



International Lithosphere Program

- Activity Report 2023 -

Task Force Name : Bio-geodynamics of the Lithosphere
and data
(Task Force No. : TF VII
Task Force Leader(s) : Gerya, T., Stern, R.

1. Highlights of recent ILP Task Force work/results

The TF VII networking activities in 2023 has been again devoted toward building, stimulating and coordinating the international multi-disciplinary bio-geodynamical research community involving interested geodynamicists, geologists, (geo)biologists, ecologists, geochemistrists, paleontologists and climate evolution experts. The first hybrid workshop on Biogeodynamics and Habitability (>50 attendees) has been conducted at ETH Zurich:

https://balatt.weebly.com/uploads/1/2/1/0/121056708/bgd2023_poster.pdf,
<https://www.youtube.com/playlist?list=PL1Qequ-uCd1vshS2RzrnblCZYrLVwZeHi>

We also co-sponsored GeoMod conference in Paris, which was in particular discussing relations of tectonic, geomorphological and biological processes:

<https://sites.google.com/view/geomod2023/home>

Large international COST Action proposal “pan-EUROpean BioGeodynamics network” EUROBiG has been prepared and submitted (PI T.Gerya). This international project aims at establishing the first pan-European Biogeodynamics network. This will accelerate the development of Biogeodynamics as a discipline in Europe and worldwide by supporting and linking the relevant communities, facilitating interactions to address the important scientific, methodological, educational and networking challenges of this new field. The project includes >70 participants from 20 countries. The decision on this proposal is expected in the end of May 2024.

2. Presence at international meetings/workshops (this year)

T.Gerya presented Biogeodynamics on several conferences including three invited talks: TOPO-EUROPE Workshop (28-29 September 2023, SOPRON, Hungary), ESA Brainstorming on Astrobiology (16-20 October 2023, Noordwijk, The Netherlands), AGU Fall Meeting (11-15 December, San Francisco, USA). T.Gerya also co-organised a cross-disciplinary session at EGU 2023 meeting in Vienna “Initiation and evolution of subduction: dynamics, volatiles and melts from the surface to the deep mantle”.

3. Important publications of ILP Task Force members (max. five)

Stern, R.J., Gerya, T.V. (2023) Co-evolution of life and plate tectonics: The biogeodynamic perspective on the Mesoproterozoic-Neoproterozoic transitions. In: Duarte, J. (Ed.) Dynamics of Plate Tectonics and Mantle Convection, Elsevier, pp. 295-319.

Stern, R., Gerya, T., Tackley, P. (2023) A tectonic manifesto. Perspectives of Earth and Space Scientists, 4 (1), e2023CN000214.

- Cloetingh, S., Sternai, P., Koptev, A., Ehlers, T.A., Gerya, T., et al. (2023) Coupled surface to deep Earth processes: Perspectives from TOPO-EUROPE with an emphasis on climate-and energy-related societal challenges. *Global and Planetary Change*, 104140.
- Balazs, A., Gerya, T., May, D., Tari, G. (2023) Contrasting transform and passive margin subsidence history and heat flow evolution: Insights from 3D thermo-mechanical modelling. *Geological Society, London, Special Publications*, 524 (1), SP524-2021-94.
- Chen, Y., Chen, H., Liu, M., Gerya, T. (2023) Vertical tearing of subducting plates controlled by geometry and rheology of oceanic plates. *Nature Communications* 14 (1), 7931.

4. New contacts (this year)

International group of senior and young scientists has been greatly expanded thanks to the organisation of the COST Action proposal EUROBiG:

Croatia

- Croatian Geological Survey

Ms Katja Mužek

- University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering - David RUKAVINA

Dr David RUKAVINA

Czech Republic

- Institute of Biophysics

Dr Judit Sponer

- Česká geologická služba - Czech geological survey

Prof Karel Schulmann

- Czech Geological Survey

Dr Petra Maierová

France

- Université Aix-Marseille - CEREGE

Dr Alexis Licht

- CNRS - ISTerre

Dr Laurent husson

- CNRS - CEREGE

Prof Yannick Donnadieu

- Université Côte d'Azur

Prof Nicolas Coltice

- CNRS

Mr Guillaume DUPONT-NIVET

- Sorbonne Université - Sorbonne Université

Prof Laetitia Le Pourhiet

- CNRS - Centre de Biophysique Moléculaire

Dr Frances Westall

Georgia

- Tbilisi State University

Prof David Lordkipanidze

Germany

- GFZ - Deutsches GeoForschungsZentrum GFZ

Prof claudio faccenna

- FAU Erlangen-Nürnberg - Geozentrum Nordbayern

Prof Rachel Warnock

- LMU München - Ludwig Maximilians University LMU Munich
Dr Dieter Braun
- LMU Munich
Prof William Orsi
- Helmholtz Centre Potsdam - GFZ German Research Centre for Geosciences
Dr Sascha Brune
Prof Susanne Buiter
Dr Esteban Acevedo-Trejos
- Helmholtz Association - Helmholtz-Centre Potsdam - GFZ German Research
Centre for Geosciences
Prof Stephan Sobolev
- Karlsruher Institute of Technology - Institute of Applied Geosciences
Prof Nevena Tomašević
- Universität Hamburg
Prof Philipp Porada
- Freie Universität Berlin - Freie University Berlin
Dr Svetlana Botsyun
- GFZ Potsdam
Dr Alexander Koptev
- Helmholtz Association - GFZ Potsdam
Dr Hannah Davies
- HELMHOLTZ ASSOCIATION - GEOFORSCHUNGSZENTRUM
Prof Jean Braun
- Osnabrueck University
Dr Armen Mulkidjanian
- Greece**
- NATIONAL OBSERVATORY OF ATHENS
Dr Maria Sachpazi
- Hungary**
- Eötvös University
Prof Jozsef Palfy
- Research Centre for Astronomy and Earth Sciences (CSFK)
Prof Stephen Mojzsis
- Hungarian Research Network HUN-REN - Institute of Earth Physics and Space
Science
Dr László Fodor
- Eotvos Lorand University
Dr Orsolya SZTANO
- Hungarian Research Network - HUN-REN-MTM-ELTE Research Group for
Paleontology
Mr Imre Magyar
- Research Centre for Astronomy and Earth Sciences, Hungarian Academy of
Sciences - Geological and Geochemical Reserch Institute
Dr Zsófia Ruzsiccay-Rüdiger
- Italy**
- University of Milano-Bicocca
Prof Pietro Sternai
Dr Bram Vaes
- Montenegro**
- Geological Survey of Montenegro
Mr Martin Djakovic

Netherlands

- Utrecht University
Dr Lydian Boschman
- Utrecht University - Utrecht University, Faculty of Geosciences
Prof Liviu Ciprian Matenco

Norway

- University of Oslo - Department for Geosciences
Prof Stephanie C. Werner
- University of Oslo - Trond Helge Torsvik
Prof Trond Helge Torsvik

Poland

- Polish Academy of Sciences - Institute of Paleobiology
Dr Barbara Kremer
- Instytut Nauk Geologicznych PAN
Dr Jakub Ciazela
- Institute of Geological Sciences PAS
Dr Łukasz Kruszewski

Portugal

- FCiencias.ID - Associacao para a Investigacao e Desenvolvimento de Ciencias
(FCiencias.ID)
Dr Joao Duarte
- Faculty of sciences, University of lisbon - Faculty of sciences University of lisbon
Prof Cristina Branquinho

Romania

- Babes-Bolyai University
Dr Alida Timar
Dr Daniela Constantin
Dr Dan Mircea Tamas
Dr Alexandra Tamas
- Astronomical Institute of the Romanian Academy
Dr Marina Manea
Dr Vlad Constantin Manea

Serbia

- University of Belgrade, Faculty of Mining and Geology
Mr Nikola Stankovic
Prof Dragana Životić
- Geological Survey of Serbia
Dr Katarina Bradić Milinović

Slovakia

- Comenius University Bratislava - Faculty of Natural Sciences
Dr Michal Šujan
- Earth Science Institute of the SAS - Earth Science Institute of the Slovak Academy
of Sciences
Dr Jaroslava Pánisová
- Earth - Earth Science Institute of the Slovak Academy of Sciences
Dr Jana Dérerová
- The Earth Science Institute of the Slovak Academy of Sciences
Dr Jan Vozar
- Comenius University
Dr Tomáš Vlček

Switzerland

- ETH
Prof Sean Willett
- ETH Zurich
Prof Paul Tackley
Dr Attila Balazs
- University of Geneva - Section des Sciences de la Terre et de l'Environnement
Prof Sebastien Castelltort
- University of Geneva
Dr Maura Brunetti
- ETH Zurich - Geological Institute
Dr Yanyan Wang

Türkiye

- ESKİŞEHİR OSMANGAZİ ÜNİVERSİTİ
Prof Faruk Ocakoğlu
- ISTANBUL TECHNICAL UNIVERSITY
Prof Oguz Gogus

Ukraine

- National Academy of Sciences of Ukraine - M.P. Semenenko Institute of
Geochemistry, Mineralogy and Ore Formation
Prof Leonid Shumlyanskyy

United Kingdom

- University of Leeds - School of Earth and Environment
Prof Benjamin Mills
- UCL - University College London
Dr Matthew Fox
- University of Glasgow
Prof Todd Ehlers

5. Usage of ILP funding (this year)

Funds were spent to organise the international workshop on Biogeodynamics and Habitability in Zurich

https://balatt.weebly.com/uploads/1/2/1/0/121056708/bgd2023_poster.pdf

and to co-sponsor the international GeoMod conference in Paris:

<https://sites.google.com/view/geomod2023/home>

6. Activities planned for 2024

EGU session “Biogeodynamics: the influence of tectonics and magmatism on the evolution of life and biodiversity”

AGU session “How Plate Tectonics Accelerated Life Evolution” at AGU Fall Meeting 2024