

11th EURO-conference on Rock Physics and Geomechanics
2015
6–11 September 2015
Ambleside, Lake District

Holistic rock physics: integrating theory, observation and applications in
space and time

Outline programme

Monday

8.45-9.00 Welcome – Philip Benson

9.00 – 9.25 Introduction

- TIME-DEPENDENT DEFORMATION AND FAILURE: A HOLISTIC ROCK PHYSICS APPROACH
P Meredith

9.25 – 10.15 – Keynote

- EFFECTS OF FLUIDS ON FAULT FRICTION AND HEALING BEHAVIOUR: INTEGRATING
EXPERIMENTAL, MICROPHYSICAL AND OBSERVATIONAL APPROACHES
C J Spiers

10.15 – 11.05 – Session 1

- PERMEABILITY ANISOTROPY AND FRACTURE HEALING IN SEDIMENTARY FORMATIONS IN A
HYDRO-GEOTHERMAL CONTEXT
L Griffiths, M J Heap, F Wang, D Daval, H Albert Gilg, P Baud, A Genter and J Schmittbuhl
- MECHANICAL INSTABILITY INDUCED BY WATER WEAKENING IN LABORATORY FLUID
INJECTION TESTS
C David, J Dautriat, J Sarout, C Delle Piane, B Menendez, R Macault and D Bertauld

11.05 – 11.30 – Break

11.30 – 12.45 – Session 2

- FRICTIONAL INSTABILITIES AND MINERAL CARBONATION OF BASALTS TRIGGERED BY
INJECTION OF PRESSURIZED H₂O- AND CO₂-RICH FLUIDS
P Giacomel, E Spagnuolo, A Marzoli, M Nazzari, N Youbi and G Di Toro
- THE FRICTIONAL PROPERTIES OF FAULTS AT SHALLOW DEPTHS: IMPLICATIONS FOR
RUPTURE PROPAGATION
Nicola De Paola, Rachel Unwin, Rachael Bullock, Rosanne Murray, Mark Stillings and Robert
E Holdsworth
- DYNAMIC WEAKENING AND FRACTURE ENERGY IN EXPERIMENTS AT SEISMIC CONDITIONS
Stefan Bjorklund Nielsen, Elena Spagnuolo, Marie Violay and Giulio Di Toro

12.45 – 14.00 – Lunch

14.00 – 14.50 – Session 3

- FRICTION AND WEAR
Z Reches, Y Boneh, X Chen, A Sagy and V Lyakhovsky
- SLOW EARTHQUAKES AND THE SPECTRUM OF FAULT SLIP BEHAVIORS
C Marone, J R Leeman, M M Scuderi, D M Saffer, C Collettini and P Johnson

14.50 – 15.40 – Keynote

- THE BRITTLE-DUCTILE TRANSITION IN THE EARTH: A TRIP TO THE ZOO
Brian Evans

15.40 – 16.30 – Session 4

- THE IMPACT OF CEMENTATION ON MECHANICAL PROPERTIES AND PERMEABILITY OF LEITHAKALK CALCARENITE
P Baud, U Exner, T Reuschlé and M Lommatzsch
- DEM SIMULATIONS OF COMPACTION BANDS IN SANDSTONES, AS RELATED TO DIFFERENCES BETWEEN LAB AND FIELD OBSERVATIONS
G Marketos, M P A van den Ende and A R Niemeijer

16.30 – 16.55 – Break

16.55 – 18.10 – Session 5

- MECHANISM AND MODELING OF BRITTLE-DUCTILE FAILURE OF POROUS ROCKS
E Shalev, W Zhu and V Lyakhovsky
- MICROPOROSITY DISTRIBUTION AND BRITTLE TO DUCTILE TRANSITION IN OOLITHIC CARBONATE ROCKS
J B Regnet, C. David, J Fortin, P Robion, Y Makhloufi and P Y Collin
- CONTRASTING FAILURE MODES OF FOLDED GNEISS REVEALED BY MECHANICAL, MICROSEISMIC AND MICROSTRUCTURAL DATA
F Agliardi, S Vinciguerra, M Dobbs and S Zanchetta

Tuesday

9.00 – 9.50 – Keynote

- LABORATORY EARTHQUAKES
R Paul Young

9.50 – 11.05 – Session 6

- MECHANICAL AND PETROPHYSICAL STUDY OF FRACTURED SHALE MATERIALS
Audrey Bonnelye, Alexandre Schubnel, Christian David, Pierre Henry, Yves Guglielmi, Claude Gout and Pierre Dick
- ANISOTROPY AND FRACTURE PROPAGATION IN SHALE WITH ELEVATED CONFINING PRESSURES
M Chandler, P Meredith, N Brantut, B Crawford, J Mecklenburgh and E Rutter
- THE ROLE OF PHYLLOSILICATE-RICH MYLONITIC FABRIC ON DEFORMATION, FAILURE MODE AND FAULT WEAKNESS: NEW INSIGHTS FROM ROCK DEFORMATION LABORATORY EXPERIMENTS
F Bolognesi, S Vinciguerra, A Bistacchi and M Dobbs

11.05 – 11.30 – Break

11.30 – 12.20 – Session 7

- MODELLING OF THERMO-HYDRO-MECHANICAL COUPLED PROCESSES FOR FLUID-BEARING RESERVOIRS
A B Jacquey, M Cacace, G Blöcher and M Scheck-Wenderoth
- IN SITU STATE OF STRESS AT IODP HOLE C0002A NEAR NANKAI TROUGH DETERMINED BY A STOCHASTIC PROCESS OF SONIC VELOCITY AND BREAKOUT WIDTH LOGGING DATA
I Song, C Chang and H Lee

12.20 – 13.00 – Poster session pico talks (1 minute each)

13.00 – 14.00 – Lunch

14.00 – 17.20 – Poster session 1

18.30 – Drinks reception & Banquet

Wednesday

9.0 – 9.50 – Keynote

- MODELS AND MEASUREMENTS: CASE STUDIES IN THE VISCOELASTIC AND POROELASTIC BEHAVIOUR OF ROCKS
Ian Jackson

9.50 – 11.05 – Session 8

- AN APPARATUS TO MEASURE FREQUENCY-DEPENDENT POISSON RATIO OF FLUID-SATURATED SANDSTONES
L Pimienta, J Fortin and Y Guéguen
- STATIC AND DYNAMIC POROELASTIC MODULI OF MALM CARBONATE
Alireza Hassanzadegan, Romain Guérezec, Thomas Reinsch, Guido Blöcher and Günter Zimmermann

Zimmermann

- RECOVERY OF DAMAGE AND ELASTIC WAVE SPEEDS IN DEFORMED LIMESTONE
Nicolas Brantut

11.05 – 11.30 – Break

11.30 – 12.45 – Session 9

- EVIDENCE FOR PERMEABILITY HETEROGENEITY IN A VOLCANIC CONDUIT
J Farquharson, M J Heap, Y Lavallée, N R Varley and P Baud
- TENSILE STRENGTH CONSTRAINTS ON THE TRIGGERING OF VULCANIAN EXPLOSIONS AT SANTIAGUITO VOLCANO, GUATEMALA
A J Hornby, Y Lavallée, J E Kendrick, A S D Collinson and J Neuberg
- DECIPHERING ACOUSTIC EMISSIONS PRODUCED BY COOLING VOLCANIC ROCKS
John Browning, Philip Meredith and Agust Gudmundsson

12.45 – 13.30 – Lunch

13.30 – approx. 18.00 – Excursions. Please be on the correct bus by 13.30.

Thursday

9.00 – 9.50 – Keynote

- FAULTING, CATACLASTIC FLOW AND FRICTION OF SANDSTONES
E H Rutter and A Hackston

9.50 – 11.05 – Session 10

- RUPTURES PROCESSES DURING LABORATORY EARTHQUAKES
Alexandre Schubnel, François X Passelègue, Soumaya Latour, Harsha S Bhat, Stefan B Nielsen and Raül Madariaga
- FROM LAB TO FIELD: ERUPTION FORECASTING USING VOLCANO-TECTONIC AND LOW FREQUENCY SEISMICITY
Marco Fazio, Philip M Benson and Sergio Vinciguerra
- EXTREME EVENTS DURING THE DEFORMATION OF POROUS ROCKS — FROM DISCRETE ELEMENT MODELLING TO INDUCED SEISMICITY
Ian Main, John Greenhough, Gergo P´al, Ferenc Kun and Sabine Lennartz-Sassinek

11.05 – 11.30 – Break

11.30 – 12.20 – Session 11

- THE ROCK PHYSICS OF FIBER-REINFORCED ROCKS HELPS EXPLAIN UPLIFTS AT CAMPI FLEGREI CALDERA
T Vanorio and Waruntorn Kanitpanyacharoen
- X-RAY COMPUTED TOMOGRAPHY INVESTIGATION OF STRUCTURES IN CLAYSTONES FROM LARGE SCALE TO SMALL SCALE
A Kaufhold, W Gräsle, H Halisch and G Zacher

12.20 – 13.00 – Poster session pico talks (1 minute each)

13.00 – 14.00 – Lunch

14.00 – 17.20 – Poster session, with tea & coffee 16.05 – 16.30

18.30 - Barbecue

Posters

1.01 LABORATORY PERMEABILITY AND SEISMIC VELOCITY ANISOTROPY MEASUREMENTS ACROSS THE ALPINE FAULT, NEW ZEALAND
M Allen, D Tatham, D Faulkner and E Mariani

1.02 BULK MODULUS DISPERSION AND ATTENUATION OF A FLUID-SATURATED LAVOUX LIMESTONE
J Borgomano, L Pimienta, J Fortin and Y Guéguen

1.03 HIGH-VELOCITY FRICTIONAL PROPERTIES OF FAULT CORE GOUGES AND CATACLASITES, ALPINE FAULT, NEW ZEALAND
Carolyn Boulton, Lu Yao, Daniel R Faulkner, Shengli Ma, Toshihiko Shimamoto, John Townend, Virginia G Toy and Rupert Sutherland

1.04 SUBSIDENCE ABOVE A GAS RESERVOIR AS AFFECTED BY FLOW OF ROCKSALT (THE CAP ROCK)
G Marketos, R Govers and C J Spiers

1.05 DETECTION OF MOVING CAPILLARY FRONT IN POROUS ROCKS USING X-RAY AND ULTRASONIC METHODS

C David, D Bertauld, J Dautriat, J Sarout, B Menendez and B Nabawy

1.06 THE KG2B PROJECT: A WORLD-WIDE BENCHMARK OF LOW PERMEABILITY MEASUREMENT

C David, J Wassermann, F Amann and the KG²B Team

1.07 TOWARDS NEUTRON IMAGING OF COUPLED DEFORMATION AND FLUID FLOW IN POROUS, GRANULAR ROCKS

E Tudisco, S A Hall, S D Athanasopoulos and J Hovind

1.08 THE EFFECT OF LONG-TERM FLUID-ROCK INTERACTIONS ON THE MECHANICAL PROPERTIES OF RESERVOIR ROCK — A CASE STUDY OF THE WERKENDAM NATURAL CO₂ ANALOGUE FIELD

Suzanne Hangx, Pieter Bertier, Elisenda Bakker, Georg Nover and Andreas Busch

1.09 MECHANICAL PROPERTIES OF PROTOLITH AND GOUGE FROM THE CARBONERAS FAULT, SE SPAIN: HOW MECHANICS INFLUENCE FAULT ZONE STRUCTURE

A Kätker, D Faulkner, H Leclère, C Boulton, J Renner

1.10 SIMULATION OF HYDROCARBON PRIMARY MIGRATION: MULTI-EXPERIMENTAL APPROACH

M Kobchenko, A Pluymakers, D Dysthe, F Renard and A-M Sørenssen

1.11 WHAT DO FRACTURES IN SHALE LOOK LIKE AT DEPTH? A STUDY ON THE ROUGHNESS OF THE VEIN-ROCK INTERFACE VS. OPEN FRACTURES

A Pluymakers, M Kobchenko, D Dysthe and F Renard

1.12 3D PRINTING CARBONATE MICROSTRUCTURES: PRELIMINARY POROSITY-PERMEABILITY TRENDS WITH APPLICATIONS TO THE DECARBONATION REACTION

D Head and T Vanorio

1.13 THE ARCHITECTURE AND FRICTIONAL PROPERTIES OF FAULTS IN SHALE Nicola De Paola, Rosanne Murray, Mark Stillings, Jonathan Imber and Robert Holdsworth

1.14 PRESSURE-SENSITIVITY OF PERMEABILITY OF SHALES, AND IMPLICATIONS FOR SHALE GAS RESERVOIR EVALUATION AND PRODUCTION

R L Taylor, J. Mecklenburgh, R McKernan and E H Rutter

1.15 EFFECT OF CLAY MINERALS ON THE EFFECTIVE PRESSURE LAW IN CLAY-RICH SANDSTONES

W L Xiao, L Jiang, M Li, J Z Zhao and L L Zheng

1.16 VOLCANIC PERMEABILITY: A HIGH TEMPERATURE EXPERIMENTAL INSIGHT INTO SILICIC MAGMA DEGASSING

A Chadderton, P Sammonds, P Meredith, R Smith and H Tuffen

1.17 HYDRAULIC FRACTURING — SIMULATION IN THE LABORATORY

St. Gehne, P Benson, N Koor and M Enfield

1.18 FRICTION OF PRINCIPAL SLIP SURFACES IN LIMESTONE: PRELIMINARY DATA FROM LARGE-SCALE BIAXIAL EXPERIMENTS

T Tesei, B M Carpenter, A Sagy and C Collettini

1.19 INFLUENCE OF FRACTURE FILL ON PERMEABILITY IN MACRO-FRACTURED BASALT

Guangzeng Wang, Thomas Mitchell, Philip Meredith, Pamela Perez-Flores and Yoshitaka Nara

1.20 TELESEISMIC HYDRO-SEISMOGRAMS AND SUSTAINED WATER LEVEL CHANGE

V Lyakhovskiy, I Kurzon, M –L Doan and E Shalev

2.01 THE ROLES OF COMPOSITIONAL HETEROGENEITY AND RESIDUAL MELT REMOBILIZATION IN STRAIN LOCALIZATION PROCESSES WITHIN THE RUM VOLCANO LAYERED CUMULATE INTRUSION

A F Bell and N S Roberts

2.02 CRYSTAL PLASTICITY IN MAGMAS: AN EXPERIMENTAL STUDY

J E Kendrick, E Mariani, Y Lavallée and D B Dingwell

2.03 A NEW CONCEPTUAL MODEL OF COMPACTION CREEP IN CARBONATE ROCKS AND APPLICATION TO A COMPACTING RESERVOIR

D Keszthelyi, B Jamtveit and D K Dysthe

2.04 SITE CHARACTERIZATION OF SELECTED ACCELEROMETRIC STATIONS' SITES IN CRETE ISLAND (GREECE) FOUNDED ON ROCK AND SOFT ROCK FORMATIONS

C Loupasakis, P Tsagaratos, D Rozos, A Vafidis, M Steiakakis, A Savvaidis, P Soupios, I Papadopoulos, N Papadopoulos, A Sarris, M-D Mangriotis and U Dikmen

2.05 ADVECTION-DISPERSION OF A PASSIVE TRACER IN NETWORKS OF PIPES: EFFECT OF CONNECTIVITY

Y Bernabé, Y Wang, M Li

2.06 THE EFFECT OF CHEMICAL ENVIRONMENT ON THE TIME-DEPENDENT COMPACTION BEHAVIOUR OF QUARTZ SANDS

M T W Schimmel, S J T Hangx and C J Spiers

2.07 GEOMECHANICS OF FRACTURE AND KAISER EFFECT

Sunjay and Manas Banerjee

2.08 MEASURING STRESS IN ROCK USING ELECTRIC POTENTIAL SENSOR TECHNOLOGY

J W Archer, M R Dobbs, H J Reeves and R J Prance

2.09 CONTAIN: THE GEOMECHANICS OF CANDIDATE CCS RESERVOIRS AND SEALS

M R Dobbs, A Ougier-Simonin, C C Graham, R J Cuss and J F Harrington

2.10 IMPROVED IDENTIFICATION OF CORRELATIONS IN NATURALLY VARIABLE MATERIALS BY MULTISTEP MECHANICAL TESTS

J-M Hertzsch, W Gräsle and A Kaufhold

2.11 EXPERIMENTAL LIMITATIONS ON THE MEASUREMENT OF ELASTIC DISPERSION: MODELLING THE EXPERIMENT

L Pimienta, J Borgomano, J Fortin and Y Guéguen

2.12 ELECTRIC CURRENT FLOW IN CARRARA MARBLE DURING TRIAXIAL DEFORMATION

A Cartwright-Taylor, P Sammonds and F Vallianatos

2.13 A BIAXIAL PLANE STRAIN APPARATUS FOR NEUTRON DIFFRACTION-BASED EXPERIMENTS ON GRANULAR ROCKS

S D Athanasopoulos, S A Hall, A Nordin, G Nikoleris, G Couples, J F Kelleher and T Pirling

2.14 FRICTIONAL AND MECHANICAL PROPERTIES OF VOLCANIC AND SEDIMENTARY ROCKS.
APPLICATION TO MT ETNA (SICILY)

A Castagna, S Vinciguerra, N De Paola, S Nielsen, P Benson, R J Walker and A Ougier-Simonin

2.15 THE RESPONSE OF TUNNEL PERIMETER SUB-CRITICAL CRACK GROWTH TO OVERPRINTED
STRESS AND THERMAL VARIATION

S Francis and P Benson

2.16 DAMAGE LOCALISATION AND VELOCITY EVOLUTION IN EL HIERRO AND TENERIFE BASALTS
C Harnett, P Benson and M Fazio

2.17 A NEW METHODOLOGY FOR PALEOSTRESS RECONSTRUCTION USING THEORY, FIELD
OBSERVATIONS AND PETROPHYSICAL DATA

Luca Smeraglia, Fabio Trippetta, Eugenio Carminati, and Silvio Mollo

2.18 PHYSICAL AND MECHANICAL PROPERTIES OF MAJOR VOLCANIC LITHOLOGIES RELATED TO
VOLCANIC STABILITY AND FLANK COLLAPSE: IMPLICATIONS TO STROMBOLI VOLCANO, ITALY
T Stephens, S Vinciguerra, R Walker, P Benson N De Paola and S Nielsen

2.19 FRICTIONAL PROPERTIES OF PHYLLOSILICATE-RICH MYLONITE AND CONDITIONS FOR THE
BRITTLE-DUCTILE TRANSITION

Lei Zhang and Changrong He

2.20 REACTION ACCOMMODATED CREEP OF WET GABBRO

Yongsheng Zhou, Erik Rybacki, Changrong He, Richard Wirth and Georg Dresen