneficial revolution in soil mechanics... He was loved and respected by his numerous students... Through them and the strict but friendly criticism of his colleagues' work, and his own important contributions, he exerted a unique influence.

Bishop began his career in 1943 when the new soil mechanics world was still grappling with the fundamental issue of soil shear strength. Even the great Terzaghi had not sorted this out. Bishop applied himself immediately to this problem and by the mid 1950s had largely solved it. He published his findings in 1960 in a paper co-authored with Lauritz Bjerrum. This established the parameters to be determined by triaxial testing and the two methods of analysis in use today. This was undoubtedly Bishop's most influential paper.

In the eyes of many people Bishop did not receive the recognition he deserved during his lifetime, and indeed has not received since. However, The Bishop Method makes it clear just how influential and important Bishop's contributions were to soil mechanics. The book comprises three parts:

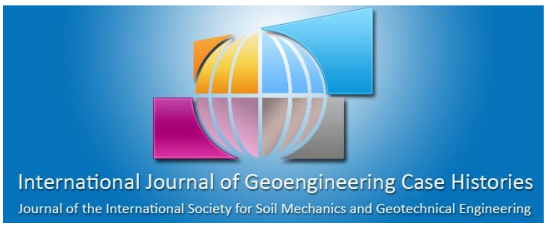
Part 1 - the story of Bishop's life, emphasising his particular problem-solving skills

Part 2 - his contribution to soil mechanics in some detail, of particular interest to anyone with a technical/professional perspective

Part 3 - articles by past students and others who knew him which together paint a fascinating picture of the man

(Whittles Publishing, 06.06.2019)

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



An official journal of the International Society for Soil Mechanics and Geotechnical Engineering
www.geocasehistoriesjournal.org/pub/issue/view/44

Κυκλοφόρησε το Volume 5, Issue 2, του International Journal of Geoengineering Case Histories με τα παρακάτω περιεχόμενα:

- Electrical Resistivity at Internal Erosion Locations in Levees, Stacey Tucker-Kulesza, Cassandra Rutherford, Michelle Bernhardt-Barry
- Forensic Analysis of Levee Failures: The Breitenhagen Case, Job J. Kool, Willem Kanning, Torsten Heyer, Cristina Jommi, Sebastiaan N. Jonkman
- Geotechnical Observations of Dams Failed During the 2015 Historic Flooding in South Carolina, Inthuorn Sasanakul, Sarah L. Gassman, Charles E. Pierce, William Ovalle-Villamil, Ryan Starcher, Emad Gheibi, Mostaqur Rahman

Geo-Trends Review
A Crowdsourcing Magazine for the Geotechnical Engineering Community - Issue #9 - NOVEMBER 2019
https://www.mygeoworld.com/geotrends/issues/9-november-2019

ITA @ news

https://about.ita-aites.org/publications/archives-ita/ita-news/

Κυκλοφόρησε το τεύχος 70, Δεκεμβρίου 2019 της ITA με τα παρακάτω περιεχόμενα:

- MESSAGE FROM JINXIU (JENNY) YAN, ITA PRESIDENT
- 2019 ITA TUNNELLING AWARDS: WINNERS ANNOUNCED
- WTC 2020: Early Bird Registration Extended
- CELEBRATION OF WORLD TUNNEL DAY
- Training session organised in Kenya for World Tunnel Day
- 2nd National Tunnelling and Underground Space Conference - Ankara-Turkey
- ETS celebrating World Tunnel Day with a conference & exhibition
- ITA Lifetime Achievement award 2019 Video
- A successful first meeting of European tunnelling professors
- Phd students gather in Turin
- ITA Publication 2019
- Read the latest issue of our ITA-CET newsletter!
- ITA-CET is pleased to announce that issue 11 of its newsletter is now available files/ITA-CET_Newsletter_Issue_11_December_2019.pdf.
- Join our free Webinar on shaft construction
- II International Conference "Polish Tunnel Forum"
- ITA - AITES Workshop 2020: HOW URBAN UNDERGROUND SPACE CAN CONTRIBUTE TOWARDS ACHIEVING THE GLOBAL GOALS FOR SUSTAINABLE DEVELOPMENT

https://www.itacet.org/sites/default/files/Newsletter%20%2331.pdf

Κυκλοφόρησε το Τεύχος #31 (Δεκεμβρίου 2019) του ITACET Foundation Newsletter με τα παρακάτω περιεχόμενα:

- President's address
- Editorial: A message from the ITA President
- Training session reports:
  - Introduction to tunnelling – From design to construction
  - The main tunnelling processes
  - Tunnelling 4.0: New technologies and automation
  - WTC2019: Communication and stakeholder engagement
  - WTC2019: Tunnellinh 4.0
- Forthcoming sessions
  - Tunnelling 4.0 and Intelligent Construction

  - Innovations in Tunnelling – Geotechnical Engineering and Project Management
- Other events in preparation
  - Switzerland: **"TBM Pilot training"** - Date to be confirmed
  - Brazil: **"Innovations in Tunnelling"** - Date to be confirmed
  - Chile: **"Mechanized tunnelling and shafts"** - Date to be confirmed
  - Colombia: **"Mechanized Tunnelling"** – Date to be confirmed
  - India: **"Structural use of fibre reinforced concrete in precast segments"** - Date to be confirmed
  - Mexico: **"Underground Urban Facilities"** – Date to be confirmed
  - Thailand: **"Contractual practices"** – Date to be confirmed
- Foundation scholarship recipients
- Other news
  - TBM driver certification scheme
  - The ITACET Foundation 'Private Area'
  - Obituary – Sherif Wissa Agaiby
  - Professor Pelizza and AFTES honoured with the2019 ITACET Awards

https://about.ita-aites.org/files/ITA-CET_Newsletter_Issue_11_December_2019.pdf

Κυκλοφόρησε το 11ο Τεύχος – Δεκεμβρίου 2019 του ITA-CET Newsletter με τα παρακάτω περιεχόμενα:

- Another 300 trainees across the globe
- The ITA-CET Steering Board meets in Turin
- TBM driver certification scheme
- Bringing together European tunnelling academia

FOR MORE INFORMATION

http://www.ita-aites.org/en/wg-committees/committees/ita-cet

ita-cet.secretariat@developpement-durable.gouv.fr

International Geosynthetics Society

Κυκλοφόρησε το IGS Newsletter της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

IGS NEWSLETTER – December 2019

Helping the world understand the appropriate value and use of geosynthetics

https://www.geosyntheticssociety.org/wp-content/uploads/2019/12/IGS-Newsletter-Dec-2019.pdf

- Sponsor The IGS TC-Soil Reinforcement & TC-Barrier Systems Barcelona Workshops! READ MORE
- Focus On Barrier Systems In Barcelona READ MORE
- Raising The Bar In The Rainbow Nation READ MORE
- GeoAmericas 2020 Case Study Competition For IGS Corporate Members READ MORE
- Have You Updated Your IGS Profile? READ MORE
- ACIGS Annual General Meeting READ MORE
- IGS Chapter Focus: Peru READ MORE
- Case Study: Eagle Gold Mine in Canada installs Concrete Canvas READ MORE
- IGS Young Members: Down to Earth – An Interview with Dawie Marx READ MORE
- 2nd EurAsian Geosynthetics Symposium (EAGS·2019) READ MORE
- Giroud Lecture Takes A Trip To London READ MORE
- Calendar of Events

READ MORE AT GEOSYNTHETICSSOCIETY.ORG

https://www.icevirtuallibrary.com/toc/jgein/26/6

Κυκλοφόρησε το Τεύχος 6 του Τόμου 26 (Δεκεμβρίου 2109) του Geosynthetics International της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

Dynamic properties of EPS-sand mixtures using cyclic triaxial and bender element tests, R. Alaie, R. Jamshidi Chenari, pp. 563–579

Field load tests and modelling of soft foundation reinforced by soilbags, L. Wang, S. Liu, J. Liao, K. Fan, pp. 580–591

Geosynthetic reinforcement stiffness characterization for MSE wall design, T. M. Allen, R. J. Bathurst, pp. 592–610

Performance of GCLs in high salinity impoundment applications, A. Y. AbdelRazek, R. K. Rowe, pp. 611–628

Centrifuge model tests of geogrid-reinforced slope supporting a high embankment, H. Xu, X. Ren, J.-N. Chen, C.-N. Liu, L. Xia, Y.-W. Liu, pp. 629–640

Geogrid installation damage caused by recycled construction and demolition waste, M. P. Fleury, E. C. G. Santos, J. Lins da Silva, E. M. Palmeira, pp. 641–656

Experimental and numerical study on square anchor plate groups in geogrid reinforced sand, A. K. Choudhary, B. Pandit, G. L. Sivakumar Babu, pp. 657–671

Announcements

Note of appreciation to paper reviewers, pp. 672

Κυκλοφόρησαν τα Τεύχη 5 και 6 του Τόμου 47 (Οκτωβρίου και Δεκεμβρίου 2109) του Geotextiles and Geomembrabes της International Geosynthetics Society με τα παρακάτω περιεχόμενα:

https://www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/47/issue/5

Editorial Board, Page ii

Regular Articles

Coupled numerical and experimental analyses of load transfer mechanisms in granular-reinforced platform overlying cavities, Caroline Chalak, Laurent Briançon, Pascal Villard, Pages 587-597

Improvements in small-scale standardized testing of geotextiles used in silt fence applications, J.B. Whitman, W.C. Zech, W.N. Donald, Pages 598-609

Experimental and upper-bound study of the influence of soilbag tail length on the reinforcement effect in soil slopes, Yan-Qiao Wang, Kang Liu, Xian Li, Qiu-Bing Ren, ... Ming-Chao Li, Pages 610-617

Performance of a test embankment on very soft clayey soil improved with drain-to-drain vacuum preloading technology, N.P. López-Acosta, A.L. Espinosa-Santiago, V.M. Pineda-Núñez, A. Ossa, ... E. Botero, Pages 618-631

Large-scale load capacity tests on a geosynthetic encased column, Nima R. Alkhorshid, Gregório L.S. Araujo, Ennio M. Palmeira, Jorge G. Zornberg, Pages 632-641

Investigations on fracture characteristics of geosynthetic reinforced asphalt concrete beams using single edge notch beam tests, Nithin Sudarsanan, Rajagopal Karpurapu, Veeraragavan Amirthalingam, Pages 642-652

Influence of toe restraint conditions on performance of geosynthetic-reinforced soil retaining walls using centrifuge model tests, Wan Zhang, Jian-feng Chen, Yan Yu, Pages 653-661

Evaluation of geocomposite compressible layers as induced trench method applied to shallow buried pipelines, R. Plácido, F.H.M. Portelinha, Pages 662-670

Centrifuge and numerical model studies on the behaviour of geogrid reinforced soil walls with marginal backfills with and without geocomposite layers, Hamid Reza Razeghi, B.V.S. Viswanadham, Jaber Mamaghanian, Pages 671-684

Evaluation of the combined effect of facing inclination and uniform surcharge on GRS walls, S.H. Mirmoradi, M. Ehrlich, P. Chinchay, C. Dieguez, Pages 685-691

Professional Practice Paper

Controlling leakage through installed geomembranes using electrical leak location, Abigail Gilson-Beck, Pages 697-710

Discussion & Reply

Discussion: Xu, C., Liang, C., and Chen, P. (2019). "Experimental and theoretical studies on the ultimate bearing capacity of geogrid-reinforced sand," *Geotextiles and Geomembranes* 47, pp. 417–428, Peter F. Hoffman, Thang Q. Pham, Jonathan T.H. Wu, Pages 692-694

Reply to discussion of "Experimental and theoretical studies on the ultimate bearing capacity of geogrid-reinforced sand" by C. xu, C. liang, and P. shen, geotextiles and geomembranes, 2019, 47, pp. 417–428, Chao Xu, Cheng Liang, Panpan Shen, Pages 695-696

https://www.sciencedirect.com/journal/geotextiles-and-geomembranes/vol/47/issue/6

Editorial Board, Page ii

EDITORIAL: Best papers published in Geotextiles and Geomembranes in 2018, R. Kerry Rowe, Page 711

Regular Articles

Mitigation of ground vibrations induced by high speed railways using double geofoam barriers: Centrifuge modeling, Mohammad Hassan Baziar, Mohammad Kazemi, Habib Shahnazari, Pages 712-728

Required strength of geosynthetics for reinforced 3D slopes in cohesive backfills with tensile strength cut-off, Z.W. Li, X.L. Yang, Pages 729-739

Chemical interaction and hydraulic performance of geosynthetic clay liners isothermally hydrated from silty sand subgrade, R. Kerry Rowe, J.D.D. Garcia, R.W.I. Brachman, M.S. Hosney, Pages 740-754

Investigation on geogrid reinforcement and pile efficacy in geosynthetic-reinforced pile-supported track-bed, Han-Lin Wang, Ren-Peng Chen, Qi-Wei Liu, Xin Kang, Pages 755-766

Experimental studies on inclined pullout behaviour of geosynthetic sheet Vis-À-Vis geogrid - Effect of type of anchor and sand, Riya Bhowmik, Jagdish Telangrao Shahu, Manoj Datta, Pages 767-779

Direct shear tests of shear strength of soils reinforced by geomats and plant roots, Huiming Tan, Fumao Chen, Jia Chen, Yufeng Gao, Pages 780-791

Deformation characteristics of soil between prefabricated vertical drains under vacuum preloading, Peng Wang,

Yanbing Han, Jun Wang, Yuanqiang Cai, Xueyu Geng, Pages 798-802

Centrifuge model studies on the performance of soil walls reinforced with sand-cushioned geogrid layers, S. Balakrishnan, B.V.S. Viswanadham, Pages 803-814

Long-term performance of a HDPE geomembrane stabilized with HALS in chlorinated water, F.B. Abdelaal, M.S. Morsy, R. Kerry Rowe, Pages 815-830

Deformation analysis of geosynthetic-encased stone column using cavity expansion models with emphasis on boundary condition, Yang Zhou, Gangqiang Kong, Qing Yang, Hui Li, Pages 831-842

A short-term model for extrapolating unconfined creep deformation data for woven geotextiles, José Luiz Ernandes Dias Filho, Paulo Cesar de Almeida Maia, Gustavo de Castro Xavier, Pages 792-797

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2019 – 2022)

Πρόεδρος	:	Μιχάλης ΜΠΑΡΔΑΝΗΣ, Πολιτικός Μηχανικός, ΕΔΑΦΟΣ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Α.Ε. mbardanis@edafos.gr, lab@edafos.gr
Α' Αντιπρόεδρος	:	Χρήστος ΤΣΑΤΣΑΝΙΦΟΣ, Δρ. Πολιτικός Μηχανικός, ΠΑΝΓΑΙΑ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Ε.Π.Ε. editor@hssmge.gr, ctsatsanifos@pangaea.gr
Β' Αντιπρόεδρος	:	Μιχάλης ΠΑΧΑΚΗΣ, Πολιτικός Μηχανικός mpax46@otenet.gr
Γενικός Γραμματέας	:	Γιώργος ΜΠΕΛΟΚΑΣ, Δρ. Πολιτικός Μηχανικός, Επίκουρος Καθηγητής ΤΕΙ Αθήνας gbelokas@teiath.gr, gbelokas@gmail.com
Ταμίας	:	Γιώργος ΝΤΟΥΛΗΣ, Πολιτικός Μηχανικός, ΕΔΑΦΟΜΗΧΑΝΙΚΗ Α.Ε.- ΓΕΩΤΕΧΝΙΚΕΣ ΜΕΛΕΤΕΣ Α.Ε. gdoulis@edafomichaniki.gr
Έφορος	:	Γεώργιος ΓΚΑΖΕΤΑΣ, Δρ. Πολιτικός Μηχανικός, Ομότιμος Καθηγητής Ε.Μ.Π. gazetas@central.ntua.gr, gazetas50@gmail.com
Μέλη	:	Ανδρέας ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ, Δρ. Πολιτικός Μηχανικός, Ομότιμος Καθηγητής Ε.Μ.Π. aanagn@central.ntua.gr
		Παναγιώτης ΒΕΤΤΑΣ, Πολιτικός Μηχανικός, ΟΜΙΛΟΣ ΤΕΧΝΙΚΩΝ ΜΕΛΕΤΩΝ Α.Ε. otmate@otenet.gr
		Μαρίνα ΠΑΝΤΑΖΙΔΟΥ, Δρ. Πολιτικός Μηχανικός, Αναπληρώτρια Καθηγήτρια Ε.Μ.Π. mpanta@central.ntua.gr
Αναπληρωματικά Μέλη	:	Χρήστος ΣΤΡΑΤΑΚΟΣ, Πολιτικός Μηχανικός, ΝΑΜΑ Α.Ε. stratakos@namalab.gr
		Βάλια ΞΕΝΑΚΗ, Δρ. Πολιτικός Μηχανικός, ΕΔΑΦΟΜΗΧΑΝΙΚΗ Α.Ε. vxenaki@edafomichaniki.gr
Εκδότης	:	Χρήστος ΤΣΑΤΣΑΝΙΦΟΣ, Δρ. Πολιτικός Μηχανικός, ΠΑΝΓΑΙΑ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Ε.Π.Ε. editor@hssmge.gr, ctsatsanifos@pangaea.gr

ΕΕΕΕΓΜ

Τομέας Γεωτεχνικής
ΣΧΟΛΗ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ
ΕΘΝΙΚΟΥ ΜΕΤΣΟΒΙΟΥ ΠΟΛΥΤΕΧΝΕΙΟΥ
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

«ΤΑ ΝΕΑ ΤΗΣ ΕΕΕΕΓΜ» «αναρτώνται» και στην ιστοσελίδα www.hssmge.gr