

Symposium
on
Mechanics of Natural Solids

HORTO/Greece
7th - 9th September 2009

organised by D. Kolymbas (Innsbruck) and C. Viggiani (Grenoble)



Aims

The symposium aims to deliver a paradigm for the interconnection of the mechanics of soil, rock, ice and snow and also for the interdisciplinary character of the related research. Therefore, the lectures will be of fundamental character and address the possible interfaces and the fascinating contents of the several subjects.

Scope

Natural solids (soil, rock, ice, snow) are characterised by inhomogeneity and by properties that vary in a very large range. For example, granite is usually very hard, but weathered granite can be kneaded by hand. Rock can be continuous or jointed, large rock strata undergo in the course of millions of years enormous deformations, they can be folded and/or upheaved by several kilometers. Continuous disintegration transforms rock to soil, a granular material that exhibits peculiar properties the most striking of which is that it can undergo extremely large deformations and then resume solidity, when the individual grains are pressed against each other. Sand shares with rock the ability to undergo large deformation, provided that rock is deformed in completely different time scales from sand. Thus, strength and rigidity (stiffness) of rock are a matter of deformation rate, and sand can be considered as an archetype of all natural solids. The inherent similarity that connects rock and soil holds also for ice and snow. Snow is a sintered material but shares some properties with soil, whereas glacier ice behaves like a low-viscosity rock.

Speakers & Presentations

- Eduardo Alonso, Barcelona: **Size effects and long term behaviour of coarse granular media**
- Gary Couples, Edinburgh: **Nature: A very sophisticated experimentalist**
- Itai Einav, Sydney: **Confined comminution in granular materials: from discrete to continuum**
- Steve Hall, Grenoble: **When geophysics meet geomechanics: elastic-wave imaging of geomechanical properties and processes**
- Dimitrios Kolymbas, Innsbruck: **Sand as an archetypical natural solid**
- Mario Liu, Tübingen: **Physical foundations of sand mechanics**
- Jacques Meyssonier, Grenoble: **Experimental studies of the viscoplasticity of ice and snow**
- Carlos Santamarina, Georgia: **Particle-level processes in the development of discontinuities in granular materials**
- Martin Schneebeli, Davos: **Snow mechanics in view of the transition between a sintered and granular material**
- Martin Schöpfer, Dublin: **Distinct Element Method (DEM) modelling of laboratory to outcrop-scale fracturing of natural rocks**
- Erland Schulson, Dartmouth, New Hampshire: **Fracture of Ice**
- Antoinette Tordesillas, Melbourne: **Are we there yet?: Following the energy trail in cohesionless granular solids**
- Cino Viggiani, Grenoble: **Mechanisms of localized deformation/damage in geomaterials: an experimental insight**
- Teng Fong Wong, New York: **Grain crushing, pore collapse and strain localization in porous rock**

Programme

Monday, 7th September 2009

- 08:30 Opening address C.Viggiani – D. Kolymbas
- 09:00 - 10:00 Sand as an archetypical natural solid (Kolymbas)
- 10:00 - 11:00 The physics of granular mechanics (Liu)
- 11:00 - 11:30 *Break*
- 11:30 - 12:30 Are we there yet?: Following the energy trail in cohesionless granular solids (Tordesillas)
- 18:00 - 19:00 Micromechanical alternatives to phenomenological hardening plasticity (Einav)
- 19:00 - 20:00 Mechanisms of localized deformation in geomaterials: an experimental insight using full-field measurement techniques (Viggiani)

Tuesday, 8th September 2009

- 09:00 - 10:00 2D DEM-modeling of tectonic fault growth in mechanically layered sequences (Schöpfer)
- 10:00 - 11:00 When geophysics met geomechanics: Imaging of geomechanical properties and processes using elastic waves (Hall)
- 11:00 - 11:30 *Break*
- 11:30 - 12:30 Fracture of Ice and other Coulombic Materials (Schulson)
- 18:00 - 19:00 Experimental studies of the viscoplasticity of ice and snow (Meyssonnier)
- 19:00 - 20:00 Discontinuities in granular materials: Particle-level mechanisms (Santamarina)

Wednesday, 9th September 2009

- 09:00 - 10:00 Grain crushing, pore collapse and strain localization in porous sandstone (Wong)
- 10:00 - 11:00 Long term behaviour and size effects of coarse granular media (Alonso)
- 11:00 - 11:30 *Break*
- 11:30 - 12:30 Nature: A very clever experimentalist (Couples)
- 18:00 - 19:00 Snow mechanics in view of the transition between a sintered and granular material (Schneebeli)

Tourist Information and Accommodation

Information on Accommodation in Horto and Horto itself is available on the internet:

<http://www.aroundpelion.com/pelion/horto>
<http://www.pelion-hotels.peliongreece.com>
<http://www.ledapelion.com>
<http://www.hortoapartments.com>
<http://www.irenevilla.com>
<http://www.diplomatsholidays.com>
<http://www.holidays-in-pelion.com.gr>

Accommodation can be directly booked under the indicated www addresses. Upon request, we can book for you.



Guesthouse KARYDIES, G. Zirganos, Tel. +3024230/54364

Registration and Fees

To subscribe, please send an e-mail with the required information (name, address, affiliation, etc.) to daniel.renk@uibk.ac.at.

Deadline for registration: 31st March 2009

Please notice: the number of participants is limited to 50.

Participation fees: 350 Euro.

(To be paid after notification of acceptance. The amount includes participation, coffee breaks and lecture notes.)

Important Dates

DEADLINE for registration: **31st March 2009**

Notification of acceptance: **30th April 2009**

Transfer of the fees - DEADLINE: **31st May 2009**

Notification of final registration: **30th June 2009**

Transfer Connections

Thessaloniki airport – Intercity bus station: Taxi (45 minutes, ca 23.00 €)

Intercity bus station Thessaloniki - Volos: 2.5 hours drive, 16.60 €

Departures: 07:00, 09:00, 11:00, 13:00, 15:15, 17:00, 19:15, 21:15, 23:00 (www.ktel-thes.gr)

Volos - Horto: 1 hour, 45 km

- Taxi ca 50,00 €
- bus, Departures (Monday – Friday): 04:30, 04:45, 09:45, 12:15, 14:30, 16:30, Saturday: 04:30, 05:30, 09:45, 12:15, 14:30, 16:30, Sunday: 04:30, 05:30, 09:45, 14:30, 16:30 (www.ktelvolou.gr)

Horto - Volos: Bus departures

Monday – Friday: 08:00, 09:30, 13:45, 16:15, 18:15, 19:30

Saturday: 08:00, 13:45, 16:15, 18:15, 19:30

Sunday: 08:00, 09:30, 16:15, 18:15, 19:30

Volos - Thessaloniki: Bus departures

Monday – Saturday: 04:30, 06:00, 08:00, 10:00, 12:15, 14:00, 16:15, 18:15, 20:30

Sunday: 06:00, 08:00, 10:00, 12:15, 14:00, 16:15, 18:15, 20:30

Athens airport – Intercity Bus station: 65 minutes, 3.20 € Bus No. ‘X93’ Departures: from 06:05 to 24:50: ca. every 30 minutes

Intercity bus Athens - Volos: 4 hours, Departures (Monday – Saturday): 06:30, 08:00, 09:30, 11:00, 12:00, 13:00, 15:00, 16:00, 17:00, 18:30, 20:00, 22:00,

Sunday: 08:00, 09:30, 11:00, 12:00, 13:30, 15:00, 16:00, 17:00, 18:30, 20:00, 22:00

(www.ktelvolou.gr)

Bus Volos - Athens: Departures (Monday – Saturday): 05:00, 07:00, 09:00, 10:30, 12:00, 13:30, 15:00, 16:00, 17:00, 18:30, 21:00, 01:00,

Sunday: 07:00, 09:00, 10:30, 12:00, 13:30, 15:00, 16:00, 17:00, 18:30, 21:00, 01:00

CAR DRIVE from Thessaloniki to HORTO

279 km, 3 hours 54 minutes, Road toll: 8,00 € Thessaloniki – Katerini – Larissa - Volos – Agria – Argalasti – Horto



TAXI Milina: 0030 24230-65219, **TAXI Argalasti:** 0030 24230 54245

Hospital in Argalasti: 0030 24230 54611-2,

pharmacy: in Milina (3 km), in Argalasti (7 km)

Car rental: www.mietwagengriechenland.com, www.billiger-mietwagen.de,
www.autoeurope.eu, www.chalkidiki-cars.com, www.economycarrentals.com

Arriving to HORTO

Horto is a very small village. Upon arrival proceed to the workshop venue, which is situated next to the church. Alternatively call Sarah-Jane (+43 650 5303881) or Daniel (+43 650 4731512) or Ansgar (+43 650 5318482), and you will be advised how to get to your guesthouse. The positions of the several guesthouses are indicated in the map shown below.



Note that there is no cash dispenser in Horto, The nearest is in Argalasti (ca 1 hour by foot or 10' by car).

Interesting places to visit are: Milina, Lafkos, Milies, Vizitsa, Tsangarada, the beaches of Potistika and Milopotamos, the Saturday morning market in Argalasti.

Note that there are several spellings of Horto (Greek: XOPTO): Hortos, Horto, Horton, Chorto.

Participants

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