



El Capitan, Yosemite Valley, California, USA

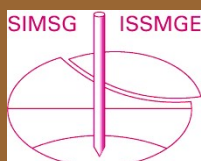


ΕΛΛΗΝΙΚΗ
ΕΠΙΣΤΗΜΟΝΙΚΗ
ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

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132

Αρ. 132 – ΝΟΕΜΒΡΙΟΣ 2019



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ΟΡΓΑΝΩΣΗ
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ΜΗΧΑΝΙΚΗΣ

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2019

ΑΘΗΝΑ
ΠΟΛΕΜΙΚΟ
ΜΟΥΣΕΙΟ

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Laird Station Excavation on the Eglinton Crosstown LRT, Canada Tunn Assoc Canada Photo of the Year

8^ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΓΕΩΤΕΧΝΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

Μεταξύ 6 και 8 Νοεμβρίου διεξήχθη στο Πολεμικό Μουσείο στην Αθήνα το 8^ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής.

Οι σύνεδροι έφτασαν τους 298, εκ των οποίων οι 101 ήταν φοιτητές.



Ο Πρόεδρος της ΕΕΕΕΓΜ και Πρόεδρος της Οργανωτικής Επιτροπής του Συνεδρίου, ομότιμος καθηγητής ΕΜΠ Γιώργος Γκαζέτας κατά την κήρυξη της έναρξης του συνεδρίου



Ο Πρόεδρος του Επιστημονικού και Τεχνικού Επιμελητηρίου Κύπρου (ΕΤΕΚ) κ. Στέλιος Αχνιώτης κατά τον χαιρετισμό του στην έναρξη του συνεδρίου

Υπήρξε ειδική ομιλία του καθηγητή Eduardo Alonso από το Πανεπιστήμιο της Βαρκελώνης (UPC) με θέμα «Triggering and motion of landslides»



Ο καθηγητής του Πανεπιστημίου UPC Βαρκελώνης Eduardo Alonso κατά την ομιλία του

καθώς και 12 ειδικές ομιλίες από τους:

1. Κυριαζή Πιτιλάκη, Ομότιμο Καθηγητή ΑΠΘ με θέμα «Αναθεώρηση των σεισμικών δράσεων στον Ευρωκώδικα 8: Πρόταση νέου συστήματος εδαφικής κατηγοριοποίησης και ελαστικών φασμάτων σχεδιασμού»



Ο ομότιμος καθηγητής ΑΠΘ Κυριαζής Πιτιλάκης κατά την ομιλία του

2. Σταυρούλα Κοντοέ, Επίκουρος Καθηγήτρια Imperial College με θέμα «Σχεδιασμός πασσάλων για τη θεμελίωση θαλάσσιων ανεμογεννητριών σε δυσχερή εδάφη»



Η Επίκουρη Καθηγήτρια του Imperial College Σταυρούλα Κοντοέ κατά την ομιλία της

3. Μιχάλη Καββαδά, Καθηγητή ΕΜΠ με θέμα «Ασφάλεια των (γεω)τεχνικών έργων: Μύθοι και πραγματικότητα»
4. Τάσο Κολλιό, Δρ Πολιτικό Μηχανικό, ΕΔΑΦΟΜΗΧΑΝΙΚΗ ΑΤΕ, Πρόεδρο Ελληνικού Συνδέσμου Γεωσυνθετικών Υλικών με θέμα «Κριτική θεώρηση αστοχιών συστήματος στεγάνωσης πρανών με γεωμεμβράνες»
5. Γιάννη Αναστασόπουλο, Καθηγητή Πανεπιστημίου ΕΤΗ Ζυρίχης με θέμα «Σχεδιασμός έναντι τεκτονικής διάρρηξης: Νέες εξελίξεις»



Ο καθηγητής του ΕΤΗ Ζυρίχης Γιάννης Αναστασόπουλος κατά την ομιλία του

6. Κωστή Γεωργιάδη, Καθηγητή ΑΠΘ με θέμα «Οριακή πλευρική αντίσταση του εδάφους σε μεμονωμένους πασσάλους και ομάδες πασσάλων»
7. Δημήτρη Ζέκκο, Αναπληρωτή Καθηγητή Πανεπιστημίου του Michigan με θέμα «Εφαρμογές ρομποτικής στον κλάδο της γεωτεχνικής μηχανικής»



Ο καθηγητής ΑΠΘ Κωστής Γεωργιάδης κατά την ομιλία του



Ο αναπληρωτής καθηγητής του Πανεπιστημίου του Michigan Δημήτρης Ζέκκος κατά την ομιλία του

8. Παναγιώτη Ντακούλα, Καθηγητή Πανεπιστημίου Θεσσαλίας με θέμα «Σεισμική συμπεριφορά λιμενικών τοίχων αντιστήριξης»



Ο καθηγητής Πανεπιστημίου Θεσσαλίας Παναγιώτης Ντακούλας κατά την ομιλία του

9. Νίκου Γερόλυμου, Αναπληρωτή Καθηγητή ΕΜΠ με θέμα «Σχεδιασμός φρεάτων θεμελιώσεως για θαλάσσιες ανεμογεννήτριες σε ρευστοποιήσιμο έδαφος»



Ο αναπληρωτής καθηγητής ΕΜΠ Νίκος Γερόλυμος κατά την ομιλία του

10. Γιώργου Κουρετζή, Αναπληρωτή Καθηγητή Πανεπιστημίου Newcastle Αυστραλίας με θέμα «Πρόβλεψη της μακροχρόνιας συμπεριφοράς επιχωμάτων σε μαλακές αργίλους»



Ο αναπληρωτής καθηγητής Πανεπιστημίου Newcastle Αυστραλίας Γιώργος Κουρετζής κατά την ομιλία του

11. Γιώργου Μπουκοβάλα, Καθηγητή ΕΜΠ με θέμα «Παραμετρικός σχεδιασμός δικτύων αγωγών υψηλής πίεσης σε περιοχές με ρευστοποίηση»



Ο καθηγητής ΕΜΠ Γιώργος Μπουκοβάλας κατά την ομιλία του

12. Ζαχαρία Αγιουτάντη, Καθηγητή Πανεπιστημίου Κεντάκι με θέμα «Εφαρμογές βραχομηχανικής στον σχεδιασμό υπόγειων εκμεταλλεύσεων»



Ο καθηγητής Πανεπιστημίου Κεντάκι Ζαχαρίας Αγιουτάντης κατά την ομιλία του

Υπήρξε επίσης ειδική συνεδρία για τον σεισμό της Αθήνας του 1999 με ομιλητές τους Κώστα Παπαζάχο, Μιχάλη Φαρδή και Γιώργο Γκαζέτα καθώς και ειδική συνεδρία «Εδαφομηχανευόμενοι για δεκαετίες» προς τιμήν παλαιών έμπειρων συναδέλφων γεωτεχνικών μηχανικών υπό τον συντονισμό του Ομότιμου Καθηγητή ΕΜΠ Θεόδωρη Τάσιου. Στη συνεδρία αυτή συμμετείχαν οι Γιώργος Ρούσσος, Βασίλης Σωτηρόπουλος, Ηλίας Σωτηρόπουλος, Δημήτρης Κούμουλος, Ανδρέας Αναγνωστόπουλος, Σπύρος Παπασπύρου, Πάυλος Μαρίνος και Σπύρος Καβουνίδης.



Ο καθηγητής ΑΠΘ Κώστας Παπαζάχος κατά την ομιλία του στο πλαίσιο της συνεδρίας για τον Σεισμό της Αθήνας του 1999



Ο ομότιμος καθηγητής Πανεπιστημίου Πατρών Μιχάλης Φαρδής κατά την ομιλία του στο πλαίσιο της συνεδρίας για τον Σεισμό της Αθήνας του 1999

ΣΥΝΕΔΡΙΑ ΕΔΑΦΟΜΗΧΑΝΕΥΟΜΕΝΟΙ ΓΙΑ ΔΕΚΑΕΤΙΕΣ

Μία συνεδρία σε έμπνευση Γιώργου Ντούλη, ονοματοδοσία Σπύρου Καβουνίδη, οργάνωση Γιώργου Γκαζέτα και συντονισμό Θεοδόση Τάσιου.



Θεοδόσης Τάσιος



Γιώργος Ρούσσος



Δημήτρης Κούμouλος



Βασίλης Σωτηρόπουλος



Ηλίας Σωτηρόπουλος



Ανδρέας Αναγνωστόπουλος



Σπύρος Παπασπύρου



Παύλος Μαρίνος



Σπύρος Καβουνίδης

Τα επιστημονικά άρθρα ήταν 151 κατανεμημένα σε 16 συνεδρίες και συμπεριλήφθησαν σε USB που μοιράστηκε στους συνέδρους. Παράλληλα με το συνέδριο διεξήχθη και τεχνική έκθεση με οκτώ εκθέτες (κατά σειρά αριθμού περιπτέρων: Hellenplan Ltd, NAMA LAB, OTM AE, ELEBOR AE, Elxis Group, NEOTEK OE, Thrace Group, ΕΔΑΦΟΣ Σύμβουλοι Μηχανικοί Α.Ε.).

Στο τέλος του συνεδρίου η ΕΕΕΕΓΜ τίμησε τα μέλη της:

- Χρήστο Τσατσανίφο, Δρ Πολιτικό Μηχανικό και πρώην Πρόεδρο της ΕΕΕΕΓΜ για την πολυετή προσφορά του στην επιστημονική εταιρεία και την σύνταξη του Ενημερωτικού Δελτίου της ΕΕΕΕΓΜ



Ο πρώην πρόεδρος της ΕΕΕΕΓΜ Χρήστος Τσατσανίφος κατά τη βράβεισή του από τον Πρόεδρο της ΕΕΕΕΓΜ Γιώργο Γκαζέτα με ειδική τιμητική πλακέτα για την πολυετή προσφορά του στην ΕΕΕΕΓΜ και τη σύνταξη του Ενημερωτικού Δελτίου της ΕΕΕΕΓΜ

- Ανδρέα Αναγνωστόπουλο, Ομότιμο Καθηγητή ΕΜΠ και επί πολλά έτη γενικό γραμματέα της ΕΕΕΕΓΜ για την πολυετή προσφορά του στην επιστημονική εταιρεία.



Ο ομότιμος καθηγητής ΕΜΠ και επί σειρά θητειών Γενικός Γραμματέας της ΕΕΕΕΓΜ Ανδρέας Αναγνωστόπουλος (δεξιά) κατά τη βράβεισή του από τον Γενικό Γραμματέα της ΕΕΕΕΓΜ Μιχάλη Μπαρδάνη με ειδική τιμητική πλακέτα για την πολυετή προσφορά του στην ΕΕΕΕΓΜ

Απονεμήθηκαν επίσης ειδικά βραβεία για τους διαγωνισμούς καλύτερων διπλωματικών εργασιών έτους 2014 και έτους 2015 στις:

- Ειρήνη Γεωργίου, νικήτρια του διαγωνισμού 2014 για τη διπλωματική της με τίτλο «Στατική και Δυναμική Απόκριση Κοίλων Κυλινδρικών Φρεάτων υπό Συνδυασμένη Τριδιάστατη Φόρτιση» και επιβλέποντα τον Γιώργο Γκαζέτα, καθηγητή ΕΜΠ
- Διονυσία Σιάμπου και Ηλιάνα Πανάγου, συν-νικήτριες του διαγωνισμού 2015 για τη διπλωματική με τίτλο «Αριθμητική Προσομοίωση Σεισμικής Απόκρισης Εδαφών και Αβαθών Θεμελιώσεων μετά από Παθητική Σταθεροποίηση έναντι Ρευστοποίησης» και επιβλέποντα τον Αχιλλέα Παπαδημητρίου, επίκουρο καθηγητή ΕΜΠ.



Ο κα Ηλιάνα Πανάγου, συν-νικήτρια του Διαγωνισμού Δι-πλωματικής Εργασίας της ΕΕΕΕΓΜ για το έτος 2015 (αριστερά) κατά τη βράβειυσή της με ειδική τιμητική πλακέτα από το μέλος της Εκτελεστικής Επιτροπής της ΕΕΕΕΓΜ και Αναπληρώτρια Καθηγήτρια ΕΜΠ κα Μαρίνα Πανταζίδου



Στιγμιότυπα από τον χώρο της έκθεσης σε διάλειμμα μεταξύ συνεδριών

ΔΕΞΙΩΣΗ ΥΠΟΔΟΧΗΣ



Το μουσικό σύνολο της βραδιάς της δεξίωσης υποδοχής του συνεδρίου πριν την έναρξη του μουσικού προγράμματος...



...με συνοδεία και από τον Γιώργο Αθανασόπουλο στα κρουστά...



...και τους Γιώργο Γκαζέτα και Λάζαρο Λαζαρίδη στο τραγούδι. Ειδικά για αυτό, ακολουθήστε το προφίλ της ΕΕΕΕΓΜ στο LinkedIn και δείτε ποίηση Γιώργου Σεφέρη και μουσική Μίκη Θεοδωράκη σε εκτέλεση μελών της ΕΕΕΕΓΜ («Το περιγιάλι το κρυφό / Άρνηση»

https://www.linkedin.com/posts/hssmge-greece-5294a013b_8hcge2019-hssmge-geotechnicalengineering-activity-6599296881732517888-BrGI)

Μιχάλης Μπαρδάνης, Γενικός Γραμματέας ΕΕΕΕΓΜ

ΓΕΝΙΚΗ ΣΥΝΕΛΕΥΣΗ ΕΕΕΕΓΜ

ΓΕΝΙΚΗ ΣΥΝΕΛΕΥΣΗ ΤΗΣ ΕΕΕΕΓΜ ΤΗΣ 7ης ΝΟΕΜΒΡΙΟΥ 2019

Στη Γενική Συνέλευση παρέστησαν τα παρακάτω 63 μέλη της ΕΕΕΕΓΜ:

α/α	Ονοματεπώνυμο
1	ΑΛΑΜΑΝΗΣ Νικόλαος
2	ΑΛΕΞΑΝΔΡΗΣ Ανάργυρος
3	ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ Ανδρέας
4	ΑΝΑΣΤΑΣΟΠΟΥΛΟΣ Κωνσταντίνος
5	ΑΝΑΣΤΑΣΟΠΟΥΛΟΣ Ιωάννης
6	ΑΝΤΩΝΑΚΟΣ Γεώργιος
7	ΑΣΤΕΡΙΟΥ Παύλος
8	ΒΕΤΤΑΣ Παναγιώτης
9	ΓΑΖΕΛΑΣ Δημήτριος
10	ΓΑΡΙΝΗ Ευαγγελία
11	ΓΕΛΑΓΩΤΗ Φανή
12	ΓΕΩΡΓΙΑΔΗΣ Κωνσταντίνος
13	ΓΙΟΥΤΑ-ΜΗΤΡΑ Παρασκευή
14	ΓΚΑΖΕΤΑΣ Γεώργιος
15	ΔΗΜΗΤΡΙΑΔΗ Βασιλική
16	ΕΓΓΛΕΖΟΣ Δημήτριος
17	ΖΕΚΚΟΣ Δημήτριος
18	ΖΕΥΓΩΛΗΣ Ιωάννης
19	ΚΑΒΒΟΥΝΙΔΗΣ Στυρίδων
20	ΚΑΛΟΥ Παρασκευή
21	ΚΑΛΟΣ Αλέξανδρος
22	ΚΑΡΑΓΕΩΡΓΙΟΥ Αγγελική
23	ΚΕΡΑΜΙΔΑΣ Ευτύχιος
24	ΚΛΗΜΗΣ Νικόλαος
25	ΚΟΖΟΜΠΟΛΗΣ Απόστολος
26	ΚΟΛΛΙΟΣ Αναστάσιος
27	ΚΟΝΤΟΕ Σταυρούλα
28	ΚΩΝΣΤΑΝΤΗΣ Θωμάς
29	ΜΑΡΙΝΟΣ Παύλος
30	ΜΑΡΚΟΥ Ιωάννης
31	ΜΙΧΑΛΗΣ Ηλίας
32	ΜΠΑΛΤΖΟΓΛΟΥ Αθανάσιος
33	ΜΠΑΡΔΑΛΗΣ Μιχαήλ
34	ΜΠΑΣΔΕΚΗΣ Αναστάσιος
35	ΜΠΕΛΟΚΑΣ Γεώργιος
36	ΜΠΟΥΚΟΒΑΛΑΣ Γεώργιος
37	ΝΤΟΥΛΗΣ Γεώργιος
38	ΝΤΟΥΝΙΑΣ Γεώργιος
39	ΞΕΝΑΚΗ Βασιλική
40	ΠΑΛΑΣΟΠΟΥΛΟΣ Γεώργιος
41	ΠΑΝΤΑΖΙΔΟΥ Μαρίνα

α/α	Ονοματεπώνυμο
42	ΠΑΠΑΔΗΜΗΤΡΙΟΥ Αχιλλέας
43	ΠΑΧΑΚΗΣ Μιχαήλ
44	ΠΕΛΕΚΗΣ Παναγιώτης
45	ΠΕΤΣΗ Φωτεινή
46	ΠΛΑΤΗΣ Αθανάσιος
47	ΠΛΥΤΑΣ Κωστής
48	ΣΙΤΑΡΕΝΙΟΣ Παναγιώτης
49	ΣΟΥΝΔΙΑΣ Εμμανουήλ
50	ΣΤΡΑΤΑΚΟΣ Χρήστος
51	ΣΧΙΝΑ Σταυρούλα
52	ΤΖΙΒΑΚΟΣ Κωνσταντίνος
53	ΤΟΛΗΣ Σταύρος
54	ΤΣΑΝΤΗΛΑΣ Λουίζος
55	ΤΣΑΤΣΑΝΙΦΟΣ Χρήστος
56	ΤΣΙΑΠΑΣ Ιωάννης
57	ΤΥΡΟΛΟΓΟΥ Παύλος
58	ΦΕΛΕΚΟΣ Στυλιανός
59	ΦΙΚΙΡΗΣ Ιωάννης
60	ΦΛΩΡΟΣ Ξενοφών
61	ΧΑΛΟΥΛΟΣ Ιωάννης
62	ΧΑΡΩΝΙΤΗΣ Γεώργιος
63	ΧΙΚΑΡΑΣ Μιχαήλ
64	ΧΛΙΜΙΝΤΖΑΣ Γεώργιος

Κατά τις διεξαχθείσες αρχαιρεσίες, τις οποίες διενήργησε Εφορευτική Επιτροπή αποτελούμενη από τους συναδέλφους Ευαγγελία Γαρίνη, Αλέξανδρο Καλό και Λουίζο Τσαντήλα, εψήφισαν τα παρακάτω συμμετέχοντα μέλη της ΕΕΕΕΓΜ:

α/α	Ονοματεπώνυμο
1	ΑΛΑΜΑΝΗΣ Νικόλαος
2	ΑΛΕΞΑΝΔΡΗΣ Ανάργυρος
3	ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ Ανδρέας
4	ΑΝΑΣΤΑΣΟΠΟΥΛΟΣ Κωνσταντίνος
5	ΑΝΑΣΤΑΣΟΠΟΥΛΟΣ Ιωάννης
6	ΑΝΤΩΝΑΚΟΣ Γεώργιος
7	ΑΣΤΕΡΙΟΥ Παύλος
8	ΒΕΤΤΑΣ Παναγιώτης
9	ΓΑΖΕΛΑΣ Δημήτριος
10	ΓΑΡΙΝΗ Ευαγγελία
11	ΓΕΛΑΓΩΤΗ Φανή
12	ΓΕΩΡΓΙΑΔΗΣ Κωνσταντίνος
13	ΓΙΟΥΤΑ-ΜΗΤΡΑ Παρασκευή
14	ΓΚΑΖΕΤΑΣ Γεώργιος
15	ΔΗΜΗΤΡΙΑΔΗ Βασιλική
16	ΕΓΓΛΕΖΟΣ Δημήτριος
17	ΖΕΚΚΟΣ Δημήτριος
18	ΖΕΥΓΩΛΗΣ Ιωάννης
19	ΚΑΒΒΟΥΝΙΔΗΣ Σπυρίδων
20	ΚΑΛΛΟΥ Παρασκευή
21	ΚΑΛΟΣ Αλέξανδρος
22	ΚΑΡΑΓΕΩΡΓΙΟΥ Αγγελική
23	ΚΕΡΑΜΙΔΑΣ Ευτύχιος
24	ΚΛΗΜΗΣ Νικόλαος
25	ΚΟΖΟΜΠΟΛΗΣ Απόστολος
26	ΚΟΛΛΙΟΣ Αναστάσιος
27	ΚΟΝΤΟΕ Σταυρούλα
28	ΚΩΝΣΤΑΝΤΗΣ Θωμάς
29	ΜΑΡΙΝΟΣ Παύλος
30	ΜΑΡΚΟΥ Ιωάννης
31	ΜΙΧΑΛΗΣ Ηλίας
32	ΜΠΑΛΤΖΟΓΛΟΥ Αθανάσιος
33	ΜΠΑΡΔΑΝΗΣ Μιχαήλ
34	ΜΠΑΣΔΕΚΗΣ Αναστάσιος
35	ΜΠΕΛΟΚΑΣ Γεώργιος
36	ΝΤΟΥΛΗΣ Γεώργιος
37	ΝΤΟΥΝΙΑΣ Γεώργιος
38	ΞΕΝΑΚΗ Βασιλική
39	ΠΑΛΑΣΟΠΟΥΛΟΣ Γεώργιος

α/α	Ονοματεπώνυμο
40	ΠΑΝΤΑΖΙΔΟΥ Μαρίνα
41	ΠΑΠΑΔΗΜΗΤΡΙΟΥ Αχιλλέας
42	ΠΑΧΑΚΗΣ Μιχαήλ
43	ΠΕΛΕΚΗΣ Παναγιώτης
44	ΠΕΤΣΗ Φωτεινή
45	ΠΛΑΤΗΣ Αθανάσιος
46	ΠΛΥΤΑΣ Κωστής
47	ΣΙΤΑΡΕΝΙΟΣ Παναγιώτης
48	ΣΟΥΝΔΙΑΣ Εμμανουήλ
49	ΣΤΡΑΤΑΚΟΣ Χρήστος
50	ΣΧΙΝΑ Σταυρούλα
51	ΤΖΙΒΑΚΟΣ Κωνσταντίνος
52	ΤΟΛΗΣ Σταύρος
53	ΤΣΑΝΤΗΛΑΣ Λουίζος
54	ΤΣΑΤΣΑΝΙΦΟΣ Χρήστος
55	ΤΣΙΑΠΑΣ Ιωάννης
56	ΤΥΡΟΛΟΓΟΥ Παύλος
57	ΦΕΛΕΚΟΣ Στυλιανός
58	ΦΙΚΙΡΗΣ Ιωάννης
59	ΦΛΩΡΟΣ Ξενοφών
60	ΧΑΛΟΥΛΟΣ Ιωάννης
61	ΧΑΡΩΝΙΤΗΣ Γεώργιος
62	ΧΙΚΑΡΑΣ Μιχαήλ
63	ΧΛΙΜΙΝΤΖΑΣ Γεώργιος

Επί των ανωτέρω ευρέθη ένας φάκελος της μυστικής ψηφοφορίας που σημειώθηκε ως άκυρος, δεδομένου ότι φέρει σήμανση πέραν του ενδεδειγμένου σταυρού.

Επίσης, βάσει της σχετικής διάταξης του Καταστατικού, εψήφισαν διά ταχυδρομικής ψήφου τα παρακάτω μέλη της ΕΕΕΕΓΜ:

α/α	Ονοματεπώνυμο	Άκυρα	Σημειώσεις
1	Άγνωστος	Χ	Άγνωστος Αποστολέας
2	ΒΑΝΤΟΛΑΣ Λάμπρος		
3	ΒΑΝΤΟΛΑΣ Βασίλειος		
4	ΒΟΥΖΑΡΑΣ Εμμανουήλ		
5	ΓΙΑΓΚΟΣ Αλέξανδρος		
6	ΖΑΪΡΗΣ Παύλος		
7	ΚΑΛΛΙΟΓΛΟΥ Πολυξένη		
8	ΜΑΥΡΟΜΜΑΤΗ Ζωή-Χριστίνα		
9	ΜΠΟΥΚΟΒΑΛΑΣ Γεώργιος		
10	ΣΑΧΠΑΖΗΣ Κώστας	Χ	Μη ενήμερος
11	ΣΑΚΟΥΜΠΕΝΤΑ Ελένη		
12	ΣΙΑΧΟΥ Σοφία		

Οι δύο φάκελοι της ταχυδρομικής ψηφοφορίας που σημειώνονται παραπάνω με την ένδειξη «Άκυρο» δεν ανοίχθηκαν. Τα ψηφοδέλτια που ευρέθηκαν εντός των υπολοίπων φακέλων ήταν όλα έγκυρα.

ΑΠΟΤΕΛΕΣΜΑΤΑ ΑΡΧΑΙΡΕΣΙΩΝ

ΠΡΑΚΤΙΚΟ ΕΚΛΟΓΩΝ ΕΕΕΕΓΜ 2019

Σήμερα, Πέμπτη 7^η Νοεμβρίου 2019 και ώρα 18:00, συνετέθη η τριμελής εφορευτική επιτροπή για τη διεξαγωγή των εκλογών ανάδειξης εκτελεστικής και εξελεγκτικής επιτροπής της Ελληνικής Επιστημονικής Εταιρείας Εδαφομηχανικής και Γεωτεχνικής Μηχανικής, αποτελούμενη από τα εξής μέλη (κατ' αλφαβητική σειρά):

1. Ευαγγελία Γαρίνη του Κωνσταντίνου
2. Αλέξανδρου Καλού του Νικολάου
3. Λουίζου Τσαντήλα του Αναστάσιου

Οι εκλογές της Εταιρείας διεξήχθησαν με επιτυχία στο Αμφιθέατρο «Ιωάννης Καποδίστριας» του Πολεμικού Μουσείου και έπειτα από καταμέτρηση των ψήφων από την ανωτέρω εφορευτική επιτροπή προέκυψαν τα ακόλουθα συγκεντρωτικά και επιμέρους αποτελέσματα:

ΨΗΦΟΔΕΛΤΙΑ

ΕΓΚΥΡΑ: 73
ΑΚΥΡΑ: 3
ΣΥΝΟΛΟ: 76

ΑΠΟΤΕΛΕΣΜΑΤΑ ΕΚΤΕΛΕΣΤΙΚΗΣ ΕΠΙΤΡΟΠΗΣ		
A/A	ΟΝΟΜΑΤΕΠΩΝΥΜΟ	ΑΡΙΘΜΟΣ ΨΗΦΩΝ
1	ΜΠΑΡΔΑΝΗΣ Μιχαήλ	51
2	ΤΣΑΤΣΑΝΙΦΟΣ Χρήστος	42
3	ΓΚΑΖΕΤΑΣ Γεώργιος	39
4	ΝΤΟΥΛΗΣ Γεώργιος	34
5	ΠΑΝΤΑΖΙΔΟΥ Μαρίνα	27
6	ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ Ανδρέας	25
7	ΒΕΤΤΑΣ Παναγιώτης	24
7	ΜΠΕΛΟΚΑΣ Γεώργιος	24
7	ΠΑΧΑΚΗΣ Μιχαήλ	24
8	ΞΕΝΑΚΗ Βασιλική	23
8	ΣΤΡΑΤΑΚΟΣ Χρήστος	23
9	ΖΕΥΓΩΛΗΣ Ιωάννης	21

10	ΠΛΥΤΑΣ Κωνσταντίνος	19
11	ΣΧΙΝΑ Σταυρούλα	18
12	ΑΝΤΩΝΑΚΟΣ Γεώργιος	16
13	ΧΛΙΜΙΝΤΖΑΣ Γεώργιος	15
14	ΙΩΑΝΝΙΔΗΣ Κωνσταντίνος	10
15	ΓΙΟΥΤΑ-ΜΗΤΡΑ Παρασκευή	7

ΑΠΟΤΕΛΕΣΜΑΤΑ ΕΞΕΛΕΓΚΤΙΚΗΣ ΕΠΙΤΡΟΠΗΣ		
Α/Α	ΟΝΟΜΑΤΕΠΩΝΥΜΟ	ΑΡΙΘΜΟΣ ΨΗΦΩΝ
1	ΑΛΕΞΑΝΔΡΗΣ Ανάργυρος	48
2	ΚΟΖΟΜΠΟΛΗΣ Απόστολος	45
3	ΤΥΡΟΛΟΓΟΥ Παύλος	32

Τα αποτελέσματα των αρχαιρεσιών έχουν ως εξής:

Για την **ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ** εξελέγησαν οι ακόλουθοι:

Τακτικά Μέλη (κατ' αλφαβητική σειρά)

ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ Ανδρέας
ΒΕΤΤΑΣ Παναγιώτης
ΓΚΑΖΕΤΑΣ Γεώργιος
ΜΠΑΡΔΑΝΗΣ Μιχαήλ
ΜΠΕΛΟΚΑΣ Γεώργιος
ΝΤΟΥΛΗΣ Γεώργιος
ΠΑΝΤΑΖΙΔΟΥ Μαρίνα
ΠΑΧΑΚΗΣ Μιχαήλ
ΤΣΑΤΣΑΝΙΦΟΣ Χρήστος

Για την **ΕΞΕΛΕΓΚΤΙΚΗ ΕΠΙΤΡΟΠΗ** εξελέγησαν οι ακόλουθοι (κατ' αλφαβητική σειρά)

ΑΛΕΞΑΝΔΡΗΣ Ανάργυρος
ΚΟΖΟΜΟΛΗΣ Απόστολος
ΤΥΡΟΛΟΓΟΥ Παύλος

Η Εφορευτική Επιτροπή

Ευαγγελία Γαρίνη



Αλέξανδρος Καλός



Λουίζος Τσαντήλας



Σημείωση Εκδότη: Η σειρά των σελίδων του Πρακτικού της Εφορευτικής Επιτροπής έχει διαφοροποιηθεί, προκειμένου να γίνει δυνατή η παράθεση του στο περιοδικό.

Late, Great Engineers: Gustave Eiffel

Best known for his eponymous tower in Paris and the Statue of Liberty in New York, Gustave Eiffel's career was a mixture of technical achievement, public scandal and obscurity, as *Nick Smith* explains



Gustave Eiffel, 1832-1923

Despite being one of the most important engineers and aerodynamicists of his age, Gustave Eiffel's reputation ultimately rests on two instantly recognisable landmarks: the Eiffel Tower and the Statue of Liberty. His monumental career spanned seven decades, from his early civil projects such as the Bordeaux bridge to his later scientific research into air resistance. Living well into his nineties, Eiffel is remembered the greatest engineer France has ever produced.



Alexandre Gustave Bonickhausen dit Eiffel was born in Burgundy in 1832 at a time when France, under the rule of Louis Philippe I, was in a period of rapid industrial, economic and colonial expansion. His mother had a successful charcoal business and his uncle distilled vinegar: the former providing the undistinguished school student with a stable financial background, while the latter supplied an improvised education, teaching the young Gustave the rudiments of an eclectic set of disciplines that included chemistry, mining, theology and philosophy. This unorthodox background bore fruit to a degree when he was accepted by the École Centrale des Arts et Manufactures in Paris, where we know he specialised in chemistry and we think developed his passion for engineering. His enthusiasm for technology was nurtured by the fact that in 1855 Paris played host to the second World's Fair, for which his mother supplied him with a season ticket. A quarter of a century later his famous tower would be the centrepiece of another technology showcase, the 1889 Exposition Universelle.

"Can one think that because we are engineers, beauty does not preoccupy us, or that we do not try to build beautiful, as well as solid and long-lasting structures?"



Eiffel's career got off to an uncertain start, with family disputes and employer bankruptcies obstructing his path. But eventually he fell into the orbit of railway engineer Charles Nepveu, managing director of two factories in Paris owned by the Compagnie Belge de Matériels de Chemin de Fer, and an influence on Eiffel's initial success. His first significant project under Nepveu was assisting on a 500m iron girder railway bridge over the river Garonne at Bordeaux. Following his boss's resignation, Eiffel was promoted to manage the entire project, subsequently rising to become principal engineer of the Compagnie Belge. By 1865 dwindling market conditions meant that Eiffel had little choice but to go it alone as an independent engineering consultant. It was a move that would see him building locomotives for the Egyptian government and assisting with the design of the exhibition hall of the 1867 Exposition Universelle, which would

lead him into researching the structural properties of cast iron. By 1868 he was sufficiently established to form 'Eiffel et Cie' (Eiffel & Co) in partnership with his fellow École Centrale graduate and bridge builder Théophile Seyrig.

Their first projects were a railway terminus for the line from Vienna to Budapest, and a bridge over the river Douro in Portugal. At the time, this bridge represented the longest arch span (160m) ever built, and was finished in less than two years for just under a million French francs. Within a decade, Eiffel was France's most famous engineer, and by 1879 he had parted company with Seyrig, and was trading under the name Compagnie des Établissements Eiffel. Such was his reputation that he was routinely commissioned for major works without having to go through the process of competitive tendering. Eiffel also started to introduce his concept of exporting prefabricated bridges as far afield as China that could be assembled by bolting them together rather than riveting. At the same time Eiffel took on key technical personnel –including Franco-Swiss structural engineer Maurice Koechlin and French civil engineer Émile Nouguier – who were to play vital roles in the design of the Eiffel Tower.



In 1881 Eiffel became involved in a project to build a neo-classical monument that was to be a gift from France to America to commemorate the centenary of American Independence. The Statue of Liberty (more correctly 'Liberty Enlightening the World') in New York Harbor was the brainchild of French sculptor Frédéric Auguste Bartholdi who had conceived of the Roman goddess Libertas bearing a torch in her right hand, while in her left, a tablet inscribed with "JULY IV MDCCLXXVI" (July 4, 1776). Bartholdi required an engineer to help him bring his design to fruition and Eiffel, duly enlisted because of his vast knowledge of wind stresses acquired during a career designing bridges, created the four-legged pylon that supports Liberty's copper sheet exterior. Eiffel built the statue at his works in Paris before shipping it in boxes to America for reassembly on Bedoe's Is-

land, where it was dedicated by President Grover Cleveland on 26 October 1886, a decade after the actual centenary.

When the idea for erecting a tower in central Paris that would be a focus for the 1889 Exposition Universelle was first floated, Eiffel showed no interest other than to tolerate Koechlin and Nouguier working on plans for 'a great pylon' in their own time. But, as the concept gathered momentum – structural flourishes were added by architect Stephen Sauvestre in the form of decorative arches at ground level, a glass pavilion on the first level and a cupola at its summit – Eiffel displayed more enthusiasm, delivering a paper on the project's technical challenges to the Société des Ingénieurs Civils. Political inertia at government level put the idea on hold until a budget for the exposition was eventually passed by Minister for Trade, Edouard Lockroy, who then released a schedule of regulations for what was officially an 'open' competition but was transparently biased in favour of Eiffel's pre-existing design.



Eiffel's Maria Pia bridge spans the river Duoro in Portugal

At this point Eiffel pricked up his ears and started to enter into contracts for the proposed 6.5 million-franc tower as a private individual, rather than as a representative of his own company. As construction got underway on the Champ de Mars, the artistic community mobilised a protest against this "ridiculous tower dominating Paris like a gigantic smokestack" by way of a petition from the Committee of Three Hundred, sent to the Minister of Works and published in *Le Temps* newspaper. Eiffel retaliated by comparing his oeuvre to the Pyramids: "Why should that which is admirable in Egypt become hideous in Paris?" He also declared his tower would be the highest structure ever built, which remained true from its inauguration in 1889 until 1929, when it was overtaken by New York's Chrysler Building.

Reaction to the tower was mixed. While Thomas Edison gushed over "Monsieur Eiffel the Engineer, who has the greatest respect and admiration for all Engineers including the Great Engineer the Bon Dieu," man of letters Guy de Maupassant showed his displeasure at a vulgar edifice he regarded as his 'arch nemesis' by dining at the restaurant on the *deuxième étage* every day, famously claiming: "inside the restaurant was one of the few places where I could sit and not actually see the Tower."

If the tower had been a cause célèbre, what followed was nothing less than an outright public scandal. Eiffel became embroiled in the French attempt to build a canal crossing across the Panama isthmus in Central America. His involvement was as a sub-contractor in charge of designing and manufacturing the canal locks. But when the French Panama Canal Company went into liquidation, he was caught up in a political and financial melee, with the result

that in 1893 he was charged along with the directors of the company with misuse of funds. Eiffel was found guilty, fined 20,000 francs and sentenced to two years imprisonment. Although acquitted on appeal, his reputation was in tatters, leading to his resignation from the Board of Directors of Compagnie des Établissements Eiffel. At his own insistence his name was expunged from the organisation (only to be reinstated in 1937, 14 years after his death).

"Paris must groan beneath the shadow of the iron version of the Tower of Babel" – read The Engineer's contemporaneous take on Eiffel's most famous structure (<https://s3-eu-central-1.amazonaws.com/centaur-wp/theengineer/prod/content/uploads/2019/11/18153027/Eiffel-Tower.pdf>)

The remainder of Eiffel's career was spent in the relative obscurity of scientific research in the field of aerodynamics. He had a laboratory at the foot of the tower that bore his name and, by experimenting with dropping objects from his tower, proved that the air resistance of a body is related to the square of the airspeed. In 1909, he built a wind tunnel to investigate the characteristics of aerofoils that were finding their way into technology under development by aviation engineers such as Louis Blériot. In 1913 he was presented with a medal by the Smithsonian Institution for his work in aerodynamics, with Alexander Graham Bell stating that Eiffel's writings on the subject were 'classical' and had "given engineers the data for designing and constructing flying machines upon sound, scientific principles."

Gustave Eiffel died in 1923 while listening to Beethoven's 5th symphony.

(THE ENGINEER, 19th November 2019, <https://www.theengineer.co.uk/late-great-engineers-gustave-eiffel/>)

Seven things you need to know about the Circular Economy (and the role of water and the subsurface)

7

The world's population is expanding and we are all using more and more raw materials. That requires a waste-free economy in which raw materials are used again and again, and in which we are economical in our approach to water and the subsurface. Deltares is developing a range of solutions.

1

By 2050, our planet is expected to be home to more than nine billion people. In the meantime, levels of prosperity will rise. That means increasing demand for raw materials for things like **food**, clothing, transport and energy. Unfortunately, raw materials are becoming increasingly scarce, and extraction and consumption cause environmental pollution. In short, the system is unsustainable. That is why the linear economy has to be replaced with a circular economy in which there is no waste and raw materials are constantly reused.

2

In a circular economy, designers ensure that products last longer, that they can be repaired easily and that they are made from recyclable raw materials. For example, Deltares is working with others to look at how we can build more sustainable locks, bridges and dikes so that they can last a hundred years instead of fifty.

3

When it comes to the circular economy, the focus is primarily on materials, industrial ecosystems and technical cycles. Water and sediments such as clay, silt, sand and gravel are often overlooked. Wrongly so. Deltares is emphasising that these resources are becoming scarce as raw materials for agriculture, industry and construction, and so we should be paying more attention to them.

4

When it comes to the circular economy, companies and organisations often think in terms of individual sectors such as water, energy or agriculture. The use of biofuels (from rapeseed and algae, for example) reduces carbon emissions. But growing them also requires a lot of water and nutrients. Deltares therefore advises focusing not just on one cycle but precisely on the interaction between different cycles.

5

The civil engineering sector has a large ecological footprint world wide. The extraction of sand and dredging operations, for example, affect natural systems and dumped residual materials pollute eco systems. That is why Deltares is looking at solutions for things like the re-use of sludge (see inset).

6

The circular economy also contributes to stability in the world. When resources become scarce, conflicts and flows of climate refugees become more likely. Better land use can prevent desertification, for example by retaining rainwater, planting new trees, temporarily stopping grazing and using groundwater sustainably. Deltares is investigating these areas in collaboration with other research institutes.

The use of fresh groundwater is rising worldwide. In deltas, that can lead to land subsidence and the salinisation of groundwater stocks. Deltares is trying to raise awareness about this issue and we are looking at possible ways of using brackish groundwater for agricultural or industrial applications.

Deltares and the circular economy

Deltares researchers are looking at the circular economy from different angles. For example, the Clay Ripener research project is focusing on the possibilities for using wet, salt sediment dredged in the port of Delfzijl or from the Breeboort polder to produce clay that is suitable for strengthening dikes. If they are successful, the clay will not have to be brought in over long distances, and it will be possible to prevent high costs and environmental pollution.

Another example is the Hazerswoude Topsurf pilot project, which is looking at how to use a mixture of manure, sludge, dredged material and vegetable materials to combat land subsidence. This approach can also be good for the environment because these organic materials capture CO₂ and the sludge doesn't have to go to landfill or be incinerated.

Another interesting development is the SURICATES project that is being conducted by an international research consortium (including Deltares) to devise solutions for environmental pollution caused by dredging. Every year, dredgers extract no less than 200 million cubic metres of sediment from European ports and waterways (source: SedNet, Venice, 2004). Just under 1% of that material (800,000 tonnes per year) is reused: 99% of it is dumped at sea. SURICATES is investigating how sediment can be used for coastal protection and restoration. The aim is to reuse 2.3 million tonnes of dredged sediment annually in the European Union within ten years. In short, about three times the current amount.

Deltares also developed a circular economy scan recently. This is an objective method for determining the extent to which water and subsurface projects contribute to circularity. In collaboration with Rijkswaterstaat, this method is being developed further for applications in delta technology.

(Elsa Lageman, hans.vissers@deltares.nl, DELTAlife, Deltares Magazine No. 12, October 2019, pp. 18-19, <https://media.deltares.nl/deltalife/12/en/>)



Hundreds of businesses sign pledge to change engineering image problem

Over 100 organisations, including the BBC, National Grid, Facebook and Rolls-Royce, have signed up to a pledge to help change the online image search results for the word 'engineer', as an AI programme scours the internet and decides that a typical engineer looks like a white man wearing a hard hat.



© This is Engineering

Led by the Royal Academy of Engineering, the pledge, which has been signed by *The Engineer*, aims to address the misrepresentation of engineers and engineering online and in popular culture. It will do this by actively increasing the public visibility of more representative images of engineers and engineering.

The pledge has been launched on [This is Engineering Day](#) – a national awareness day held during Tomorrow's Engineers Week to celebrate the unsung contribution that engineers make to our lives.



https://www.youtube.com/watch?v=vYLFyR4z5yE&feature=emb_logo

To test the representation of the profession online, an AI machine learning model, otherwise known as a Generative Adversarial Network (GAN), analysed over 1,100 images of engineers sourced online, and generated images based on this given dataset. The images generated by the GAN showed how narrowly an engineer is typically portrayed online: the majority of the generated images were of a white male wearing a hard hat.

Challenging and changing the image of engineering

Meanwhile, an online search, conducted by the Royal Academy of Engineering on 21 October 2019, found that 63 per cent of images on the first page of the search results were of a person in a hard hat, despite the fact that only a small minority of professional engineers wear hard hats most of the time.



Image Problem: After scouring the web, this is what AI decided a typical engineer looks like. Image: RAE

Concerns persist about a shortage of engineers. Many of the emerging and in-demand jobs identified by the World Economic Forum are engineering jobs, yet every year the UK is short of up to 59,000 engineers, while only 12 per cent of the engineering workforce in the UK are female, and nine per cent are from black, Asian and minority ethnic backgrounds.

Research from EngineeringUK shows that more needs to be done to raise awareness of engineering careers and encourage young people to consider the profession. Over three quarters (76 per cent) of young people aged 11-19 and 73 per cent of parents do not know a lot about engineers and the work they do.

Commenting on this latest effort to shift the balance Dr Hayaatun Sillem, Chief Executive of the Royal Academy of Engineering, said: "Engineers play a profoundly important role in shaping the world around us...but that's simply not reflected in online image searches. That's why on *This is Engineering Day* I'm appealing to anyone who uses or pro-

motes images of engineers to join us in challenging outdated and narrow stereotypes of engineering. We want to ensure that engineers are portrayed in a much more representative way, and that we help young people see the fantastic variety of opportunities on offer.”

(THE ENGINEER, 6th November 2019,
<https://www.theengineer.co.uk/pledge-engineering-image-problem>)

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ

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

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

ICGU 4th 2019 4th International Conference on Ground Improvement and Ground Control (ICGI2019): Infrastructure Development and Natural Hazards Mitigation, 1-3 December 2019, Luxor, Egypt, <https://icgi2019-ets.org/page/p/Welcome-ICGI>

ETS Conference and Exhibition 2019, 4-5 December 2019, Luxor - Egypt, <https://icgi2019-ets.org/page/p/Welcome-ETS>

ISOG 2019 First Indian Symposium on Offshore Geotechnics, December 5-6, 2019, IIT Bhubaneswar, Odisha, India, <https://sites.google.com/iitbbs.ac.in/isog2019/home>

15th International Conference on Geotechnical Engineering, and 9th Asian Young Geotechnical Engineers Conference, 05 ÷ 07-12-2019, Lahore, Pakistan, <http://www.pges-pak.org>

GeoSS International Conference on Case Histories & Soil Properties, 5-6 December 2019, Singapore, www.iccs2019.org

1st ITA-CET Meeting for European Tunnelling Professors and PhD Students, 5-6 December 2019, Torino, Italy, ita-cet.secretariat@developpement-durable.gouv.fr

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>



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 – 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

study of the Earth's interior, array seismology, engineering seismology, induced seismicity, seismic anisotropy, earthquake forecasting, statistical seismology, historical seismology and microseismology, recent significant earthquakes, earthquake secondary effects, as well as education, outreach and societal implications, making the 2020 ESC General Assembly one of the largest meetings ever.

We look forward to seeing you in Corfu.

Call for Sessions

The Local Organizing Committee (LOC) is accepting session proposals.

Our goal is to make the 37th General Assembly of the ESC 2020 an exceptional meeting by including sessions related to the latest research, methodologies, technological developments and regional studies. This will allow for fruitful dialogue and new ideas. Sessions are encouraged from all the broad fields of seismology including, but not limited to:

- seismic networks, data acquisition and processing
- seismic hazard and risk, including site effects
- physics of earthquakes
- study of the Earth's interior
- array seismology
- engineering seismology
- earthquake engineering
- induced seismicity
- seismic anisotropy
- machine learning applied to seismology
- earthquake forecasting
- statistical seismology
- historical seismology and macroseismology
- recent significant earthquakes
- earthquake secondary effects (e.g. tsunamis and landslides)
- education, outreach and societal implications.

The LOC also encourages multi-disciplinary sessions involving seismology. One session will be organized jointly with the Seismological Society of America.

For questions about proposing a session, contact the LOC chair at youlgaris@geol.uoa.gr



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

On behalf of the Local Organizing Committee, I would like to welcome you to Corfu (Greece) and the 37th General Assembly (GA) of the European Seismological Commission.

As in the previous successful conferences, we have committed ourselves to organize and deliver a focused event, trying to keep the highest scientific and logistic standards.

The 37th GA of the ESC will be held in Corfu, a place with long history since the antiquity and rich tradition, as well as one of the most cosmopolitan islands of Greece. We are proud to host you in Corfu to discuss recent advances in seismology in a location that lies north of the NW edge of the Hellenic Arc, where a variety of geological processes take place. The venue of the GA is the "Corfu Holiday Palace", located in Kanoni, one of the most famous touristic sights of the island.

In 2020 about 700 early-career and senior researchers from more than 60 countries from Europe and all over the world will meet in Corfu to discuss different modern fields of seismology and related applications. We are anticipating about 1000 abstracts covering the broad fields of seismic networks, seismic hazard and risk, physics of earthquakes,

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



<http://hwm-conferences.tuc.gr>

The 7th International Conference on Industrial and Hazardous Waste Management is going to be held from September 15th to September 18th, 2020, on the beautiful island of Crete, Greece.

CRETE 2020 is organized by the Technical University of Crete, the University of Padua, the Hamburg University of Technology, as well as the Tsinghua University of Beijing.

An extended spectrum of Conference topics has been formed, in order to allow a holistic approach of industrial and hazardous waste management and create an appealing, interesting and riveting Conference program.

CRETE 2020 Organizing Team is working on new ideas and events, in order to make the upcoming Conference even more successful, always counting on your high quality contributions and presentations.

Topics

- Industrial and Hazardous Waste (IHW): Regulations, Legislation & Characterization
- Producer Responsibility and Hazardous Compounds in Products
- IHW Management: Emission Control, Concepts & Practices
- IHW Minimization & Recycling: Optimized Production Processes, Re-utilization, Waste Stock Market, etc.
- Toxicological & Safety Aspects of IHW / Contaminated Sites Management
- Design & Operation of IHW Treatment Plants & Disposal Sites: Recycling Plants, Incinerators, Chemical/ Physical Treatment Plants, Landfills, Intermediate Storage Facilities, etc.
- Contaminant Release & Transport: Processes, LCA, Risk Assessment
- Environmental Toxicology of Persistent Organic Pollutants (POPs), persistent Biocides and Pesticides
- Formation and Destruction of Halogenated Dioxins, PAHs, Biphenyls and Similar Compounds
- Remediation of Contaminated Sites & Groundwater
- Remediation of Mines and Treatment of Mine Residues
- Special Waste Management: Medical, Radioactive, Agro-Industrial and Pharmaceutical Waste, Production Residues, Asbestos, WEEE, etc.
- Catastrophes and War: Effects on the Environment, Impact, Remediation
- Pollution of Marine Environment by Plastic Debris & other Waste

- IHW Energy Management Concepts: Energy Reduction and Recovery
- Social Aspects of IHW Management: Public Acceptance, Public Involvement, Information Policy, Safety Aspects
- Aspects of Global Pollution: Reduction of diffuse Emissions, Targets for acceptable Water, Air & Soil Contamination (Planetary Boundaries), etc.
- Reduction of Air Pollution by advanced Industrial Emission Control
- New Ways of Education in the Field of IHW in Schools, Universities & the Public: Virtual Reality, Advanced Internet Utilization (Presentations, Communication, Courses, etc.), Waste and Art, etc.
- Waste and climate change
- Case Studies
- Industrial Company Presentations and Forum

Contact

Technical University of Crete, University Campus, 73100, Chania, Crete, Greece

Tel. +302821037790 Fax. +302821037850

E-mail: hwm.conferences@enveng.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>

EUROENGE0 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.inec.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>**

On behalf of the Organizing Committee, we are pleased to invite you to attend the fourth GeoMEast 2020 International Congress & Exhibition to be held in Cairo, Egypt from November 08 to 12, 2020. The GeoMEast SERIES is managed by SSIGE and supported by a number of leading international professional organizations.

For the first time in Africa and Middle East, the next 4th Geo-MEast2020 International Congress and Exhibition includes three parallel international conferences in one congress. The Sustainable Structures, Underground Structures and Transportation & Infrastructure Conferences will shape the future of the "Sustainable Construction in Africa and Middle East", which is chosen as the theme of the GeoMEast2020 congress. The three conferences will be held in parallel at the Sheraton Cairo Hotel and Resort during the period of November 08-12, 2020.

Recent rapid construction in Africa and Middle East have provided great opportunities for structure, bridge, material, transportation, pavement, geotechnical, geological, tunnel, geosynthetics, infrastructure and all engineers to use their knowledge and talents to solve many challenging problems and cutting-edge technologies.

GeoMEast 2020 will provide a showcase for recent developments and advancements in design, construction, and safety inspections of sustainable structures, underground structures and transportation infrastructures, and offer a forum to discuss and debate future directions for the 21st century. You will have the opportunity to meet colleagues from all over the world for technical, scientific, and commercial discussions.

IUSC 2020 will have keynote speakers, technical sessions, workshops, courses and publications. There will be a general steering committee for the GeoMEast2020 congress that controls the three conferences and their developments.

Proceedings of the IUSC 2020 conference will be published in some Edited Books by Springer-DE, which will be submitted for inclusion in EI, Scopus and ISI "Thomson Reuters". In addition, some journal special issues will be published in some prestigious journals from selected best papers of the conference, however, authors need to expand and include materials that are at least 75% different than the accepted papers in the proceedings.

IUSC 2020 will provide some awards; such as: best paper awards, best presenter awards, best student presenter awards, industrial project, and others.

Technical Themes

- Geotechnical Engineering
- Geosynthetics Engineering
- Geological Engineering
- Geoenvironmental Engineering
- Foundation Engineering
- Soil-Structure Interaction
- Tunnelling Engineering
- Dams and Water Structures
- Underground Structures
- Underground Construction Management

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Middle East Office: SSIGE

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Tel. 00201110666775
Email: info@geomeast.org



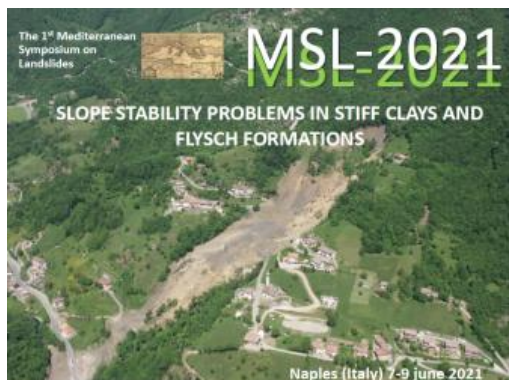
10th International Conference on Scour and Erosion (ICSE-10), November 15-18, 2020, Arlington, Virginia, USA,
www.engr.psu.edu/xiao/ICSE-10 Call for abstract.pdf



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 June 2021, 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



SYDNEY ICSMGE 2021 20th International Conference on Soil Mechanics and Geotechnical Engineering, 12-17 September 2021, Sydney, Australia, www.icsmge2021.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://3eceeds.ro>



UNSAT2022

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

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>

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ

Μύθοι για τους Σεισμούς

Ευρώπη

Ελλάδα

Ο Εγκέλαδος

Ο Εγκέλαδος στην ελληνική μυθολογία φέρεται ως ο αρχηγός των Γιγάντων. Ήταν γιος του Ταρτάρου και της Γης και έπαιξε πρωτεύοντα ρόλο στη Γιγαντομαχία κατά τη διάρκεια της οποίας έχασε τη ζωή του.

Πολλές είναι οι παραλλαγές του μύθου που συνδέονται με το όνομά του. Σύμφωνα με κάποιες από αυτές, κατά τη Γιγαντομαχία τον σκότωσε ο Σειληνός ο ακόλουθος του θεού Διόνυσου, ή τον κατακεραύνωσε ο αντίπαλός του ο Δίας και μετά τον έθαψε ρίχνοντας πάνω του την Όσσα ή την Όθρη.

Ο επικρατέστερος όμως μύθος αναφέρει ότι στη Γιγαντομαχία ο Εγκέλαδος ήταν αντίπαλος της θεάς Αθηνάς, η οποία τον εξουδετέρωσε ρίχνοντας πάνω του τη Σικελία. Από τότε ο Εγκέλαδος προσπαθεί να ελευθερωθεί, προκαλώντας έτσι σεισμούς και εκρήξεις του ηφαιστείου της Αίτνας.

Ο Παυσανίας αναφέρει και άλλη μία εκδοχή, σύμφωνα με την οποία η θεά Αθηνά σκότωσε τον Εγκέλαδο ρίχνοντας επάνω του το τέθριππο άρμα της.

Ο Ποσειδώνας

Οι αρχαίοι Έλληνες θεωρούσαν τον Ποσειδώνα ως το θεό της θάλασσας, συχνά όμως συνέδεαν το θεό αυτό και με τους σεισμούς. Πίστευαν ότι χτυπούσε το πόδι του ή χτυπούσε τη Γη με την τρίαινα του για να δημιουργήσει ένα σεισμό. Αυτή η ικανότητά του να δημιουργεί τους σεισμούς του χάρισε τον τίτλο: "Τινάκτωρ της Γαίας".

Ο Δίας

Στην αρχαία Ελλάδα κάποιοι υποστήριζαν ότι οι σεισμοί προκαλούνται και από τον αρχηγό των αρχαίων θεών, το Δία.

Η θεωρία αυτή, ότι ο θεός Δίας στέλνει τους σεισμούς, αντικαταστάθηκε αργότερα με απόψεις που διατύπωσαν αρκετοί φιλόσοφοι.

Σκανδιναβία

Σύμφωνα με τη μυθολογία το θεό Loki τον έδεσαν σε ένα βράχο μέσα σε μια υπόγεια σπηλιά για να τον τιμωρήσουν για τη δολοφονία του αδερφού του Baldur.

Ένα ερπετό ήταν πάνω από το πρόσωπό του και του έριχνε συνεχώς δηλητήριο. Η αδερφή του θεού Loki στεκόταν πάντοτε δίπλα του και μάζευε το δηλητήριο σε ένα δοχείο για να τον προστατεύει.

Πότε - πότε όμως η κοπέλα απομακρυνόταν για να αδειάσει το δοχείο, οπότε το δηλητήριο έπεφτε πάνω στο πρόσωπο του Loki. Αυτός, για να το αποφύγει στριφογύριζε και τότε το έδαφος δονούνταν και γινόταν σεισμός.

Αμερική

Βόρεια Αμερική

Πολλά χρόνια πριν, όταν το μεγαλύτερο μέρος της Γης ήταν σκεπασμένο με νερό, το Μεγάλο Πνεύμα αποφάσισε να δημιουργήσει μια όμορφη χώρα με λίμνες και ποτάμια, την οποία οι θαλάσσιες χελώνες θα μετέφεραν στην πλάτη τους.

Οι θαλάσσιες χελώνες συνεργάστηκαν και το Μεγάλο Πνεύμα δημιούργησε την πλάση. Μια μέρα όμως οι χελώνες διαφώνησαν μεταξύ τους, οπότε κάποιες από αυτές άρχισαν να κολυμπούν ανατολικά, ενώ άλλες κολύπησαν δυτικά. Τότε ακούστηκε ένας δυνατός θόρυβος και η Γη άρχισε να σείεται. Οι χελώνες δεν μπόρεσαν να κολυμήσουν μακριά γιατί η Γη ήταν πολύ βαριά, έτσι σταμάτησαν να διαφωνούν και συμφιλιώθηκαν.

Παρ' όλα αυτά κάποιες φορές οι χελώνες, που κουβαλούν την Καλιφόρνια στην πλάτη τους, διαφωνούν και πάλι. Κάθε φορά που γίνεται αυτό η γη τρέμει και εκδηλώνεται σεισμός.

Περου

Σύμφωνα με τη μυθολογία ο θεός επισκέπτεται πότε - πότε τη Γη για να μετρήσει τους ανθρώπους που ζουν στον πλανήτη. Τα βήματά του όμως τραντάζουν το έδαφος και προκαλούν σεισμούς.

Οι άνθρωποι κάποιες φορές για να τον διευκολύνουν στην καταμέτρηση, βγαίνουν έξω από τα σπίτια τους και φωνάζουν "Είμαι εδώ, είμαι εδώ!".

Μεξικό

Στο Μεξικό, σύμφωνα με τη μυθολογία, ο σατανικός El Diablo, δημιουργεί τεράστιες ρωγμές στο εσωτερικό της Γης.

Αυτός και οι σύντροφοί του χρησιμοποιούν τις ρωγμές αυτές όταν θέλουν να βγουν στην επιφάνεια της Γης και να προκαλέσουν προβλήματα. Σε κάθε τέτοια περίπτωση η Γη δονείται και εκδηλώνεται σεισμός.

Αφρική

Ανατ. Αφρική

Στην Ανατολική Αφρική πίστευαν ότι ένα γιγάντιο ψάρι κουβαλάει ένα βράχο στην πλάτη του. Πάνω σε αυτό το βράχο στέκεται μια αγελάδα με τη Γη να ισορροπεί σε ένα από τα κέρατά της.

Η αγελάδα που και που μετακινεί τη Γη από το ένα της κέρατο στο άλλο προσπαθώντας να ξεμουδιάσει και έτσι προκαλούνται οι σεισμοί.

Δυτ. Αφρική

Στη Δυτική Αφρική πίστευαν ότι ένας γίγαντας μεταφέρει τη Γη πάνω στο κεφάλι του. Όλα τα φυτά που υπάρχουν στον πλανήτη είναι τα μαλλιά του, ενώ οι άνθρωποι και τα ζώα είναι τα έντομα που βρίσκονται ανάμεσα στα μαλλιά του.

Ο γίγαντας συχνά κάθεται και ρεμβάζει κοιτάζοντας προς την ανατολή. Κάποιες φορές όμως στρέφει το κεφάλι του προς τη δύση και μετά ξανά προς την ανατολή. Η κάθε μια από αυτές τις απότομες κινήσεις είναι και ένας σεισμός.

Μοζαμβίκη

Στη Μοζαμβίκη θεωρούσαν ότι η Γη είναι ένας ζωντανός οργανισμός. Πολλές φορές λοιπόν, όπως όλα τα έμβια όντα, η Γη αρρωσ-

ταίνει και έχει πυρετό. Στις περιπτώσεις αυτές εκδηλώνονται σεισμοί.

Ασία

Ινδία

Διάφοροι μύθοι στην Ινδία αφορούν στους σεισμούς.

Σύμφωνα με τον μύθο Hindu η Γη είναι μια τεράστια πλατφόρμα που στηρίζεται σε οκτώ ελέφαντες. Οι σεισμοί προκαλούνται, όταν ένας από τους ελέφαντες κουράζεται και χαμηλώνει το κεφάλι του, ταραζώντας έτσι την ισορροπία της Γης.

Ένας άλλος μύθος υποστηρίζει ότι η Γη ισορροπεί πάνω σε τέσσερις ελέφαντες, οι οποίοι βρίσκονται πάνω στη ράχη μιας χελώνας. Η χελώνα με τη σειρά της ισορροπεί πάνω σε μία κόμπρα. Όταν ένα από αυτά τα ζώα κινείται, η Γη τρέμει και σείεται.

Ένας τρίτος μύθος αναφέρει ότι επτά ερπετά έχουν ως καθήκον να προστατεύουν τους επτά τομείς του κατώτερου τμήματος του ουρανού και να συγκρατούν εναλλάξ τη Γη. Όταν το ένα ερπετό τελειώνει τη βάρδιά του και αντικαθίσταται από κάποιο άλλο, τότε οι άνθρωποι στη Γη αισθάνονται μια απότομη δόνηση, που δεν είναι άλλη από το σεισμό.

Ιαπωνία

Σύμφωνα με τη μυθολογία ένα γιγαντιαίο γατόψαρο ζει στη λάσπη κάτω από τη Γη. Στο γατόψαρο αυτό αρέσει να κάνει αστεία εις βάρος άλλων και μόνο ο θεός Kashima μπορεί να το χαλιναγωγήσει.

Ο Kashima λοιπόν κρατάει έναν μεγάλο βράχο με μαγικές δυνάμεις πάνω από το γατόψαρο εμποδίζοντάς το να κινηθεί και έτσι η Γη παραμένει ήρεμη και ακίνητη. Υπάρχουν φορές όμως που το γατόψαρο ξεφεύγει από την επίβλεψη του θεού Kashima και αρχίζει να κινείται προκαλώντας σεισμούς.

Μογγολία

Σύμφωνα με τη μυθολογία ένας γιγαντιαίος βάτραχος κουβαλάει τη Γη πάνω στην πλάτη του.

Κατά διαστήματα ο βάτραχος κοάζει με αποτέλεσμα να δονείται η Γη και να εκδηλώνονται σεισμοί.

Ρωσία

Στη Σιβηρία πίστευαν ότι ένας θεός με το όνομα Tuli οδηγεί ένα έλκηθρο που έχει πάνω τη Γη. Το έλκηθρο αυτό το σέρνουν σκύλοι, οι οποίοι έχουν ψύλλους.

Συχνά τα σκυλιά σταματούν για να ξυστούν, οπότε η Γη κλονίζεται και γίνεται σεισμός.

Ωκεανία

Νέα Ζηλανδία

Στη Νέα Ζηλανδία πίστευαν ότι οι σεισμοί σχετίζονται με την εγκυμοσύνη της Μητέρας Γης.

Η Γη κυοφορεί το θεό Ru, ο οποίος συχνά την κλωτσάει. Κάθε φορά που γίνεται αυτό ο πλανήτης σείεται και εκδηλώνεται σεισμός.

(από τον ιστότοπο του ΟΑΣΠ,
<https://www.oasp.gr/node/2074>)



Research studies tsunami impact on infrastructure Delving into the soil

New research from Oregon State University takes steps toward understanding how tsunamis destabilize soil, which is key to building and retrofitting infrastructure that can withstand a disaster.

"Traditionally, in the past, the structural engineers have only thought about what happens at the soil level and above, and the soil engineers have thought about what happens at the surface and below," said Ben Mason, an associate professor at Oregon State's College of Engineering.

The project combines what scientists know about how the soil will affect the structure, and how the structure will affect the soil. The findings could help communities on the North Coast prepare for a Cascadia Subduction Zone earthquake and tsunami.



Several bridges in Seaside have been determined to be insufficient in an earthquake or tsunami.

"Ultimately you have to understand the marriage between the two during both the earthquake and the tsunami to be able to develop reasonable designs," Mason said. "It's a symphony — it really is."

The research was conducted in collaboration with the University of California, Davis and published in July.

Up until now, scientists have been speculating about how water pressure changes the soil, but now they have experimental data they can use to improve their computer models and run simulations to see how infrastructure in different coastal towns will be affected based on their soil density and existing structures.

Building sustainable infrastructure depends on the soil of a given location. How engineers build a bridge should depend on the soil, and how soil moves depends on how engineers build the bridge, Mason said.

"The perfect example of that is the 1986 Mexico City earthquake," Mason said. "The city is built on an ancient lake bed and there's buildings that got absolutely demolished there due to a relatively modest earthquake."

"And then if you go just barely up the mountain to where it's rock, none of the buildings saw any damage. So, the soil is extremely important to how the bridges and buildings and

infrastructure is going to fare during an earthquake and a tsunami."

Mason plans to continue having conversations with local governments on the North Coast to help educate people on what they should expect to see happen in a large earthquake and tsunami.

"In terms of actual communities and engineers or city managers, they're largely going to be concerned with just evacuation procedures during the hazard to try to get their population to higher ground or to safety and then setting up emergency shelters and relief after the event," he said.

The Oregon Department of Transportation is going to be responsible for moving the needle on retrofitting critical bridges, as it is very costly, he said. And since it is difficult for coastal towns to obtain enough funding to improve infrastructure, they need to prioritize their strategies.

"When you start talking about a hazard that might only occur, let's just call it every 500 years, it's very hard to convince governments to spend money to invest in resources and especially retrofit bridges or infrastructure," Mason said.

"The No. 1 thing I'm always a proponent of is, which I think is a lot cheaper and a lot more effective, is educating the population and the government officials about what we expect to happen during the next natural disaster and what are some more cost-effective strategies for keeping the population safe."

As local governments develop emergency preparedness plans and scientists continue to improve research methods, Mason said everyone can do a better job of communicating.

"Sometimes when the scientists come and talk to government officials, they don't really know how to interact with people very well and they can come across as like the annoying computer guy who knows more than you and can't really talk without using jargon," Mason said.

"A lot of times, that's not even ill-intentioned, it's just that we're not taught the skills of how to do that. And I think perhaps because of that maybe there's a boundary between scientists and city managers ... and maybe that brings some reluctance to reach out and talk to the scientists. It's a vicious cycle, really."

(Nicole Bales / The Astorian, Aug 19, 2019, https://www.dailyastorian.com/news/local/research-studies-tsunami-impact-on-infrastructure/article_e7f0f0ba-c160-11e9-8028-b34979296066.html)



Study shows seasonal factors can affect earthquake impact



A new study concludes that the season in which earthquake happens can affect the impact of ground failure and potential destruction.

The paper, published in *Seismological Research Letters* journal, said the 1887 Magnitude 7.3 Verny earthquake and the nearby 1911 Magnitude 7.8 Kemin earthquake likely produced the same shaking. However, the Kemin quake caused significantly more ground failure possibly due to a shallow frozen ground layer that was occurring during the winter season.

The frozen layer may have inhibited the drainage of pore-pressure excess through the surface during the earthquake, causing liquefaction at depth. As a result, the frozen layer extending about one meter below the surface "was a sealant layer that was not allowing the pore pressure to diffuse," explained Stefano Parolai from the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale in Italy, also one of the study authors.

The findings suggested seismologists should consolidate potential seasonal differences in soil characteristics "as they are making probabilistic liquefaction or ground failure assessments," co-author Denis Sandron explained, from the Istituto Nazionale.

The effect of frozen ground on ground deformation is already calculated for some types of infrastructure like oil pipelines in Alaska. However, Parolai said the Kazakhstan study shows the significance of considering these effects in urban areas, particularly when it can become a seasonal effect.

The 1887 earthquake in Verny, the former name of Almaty, ravaged almost all of the town's buildings and killed 300 people.

The Kemin earthquake, which occurred about 40 km (25 miles) from Verny, caused an unexpected amount of widespread ground failure and devastation, as well as 390 fatalities.

The team reviewed historical records of the two earthquakes as part of a larger project that is examining site effects and seismic risk in central Asia-- this is led by the GFZ German Research Center for Geosciences.

The two quakes in Almaty, including the secondary effects like landslides, "were very well documented by expeditions of the Mining Department of Russia and the Russian Mining Society at the time," said Parolai.

The differences in ground failure were perplexing, according to the researchers. The fact that the two quakes had occurred at different times of year urged Sandron and his colleagues to consider whether frozen ground might have been a factor in ground failure, as previous researchers had noted for the Magnitude 9.2 Great Alaska earthquake in 1964.

To delve further into this idea, the research team made computer simulations of the quakes using different models of the soil profile that would affect the velocity of seismic waves passing through them, along with temperature data to identify whether it would be possible to have a frozen layer of ground at shallow depth during January.

Co-author Rami Alshembari of the University of Exeter in the United Kingdom said one of the factors was finding a way to include appropriate strong motion data recordings in the simulations, since "of course there were no digital recordings of these two earthquakes. We had to choose the most reasonable and robust studies for [the] input of strong motion."

Researchers concluded that models that included a frozen layer 1 m (3 feet) deep as a seal against pore pressure draining were the best fit for the ground failure seen in the Kemin earthquake.

Although the authors suspected that a frozen layer could be the culprit, they said they were astounded by the strength of the effect.



Ground deformation after the Kemin 1911 earthquake.

"Even in materials where we would not expect this effect, due to local conditions and temperatures, it could happen. Without this good documentation, probably we would not have noticed this effect," Parolai said.

"This is telling us that good data taken in the past can be very precious in 100 years."

Reference:

"Seasonality in Site Response: An Example from Two Historical Earthquakes in Kazakhstan" - Alshembari, R. et al - Seismological Research Letters - <https://doi.org/10.1785/0220190114>

(Julie Celestial / THE WATCHERS, November 11, 2019, <https://watchers.news/2019/11/11/study-shows-seasonal-factors-can-affect-earthquake-impact>)

Seasonality in Site Response: An Example from Two Historical Earthquakes in Kazakhstan

Rami Alshembari; Stefano Parolai; Tobias Boxberger; Denis Sandron; Marco Pilz; Natalya Sylacheva

ABSTRACT

During the past 150 yr, the city of Almaty (formerly Verny) in Kazakhstan has suffered significant damage due to several large earthquakes. The 9 June 1887 Mw 7.3 Verny earthquake occurred at a time when the city mainly consisted of adobe buildings with a population of 30,000, with it being nearly totally destroyed with 300 deaths. The 3 January 1911 Mw 7.8 Kemin earthquake caused 390 deaths, with 44 in Verny itself. Remarkably, this earthquake, which occurred around 40 km from Verny, caused significant soil deformation and ground failure in the city. A crucial step toward preparing for future events, mitigating against earthquake risk, and defining optimal engineering designs, involves undertaking site response studies. With regard to this, we investigate the possibility that the extreme ground failure observed after the 1911 Kemin earthquake could have been enhanced by the presence of a shallow frozen ground layer that may have inhibited the drainage of pore pressure excess through the surface, therefore inducing liquefaction at depth. We make use of information collected regarding the soil conditions around the city at the time of the earthquakes, the results from seismic noise analysis, borehole data, and surface temperature data. From these datasets, we estimated the necessary parameters for evaluating the dynamic properties of the soil in this area. We successively characterize the corresponding sediment layers at the sites of the observed liquefaction. Although the estimated soil parameters are not optimally constrained, the dynamic analysis, carried out using selected strong-motion recordings that are expected to be compatible with the two considered events, indicated that the extensive ground failure that occurred during the Kemin event could be due to the presence of a superficial frozen soil layer. Our results indicate that for this region, possible seasonal effects should, therefore, be considered when undertaking site effect studies.

Seismological Research Letters (2019), Research Article, November 06, 2019, <https://doi.org/10.1785/0220190114>

<https://pubs.geoscienceworld.org/ssa/srl/article-abstract/doi/10.1785/0220190114/574575/Seasonality-in-Site-Response-An-Example-from-Two?redirectedFrom=PDF>



Σε ποιο ελληνικό νησί θα γίνει δοκιμή συστήματος προειδοποίησης για τσουνάμι



Άσκηση αντιμετώπισης έκτακτης ανάγκης λόγω τσουνάμι θα διεξαχθεί την Τρίτη στις 9 το πρωί στην Κω - Η άσκηση θα διαρκέσει τέσσερις ώρες

Σε άσκηση αντιμετώπισης έκτακτης ανάγκης λόγω τσουνάμι προχωρά την ερχόμενη Τρίτη στις 9 το πρωί το Κοινό Κέντρο Ερευνών (JRC) της Ευρωπαϊκής Επιτροπής, οι υπηρεσίες έκτακτης ανάγκης και η τοπική κοινότητα της Κω.

Στην άσκηση θα δοκιμαστεί ο νέος εξοπλισμός, αλλά και οι νέες διαδικασίες που θεσπίστηκαν στο πλαίσιο του σχεδίου της ΕΕ «Tsunami Last Mile», μετά το τσουνάμι το οποίο έπληξε την Κω το 2017 και προκάλεσε δύο θανάτους.

Αισθητήρες, πινακίδες με μεγάφωνα και σειρήνες

Η υποδομή «Tsunami Last Mile» περιλαμβάνει αισθητήρες και σταθμούς για τη μέτρηση της στάθμης της θάλασσας, ενημερωτικές πινακίδες με μεγάφωνα στην ακτογραμμή της μαρίνας της Κω και σειρήνες μεγάλης εμβέλειας. Το σύστημα έχει σχεδιαστεί έτσι ώστε να βελτιωθεί η έγκαιρη προειδοποίηση και η επικοινωνία, προκειμένου ο τοπικός πληθυσμός να είναι καλά ενημερωμένος, εγκαίρως στην περίπτωση που συμβεί τσουνάμι στο μέλλον.

Για την εκτέλεση της δοκιμής στις 9 η ώρα το πρωί, η ομάδα της άσκησης θα προσομοιώσει έναν σεισμό και θα προγραμματίσει τους αισθητήρες να διαβάσουν το ίδιο ύψος κύματος με εκείνο το οποίο σημειώθηκε κατά τον υποθαλάσσιο σεισμό που προκάλεσε στο Αιγαίο το τσουνάμι του 2017.

Προκειμένου να διασφαλιστεί η καταλληλότητα του συστήματος, η ομάδα θα χρονομετρήσει την ικανότητα του συστήματος να εντοπίσει τον σεισμό, να δημιουργήσει κατάλληλο μήνυμα προειδοποίησης και να το διαδώσει στους σχετικούς δέκτες.

Η άσκηση θα διαρκέσει τέσσερις ώρες, και θα συμμετέχει σε αυτήν το σύνολο του τοπικού συστήματος αντιμετώπισης έκτακτων αναγκών: η διοίκηση του δήμου, η πυροσβεστική, η αστυνομία, το λιμεναρχείο, η υπηρεσία ασθενοφόρων, ο Ερυθρός Σταυρός και εθελοντές. Οι ομάδες που συμμετέχουν στην άσκηση, θα λάβουν προειδοποιητικό μήνυμα, και η αντίδρασή τους, συμπεριλαμβανομένων των διαδικασιών εκκένωσης, θα παρατηρηθεί και θα αξιολογηθεί.

Στην άσκηση μετέχουν και μαθητές

Οι μαθητές του 3ου Δημοτικού Σχολείου και του 1ου Γυμνασίου Κω, καθώς και οι εργαζόμενοι σε τοπικό ξενοδοχείο, αναμένεται να ακολουθήσουν τα σήματα του τσουνάμι κατά μήκος των οδών εκκένωσης και να συγκεντρωθούν σε περιοχές συνάθροισης, όπου θα εγγραφούν από τους φορείς του τοπικού συστήματος αντιμετώπισης καταστάσεων έκτακτης ανάγκης, οι οποίοι και θα αναλάβουν τη φροντίδα τους.

Θα δοκιμαστεί επίσης η ενσωμάτωση του τοπικού συστήματος με την υπηρεσία παρακολούθησης και προειδοποίησης για τσουνάμι σε εθνικό επίπεδο από το Εθνικό Αστεροσκοπείο Αθηνών. Εκπρόσωποι της αρμόδιας υπηρεσίας της Ευρωπαϊκής Επιτροπής (Γενική Διεύθυνση Ευρωπαϊκής Πολιτικής Προστασίας & Επιχειρήσεων Ανθρωπιστικής Βοήθειας/ΓΔ ΕCHO) και της γενικής γραμματείας Πολιτικής Προστασίας στην Ελλάδα θα παρακολουθούν και θα αξιολογούν τα αποτελέσματα της δοκιμής. Επιστήμονες από το Κοινό Κέντρο Ερευνών και από το Εθνικό Αστεροσκοπείο Αθηνών θα κατευθύνουν και θα επιβλέπουν τη διαδικασία από την αίθουσα ελέγχου της άσκησης.

Θα χρησιμοποιηθεί εφαρμογή κινητής τηλεφωνίας

Κατά τη διάρκεια της άσκησης, θα χρησιμοποιηθεί η εφαρμογή κινητής τηλεφωνίας KATWARN, την οποία έχει αναπτύξει το γερμανικό Ινστιτούτο Ερευνών Fraunhofer, προκειμένου να ενημερώνονται οι εμπλεκόμενοι φορείς σχετικά με τα τρέχοντα μηνύματα συναγερμού και να παρακολουθούν τα στάδια της άσκησης.

Εάν αποδειχτεί αποτελεσματικό, το τοπικό δίκτυο «Tsunami Last Mile» και η ενσωμάτωσή του στο Εθνικό Κέντρο Προειδοποίησης Τσουνάμι της Ελλάδας, θα μπορούσαν να αποτε-

λέσουν πρακτική αναφοράς για ολόκληρη την περιοχή της Μεσογείου.

Η άσκηση είναι το τελευταίο στάδιο του σχεδίου «Tsunami Last Mile», που ξεκίνησε και χρηματοδοτήθηκε από την ΕΕ το 2018, μετά από δύο τσουνάμι στο Αιγαίο, τα οποία έπληξαν τις ακτές της Ελλάδας και της Τουρκίας (12 Ιουνίου και 21 Ιουλίου 2017). Στις περιπτώσεις εκείνες, το προειδοποιητικό μήνυμα δεν έφτασε στις τοπικές κοινότητες. Στην Κω, το τσουνάμι συνέβη τη νύχτα, ενόσω η μαρίνα είχε λιγότερη κίνηση απ' ό,τι συνήθως. Ωστόσο, σημειώθηκαν δύο θάνατοι και δεκάδες τραυματισμοί.

Το σχέδιο «Tsunami Last Mile» σχεδιάστηκε και οργανώθηκε από το Κοινό Κέντρο Ερευνών της ΕΕ με χρηματοδότηση από τη ΓΔ ΕCHO της Ευρωπαϊκής Επιτροπής. Η δεύτερη φάση του σχεδίου θα διοργανωθεί την περίοδο 2020-2021 και θα περιλαμβάνει περισσότερες χώρες της Μεσογείου, καθώς και τοποθεσία στην Ινδονησία που συμφώνησε να συμμετάσχει στο σχέδιο.

(in.gr, 16 Νοεμβρίου 2019, <https://www.in.gr/2019/11/16/greece/se-poio-elliniko-nisi-tha-ginei-dokimi-systimatos-proeidopoiisis-qia-tsounami>)



Satellite-based radar maps fault of rare earthquake in France



Southeast France was hit by a [M5.4 earthquake](#) at 10:52 UTC on November 11, damaging establishments and displacing residents. The tremors were felt between Lyon and Mintellimar.

Earthquakes in this part of France are very rare, prompting scientists to investigate the region.

They turned to satellite-based radar observations to further understand the nature of the seismic fault and map its location. By combining imagery taken before and after an earthquake, shiftings on the ground that happened between two acquisition dates resulted in rainbow-colored interference patterns in the combined image, known as an "interferogram". This enabled scientists to measure ground movement.

The acquisition was made on November 12 by Copernicus Sentinel-1, a day after the event. It was ready to process on European Space Agency's (ESA) Geohazards Exploitation Platform (GEP) - a cloud-based processing environment with on-demand terrain motion mapping features.

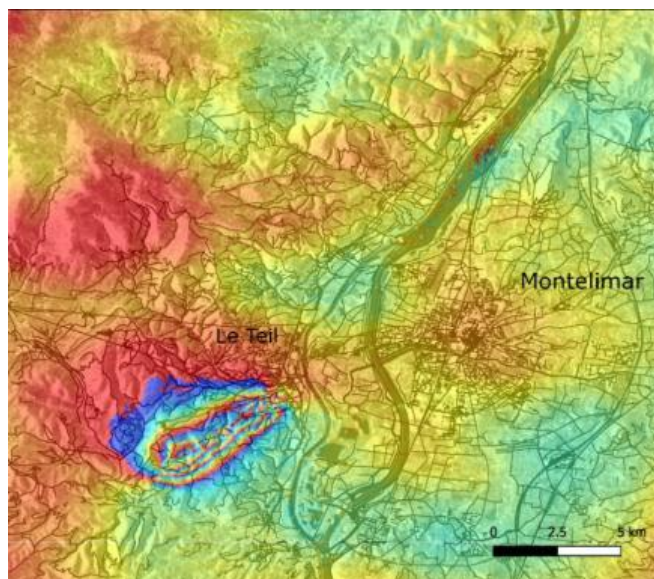
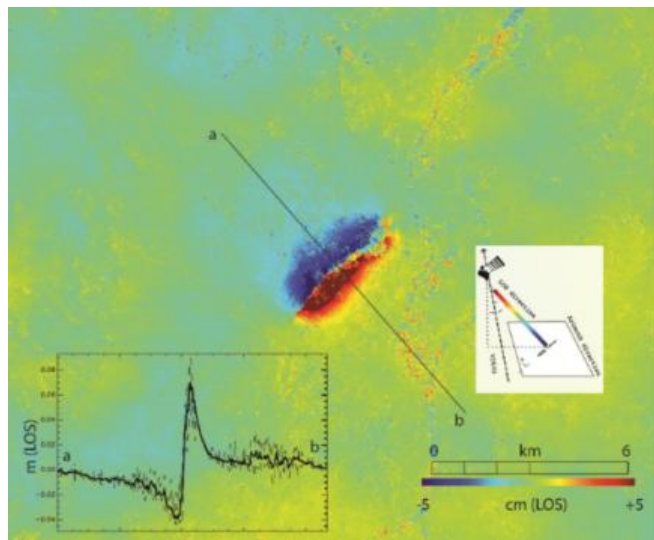
Some users have quantified interferograms over the affected region. While a few faults are present in the region and marked in geological maps, none were identified as seismically active.

The interferogram displayed a series of fringes in the area west of Le Teil city and has enabled scientists to determine the fault at the quake's origin.

Satellite observation also calculated a ground displacement that corresponds to an uplift of up to 80 mm (3 inches) in the southern part of the fault.

The ground motion's intensity is unusual for this magnitude unless the quake epicenter is shallow. Indeed, seismic data put the epicenter between 1 and 3.5 km (0.6 to 2.2 miles) below the surface.

Observations on November 13 suggested that the rupture generated up to the surface.



"The rapid release to the public of up-to-date Copernicus Sentinel-1 based products visualized in a friendly fashion on the GEP geobrowser was followed by a peak of connections. It helped the scientific community better map the location of the fault and to confirm the mechanism of the earthquake," said ESA researcher, Floriane Provost.

"This example shows how the GEP environment contributes to the rapid processing and exchange of information within the geohazards community."

"Field investigations by BRGM experts are on-going, while interferometric synthetic aperture radar results are actually helping them to correlate the distribution of damage with

the location of the activated fault and measured ground displacements," added Michael Fournel, a researcher at the French Geological Survey BRGM.

(Julie Celestial / THE WATCHERS, November 20, 2019, <https://watchers.news/2019/11/20/satellite-based-radar-maps-fault-of-rare-earthquake-in-france>)

(Σημείωση Εκδότη:

Ο **Μιχαήλ Φουρμέλης** εργάζεται από τον Μάρτιο 2017 στην

French Geological Survey | BRGM - Direction Risques et Prévention, BRGM - French Geological Survey, Orléans, France - Position: EO Scientist. Από τον Φεβρουάριο 2012 μέχρι τον Φεβρουάριο 2017 εργάστηκε στο **European Space Agency (ESA)** Frascati, Italy, αρχικά ως Research Fellow και στην συνέχεια ως EO Scientist).

Είναι απόφοιτος του ΕΚΠΑ (Σεπ 2000 - Ιουν 2004 - Field of study: Remote Sensing and Geographic Information Systems και Σεπ 2004 - Δεκ 2009 - Field of study: Satellite Geodesy and SAR Interferometry)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

Researchers discovered what could be the largest caldera on Earth

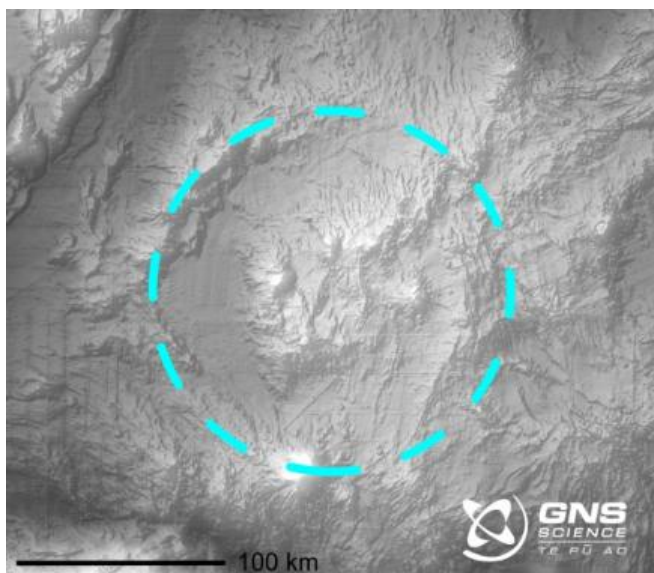


A team of researchers including members from GNS Science, led by marine geophysicist Jenny Anne Barretto, have identified an ancient mega-volcano with what could be the largest known caldera on Earth. The feature is on the crest of Benham Rise, an oceanic plateau off the Philippines coast.

The discovery of such a large caldera raises questions about volcanism in the Benham Rise around 48-41 million years ago and what special conditions were present for the Apolaki caldera to form. If the team's conclusions are confirmed by further research, it will officially become the largest known caldera on Earth.

A caldera is defined as a depression produced when a volcano collapses after the emptying of its magma chamber in an explosion.

The caldera on Benham Rise, about 150 km (93 miles) in diameter, can be compared to the biggest impact craters on Earth. It could also be bigger than any other identified calderas on the planet.



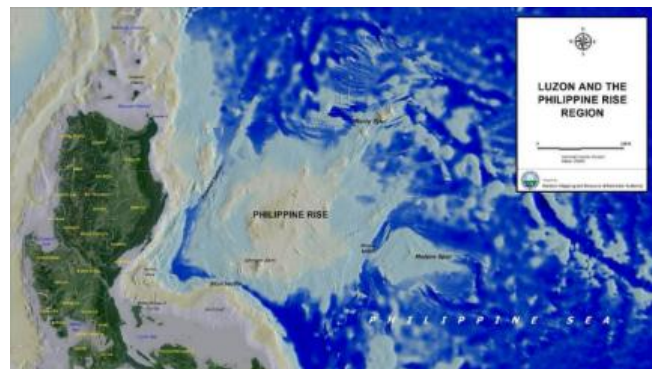
The largest known identified craters on Earth include Chicxulub, about 200 km (124 miles) wide, produced by the impact of the asteroid that made dinosaurs extinct 66 million years ago.

This study showed it had more in common with calderas than impact craters. The crater-like summit of Benham Rise

could be compared in size to calderas on Mars, such as Olympus Mons. It was also comparable to that of Venus, such as Colette and Sacajawea.

Due to the caldera's massive size, it was named after Filipino mythical god of the sun and war, Apolaki, whose name also translates to "giant lord".

Scientists believe that the caldera went through multiple collapse events and a resurgence phase.



"Apolaki Caldera may well be the world's largest caldera," researchers said. "The short-lived but immense magmatic pulses associated with its formation must have altered the chemistry and physics of the waters and atmosphere in this part of the Pacific."

GNS said the discovery of such large caldera raised queries about volcanism in the Benham Rise some 48 million years ago, and if there were special conditions present for Apolaki Caldera to form.

Once the researchers' findings were confirmed, Apolaki would officially be recognized as the largest known caldera on Earth.

80% of the world's ocean floor was unmapped, and a worldwide push for more study about the depth of the sea-floor could lead to more rare discoveries, GNS noted.

The study was published in the *Marine Geology* journal.

Reference

"Benham Rise unveiled: Morphology and structure of an Eocene large igneous province in the West Philippine Basin" - Barretto, J.A. et al - *Marine Geology* - <https://doi.org/10.1016/j.margeo.2019.106052>

Abstract

The Benham Rise is an oceanic large igneous province at the western margin of the Philippine Sea. It has an ocean island basalt geochemistry, a surface area of 0.11 Mkm² and a volume of ~0.13 Mkm³. A crustal thickness of ~15 km is estimated from gravity anomalies. Volcanism was most active in the early stages of its formation, during the Lutetian from ~47.9 Ma to 41.3 Ma, although volcanic activity extended to ~26 Ma. Multibeam bathymetry with almost 100% coverage has revealed the morphology of Benham Rise for the first time. It consists of a main body (~310 km by 330 km) with the Narra, Loro and Molave Spurs extending 100–200 km from its eastern side. The main body is built on a shield platform from ~5200 m to ~3800 m sub-sea. The platform flanks consist of ~3–15 km wide terraces with scarps as high as 100 m to 300 m. The platform is surmounted by a crest exhibiting caldera morphology at an average depth of ~2500 m. The crest is named Apolaki Caldera and may be the world's largest known caldera with a diameter of ~150 km. Features like a breached rim, intra-

caldera benches, and a resurgent dome indicate a multi-phase volcanic history consisting of both quiet and explosive eruptions. The bathymetry and publicly available geological and geophysical data record three main stages in the tectonic history of Benham Rise – shield-building, caldera formation, and post-caldera/late stage volcanism. The platform base is interpreted to have formed over a hotspot beneath the Central Basin Spreading Center during the shield-building phase between ~47.9 Ma to ~42.5 Ma. The arrowhead shaped Molave Spur is interpreted to have formed late in this stage along a ridge that propagated away from the hotspot. The caldera formation followed and is interpreted to have occurred before ~41.3–41.5 Ma when Benham Rise was still joined with Urdaneta Plateau. The Narra Spur was formed by late-stage hotspot related volcanism, as Benham Rise and Urdaneta Plateau separated, and ended with the eruptions of the Vinogradov Seamount at ~26 Ma.

(Julie Celestial / THE WATCHERS, November 10, 2019, https://watchers.news/2019/11/10/largest-caldera-earth/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+adorraeli%2FtsEq+%28The+Watchers+-+watching+the+world+evolve+and+transform%29)

Benham Rise unveiled: Morphology and structure of an Eocene large igneous province in the West Philippine Basin

Jenny Barretto, Ray Wood, John Milsom

Highlights

- Benham Rise is a large igneous province in the West Philippine Basin.
- The crest of the rise has the morphology of a caldera with a diameter of ~150 km.
- The morphology and structure of the rise show that it formed as a result of mantle plume and spreading ridge interaction.

Abstract

The Benham Rise is an oceanic large igneous province at the western margin of the Philippine Sea. It has an ocean island basalt geochemistry, a surface area of 0.11 Mkm² and a volume of ~0.13 Mkm³. A crustal thickness of ~15 km is estimated from gravity anomalies. Volcanism was most active in the early stages of its formation, during the Lutetian from ~47.9 Ma to 41.3 Ma, although volcanic activity extended to ~26 Ma.

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(**Marine Geology**, Volume 419, January 2020, 106052, <https://doi.org/10.1016/j.margeo.2019.106052>Get rights and content, <https://www.sciencedirect.com/science/article/pii/S002532719300684?via%3Dihub>)



Very large impacts may have stimulated blasts of plate tectonics



A new study suggests that the Earth's evolution from a hot, primordial mush into a rocky planet continuously resurfaced by plate tectonics may be triggered by extraterrestrial impacts. By examining the implications of these processes, the researchers believe that scientists can now start exploring how the modern habitable Earth came to be.

"We tend to think of the Earth as an isolated system, where only internal processes matter," said Craig O'Neill, director of Macquarie University's Planetary Research Center and one of the study authors.

"Increasingly, though, we're seeing the effect of solar system dynamics on how the Earth behaves," he added.

Modeling simulations and comparisons with lunar impact studies have shown that following Earth's accretion about 4.6 billion years ago, shattering impacts continued to mold the planet for hundreds of millions of years.

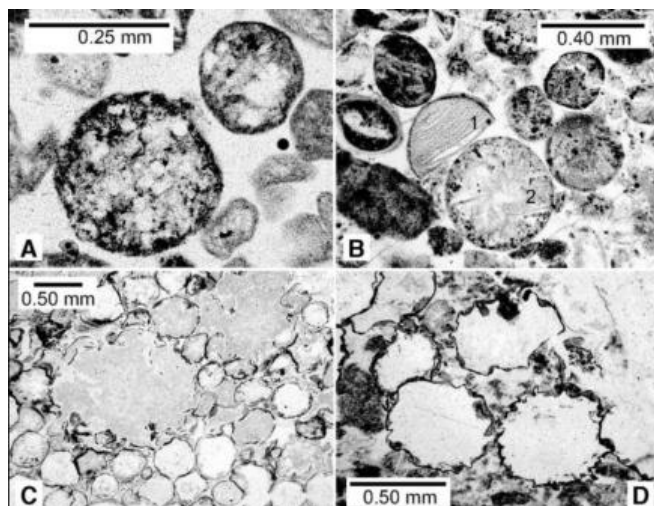
Although these happenings appear to have tapered off over time, spherule beds suggest that the Earth experienced a period of extreme bombardment roughly 3.2 billion years ago, around the same time the first signs of plate tectonics appear on rock record.

Spherule beds are distinctive layers of round particles condensed from rock vaporized during an extraterrestrial impact. These were found in South Africa and Australia.

The coincidence led O'Neill and his co-authors Simone Marchi, William Bottke, and Roger Fu to find out if these events could be related.

"Modelling studies of the earliest Earth suggest that very large impacts-- more than 300 km (186 miles) in diameter -

- could generate a significant thermal anomaly in the mantle," said O'Neill. This appeared to have changed the mantle's buoyancy enough to make upwellings that "could directly drive tectonics."



Spherules in the Barberton greenstone belt in the Kaapvaal craton, South Africa.

However, the limited evidence found to date from the Archaean-- about 4 to 2.5 billion years ago-- suggests that mostly smaller impacts less than 100 km (62 miles) in diameter happened during this interval.

The researchers used existing methods to expand the Middle Archaean impact record to identify whether these modest collisions were still large and often enough to trigger global tectonics.

They also developed numerical simulations to model the thermal effects of these impacts on the mantle.

The findings showed that during the Middle Archaean, 100 km (62 miles) wide impacts, which are about 30 km (19 miles) wider than the Chixclub crater, were able to weaken the planet's rigid, outermost layer. This could be the trigger for tectonic processes, particularly if Earth's exterior was already primed for subduction, explained O'Neill.

"If the lithosphere were the same thickness everywhere, such impacts would have little effect. But during the Middle Archaean, he says, the planet had cooled enough for the mantle to thicken in some spots and thin in others."

The modeling also showed that if an impact were to occur in a place where these differences existed, it would create a point of fragility in a system that already had a large contrast in buoyancy, and eventually trigger modern tectonic processes.

"Our work shows there is a physical link between impact history and tectonic response at around the time when plate tectonics was suggested to have started," O'Neill stated.

"Processes that are fairly marginal today -- such as impact-ing, or, to a lesser extent, volcanism -- actively drove tectonic systems on the early Earth."

Reference

"The role of impacts on Archaean tectonics" - O'Neill, C. et al - *Geology* - <https://doi.org/10.1130/G46533.1>

Abstract

Field evidence from the Pilbara craton (Australia) and Kaapvaal craton (South Africa) indicate that modern tectonic processes may have been operating at ca. 3.2 Ga, a time also associated with a high density of preserved Archaean impact indicators. Recent work has suggested a causative association between large impacts and tectonic processes for the Hadean. However, impact flux estimates and spherule bed characteristics suggest impactor diameters of <100 km at ca. 3.5 Ga, and it is unclear whether such impacts could perturb the global tectonic system. In this work, we develop numerical simulations of global tectonism with impacting effects, and simulate the evolution of these models throughout the Archaean for given impact fluxes. We demonstrate that moderate-size (~70 km diameter) impactors are capable of initiating short-lived subduction, and that the system response is sensitive to impactor size, proximity to other impacts, and also lithospheric thickness gradients. Large lithospheric thickness gradients may have first appeared at ca. 3.5–3.2 Ga as cratonic roots, and we postulate an association between Earth's thermal maturation, cratonic root stability, and the onset of widespread sporadic tectonism driven by the impact flux at this time.

<https://pubs.geoscienceworld.org/gsa/geology/article-abstract/doi/10.1130/G46533.1/575921/The-role-of-impacts-on-Archaean-tectonics?redirectedFrom=fulltext>

(Julie Celestial / THE WATCHERS, November 28, 2019, <https://watchers.news/2019/11/28/very-large-impacts-may-have-stimulated-blasts-of-plate-tectonics>)

Plan for three metre sea level rise, warns IMechE

The Institution of Mechanical Engineers (IMechE) is urging governments around the world to plan for sea level rises of up to three metres.



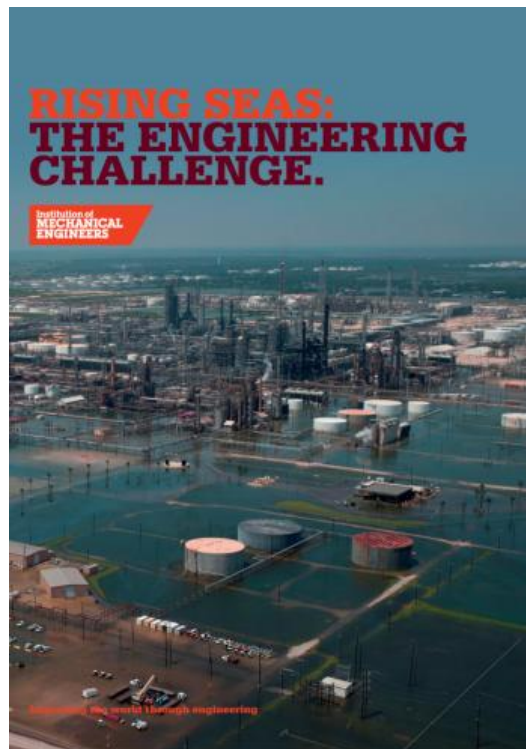
In its new report, *Rising Seas: The Engineering Challenge*, the institution warns that current policies for coastal adaptation to heightened sea levels may not be adequate. IMechE said governments should be planning for sea level rises of one metre this century, but that infrastructure planning should take into account the possibility of a much bigger increase over the longer term.

"There is emerging evidence that sea-levels could rise further and more rapidly than the most recent predictions from the Intergovernmental Panel on Climate Change," said IMechE fellow and report author Dr Tim Fox. "In light of this, it is essential that governments and the engineering profession consider this when designing and implementing national policies and strategies for adaptation to future coastal flooding.

"Engineered structures, devices and systems – particularly larger projects like bridges, roads or rail lines – can often be in service for 50-100 years. When we are thinking about projects this important to businesses and communities worldwide and the potential for how sea-levels might change in that time, the pressing case for changing our thinking and our approach becomes clear."

While rising seas will directly affect those living in coastal areas, they also have the potential to disproportionately impact key infrastructure such as power stations, oil refineries and wastewater plants, which are often located on the coast or tidal estuaries. Despite this, IMechE said there is little evidence to suggest that the owners and operators of this infrastructure are taking the necessary action to mitigate the risks.

The report, delivered in collaboration with the Rising Seas Institute, outlines the role that engineers can play in addressing the challenge and the steps that should be taken by governments around the world. Its recommendations include adapting policy to acknowledge a potential rise of three metres, ensuring major coastal infrastructure is included in planning, and setting up industry task forces to deal with anticipated coastal flooding events.



<https://www.imeche.org/docs/default-source/1-oscar/reports-policy-statements-and-documents/imeche-rising-seas-report.pdf?sfvrsn=2>



Τα μυστηριώδη «παγωμένα αυγά», που κάλυψαν παραλία της Φινλανδίας



Χιλιάδες κομμάτια πάγου, σε σχήμα αυγού ή και μεγάλης μπάλας, έχουν καλύψει μία παραλία στην Φινλανδία, ως αποτέλεσμα ενός σπάνιου καιρικού φαινομένου.

Ο ερασιτέχνης φωτογράφος, Ρίστο Ματίλα, ήταν μεταξύ αυτών που αντίκρυσαν το φαινόμενο στο νησί Χαϊλουότο, στον Βοθνικό Κόλπο ανάμεσα στην Φινλανδία και τη Σουηδία.

Οι ειδικοί εξηγούν πως πρόκειται για μία σπάνια διαδικασία, κατά την οποία μικρά κομμάτια πάγου "τυλίγονται" από τον άνεμο και τον αέρα και σχηματίζουν σφαίρες.

Ο κ. Ματίλα από την κοντινή πόλη Ούλου δήλωσε στο BBC ότι δεν είχε ξαναδει κάτι τέτοιο.

Όπως ανέφερε αν και ο καιρός ήταν ηλιόλουστος, το θερμόμετρο ήταν στο -1 C, ενώ έπνεαν ισχυροί άνεμοι.

Οι μικρότερες σφαίρες πάγου είχαν το μέγεθος αυγού και οι μεγαλύτερες το μέγεθος μπάλας ποδοσφαίρου, τόνισε ο ερασιτέχνης φωτογράφος, κάνοντας λόγο για ένα αξέχαστο θέαμα.

Πηγή: BBC

(ΝΑΦΤΕΜΠΟΡΙΚΗ, Σάββατο, 09 Νοεμβρίου 2019, https://www.naftemporiki.gr/story/1531361/ta-mustiriodi-pagomena-auqa-pou-kalupsan-paralia-tis-finlandias?utm_source=email_service&utm_medium=email&utm_content=naftemporiki_articles&utm_campaign=email_service)



Οι επιστήμονες ανακάλυψαν την ηλικία του Νείλου - Ο αριθμός εκπλήσσει
Τι δείχνει έρευνα που δημοσιεύεται στο «Nature Geoscience»



Ο ποταμός Νείλος, τον οποίο οι αρχαίοι Αιγύπτιοι θεωρούσαν πηγή όλης της ζωής, έχει ηλικία περίπου 30 εκατομμυρίων ετών, σχεδόν έξι φορές μεγαλύτερη από αυτή που πίστευαν οι επιστήμονες, σύμφωνα με νέες εκτιμήσεις.

Ο Νείλος ακολουθεί μια βορειοδυτική πορεία και έχει καταστήσει εύφορες τις κοιλάδες της βορειοανατολικής Αφρικής εδώ και εκατομμύρια χρόνια, παίζοντας παράλληλα καθοριστικό ρόλο στην πορεία του ανθρώπινου πολιτισμού. Οι επιστήμονες, με μια νέα μελέτη τους, εκτιμούν ότι εκτός από την πολύ μεγαλύτερη ηλικία του, ο Νείλος – αν ο ρους του δεν επηρεαζόταν καθοριστικά από την μορφολογία και την κίνηση πετρωμάτων στα βάθη της Γης – θα είχε προ καιρού στραφεί προς τα δυτικά, κάτι που πιθανώς θα άλλαζε την πορεία της αιγυπτιακής (και όχι μόνο) ιστορίας.

Η αμετάβλητη πορεία του ποταμού στο πέρασμα του χρόνου, αποτελούσε ανέκαθεν ένα γεωλογικό μυστήριο, καθώς τα μακρόβια ποτάμια συνήθως μετακινούνται σταδιακά και αλλάζουν πορεία. Οι ερευνητές από τις ΗΠΑ, την Ιταλία και το

Ισραήλ, με επικεφαλής τον καθηγητή Κλαούντιο Φατσένα του Πανεπιστημίου «Ρώμη 3», που έκαναν τη σχετική δημοσίευση στο περιοδικό γεωεπιστήμης «Nature Geoscience», έριξαν φως στο μυστήριο αυτό, συνδέοντας τη ροή του Νείλου με την πολύ αργή κίνηση του μανδύα στο υπέδαφος κάτω από το ποτάμι.

Η τοπογραφία του υπεδάφους από τα αιθιοπικά υψίπεδα έως το δέλτα του ποταμού στη Μεσόγειο, δημιουργεί μια συγκεκριμένη κλίση που κρατά το Νείλο στην ίδια ουσιαστικά κοίτη εδώ και εκατομμύρια χρόνια. Οι επιστήμονες επαλήθευσαν τα ευρήματά τους με προσομοιώσεις σε υπολογιστή, οι οποίες αναδημιούργησαν 40 εκατομμύρια χρόνια τεκτονικής δραστηριότητας στην περιοχή του Νείλου.

Οι ερευνητές σκοπεύουν να χρησιμοποιήσουν τη νέα μέθοδο για να χρονολογήσουν ξανά και άλλα μεγάλα ποτάμια, όπως ο Γιανγκτσέ στην Κίνα και ο Κονγκό στην Αφρική.

Πηγή: ΑΠΕ-ΜΠΕ

(TA NEA Team, 12 Νοεμβρίου 2019, <https://www.tanea.gr/2019/11/12/science-technology/oi-epistimones-anakalypsan-tin-ilikia-tou-neilou-o-arithmos-ekplissei>)

Role of dynamic topography in sustaining the Nile River over 30 million years

Claudio Faccenna, Petar Glišović, Alessandro Forte, Thorsten W. Becker, Eduardo Garzanti, Andrea Sembroni & Zohar Gvirtzman

Abstract

The Nile is the longest river on Earth and has persisted for millions of years. It has been suggested that the Nile in its present path is ~6 million years old, whereas others argue that it may have formed much earlier in geological history. Here we present geological evidence and geodynamic model results that suggest that the Nile drainage has been stable for ~30 million years. We suggest that the Nile's longevity in essentially the same path is sustained by the persistence of a stable topographic gradient, which in turn is controlled by deeper mantle processes. We propose that a large mantle convection cell beneath the Nile region has controlled topography over the last 30 million years, inducing uplift in the Ethiopian–Yemen Dome and subsidence in the Levant Sea and northern Egypt. We conclude that the drainage system of large rivers and their evolution over time can be sustained by a dynamic topographic gradient.

(Nature Geoscience (2019), 11 November 2019, <https://www.nature.com/articles/s41561-019-0472-x>)



Το φράγμα του Θησαυρού: Συνύπαρξη φύσης και τεχνολογίας στα ορεινά της Δράμας

Λίγες είναι οι περιπτώσεις εκείνες, που ένα εντυπωσιακό τεχνικό έργο όχι μόνο δε προσβάλει την εικόνα του φυσικού περιβάλλοντος αλλά φαίνεται σαν να ταιριάζει με αυτό. Μια τέτοια συνύπαρξη, φύσης και τεχνολογίας, αποτελεί το υδροηλεκτρικό συγκρότημα Νέστου, στα ορεινά της Δράμας, στο δήμο Παρανεστίου, σαράντα πέντε περίπου χιλιόμετρα από την πόλη της Δράμας.

Τα φράγματα της Πλατανόβρυσης και του Θησαυρού έχουν δυο σημαντικές πρωτιές. Το τελευταίο, το φράγμα του Θησαυρού, είναι το μεγαλύτερο λιθόρριπτο (δηλαδή χωμάτινο) φράγμα των Βαλκανίων.



Το φράγμα της Πλατανόβρυσης, έχει μια πρωτοποριακή κατασκευή καθώς αποτελεί το πρώτο φράγμα από κυλινδρικό-μενο σκυρόδεμα για την παρασκευή του οποίου χρησιμοποιήθηκε ως βασικό υλικό η ιπτάμενη τέφρα των θερμοηλεκτρικών σταθμών της Πτολεμαΐδας, επιτυγχάνοντας μεγάλα οικονομικά οφέλη στη ΔΕΗ και σημαντικά περιβαλλοντικά οφέλη στο φυσικό τοπίο της περιοχής.

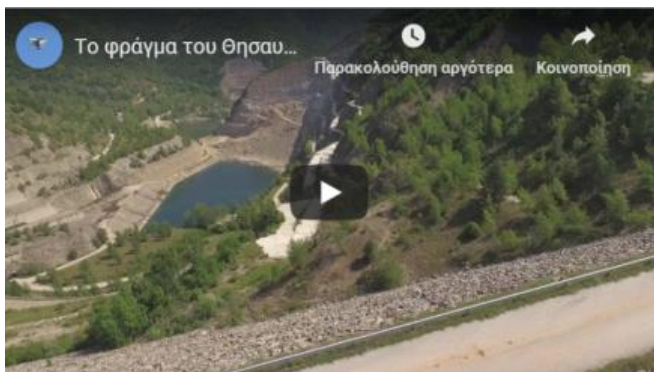
Το περιβάλλον σαγηνεύει

Η διαδρομή προς τα δύο φράγματα ακολουθεί το δρόμο για το Παρανέστι και στο μεγαλύτερο μέρος της γίνεται παράλληλα με τον ποταμό Νέστο που χαρίζει πραγματικά υπέροχες εικόνες ακόμα και στην καρδιά του Φθινοπώρου.

Η εποχή αυτή είναι ιδανική για μια επίσκεψη στο φράγμα του Θησαυρού. Μετά την τοπική κοινότητα Πλατανιάς ο επισκέπτης βλέπει μπροστά του ένα επιβλητικό τούνελ που κυριολεκτικά σκάβει το βουνό. Θα το διασχίσει και στην άλλη μεριά θα τον υποδεχθεί ο Νέστος σε όλο του μεγαλείο.

Η εικόνα του ποταμού πάνω από την εντυπωσιακή γέφυρα είναι πραγματικά σαγηνευτική - θυμίζει κάτι από νησί, ίσως και σκανδιναβικό φιόρδ.

Τα χρώματα του φθινοπώρου ντύνουν τη χλωρίδα της περιοχής προσφέροντας στον επισκέπτη εικόνες μοναδικής ομορφιάς.



<https://youtu.be/VPONfz5zl9o>

Λόγω του υψόμετρου οι καιρικές συνθήκες γίνονται περισσότερο δύσκολες καθώς μπαίνει ο χειμώνας. Την Άνοιξη και το Καλοκαίρι πάντως η καταπράσινη βλάστηση, τα γαλαζοπράσινα νερά και οι χρυσαφίες ακτίνες του ήλιου συνθέτουν ένα

υπέροχο μωσαϊκό.

Όσο εντυπωσιακά και αν είναι τα τεχνικά χαρακτηριστικά του φράγματος, δεν συγκρίνονται με την καθ' όλα εντυπωσιακή εικόνα του ταμειευτήρα του Νέστου πίσω από το φράγμα. Η λίμνη που σχηματίζεται εκεί εκτείνεται κατά μήκος της παλιάς κοίτης του ποταμού κάνοντας τον Νέστο να φαντάζει από ψηλά σαν μια θάλασσα.

Στο δρόμο της επιστροφής μια στάση στο κατάφυτο Παρανέστι. Το μεγαλύτερο από τα χωριά της ορεινής Δράμας και έδρα του ομώνυμου δήμου θα δώσει την ευκαιρία για ξεκούραση και καλό φαγητό στις ταβέρνες της περιοχής μέσα σ' ένα όμορφο φυσικό περιβάλλον.



Παραμυθένιες οι όχθες του Νέστου έξω από το Παρανέστι

Τελευταία στάση για έναν παραδοσιακό ελληνικό καφέ στο χωριό Νικηφόρος. Τα ερειπωμένα διώροφα σπίτια στον κεντρικό δρόμο και τα στενά σοκάκια του οικισμού, μαζί με το εγκαταλελειμμένο αλλά όμορφο κτίριο του σιδηροδρομικού σταθμού, μαρτυρούν την ακμή που είχε κάποτε η περιοχή.

Με πληροφορίες από ΑΠΕ - ΜΠΕ

(Η ΚΑΘΗΜΕΡΙΝΗ, 27.11.2019,
<https://www.kathimerini.gr/1053741/gallery/epikairothta/el-lada/to-fragma-toy-8hsayroy-synypar3h-fyshs-kai-texnologias-sta-oreina-ths-dramas-vinteo>)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ

Bridge Construction Animation

https://www.facebook.com/civilengineer365/videos/2335682146761618/UzpfSTewMDAwMzY3NzY4MTgzNTpWSzoXODk0NzIzNDg3MzQwNDEx/?multi_permalink=1894723487340411¬if_id=1573387054574445¬if_t=group_activity



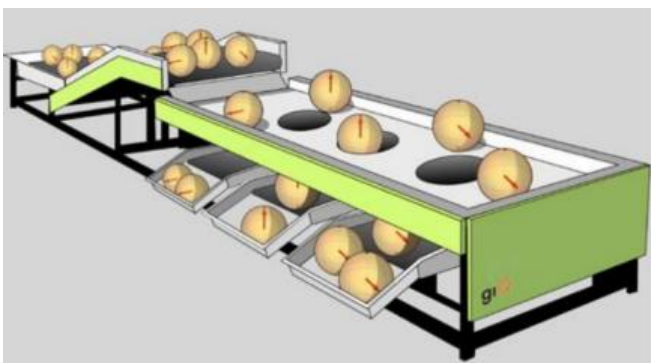
New quantum data protocol takes humans closer to a future 'quantum internet'



Researchers make efforts every day towards the creation of 'quantum internet', and now, a new quantum data protocol has been developed which brings humans nearer its fruition.

Autonomous University of Barcelona (UAB) researchers have managed to go through one of the many issues present when designing a quantum internet connection by optimizing automated information treatment protocols to work with quantum data sets.

They created an optimal internet procedure that can identify such sets, and this is conducted through a quantum network protocol that can determine common underlying probability distributions, organizing them into patterns that are recognizable.



Schedule of the quantum data classification protocol.

Quantum internet promises a "virtually unbreakable privacy and security in communications; a more mature network could include a range of applications for science and beyond that aren't possible with classical systems," Davide Castelvecchi said in Nature Research

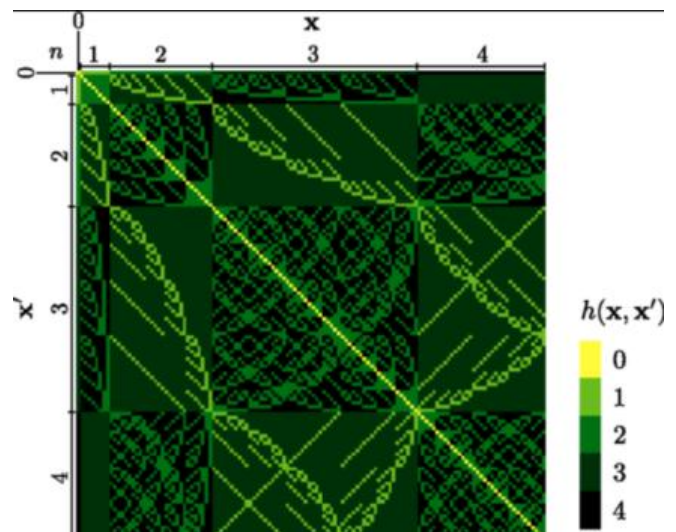
(<https://www.nature.com/articles/d41586-018-07129-y>). Instead of radio waves, this future internet would use quantum signals to deliver information.

Furthermore, quantum-based communication and computation technologies would be "capable of solving specific problems with a level of efficiency impossible to reach by classical computers."

Quantum computers are also envisioned as nodes in a network of quantum devices, "where connections are established via quantum channels and data are quantum systems that flow through the network, thus setting the bases for a future quantum internet."

With the quantum information's design, networks face new theoretical challenges considering that it is important to build optimized automated information protocols to work with quantum data, and UAB researchers dealt with it for the first time.

The protocol developed by the researchers showed a natural connection to an archetypical use case of classical machine learning-- clustering data samples based on whether they share the same underlying probability distribution.



This challenge is similar to how a classic computer perceives the origin of different sounds captures by a microphone placed on the street. The computer can discern patterns, conversations, traffic, for instance.

However, unlike soundwaves, identifying patterns in quantum data is much more complex.

Researchers were able to compare the performances of classical and quantum protocols. By far, the new protocol outperforms classical strategies, especially for large dimensional data.

This proposal sets a solid theoretical framework on the possibilities in the field of automated classification and distribution of quantum information. The study was published in the *Physical Review* journal on November 8, 2019.

Reference

"Unsupervised Classification of Quantum Data" - Sentis, G. et al - Physical Review X - DOI: <https://doi.org/10.1103/PhysRevX.9.041029>

Abstract

We introduce the problem of unsupervised classification of

quantum data, namely, of systems whose quantum states are unknown. We derive the optimal single-shot protocol for the binary case, where the states in a disordered input array are of two types. Our protocol is universal and able to automatically sort the input under minimal assumptions, yet partially preserves information contained in the states. We quantify analytically its performance for an arbitrary size and dimension of the data. We contrast it with the performance of its classical counterpart, which clusters data that have been sampled from two unknown probability distributions. We find that the quantum protocol fully exploits the dimensionality of the quantum data to achieve a much higher performance, provided the data are at least three dimensional. For the sake of comparison, we discuss the optimal protocol when the classical and quantum states are known.

(Julie Celestial / THE WATCHERS, November 24, 2019, <https://watchers.news/2019/11/24/new-quantum-data-protocol-takes-humans-closer-to-future-quantum-internet/>)



As Urbanization Accelerates, Cities Go Skyward, Underground and High-Tech



A modified Tesla Model X drives into the tunnel entrance before an unveiling event for the Hawthorne test tunnel created by Elon Musk's Boring Co. in Hawthorne, California, on Dec. 18, 2018. / REUTERS

LONDON—Driverless transport, underground shops, heated bike paths, armed street patrols – this is not the setting for a dystopian novel but it could soon be the city where you live.

As the world sees the biggest wave of urban growth in history – with almost 70 percent of its population expected to be living in urban areas by 2050, up from 56 percent today – the task of making cities greener and safer is becoming more urgent.

That cities are attracting more people is nothing new, noted urban specialist Philipp Rode, who runs London-based research center LSE Cities.

"People move to cities to live and work because they're a solution: they significantly reduce the amount of movement and space required to do anything," he told the Thomson Reuters Foundation.

"But the absolute increase in population, the millions coming into cities – that's unprecedented."

The shift is creating significant challenges for many cities already at risk from worsening climate change and rising inequality, with the race on to house swelling populations and tackle homelessness.

To cope with these modern-day pressures, cities around the world are trying to become "smarter" – from moving storage and retail facilities underground, to using data and technology to improve security, healthcare and mobility.

Many cities, particularly in poorer nations, are also facing large and expanding slum populations which lack basic services, fueling inequality, and, in some cases, violence.

Mandy Pienaar, a 43-year-old media executive from Johannesburg, knows this only too well.

One winter evening, as she and her boyfriend drove home from the movies in the South African city, two armed assailants hijacked their car, stripped them of their clothing and stole their bank cards before the couple managed to escape.

"It was quite shocking because there were a lot of people walking past who kind of looked at me as if this was an everyday occurrence, to see a stripped woman sitting in a slum area in the cold," Pienaar recalled.

Their ordeal illustrates the "false sense of security" that comes with living as they do in a gated community, she said.

"We have bars on every window, huge dogs, electric fencing ... to us that's normal. We've become desensitized."

Community-led projects like "vuvuzela patrols" aim to tackle such violence, with groups of men armed with plastic trumpets escorting women on their daily commutes in Johannesburg.

But security is not the only worry on urban planners' minds.

From the small US city of Duluth to the metropolis of Hong Kong, cities are thrashing out ways to reinvent themselves and revamp how their residents live, move and consume.

"Mobility, water, waste: the world's greatest challenges are solved in cities," said Tiina Kaho, head of the Helsinki Metropolitan Smart & Clean Foundation, a coalition of businesses, researchers and state officials.

Yet as the world transforms rapidly, "cities will have to innovate like never before", she said.

Going underground

From Singapore to sub-Saharan Africa, cities are running out of space to house swelling populations.

"It's a scarce resource," said Rode. "Using that space in the most efficient way possible is crucial."

Historically cities have tended to grow outwards rather than upwards, according to a report published by the World Resources Institute and Yale University in January.

But, if uncontrolled, such expansion can make it challenging to deliver basic services, with trips to school or the doctor becoming longer, for example. At the same time, it eats into farmland and can threaten green areas and biodiversity.

To be sustainable, cities will need to temper their sprawl with efforts to increase density, researchers said.

In Britain, for example, the government announced plans to build hundreds of thousands of new rural homes along its "Green Belt" – protected areas in the English countryside.

For other cities, increasing density will mean putting more facilities below ground – not just subway networks and utilities but commercial, retail and storage facilities too.

In Hong Kong, known for its towering skyscrapers and wooded hills, there is a particular urgency to maximize use of underground space, with home and land prices among the world's highest.

The government has vowed to free more space for housing through measures like building artificial islands.

It is also looking to use underground spaces for waste treatment, data centers, water reservoirs, power stations, crematoriums and sports facilities.

"For the city, it results in more efficient use of space ... and avoids the conflicts of traffic and weather disruptions above ground," said Mark Wallace, director of infrastructure at Arup, a consultancy that studied underground space in Hong Kong.

Other cities have also gone underground, with Finland's capital Helsinki moving sports facilities and emergency shelters below the surface. Canada's Montreal, meanwhile, has a wide pedestrian network of shops and hotels beneath its streets.

In December billionaire entrepreneur Elon Musk unveiled a 1.8 km tunnel in the Los Angeles area that was dug with new fast, low-cost technology, as a first step to developing a high-speed subterranean network for vehicles.

While excavating and building underground is more expensive, there are savings in maintenance and land costs, Wallace said.

But underground living is no replacement for better land-use planning, researchers warned, while residents worry construction and access to buried facilities will eat into green space above.

Euan Mills, urban design and planning lead at Future Cities Catapult, a UK-funded innovation center, said cities should "accommodate nature, but not at the expense of density".

For him, the answer lies in building skywards.

"Human bodies need daylight, so going underground won't work," he said.

Safe cities

As cities seek space to grow, they must also consider how their development affects social equality, said Rode of LSE Cities.

"In fast-expanding cities the differences between rich and poor increase," he said.

Neighborhoods tend to display income disparities, leaving some with better access to services, and leading to what Rode called "anti-urban gestures" such as gated communities.

In South Africa, the legacy of apartheid-era city planning and rapid urban population growth have contributed to making it the most unequal country by income, according to the World Bank.

South Africa's cities remain for the most part racially divided more than 20 years after the end of apartheid, under which millions of black people were forcibly removed from white-only urban areas to live in crowded townships and homelands, with buffer zones separating the races.

Those patterns of inequality can stoke grievances, according to urban analysts, with South Africa – which has one of the world's highest murder rates – in July deploying the army to quell a surge in violence in gang-infested parts of Cape Town.

That has led to a proliferation of private security firms, such as safety start-up Aura, which created a mobile platform allowing customers to access a network of armed emergency services.

"The police are stretched thin," said Warren Myers, founder of Aura, which has received about 25 panic alerts a day from its 70,000 users since its launch in 2017.

"We need to marry as many different technologies as possible – CCTV, facial recognition, data collection, WhatsApp groups – to better protect South Africans," he added.

But private security is hardly sufficient to tackle crime, analysts warned, as realized by cities in Latin America where drug-fueled murder rates are among the world's highest.

After decades of heavy-handed police tactics in cities in Brazil, Colombia, Mexico, Venezuela and parts of Central America, new methods of tackling crime are gaining currency, with a stronger focus on social development projects.

In Colombia's second city of Medellin, this approach has focused on urban renewal in slums: once-neglected shanty districts now boast landscaped parks, open-air gyms, schools, playgrounds and community halls where youth orchestras play.

"Sustained investment in deprived areas ... combined with increased community policing and recreational alternatives, like after-school programs, have seemed to turn the dial in reducing homicide rates," said Robert Muggah, co-founder of the Igarape Institute, a Brazil-based think-tank.

After the death of cocaine drug-lord Pablo Escobar in 1993, Medellin's murder rate plunged more than 90 percent from 266 per 100,000 people in 1991 to 19 per 100,000 in 2018.

Medellin resident Johan Rodriguez, 25, decided to retire from gang life after taking part in a six-month program to keep vulnerable people away from crime.

The "Parceros" (Mates) project, launched last year by city hall, helps teenagers go back to school, get job interviews and set up small businesses, from textiles to DJing.

"While the violence is always there, the project showed me there's something else around the corner, another way," said Rodriguez, who now works in a motorbike factory after social workers sent out his CV to employers across the city.

Climate havens

Yet as record numbers of people move into cities, some urban areas are facing uncertainty over the future as climate change brings worsening threats, from extreme heat to flooding.

One fifth of the world's major cities will experience unprecedented climate conditions by 2050, such as more intense dry and monsoon seasons, according to the Crowther Lab, a Swiss-based research group.

Researchers predict that as wild weather becomes more frequent, it could force millions of people to move out of harm's way, with some unable to return.

From Indonesia's sinking capital of Jakarta to the Middle East's sweltering cities, that poses a new kind of challenge for urban planners, Rode said.

"Cities have faced numerous events like wars or earthquakes when populations had to be evacuated, but the idea had always been to return and rebuild," he said.

In response to the threats, some US cities – such as Minnesota's Duluth – are studying efforts to become top destinations for Americans abandoning parts of the country that may one day be made inhospitable by climate change.

Angel Dobrow, 59, who works for a small firm that supports farmers, and her husband have already made the move to lakefront Duluth, leaving their longtime home in another part of Minnesota in 2017.

"As a person concerned with climate change, being near freshwater and having a little bit of land to grow food and grow herbs was critical for me," said Dobrow, sitting in her lush garden in the northern city.

Duluth, located by the world's largest freshwater lake, may not seem the most obvious choice as a haven for climate migrants.

With its frigid winters, the metropolis is often ranked as one of the coldest cities in the US.

But Sandy Hoff, the president and owner of local real estate development firm F.I. Salter, said a changing climate could spur a property boom that would "no doubt" propel his company in ways unseen since his grandfather acquired it 90 years ago.

Dobrow said when summer heat and humidity burden other areas of Minnesota, Duluth's lakefront breezes "feel like air conditioning".

But some fear an influx of new residents could exacerbate a housing crisis in a city where few new homes have been built.

Joel Kilgour, who chairs Duluth's Affordable Housing Coalition and volunteers at housing non-profit Loaves and Fishes, said the city's homeless are forced to seek rooms at the charity as they cannot afford rising rents.

"If we as a community can't solve that, there's no way that we're going to be able to handle an influx of climate refugees in an equitable manner," Kilgour said.

Potential climate refuge cities may also struggle to build costly infrastructure, such as water treatment plants and energy utilities, without a sufficient tax base ahead of time to pay for them, researchers warned.

Smart cities?

To try to thrive amid rapid urbanization and worsening climate change threats, many cities around the world are trying to become "smarter".

From heated bike paths to melt snow in Toronto to high-tech sensors that detect when Barcelona's bins need emptying, governments are pooling resources from citizens and businesses to make cities more efficient, sustainable and livable.

Many of those efforts focus on improving mobility in cities, with urban planners looking at innovative ways to cut both traffic and climate-warming emissions.

Dubai — which, according to the Roads and Transport Authority (RTA), has more than one vehicle for every two people — is experimenting with driverless mobility pods that aim to combine the comfort of ride-hailing services like Uber with the efficiency and capacity of buses.

The cube-shaped vehicles, built by US-based NEXT Future Transportation Inc., can carry up to 10 people each and dock together when in motion, allowing passengers to move from one unit to the other using the front and rear doors.

The vehicles — which should enter mass production at the end of 2020 — are designed to pick up single users at home, then pool people going in the same direction inside one module, as other pods are released to collect more passengers.

"It's like a relay race," said founder Tommaso Gecchelin.

Rode of LSE Cities said it was important one inefficient car system should not be replaced with another, adding autonomous vehicles should carry as many passengers as possible.

Allowing private self-driving cars could result in empty vehicles "just driving around waiting for their owners", taking up public space needlessly, he warned.

Other major smart city initiatives have run into delays or unexpected problems, sparking criticism.

Kenya's planned Konza Technopolis — a new US\$14.5 billion (22.1 trillion kyats) city to be built about 60 km south-east of crowded Nairobi — has fallen behind schedule on its goal of accommodating 20,000 people by 2020, according to Nairobi-based entrepreneurs and analysts.

Dubbed the Silicon Savannah, Konza aims to become a modern tech hub but the first building has yet to be completed due to red tape and a lack of funding, critics noted.

Lavasa — the first city in India's \$7.5 billion plan to turn 100 urban centers into Smart Cities by 2020 — has suffered from design issues, and ignored the needs of poor and marginalized groups, planners and rights groups have said.

"Urban planners, not cities, are the ones who need to get smarter," said Mills of Future Cities Catapult, calling for more investment in data collection and training of city planners.

"Google knows more about our cities than planning departments do."

Slower cities?

Even as some cities become smarter and more efficient, calls also are mounting to slow the frantic pace of urban life.

Efforts range from the literal — with many cities pushing for lower speed limits on their roads — to the imaginative, including art installations to promote mindfulness.

On a recent "sound walk" in the English town of Reading, a dozen residents, including a retired historian and teenage students, strolled silently through parks, graveyards and bookstores.

Led by sound artist Richard Bentley, the group uploaded photos and audio recordings from their phones to Hush City, an app that maps quiet areas in cities.

With noise pollution the most common cause of environmental complaints in Europe, according to the European Commission, and more people crowding into urban areas, Bentley expects peace and quiet could become a "commodified luxury".

Historically, poorer groups lower down the social ladder have had to live in noisy parts of cities while those with more means could move away, he said.

"It's incredibly important to keep these quiet spaces and to be aware of their possible disappearance," he added.

Some places are jumping on the livability bandwagon through Cittaslow, which means "slow city" in Italian.

The global network of more than 260 cities grades its members according to factors such as sustainable infrastructure, promotion of local economies, fairness and "good living".

South Korean member Jeonju, a city of about 650,000 people, has planted millions of trees and runs monthly car-free zones since joining in 2016, Mayor Seung-Su Kim said by email.

Pier Giorgio Oliveti, the network's secretary general, said the approach could be a "vaccine" for the ills of modernity.

But Mills of Future Cities Catapult argued that "one of the most exciting things about cities is how alive they are".

"I don't think we should be slowing them down," he added.

Now, more than ever, urban planners and government should "reflect on what cities are for", advised LSE Cities' Rode.

"Why are cities such attractive places for living and working? Because they bring people together to enjoy public life," he said.

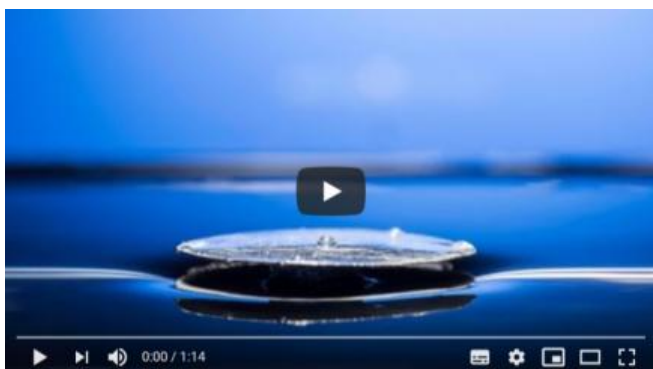
"That real, physical experience needs to be preserved."

(The Irrawaddy / REUTERS, 17 October 2019, https://www.irrawaddy.com/news/world/urbanization-accelerates-cities-go-skyward-underground-high-tech.html?utm_medium=email&utm_content=yZmJNxIvPkbxEFqmPn0WRvK6KH_IbU1vTbDXd46vbNCNOvkQVFCopb_nTkriuFwS)



Diving bell spiders inspire 'unsinkable' metallic structure

Researchers have taken inspiration from diving bell spiders and rafts of fire ants to create a metallic structure that won't sink.



https://www.youtube.com/watch?v=t4IVHd3RCNw&feature=emb_logo

(In a major follow up to their previous ground-breaking work on super water-repellent metals, University of Rochester researchers have created a metallic structure that is so

hydrophobic, it refuses to sink - no matter how often it is forced into water or how much it is damaged or punctured. Possible applications include unsinkable ships, wearable flotation devices that will still float after being punctured, and electronic monitoring devices that can survive long term in the ocean.)

The advance from the University of Rochester, New York, could lead to unsinkable ships, wearable flotation devices that continue to float after being punctured, or electronic monitoring devices that can survive in long term in the ocean.

This is the claim of Chunlei Guo, professor of optics and physics, whose lab describes the structure in *ACS Applied Materials and Interfaces*.

The structure uses a technique developed in the lab that uses femtosecond bursts of lasers to etch the surfaces of metals with intricate micro-and nanoscale patterns that trap air and make the surfaces super-hydrophobic.

Hydrophobic surfaces could provide more efficient cooling

Superhydrophobic coating is non-toxic and economical to produce

The researchers found that after being immersed in water for long periods of time, the surfaces may start to lose their hydrophobic properties, which led the team to a solution from the natural world.

Diving bell spiders and fire ants can survive long periods under or on the surface of water by trapping air in an enclosed area. Argyroneta aquatic spiders create an underwater dome-shaped web – a so-called diving bell – that they fill with air carried from the surface between their superhydrophobic legs and abdomens. Similarly, fire ants can form a raft by trapping air among their superhydrophobic bodies.



Superhydrophobic metallic structure floats to the water surface in the Guo lab (J. Adam Fenster/University of Rochester)

"That was a very interesting inspiration," Guo said in a statement. As the researchers note in the paper: "The key insight is that multifaceted superhydrophobic (SH) surfaces can trap a large air volume, which points towards the possibility of using SH surfaces to create buoyant devices."

Guo's lab created a structure in which the treated surfaces on two parallel aluminium plates face inward, so they are enclosed and free from external wear and abrasion. The surfaces are separated by enough distance to trap and hold enough air to keep the structure floating.

Even after being forced to submerge for two months, the structures immediately bounced back to the surface after the load was released, Guo said. The structures also retained this ability even after being punctured multiple times, because air remains trapped in remaining parts of the compartment or adjoining structures.

Though the team used aluminium for this project, the etching process could be used for literally any metals, or other materials, Guo said.

When the Guo lab first demonstrated the etching technique, it took an hour to pattern a one-inch-by-one-inch area of surface. By using lasers seven times as powerful, and faster scanning, the lab has speeded up the process, making it more feasible for scaling up for commercial applications.

(THE ENGINEER, 7th November 2019, <https://www.theengineer.co.uk/diving-bell-spiders-unsinkable-metallic>)

Highly Floatable Superhydrophobic Metallic Assembly for Aquatic Applications

Zhibing Zhan, Mohamed ElKabbash, JinLuo Cheng, Jihua Zhang, Subhash Chandra Singh, Chunlei Guo

Abstract

Water-repellent superhydrophobic (SH) surfaces promise nearly endless applications, from increased buoyancy to drag reduction, but their practical use is limited. This comes from the fact that a SH surface will start to lose its efficiency once it is forced into water or damaged by mechanical abrasion. Here, we circumvent these two most-challenging obstacles and demonstrate a highly floating multi-faced SH metallic assembly inspired by the diving bell spiders and fire ant assemblies. We study and optimize, both theoretically and experimentally, the floating properties of the design. The assembly shows an unprecedented floating ability; it can float back to surface even after being forced submerging under water for months. More strikingly, the assembly maintains its floating ability even after severe damage and piercing in stark contrast to conventional watercrafts and aquatic devices. The potential use of the SH floating metallic assembly ranges from floating devices and electronic equipment protection, to highly floatable ships and vessels.

<https://pubs.acs.org/doi/10.1021/acsami.9b15540#>

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ



Environmental Geotechnics in Practice: Introduction and case studies

Robert W. Sarsby

Environmental Geotechnics in Practice is an informative and practical guide to the study of land-based waste disposal. The book identifies the key elements

of a variety of waste disposal systems, and explains their role in protecting the environment. Using the most significant case histories from across the world where key lessons have been learned the book provides an engaging introduction to this important field.

The cases described all concern land-based waste disposal sites where there is significant interaction between ground engineering and the environment. Together they demonstrate that whatever the type of waste being disposed of it is possible to use geotechnical principles and practices to design a suitable facility. The author explains how the lessons from these historical cases can help current designers and constructors of waste disposal facilities to address the problems posed by climate change and land shortage. The book provides a broad coverage of environmental geotechnics relating to the performance of landfill sites, treatment of contaminated and damaged land, and stability of waste dumps (tips, tailings and lagoons).

Environmental Geotechnics in Practice will encourage readers to critically appraise the applicability of any design concept and data for the whole lifetime of a waste disposal project. The book will be of interest to a wide readership including professionals working in geotechnical engineering, environmental scientists, geology, and waste management, and also students of these subject areas.

Book Reviews

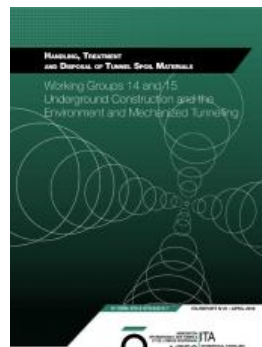
The book is a useful compendium of topics in environmental geotechnics, based on a wide range of case studies from around the world. The author has resisted the temptation to go into too much detail, but the mechanisms of failure or behaviour are clearly and concisely explained. Environmental geotechnics is now an established branch of the discipline of ground engineering, thanks, in part, to the author's contribution over the past two or three decades. This book neatly charts its history, and provides an interesting and practical snapshot of its current state of development. To anyone running or developing a master's level course in environmental geotechnics, this book would be a valuable core text and resource.

William Powrie, Professor of Geotechnical Engineering, University of Southampton

This is environmental geotechnics in practice focused on over 25 case histories, each meticulously analysed to identify key issues. A superbly referenced book of real world experience; essential reading for those who wish to learn from the history of environmental geotechnics and look to its future.

Stephan Jefferis, Director Environmental Geotechnics Ltd

(ICE Publishing 06 September 2019)



Handling, treatment and disposal of tunnel spoil materials

ITA Working groups 14 & 15

Working Group 15 of ITA, represents ITA's philosophy on Sustainable Use of the Underground Space, based on the UN Brundtland Commission's definition

on sustainability:

"Development that meets the needs of the present without compromising the ability for future generations to meet their own needs"

The work within the ITA Working Group 15 on Underground Construction and the Environment, might be divided into three categories with focus on

- Environmental opportunities by going underground
- Environmental challenges by going underground
- Environmental Guidelines and Recommendations when going underground

This report on excavated material from tunnels and underground caverns belongs to a set of reports from ITA's Working Group 15 on "Underground Construction and the Environment". It also benefits from the considerable reports and input from Working Group 14 – Mechanized Tunnelling.

The set of reports produced and planned by WG 15 is:

- Environmental and Sustainable Development Reasons for Going Underground (presented and issued in Vancouver 2010)
- Excavated materials (this report)
- Noise and vibrations (under preparation)
- Water related issues
- Architecture and aesthetics

For collection of relevant information on tunnel muck handling, treatment and disposal, a questionnaire was distributed to the member nations. Altogether information from 59 different projects were received, covering USA, Europe, Asia and Australia.

Also, research programs like the DRAGON Project (Reference 1, a joint cooperation between Austria, France, Germany, Switzerland and UK) and the "Re-Muck" program in Italy (Reference 2) on utilization of excavated materials from tunnels, presents innovative methods for eco-compatible and sustainable recycling of tunnel muck. Both programs

give immediate evaluation of the rock quality at the excavation face for finding most suitable treatment techniques and strategies for TBM excavation.

In addition, cases from Taiwan (aggregates, earthworks, shore protection and land reclamation) and Australia (Northside Storage Tunnel Project), England (Crossrail Project), Switzerland (Farettes Hydropower Project and the Gotthard Base Tunnel), and Italy (mechanized tunnelling with EPB TBMs) have been selected as examples on opportunities and challenges related to tunnel muck. Table 1 below lists the projects referenced, illustrated or described in detail in the following sections of the report.

<https://about.ita-aites.org/component/k2/1723/handling-treatment-and-disposal-of-tunnel-spoil-materials>



Current practice on cross-passage design to support safety in rail and metro tunnels

ITA-COSUF

Regulations, Guidelines and Best Practice

Cross-passages are important elements of twin-tube rail or metro tunnels. During construction and operation, the cross-passages serve different functions. For the operation phase of a tunnel, major requirements result from the different needs of normal, maintenance and emergency mode of tunnel operation.

During an emergency, cross-passages contribute significantly to the safety of tunnels by providing an escape route for the tunnel users from the incident to the non-incident tube, i.e. to a safe area, and by providing an access route for emergency forces from the safe area to the incident tube. Cross-passages need to be designed such that smoke or hazardous gases may not propagate into or through the cross-passages in order to protect the safe area in the non-incident tube. During normal operation, the cross-passages shall house and protect technical equipment of various technical systems (e.g. low voltage power supply, data / communication installations, etc.). During maintenance, the cross-passages shall support a safe working environment for staff.

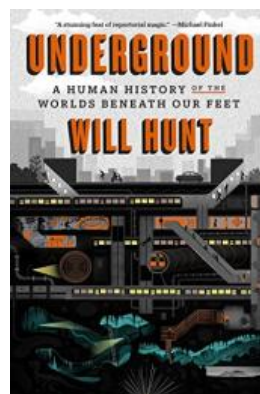
Different layouts of cross-passages for rail and metro tunnels are implemented to support the predefined protection goals within the overall safety concept and to meet the other functional requirements. This document aims at supporting the design of appropriate safety aspects of cross-passages in rail and metro tunnels by providing an overview of safety relevant aspects and common practice. Designers should consider them and analyse to which extent the given layouts and requirements apply to their project of interest.

The document at hand was established by "Activity Group 2 – Regulations, Guidelines and Best Practice" of the Committee on Operational Safety of Underground Facilities (COSUF) of the International Tunnelling and Underground Space Association (ITA). Major contributions to the document were given by Marco Bettelini, Marc Boitel, Les Fielding, Helmut

Kern, Reto Linder, Samuel Rigert and Severin Waelchli under the lead of Stig Ravn and Peter Reinke of Activity Group 2. The authors would like to express their gratitude to the reviewers Eric Premat, Haukur Ingasson, John Day and members of the ITA-COSUF Steering Board who have enriched this work.

For the future, any comments and suggestions to further update or expand this overview are very welcome."

<http://www.ita-cosuf.org/index.php/component/content/article/32-sample-data-article/publications/regulations-guidelines-and-best-practice/165-current-practice-on-cross-passage-design-to-support-safety-in-rail-and-metro-tunnels?Itemid=0>



Underground: A Human History of the Worlds Beneath Our Feet

Will Hunt

"[A] winningly obsessive history of our relationship with underground places" (*The Guardian*), from sacred caves and derelict subway stations to nuclear bunkers and ancient underground cities—an exploration of the history, science, architecture, and mythology of the worlds beneath our feet

When Will Hunt was sixteen years old, he discovered an abandoned tunnel that ran beneath his house in Providence, Rhode Island. His first tunnel trips inspired a lifelong fascination with exploring underground worlds, from the derelict subway stations and sewers of New York City to sacred caves, catacombs, tombs, bunkers, and ancient underground cities in more than twenty countries around the world. *Underground* is both a personal exploration of Hunt's obsession and a panoramic study of how we are all connected to the underground, how caves and other dark hollows have frightened and enchanted us through the ages.

In a narrative spanning continents and epochs, Hunt follows a cast of subterraneaphiles who have dedicated themselves to investigating underground worlds. He tracks the origins of life with a team of NASA microbiologists a mile beneath the Black Hills, camps out for three days with urban explorers in the catacombs and sewers of Paris, descends with an Aboriginal family into a 35,000-year-old mine in the Australian outback, and glimpses a sacred sculpture molded by Paleolithic artists in the depths of a cave in the Pyrenees.

Each adventure is woven with findings in mythology and anthropology, natural history and neuroscience, literature and philosophy. In elegant and graceful prose, Hunt cures us of our "surface chauvinism," opening our eyes to the planet's hidden dimension. He reveals how the subterranean landscape gave shape to our most basic beliefs and guided how we think about ourselves as humans. At bottom, *Underground* is a meditation on the allure of darkness, the power of mystery, and our eternal desire to connect with what we cannot see.

Praise for *Underground*

"A mesmerizingly fascinating tale . . . I could not stop reading

this beautifully written book."—**Michael Finkel, author of *The Stranger in the Woods***

"Few books have blown my mind so totally, and so often. In Will Hunt's nimble hands, excursion becomes inversion, and the darkness turns luminous. There are echoes of Sebald, Calvino, and Herzog in his elegant and enigmatic voice, but also real warmth and humor. . . . An intrepid—but far from fearless—journey, both theoretically and terrestrially."—**Robert Moor, New York Times bestselling author of *On Trails***

(Spiegel & Grau, New York, 2019)

Tunnel Engineering

Topics of Analytical and Computational methods in Tunnel Engineering

Dr. Michael Sakellariou, Emeritus Professor, National Technical University of Athens, Athens Greece, mgsakel@mail.ntua.gr

Abstract

In this Chapter a selection of tunnelling topics is presented, following the evolution of methods and tools from analytical to computational era. After an introductory discussion of the importance of elasticity and plasticity in tunnelling, some practical topics are presented as paradigms to show the successful application of them in achieving a solution. The Circular and Horseshoe tunnel sections are served as the basis of the elastic analysis of deep tunnels. Practical aspects such as, influence zone and elastic convergences in both cases are examined. In the case of circular tunnels, the estimation of plastic zone formation is discussed for a selection of strength criteria. After a detailed discussion of the influence of surface proximity, the elastic and plastic analysis of shallow tunnels is examined in some detail. The presentation is completed by a short presentation of computational methods. An overview of recent developments and a classification of the methods are presented and then some problems for the case of anisotropic rocks have been presented using Finite Element Method. Last topic is the application of AI tools in interpreting data and in estimating the relative importance of parameters involved in the problem of tunnelling induced surface settlements. In the conclusions a short discussion of main topics presented follows.

(* Chapter in the Intechopen book **Tunnel Engineering**, 2019)

BIM and Advanced Computer Based Tools for the Design and Construction of Underground Structures and Tunnels

Panayotis Kontothanasis, Vicky Krommyda and Nikolaos Roussos

Abstract

Technology and digitalization are continuously producing changes in sectors and fields of human activities. Infrastructure industry needs this support in various and extensive ways, since it affects involved parties and society overall. Even though many individual branches have been trans-

formed, design and construction show some kind of reluctance on encouraging and implementing comprehensive digitalization. A major reason is the significantly high complexity of infrastructure projects and the extended chains of work procedures and activities that are produced. All those are applying through the whole time scale of buildings' existence. Considering that safety and durability remain always the ultimate goal, every new method and concept shall be exhaustively tested, in order to prove its value and efficiency. The current chapter aims to define and prove technology contribution all along the infrastructure sector, concentrating in tunnels and underground structures. Since evolution is proceeding in accelerated rates, future perspectives are also analyzed to provide broader visions and set indicative standpoints for potential and incentives.

<https://www.intechopen.com/online-first/bim-and-advanced-computer-based-tools-for-the-design-and-construction-of-underground-structures-and->

(* Chapter in the Intechopen book **Tunnel Engineering**, 2019)

Transit-Oriented Development Interactions on Existing Metro Systems: The Need for the Design of Adequate Structural Monitoring System and the Experience from International Projects

Evangelos Astreinidis

Abstract

Contemporary metro transport systems present unrivaled efficiency for the commuting population. The development of the urban environment is interwoven with the metro transit systems. The transit-oriented development (TOD) is an upcoming topic in the design of the contemporary and of the future city and metro system alike. It entails the development of a microcell of the city centered around the metro station. Typically, bulky TOD buildings rise over and around the station and tunnel. The structural engineering aspect of these mega projects is highly complex. Major part of the complexity is due to complicated interactions between the oversite building and the underlying tunnel or station with its track-rail system. A significant number of issues arise, like methods to bridge over the tunnel or station, structural isolation, induced displacements to the track-rail system, tunnel movements and impact to tracks, vibration induction to the TOD building, and a plenitude of similar problems. It is highly important to design a structural monitoring system that will provide a validation tool of the structural-dynamic performance of the closed system TOD-tunnel/station. The distilled experience from international projects is presented.

<https://www.intechopen.com/online-first/transit-oriented-development-interactions-on-existing-metro-systems-the-need-for-the-design-of-adequ>

(* Chapter in the Intechopen book **Tunnel Engineering**, 2019)

Στο βιβλίο συμμετέχουν επίσης με κεφάλαια οι:

Βασίλης Μαρίνος: "Engineering Geology and Tunnels"

Σπύρος Μασσίνας: "Designing a Tunnel"

Πρόδρομος Ψαρρόπουλος: "Impact of tunnels and underground spaces on the seismic response of overlying structures"

Γεώργιος Κανογιάννης (The University of Nottingham Ningbo, China) & Attwell Miilo (Transport for London): "Digital construction strategies in Tunnelling engineering - BIM in Tunnelling Engineering"

ΗΛΕΚΤΡΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ



An official journal of the International Society for Soil Mechanics and Geotechnical Engineering

<https://www.geocasehistoriesjournal.org/pub/issue/view/44>

Κυκλοφόρησε το Τεύχος Νο. 2 του Τόμου 5 του International Journal of Geoengineering Case Histories με τα παρακάτω περιεχόμενα:

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

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<https://www.eesy.gr/taumicron-deltaepsilonlambdatauiotaomicron-taumeganu-sigmaetarhoalphagammaagammaomegaanu.html>

Κυκλοφόρησε το τεύχος Νοεμβρίου 2019 του περιοδικού της Ελληνικής Επιτροπής Σηράγγων & Υπογείων Έργων (Ε.Ε.Σ.Υ.Ε.) «Το Δελτίο Των Σηράγγων» με τα παρακάτω περιεχόμενα:

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