EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

Geology

Geophysics

01/2016 – 12/2021

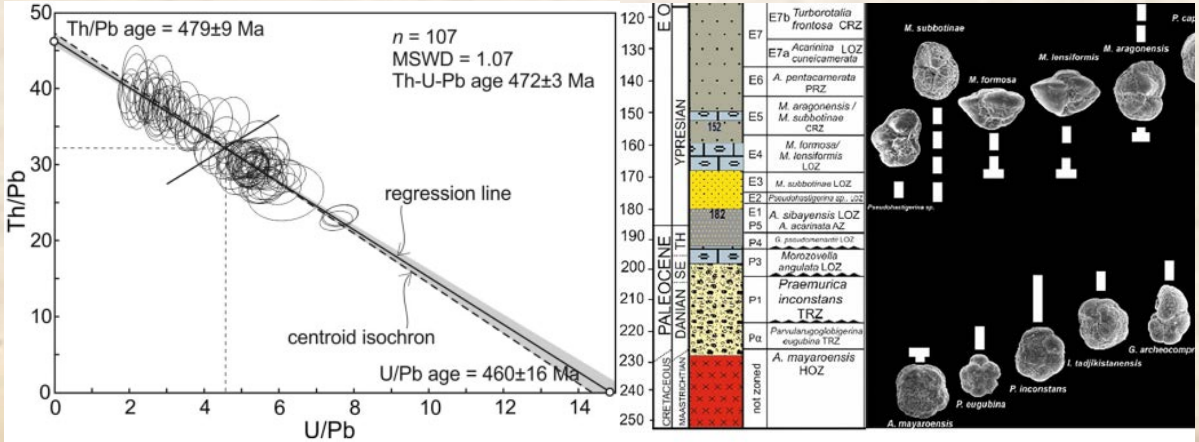
Geological Division 01/2016 – 12/2021

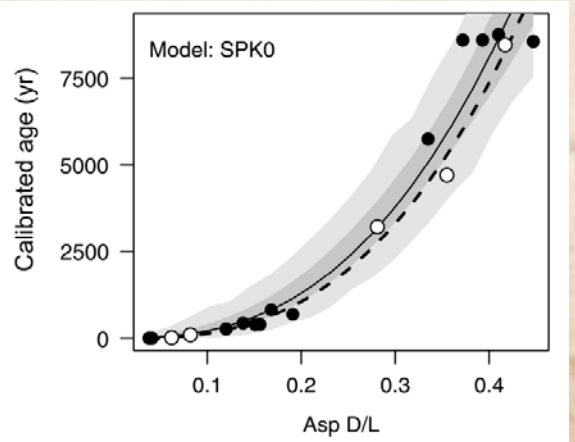
EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

SCIENTIFIC ACHIEVEMENTS

-Two hard-rock and two sedimentary/paleobiological departments, with **overlapping researchers** owing to geochronological, geochemical or mineralogical methods used in all departments (intentional integration), primarily via **labs in Banska Bystrica**

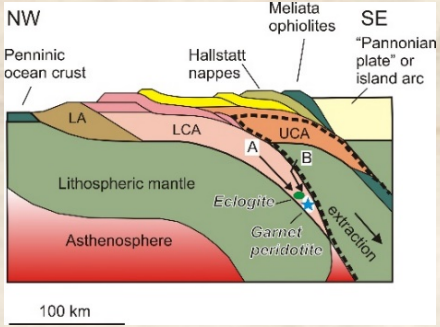
- **Age** of deposits/timing of events/rates of processes – one common denominator



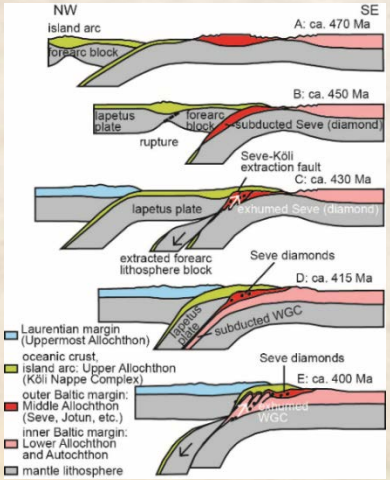


Lithosphere and geodynamic processes (Janák, Petrík, Broska, Kohút)

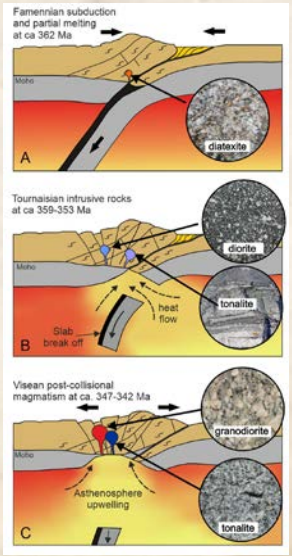
- → Geodynamic evolution of litosphere during subduction and exhumation
- → Reconstructing pressure-temperature-time paths with emphasis on ultra-high pressure metamorphism
- → Origin of magmatic rocks



Janák et al. 2015



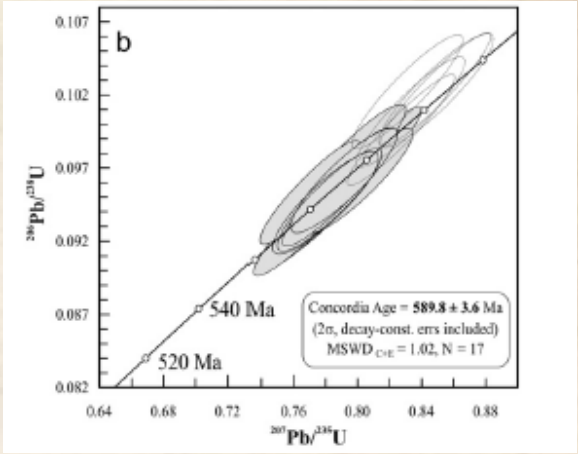
Janák et al. 2013; Petrík et al. 2019.



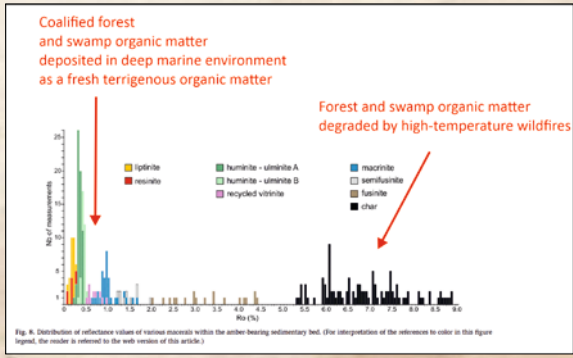
Broska et al.2021

Raw resources and geological materials (Hurai, Lexa, Kotulová)

- → Age and formation conditions of ore and non-ore deposits, feedbacks into geodynamic models
- → Quantifying thermal history of sedimentary basins focused on hydrocarbons
- → Behaviour of toxic elements during weathering of dumps
- → Provenance and restoration of historical paintings and artworks



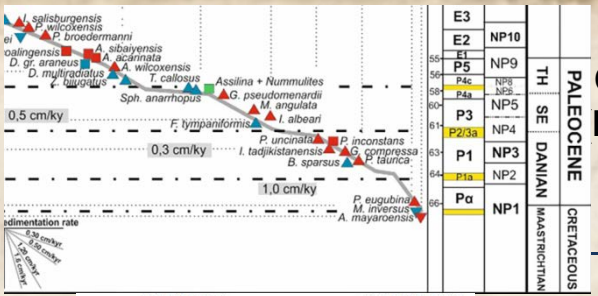
Concordia plot for baddeleyite ZrO2 from Evate carbonatite deposit, Mozambique (Hurai et al. 2017)

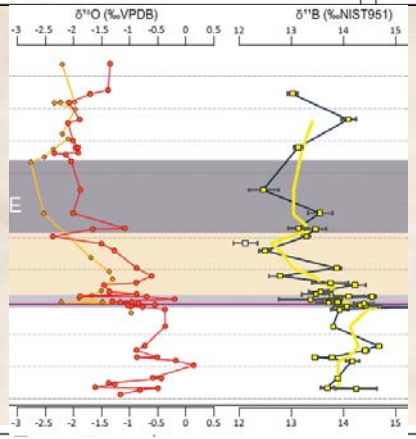


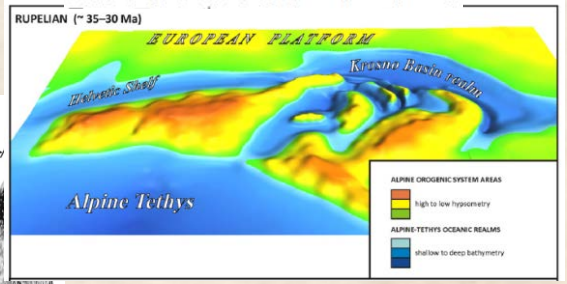
Distribution of reflectance values in amber-bearing strata

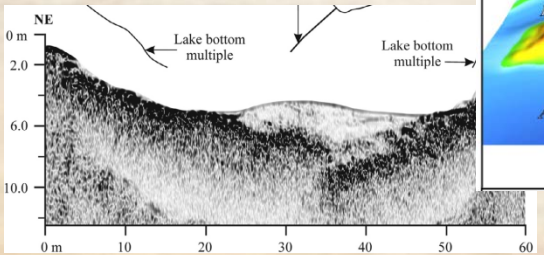
Sedimentology and bio- and chemo-stratigraphy (Soták, Pipík-Kýška, Muller)

- → Detection of unusual environmental events and attribution of their causes, such as acidification and anoxic events during the Mesozoic and Cenozoic
- → Paleogeographic evolution of Tethyan domain during this time
- → Pleistocene/Holocene env. changes documented in glacial lake sediments and caves



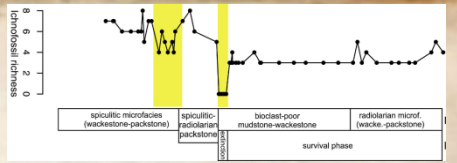


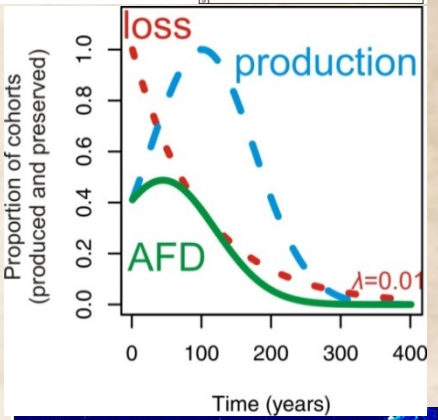


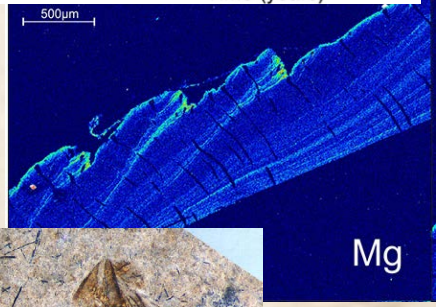


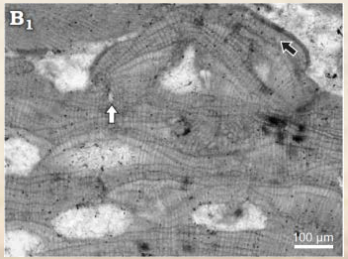
Paleobiology and Organismal Evolution Michalík, Tomašových, Vršanský)

- → Empirical analyses and modeling of evolutionary and diversity dynamics of ecosystems at large biogeographic scales
- → Unmixing and estimating Holocene-Anthropocene ecosystem perturbations
- → Model groups: forams, ostracods, molluscs, insects, coralline algae, diatoms, trace fossils, biomineralization





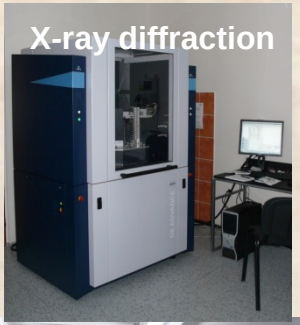




Laboratory hub - Banská Bystrica (Milovský, Milovská, Mikuš, Kurylo, Biroň)

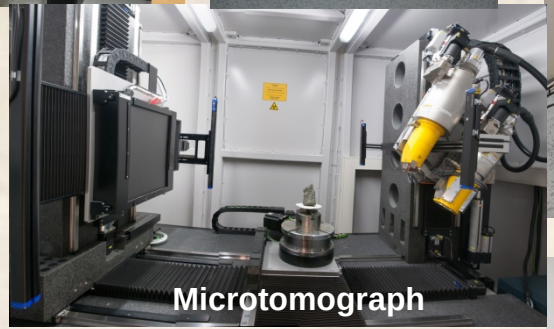

XRF


FTIR spectroscopy

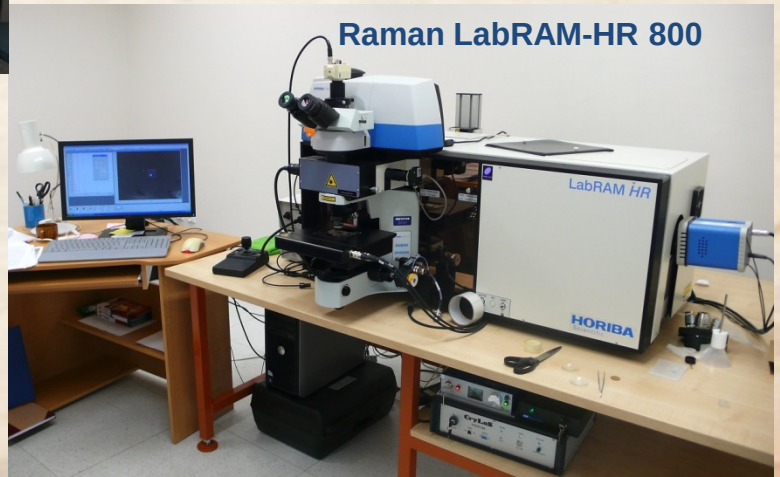

X-ray diffraction

SEM with EDS and CL


FEG microprobe JEOL JXA-8530F


Microtomograph


Stable isotopes MAT 253 Thermo Scientific



Raman LabRAM-HR 800

EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

Geology

TOP RESULTS/PUBLICATIONS

Ultrahigh-pressure metamorphism (UHPM) in collisional orogens

Litosphere/ Geodynamic proc.

JOURNAL OF PETROLOGY

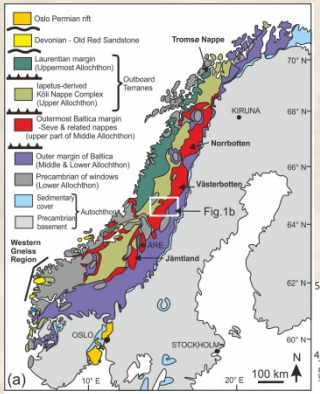
Journal of Petrology, 2019, Vol. 60, No. 9, 1773–1796
doi: 10.1093/petrology/egz051
Advance Access Publication Date: 6 November 2019
Original Article

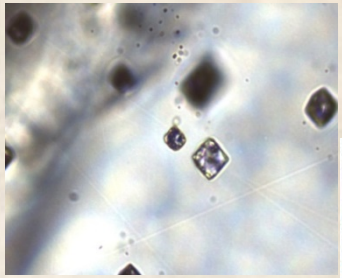
OXFORD

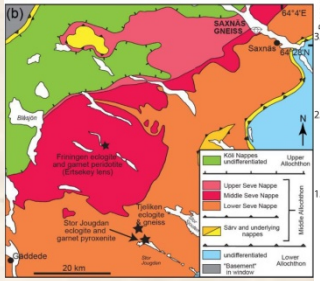
Monazite Behaviour during Metamorphic Evolution of a Diamond-bearing Gneiss: a Case Study from the Seve Nappe Complex, Scandinavian Caledonides

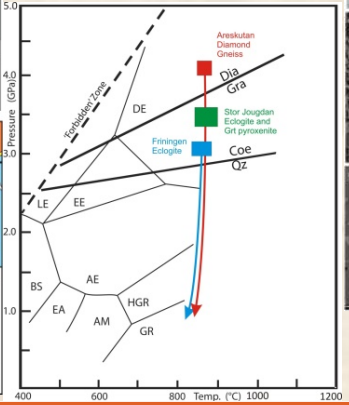
I. Petrík[1]*, M. Janák[1], I. Klonowska[2,3], J. Majka[2,3], N. Froitzheim[4], K. Yoshida[5], V. Sasinková[6], P. Konecný[7] and T. Vaculovič[8]

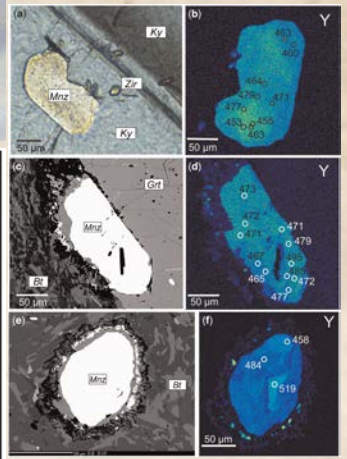
IF=3.4











- → New evidence for UHPM in the Scandinavian Caledonides (Seve Nappe Complex)
- → Discovery of microdiamonds, P-T conditions, timing of metamorphism based on Th-U-Pb dating of monazite
- → indicates that deep subduction (>100 km) of continental lithosphere was related to the Late Paleozoic collision of Baltica with Laurentia

Projects: APVV-14-0258, 18-0107

Journal of METAMORPHIC GEOLOGY

J. metamorphic Geol., 2017, **35**, 541–564
doi:10.1111/jmg.12244

Microdiamond on Åreskutan confirms regional UHP metamorphism in the Seve Nappe Complex of the Scandinavian Caledonides

IF=3.6

I. KLONOWSKA,[1] M. JANÁK,[2] J. MAJKA,[1,3] I. PETRÍK,[2] N. FROITZHEIM,[4] D. G. GEE[1] AND V. SASINKOVÁ[5]

Ultrahigh-pressure (UHP) metamorphism in collisional orogens

Litosphere/
Geodynamic proc.

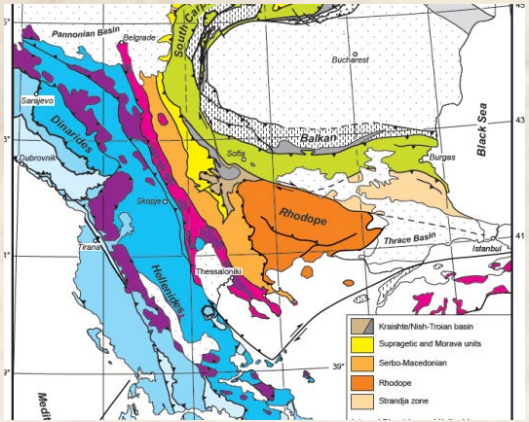
Journal of
METAMORPHIC GEOLOGY

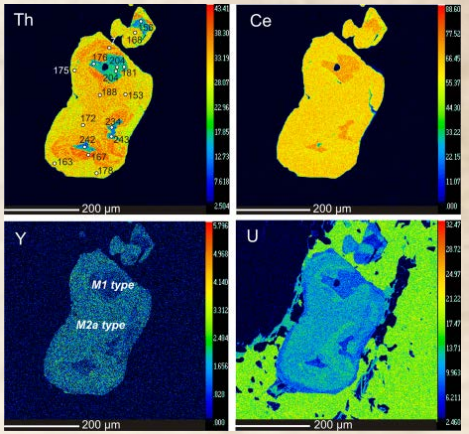
J. metamorphic Geol., 2016, 34, 265–291 doi:10.1111/jmg.12181

Triassic to Early Jurassic (*c.* 200 Ma) UHP metamorphism in the Central Rhodopes: evidence from U–Pb–Th dating of monazite in diamond-bearing gneiss from Chepelare (Bulgaria)

IF=3.6

I. PETRÍK,[1] M. JANÁK,[1] N. FROITZHEIM,[2] N. GEORGIEV,[3] K. YOSHIDA,[4] V. SASINKOVÁ,[5] P. KONECNY[6] AND S. MILOVSKÁ[7]





→ Discovery of microdiamonds in the Rhodopes

→ monazite (Th-U-Pb) and garnet (Lu-Hf) dating

→ Deep subduction of continental lithosphere during the Variscan and Alpine time

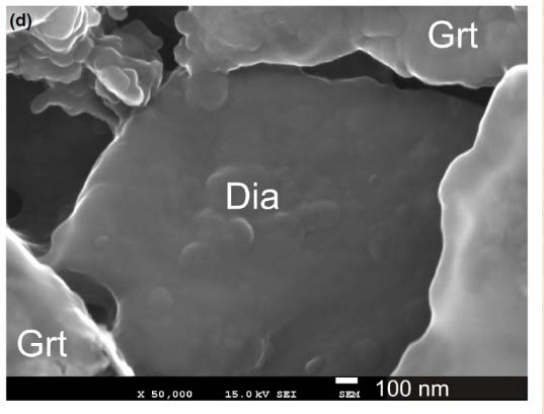
RESEARCH ARTICLE

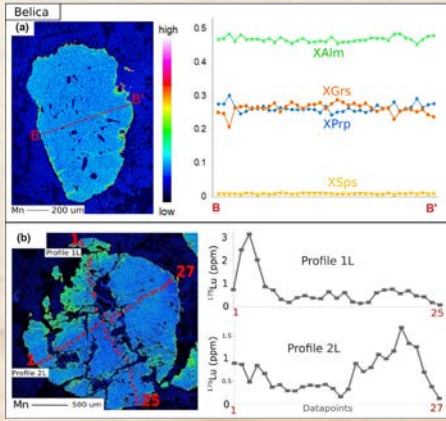
Terra Nova WILEY

Variscan ultra-high-pressure eclogite in the Upper Allochthon of the Rhodope Metamorphic Complex (Bulgaria)

IF=3.0

Svenja Trapp[1] | Marian Janák[2] | Kathrin Fassmer[1] | Nikolaus Froitzheim[1] | Carsten Münker[3] | Neven Georgiev[4]





Projects: APVV-14-0258, 18-0107

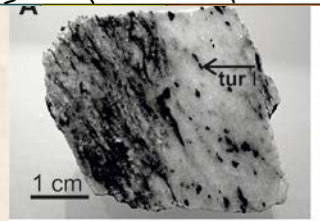
(Ultra) high-pressure metamorphism in the Himalaya

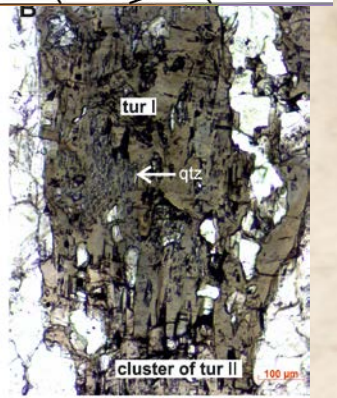
Litosphere/
Geodynamic proc.

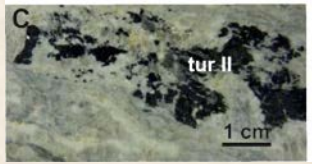
Geological Society
Special Publication 481

Myrmekitic intergrowth of tourmaline and quartz in eclogite-hosting gneisses of the Tso Morari UHP metamorphic terrane (Eastern Ladakh, India): an effect of HP conditions?

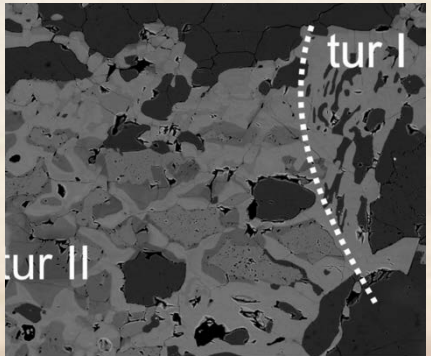
Igor Broska, Peter Bačík, Santosh Kumar, Marian Janák, Sergiy Kurylo, Ivan Filip, Jakub Bazarnik & Tomáš Mikuš

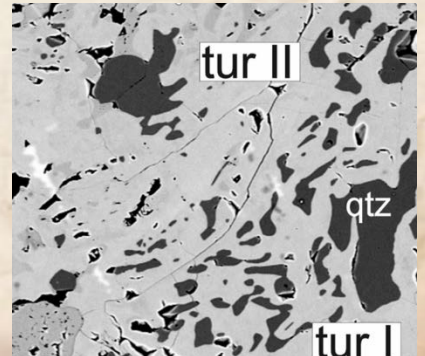






- → First occurence of tourmaline with quartz of myrmekitic texture in eclogite-hosting gneiss from Tso Morari in the Himalaya, reflecting the processes that occurred during the Tertiary subduction of Indian plate
- → Myrmekitic intergrowth of tourmaline and quartz formed during decompression from (U)HP conditions
- → First natural occurrence of silica-oversaturated UHP tourmaline known only from the experiments.





Slovak-Indian-Polish and Czech collaboration

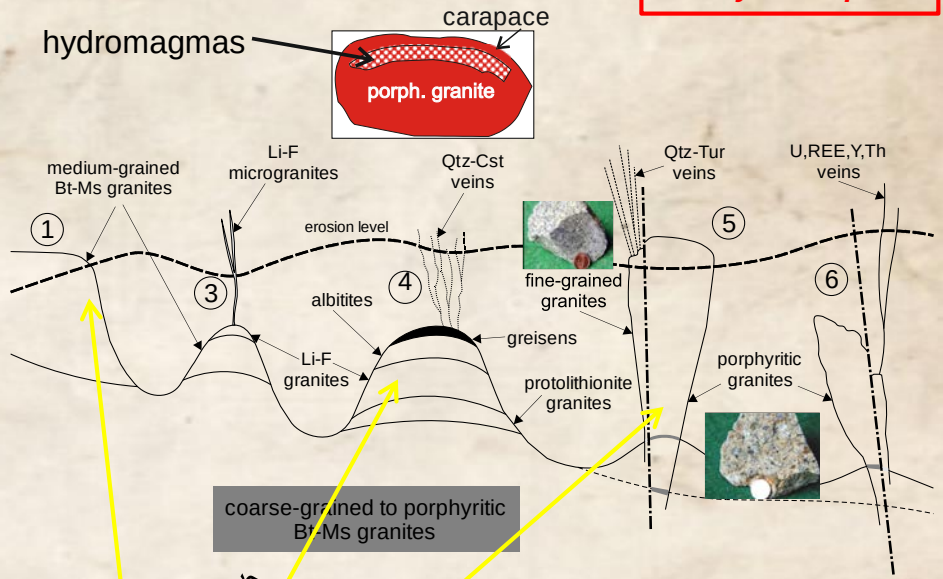
Magmatic processes - rare-metal granites and critical metals (Carpathians)

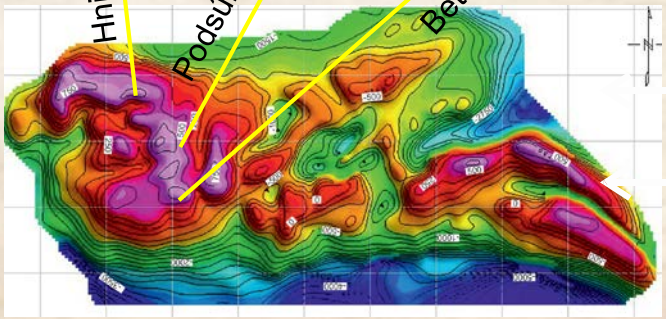
Litosphere/ Geodynamic proc.

GEOLOGICA CARPATHICA, OCTOBER 2018, 69, 5, 483–497 doi: 10.1515/geo

Accessory minerals and evolution of tin-bearing S-type granites in the western segment of the Gemeric Unit (Western Carpathians)

IGOR BROSKA and MICHAL KUBIŠ





3D density model of the Gemeric granites created by geophysical program IGMAS.

Šefara, Bielik et al. (2017, Geol. Carpath.)

- → Formation of rare-metal mineralisation in the Permian granites of the Gemeric Unit
- → Rare-metal mineralisation was formed from hydromagmas located in the cupolas of granite intrusions
- → Geophysics indicates other granites of metallogenetic potential in the area

Project(s): APVV 14-0278

Geochronological dating (FT dating, LA-ICP-MS dating)

Litosphere/ Geodynamic proc.

Contents lists available at ScienceDirect

Journal of Archaeological Science: Reports

journal homepage: www.elsevier.com/locate/jasrep

The Carpathian obsidians – Contribution to their FT dating and provenance (Zemplín, Slovakia)

Milan Kohút [a,*], John A. Westgate [b], Nicholas J.G. Pearce [c], Pavel Bačo [d]

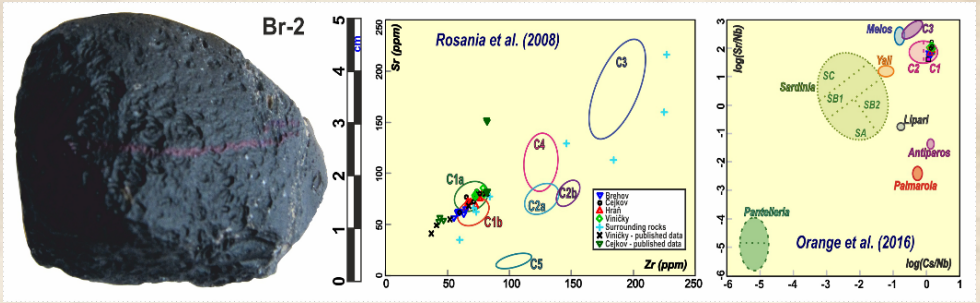
Int J Earth Sci (Geol Rundsch) (2018) 107:321–335
https://doi.org/10.1007/s00531-017-1491-8

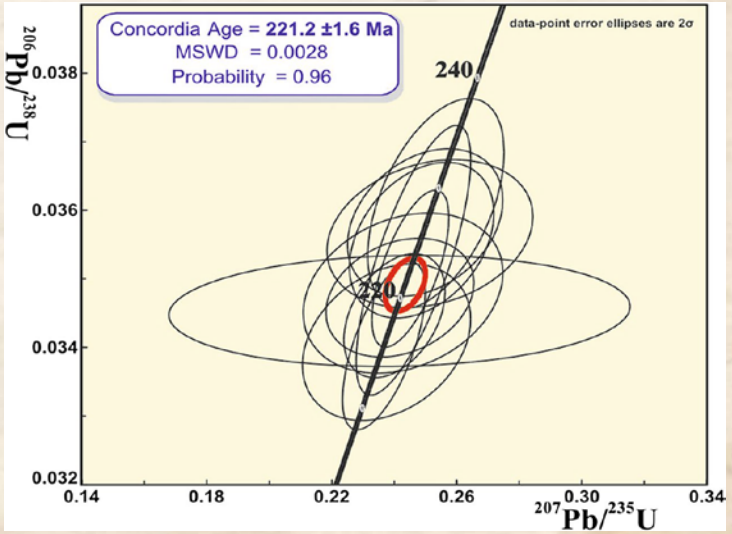
ORIGINAL PAPER

Tracking an upper limit of the "Carnian Crisis" and/or Carnian stage in the Western Carpathians (Slovakia)

Milan Kohút[1] · Mandy Hofmann[2] · Milan Havrila[3] · Ulf Linnemann[2] · Jakub Havrila[3]

IF=2.3





- → Fission track dating of obsidians sourced by the Neovolcanic field constrains their age to ~12 Ma and indicates that the long-lasting volcanism was unlikely
- → Synsedimentary volcanic zircons (LA ICP-MS) constrain the maximum age of the humid "Carnian Crisis" Event occurred during the Late Triassic to 221.2± 1.6 Ma - younger than expected

Project: APVV-18-0107, APVV-0549-07

Origin and age of apatite deposits (Mozambique)

Raw resources/ geol. materials

Contents lists available at ScienceDirect

Ore Geology Reviews

journal homepage: www.elsevier.com/locate/oregeorev

IF=3.1

New insights into the origin of the Evate apatite-iron oxide-carbonate deposit, Northeastern Mozambique, constrained by mineralogy, textures, thermochronometry, and fluid inclusions

Vratislav Hurai [a,*], Jean-Louis Paquette [b,c,d], Monika Huraiová [e], Marek Slobodník [f], Pavel Hvožďara, Peter Siegfried [h], Michaela Gajdošová [g], Stanislava Milovská [i]

Contents lists available at ScienceDirect

Lithos

journal homepage: www.elsevier.com/locate/lithos

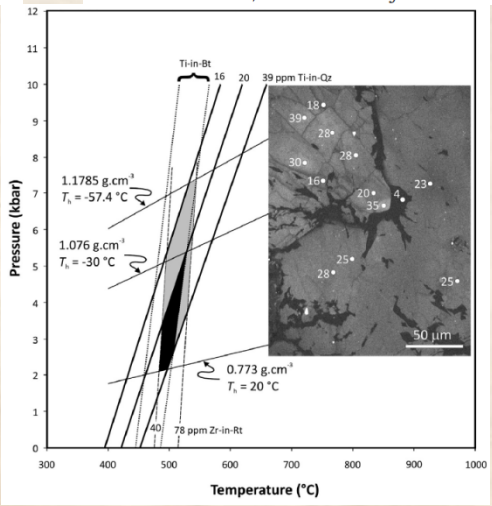
IF=4

Research Article

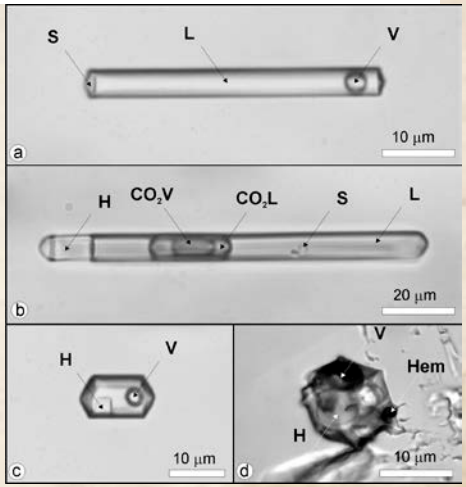
Thermobarometric and geochronologic constraints on the emplacement of the Neoproterozoic Evate carbonatite during exhumation of the Monapo granulite complex, Mozambique

Vratislav Hurai [a,*], Michaela Blažeková [b], Monika Huraiová [b], Pete R. Siegfried [c], Marek Slobodník [d], Patrik Konečný [e]

- → Fluid inclusions, thermobarometry and U-Pb dating resolved age, origin, and emplacement depth of the largest apatite deposit in South Africa
- → The apatite-bearing carbonatite formed in a post-collisional tectonic setting after the breakup of Gondwana



PT conditions inferred from fluid inclusions and mineral thermobarometers



Multiphase fluid inclusions in apatite with halite, sulfate and carbon dioxide

Projects: VEGA 2/0118/16, Centre of Excellence for Integrated Research on the Geosphere (ITMS-26220120064)

Polysulphanes (H2S*n*, *n* = 2-6) in fluid inclusions (collab.: University Nagpur, India)

Raw resources/ geol. materials

Contents lists available at ScienceDirect

Chemical Geology

journal homepage: www.elsevier.com/locate/chemgeo

IF=3.1

Raman spectroscopic study of polysulfanes (H_2S_n) in natural fluid inclusions

Vratislav Hurai[a,*], Ivan Černušák[b], Kirtikumar Randive[c]

Contents lists available at ScienceDirect

Applied Geochemistry

journal homepage: www.elsevier.com/locate/apgeochem

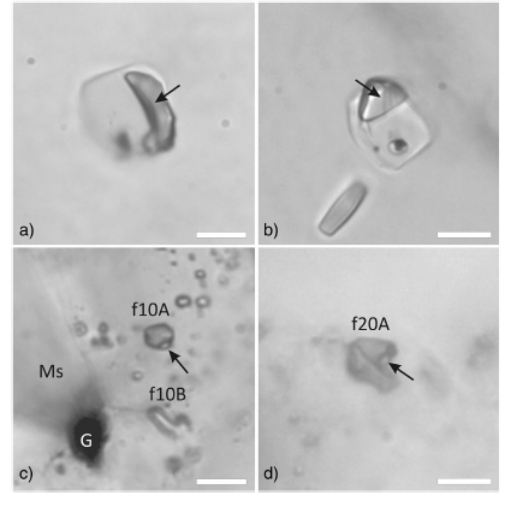
IF=2.9

Hydrogen recovery from H_2S-CH_4 inclusions trapped in quartz triggered by green laser-induced photolysis of polysulphane-sulphur bonds

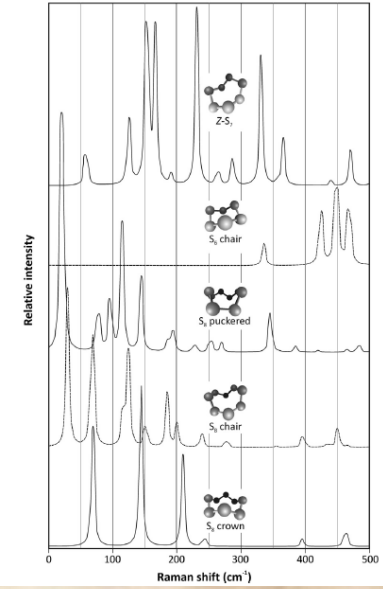
Vratislav Hurai[a,*], Ivan Černušák[b], Kirtikumar Randive[c]

- → Discovery of complex polysulphanes in natural sulfur-bearing methane-hydrogen sulfide inclusions in Archean quartzite from Bastar Craton, India
- → First description of direct, low-energy, laser-induced breakdown of H_2S to hydrogen and sulfur
- → Environment-friendly alternative to recently employed methods of super-soar natural gas cleaning and hydrogen production

Project: Centre of Excellence for Integrated Research on the Geosphere (ITMS-26220120064)



Methane inclusions with sulfur and hydrogen sulfide trapped in quartz from Archean quartzite. Arrows in c) and d) indicate photoactivated sulfur with polysulfanes



Calculated Raman spectra of sulfur allotropes

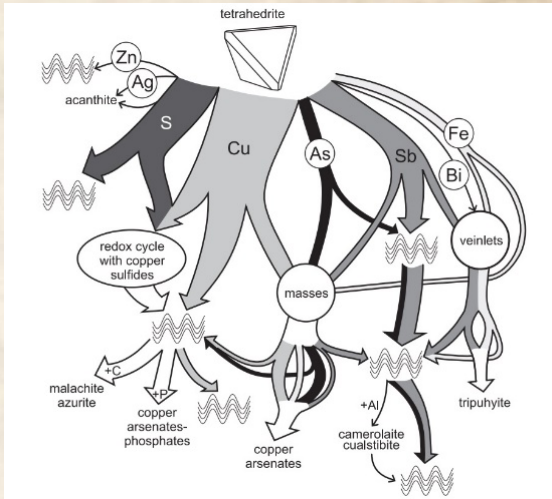
Mobility of toxic elements during weathering of ore minerals and stability

Raw resources/ geol. materials

(collab with: Jena, Prague, Hannover, Frankfurt, Salzburg)

→ Tracking geochemical behaviour and mobility of toxic elements (Sb, As, Cu, Zn, Pb, Cd) during weathering of ore minerals and stability of supergene products under the various pH conditions

→ Crystal chemistry and thermodynamics of supergene products



Contents lists available at ScienceDirect

Applied Geochemistry

journal homepage: www.elsevier.com/locate/apgeochem

IF=3.1

Mineralogy and geochemistry of the copper-dominated neutral mine drainage at the Cu deposit Ľubietová-Podlipa (Slovakia)

Juraj Majzlan[a,*], Martin Števko[b], Martin Chovan[c], Jarmila Luptáková[d], Stanislava Milovská[d], Rastislav Milovský[d], Stanislav Jeleň[d], Martina Sýkorová[d], Kilian Pollok[a], Jörg Göttlicher[e], Daniel Kupka[f]

Contents lists available at ScienceDirect

Chemical Geology

journal homepage: www.elsevier.com/locate/chemgeo

IF=3.6

Synergies in elemental mobility during weathering of tetrahedrite [(Cu,Fe,Zn)$_{12}$(Sb,As)$_4$S$_{13}$]: Field observations, electron microscopy, isotopes of Cu, C, O, radiometric dating, and water geochemistry

Juraj Majzlan[a,*], Stefan Kiefer[a], Julia Herrmann[a], Martin Števko[b], Jiří Sejkora[b], Martin Chovan[c], Tomáš Lánczos[d], Marina Lazarov[e], Axel Gerdes[f], Falko Langenhorst[a], Anežka Borčinová Radková[g], Heather Jamieson[g], Rastislav Milovský[h]

MIneralogy and crystallochemistry of new natural compounds

collab: Prague, Milan, Brno, Copenhagen

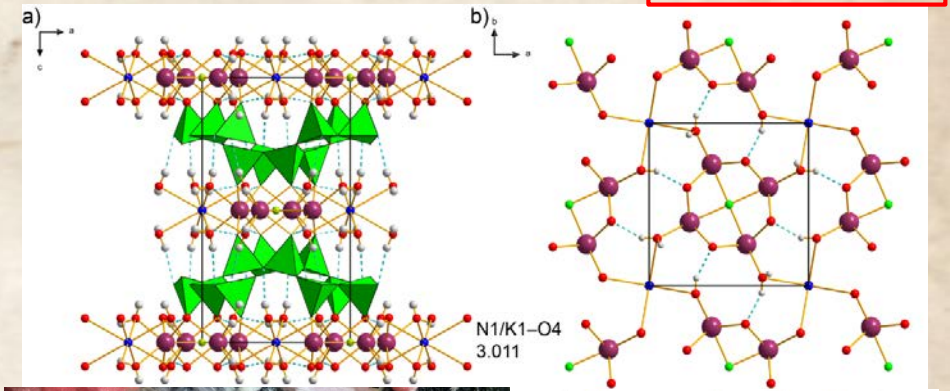
Raw resources/ geol. materials

Mineralogical Magazine, August 2018, Vol. 82(4), pp. 863–876

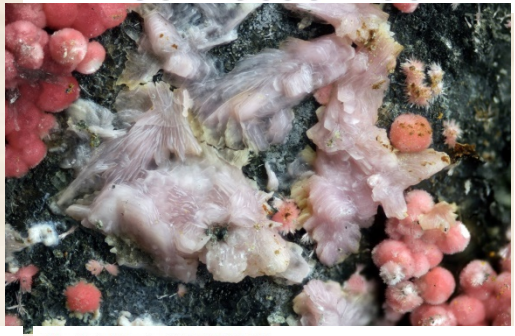
IF=1.85

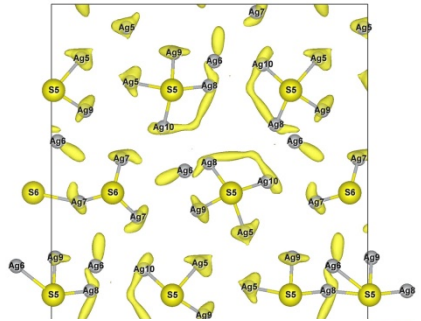
Fluorarrojadite-(BaNa), $BaNa_4CaFe_{13}Al(PO_4)_{11}(PO_3OH)F_2$, a new member of the arrojadite group from Gemerská Poloma, Slovakia

MARTIN ŠTEVKO[1,*], JIŘÍ SEJKORA[1], PAVEL UHER[2], FERNANDO CÁMARA[3], RADEK ŠKODA[4] AND TOMÁŠ VACULOVIČ[5]



- → Complex mineralogical and crystallochemical description of new natural compounds, often with very complicated structures
- → Five new minerals were discovered and published since 2018, three more were recently approved by CNMNC of IMA





Journal of Geosciences, 66 (2021), 127–135 DOI: 10.3190/jgeosci.324

Original paper

Dobšináite, $Ca_2Ca(AsO_4)_2 \cdot 2H_2O$, a new member of the roselite group from Dobšiná (Slovak Republic)

IF=1.5

Jiří SEJKORA*[1], Martin ŠTEVKO[1], Radek ŠKODA[3], Eva VÍŠKOVÁ[4], Jiří TOMAN[4], Sebastián HREUS[3], Jakub PLÁŠIL[5], Zdeněk DOLNÍČEK[1]

Mineralogical Magazine (2020), **84**, 533–539
doi:10.1180/mgm.2020.44

CAMBRIDGE UNIVERSITY PRESS

Article

IF=1.7

Fluorapophyllite-(NH_4), $NH_4Ca_4(Si_8O_{20})F \cdot 8H_2O$, a new member of the apophyllite group from the Vechec quarry, eastern Slovakia

Martin Števko[1,2*], Jiří Sejkora[2], Jakub Plášil[3], Zdeněk Dolníček[2] and Radek Škoda[4]

Detection of markers/events at the Jurassic/Cretaceous boundary

Stratigraphy & Sedimentology

Cretaceous Research 118 (2021) 104659

Contents lists available at ScienceDirect

Cretaceous Research

journal homepage: www.elsevier.com/locate/CretRes

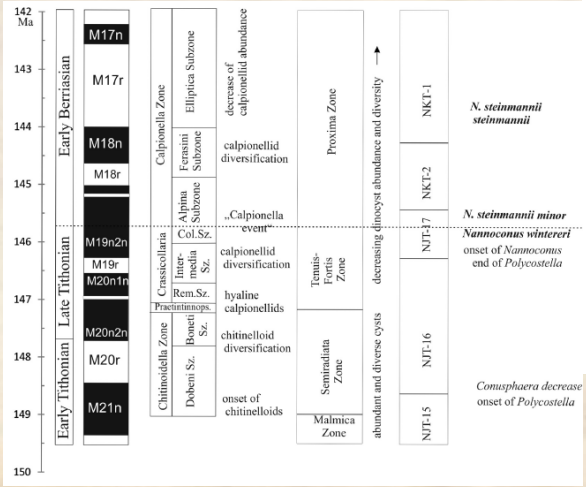
IF = 2.2

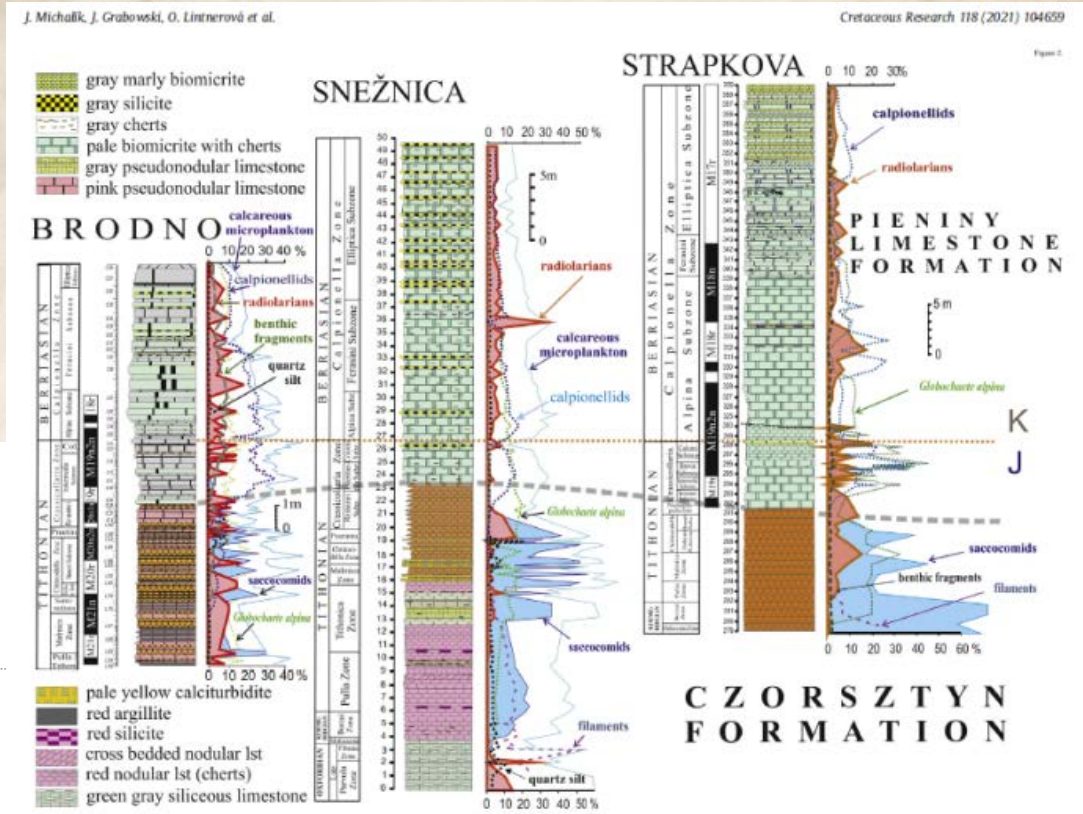
Jurassic – Cretaceous boundary record in Carpathian sedimentary sequences

Jozef Michalík [a], Jacek Grabowski [b], Otília Lintnerová [c], Daniela Reháková [c], Simon Kdýr [d], Petr Schnabl [d]

[a] Earth Science Institute of the Slovak Academy of Sciences, Dúbravská Cesta 9, P.O. Box 106, 840 05 Bratislava, Slovakia

→ Proposal of magneto- and biostratigraphic markers for the Jurassic/Cretaceous boundary that still lacks the GSSP boundary definition





Detection of biotic events during the Cretaceous-Early Cenozoic hyperthermals

Stratigraphy & Sedimentology

Palaeogeography, Palaeoclimatology, Palaeoecology 579 (2021) 110571

Contents lists available at ScienceDirect

Palaeogeography, Palaeoclimatology, Palaeoecology

journal homepage: www.elsevier.com/locate/palaeo

End-Cretaceous to middle Eocene events from the Alpine Tethys: Multi-proxy data from a reference section at Krštеňany (Western Carpathians)

IF = 3.3

Ján Soták [a,b,*], Tiiu Elbra [c], Petr Pruner [c], Silvia Antolíková [d], Petr Schnabl [c], Adrian Biroň [a], Šimon Kdýr [c], Rastislav Milovský [a]

[a] Earth Science Institute, Slovak Academy of Sciences, Dumbierska 1, 974 11 Banská Bystrica, Slovakia

Contents lists available at ScienceDirect

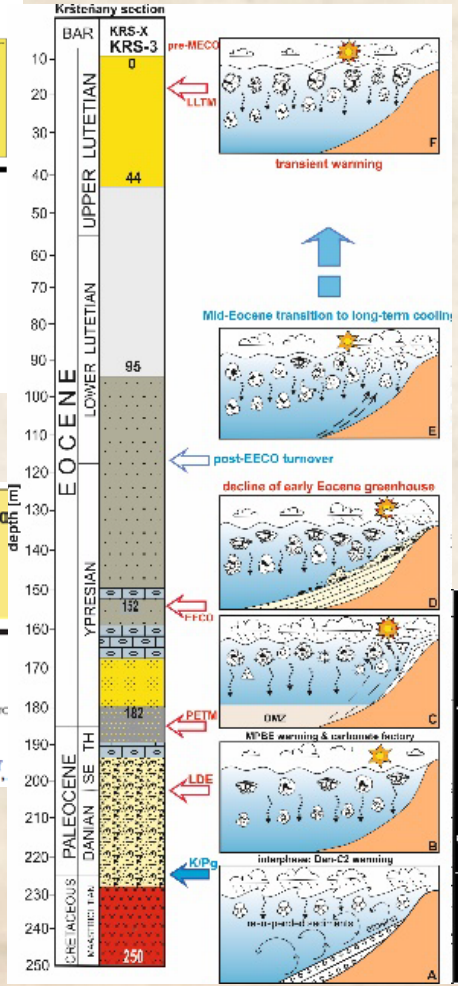
Palaeogeography, Palaeoclimatology, Palaeoecology

journal homepage: www.elsevier.com/locate/palaeo

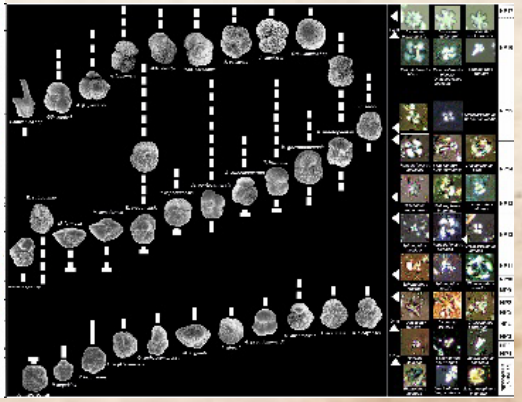
IF = 2.5

Multistratigraphic records of the Lower Cretaceous (Valanginian–Cenomanian) Puez key area in N. Italy

Alexander Lukeneder [a,*], Ján Soták [b], Luigi Jovane [d], Martino Giorgioni [d,i], Jairo F. Savian [e], Eva Halásová [f],



→ Detection of turnover and recovery of foraminifers and nannoplanton during the Early Cretaceous, after the end-Cretaceous mass extinction and during the Paleocene-Eocene hyperthermals/carbon cycle perturbations



Amber from the Oligocene deep-water deposits of the Carpathians

Stratigraphy & Sedimentology

Contents lists available at ScienceDirect

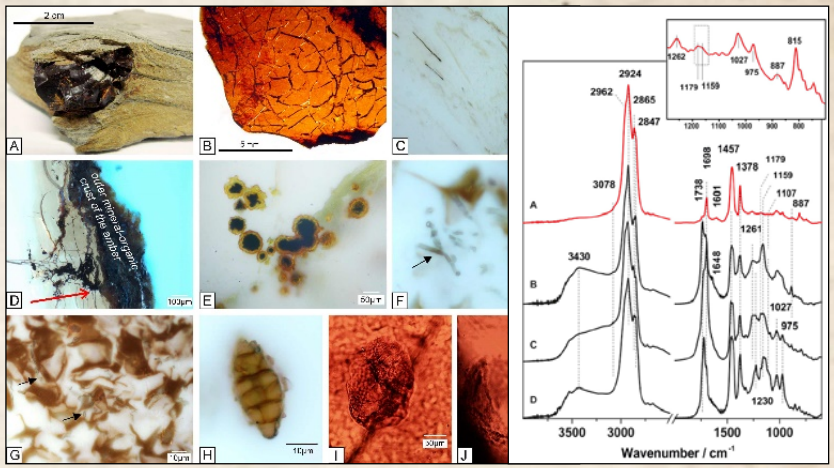
International Journal of Coal Geology

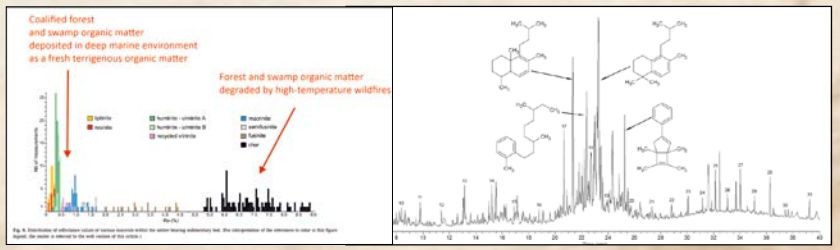
journal homepage: www.elsevier.com/locate/coal

Amber and organic matter from the late Oligocene deep-water deposits of the Central Western Carpathians (Orava–Podhale Basin)

IF = 5.3

Júlia Kotulová[a,*], Dušan Starek[a], Martina Havelcová[b], Helena Pálková[c]





- → Terrestrial-marine connections
- → Identification of a unique polylabdane structure of amber that originated from conifers, one of the very rare evidence of this family occurring in the Northern Hemisphere during the late Oligocene
- → suggesting the presence of forest-swamp type vegetation.

VEGA 2/0014/18

Evolution and ecology of insects (cockroaches)

Paleobiology & evolution

Contents lists available at ScienceDirect

Gondwana Research

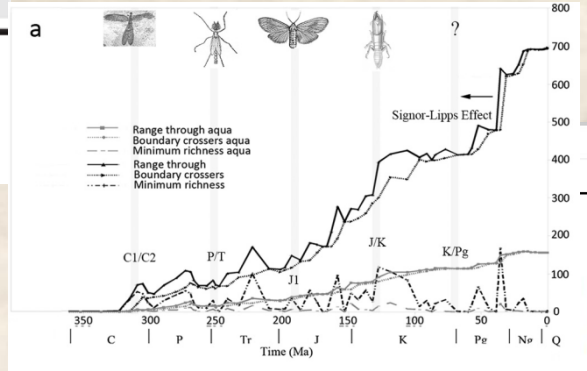
journal homepage: www.elsevier.com/locate/gr

IF = 6.5

Ancient roaches further exemplify 'no land return' in aquatic insects

Peter Vršanský [a,1,c,d,1], Hemen Sendi [e,*,1], Danil Aristov [d,f,1], Günter Bechly [g], Patrick Müller [h], Sieghard Ellenberger [i], Dany Azar [j,k], Kyoichiro Ueda [l], Peter Barna [c], Thierry Garcia [m]

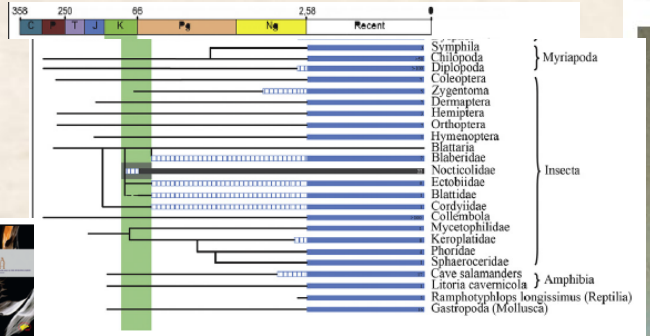
(Peter Vršanský, also at Institute of Zoology)



→ First book on fossil cockroaches

→ Repeated invasions of aquatic environments by insects since the late Paleozoic but no reversals

→ Earliest cave organism represented by Cretaceous cockroach in the Myanmar



Contents lists available at ScienceDirect

Gondwana Research

journal homepage: www.elsevier.com/locate/gr

IF = 6.2

Nocticolid cockroaches are the only known dinosaur age cave survivors

Hemen Sendi [a,b,c,d,1], Peter Vršanský [a,c,d,e,f,*,1], Lenka Podstrelená [a,b,1], Jan Hinkelman [d,g,1], Tatiana Kúdelová [b,1], Matuš Kudela [b], Ľubomír Vidlička [b,i], Xiaoyin Ren [c], Donald L.J. Quicke [h]

Eutrophication/deoxygenation of marine ecosystems (Anthropocene)

Paleobiology & evolution

THE GEOLOGICAL SOCIETY OF AMERICA®

4.6 - IF

Stratigraphic unmixing reveals repeated hypoxia events over the past 500 yr in the northern Adriatic Sea

Adam Tomašových[1†], Ivo Gallmetzer[2*], Alexandra Haselmair[2*], Darrell S. Kaufman[3*], Jelena Vidović[2], and Martin Zuschin

Sedimentology (2019) **66**, 781–807 doi: 10.1111/sed.12516

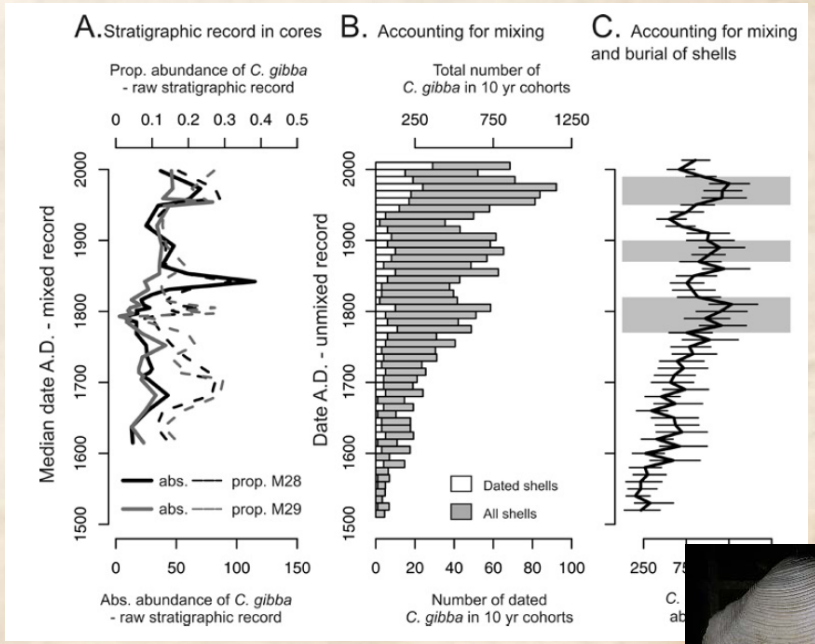
3.2 - IF

A decline in molluscan carbonate production driven by the loss of vegetated habitats encoded in the Holocene sedimentary record of the Gulf of Trieste

ADAM TOMAŠOVYCH*, IVO GALLMETZER†, ALEXANDRA HASELMAIR†, DARRELL S. KAUFMAN‡, BORUT MAVRIČ§ and MARTIN ZUSCHIN†

→ A new approach allowing unmixing of the stratigraphic record on the basis of 14C-based age distributions in sediment cores

→ A major change in composition and size structure of molluscan communities in the Adriatic Sea – in the 20th century would be underestimated in the absence of this unmixing approach



PROCEEDINGS B

royalsocietypublishing.org/journal/rspb

4.6 - IF

Research

Check for updates

Ecological regime shift preserved in the Anthropocene stratigraphic record

Adam Tomašových[1], Paolo G. Albano[2], Tomáš Fuksi[1], Ivo Gallmetzer[2], Alexandra Haselmair[2], Michał Kowalewski[3], Rafał Nawrot[2], Vedrana Nerlović[4], Daniele Scarponi[5] and Martin Zuschin[2]

Tomasovych et al. 2017 Geology, 2020 PRSB

Eutrophication/deoxygenation of marine ecosystems (Anthropocene)

Paleobiology & evolution

PROCEEDINGS B

rspb.royalsocietypublishing.org

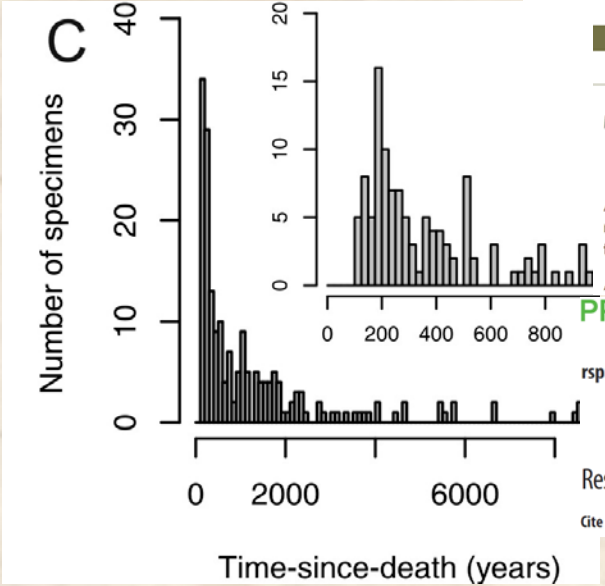
IF=4.9

Research

Nineteenth-century collapse of a benthic marine ecosystem on the open continental shelf

Adam Tomašových[1] and Susan M. Kidwell[2]

- → Radiocarbon dating of invertebrate shells on the California shelf where shells younger than 100 years old are completely missing
- → a totally unsuspected loss of filter-feeders from this shelf during the 19th century
- → Coupled with studies documenting strong thermal control on molluscan distribution



Global Ecology and Biogeography, (Global Ecol. Biogeogr.) (2016)

RESEARCH PAPER

Decoupling of latitudinal gradients in species and genus geographic range size: a signature of clade range expansion

IF=6

Adam Tomašových* and David Jablonski[2]

news & views

IF=9.6

MACROEVOLUTION

Biodiversity gradients emerge

A simulation of expansion, fragmentation and extirpation of species ranges over multiple glacial–interglacial cycles matches empirical biodiversity gradients and shows that high levels of biodiversity in the tropics can emerge from temporally variable but spatially patchy precipitation regimes, driven by allopatric speciation.

Adam Tomašových

PROCEEDINGS B

rspb.royalsocietypublishing.org

Research

Cite this article: Tomašových A *et al.* 2016

Unifying latitudinal gradients in range size and richness across marine and terrestrial systems

IF=4.8

Adam Tomašových[1], Jonathan D. Kennedy[2], Tristan J. Betzner[3], Nicole Bitler Kuehnle[3], Stewart Edie[3], Sora Kim[3], K. Supriya[4], Alexander E. White[5], Carsten Rahbek[2,6], Shan Huang[7], Trevor D. Price[4,5] and David Jablonski[3,4]

Toarcian oceanic anoxic event

GEOLOGY | THE GEOLOGICAL SOCIETY OF AMERICA®

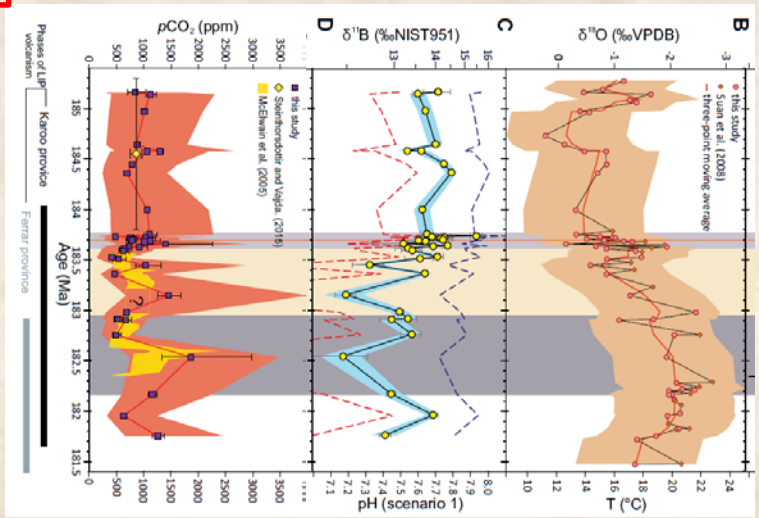
https://doi.org/10.1130/G47781.1

Manuscript received 20 April 2020
Revised manuscript received 29 June 2020
Manuscript accepted 6 July 2020

Ocean acidification during the early Toarcian extinction event: Evidence from boron isotopes in brachiopods

IF = 4.8

Tamás Müller[1,*], Hana Jurikova[2,3], Marcus Gutjahr[2], Adam Tomašových[1], Jan Schlögl[4], Volker Liebetrau[2], Luís v. Duarte[5], Rastislav Milovsky[1], Guillaume Suan[6], Emanuela Mattioli[6,7], Bernard Pittet[6] and Anton Eisenhauer[2]



→ The first record of seawater pH prior to the Early Jurassic ocean anoxic event based on boron isotopic composition (δ11B) in brachiopod shells, supporting the role of acidification in that event

Contents lists available at ScienceDirect

Chemical Geology

journal homepage: www.elsevier.com/locate/chemgeo

Strat/Sedim/ Paleobiology & evolution

Mapping intrashell variation in Mg/Ca of brachiopods to external growth lines: Mg enrichment corresponds to seasonal growth slowdown

Tamás Müller[a,b,*], Adam Tomašových[c], Matthias López Correa[d,e], Regina Mertz-Kraus[f], Tomáš Mikuš[g]

Contents lists available at ScienceDirect

Global and Planetary Change

journal homepage: www.elsevier.com/locate/gloplacha

IF = 4.5

Research article

Assessing anoxia, recovery and carbonate production setback in a hemipelagic Tethyan basin during the Toarcian Oceanic Anoxic Event (Western Carpathians)

Tamás Müller[a,b,*], Szabina Karancz[c,d], Emanuela Mattioli[e,f], Rastislav Milovský[a], József Pálfy[g,h], Jan Schlögl[i], Tomasz Segit[j], Vladimír Šimo[a], Adam Tomašových[a]

EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

Geology

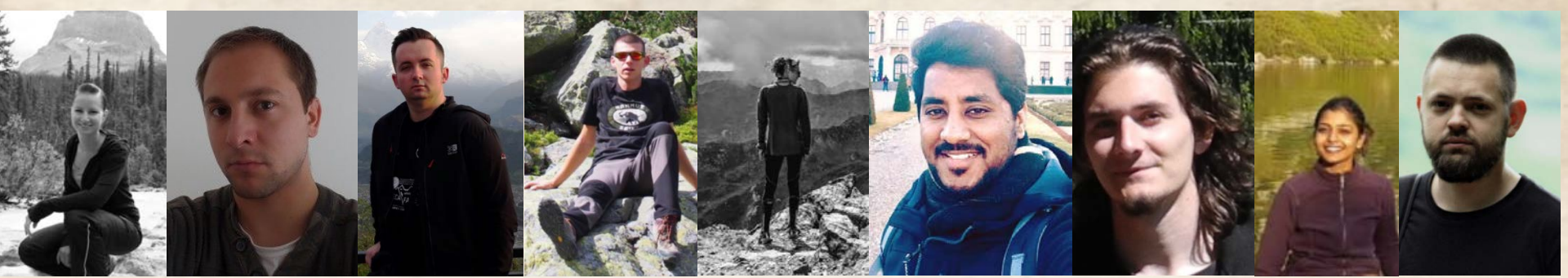
PHD STUDENTS/POSTDOCS

Geological Division **01/2016 – 12/2021**

PhD programmes and PhD students/postdocs

→ 21 PhD students (10 women and 11 men) were enrolled (including two from India, two from Hungary, one from Poland and one from Brasil)

→ Postdocs (J. Hrabovsky, Schwarz scholarship, Kurylo, internal sources)



Ten PhD students (5 men and 5 women) defended their thesis successfully (supervised by six supervisors):
Barna Peter (2016), Fuksi Tomáš (2018), Fekete Kamil (2018), Seko Michal (2019) Müller Tamás (2021) Žecová Katarína (2017), Sýkorová Martina (2016), Pulišová Zuzana (2018), Kovacs Erika (2019), Luhová (Mareková) Ľubica (2021)

Geological Division 01/2016 – 12/2021

EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

Geology

PROJECTS

- → Slovak Research and Development Agency (APVV) – PIs - 9 projects, co-PIs – 8 projects
- → Slovak Research Scientific Agency (VEGA) – PIs - 20 projects, co-PIs – 10 projects
- → International (bi-lateral) academic collaborations (MAD) – many countries
- → International Visegrad Fund (IVF) - Importance of raw materials in the economy of V4 countries

European structural funds – unsuccessful projects

- 2016 “**Energy storage in geological structures**“ – in collaboration with the Slovak oil/gas exploration company NAFTA, the call was cancelled
-
- Hydrocarbon 2016 **“Industrial research and development center for research and evaluation of the domestic raw material and energy base**“, NFP313010B740, Call: OPVaI-VA/DP/2016/1.2.1-02, 4 472 864,47€

- Hydrogen storage 2019 ”**Large-capacity energy storage in the form of hydrogen in geological structures**“, NFP313010V569, Call: OPVaI-VA/DP/2018/1.2.1-05, 5 903 989,03€

- **H2020-MSCA-ITN-2014; REA Grant Agreement No. 643084 Brachiopods As SEnsitive tracers of gLobal mariNe Environment: Insights from alkaline, alkaline Earth metal, and metalloid trace element ratios and isotope systems** – TOMAŠOVÝCH, MULLER (2015- 2018), ~185,000 EUR

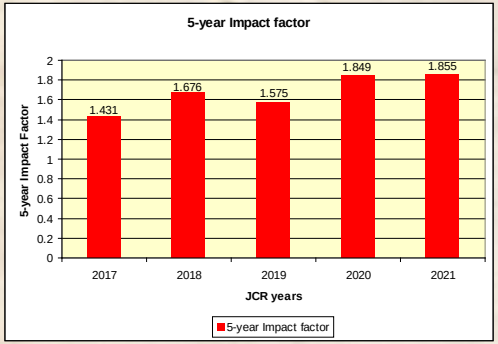
Unsuccessful COST proposals

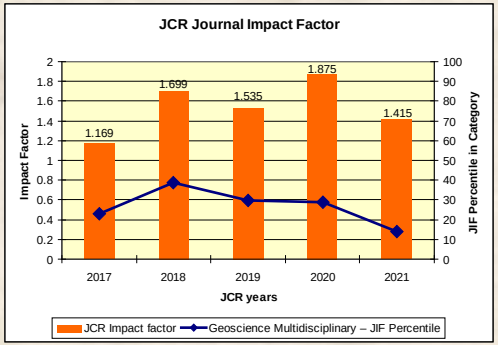
OC-2020-1-24503: European Foraminiferal Biomonitoring Initiative Proposal Acronym EUFORI
(two rejections in 2018 and 2020)
COST OC-2019-1-23948: Large foraminifera: stratigraphy, paleoecology, paleoenvironment

GEOLOGICA CARPATHICA

International peer reviewed open access geoscience journal of the Carpathian-Balkan Geological Association during the evalution period of 2016-2021

- Co-publishers: Czech Academy of Sciences, Polish Geological Institute
- Founded in 1950





Number of published articles in the evalution period: 204

The most frequent country affiliations of corresponding authors:
Czech – 10%, Polish – 9%, Austria – 7%, Hungarian – 6%, Turkey – 6%, Italian – 6%, Russia – 6%, Slovenia – 6%, and others

Selection of the most cited papers in the evaluation period


Towards better correlation of the Central Paratethys regional time scale with the standard geological time scale of the Miocene Epoch

49 citations


Late Miocene sedimentary record of the Danube Khadilkhi Basin: interregional correlation of depositional systems, stratigraphy and structural evolution

40 citations


Quaternary evolution of the Southern Apennines coastal plains: a review

36 citations


Taxonomic diversity of rockreach assemblages (Shiluvia, Insecta) of the Aptian Crato Formation (Cretaceous, NE Brazil)

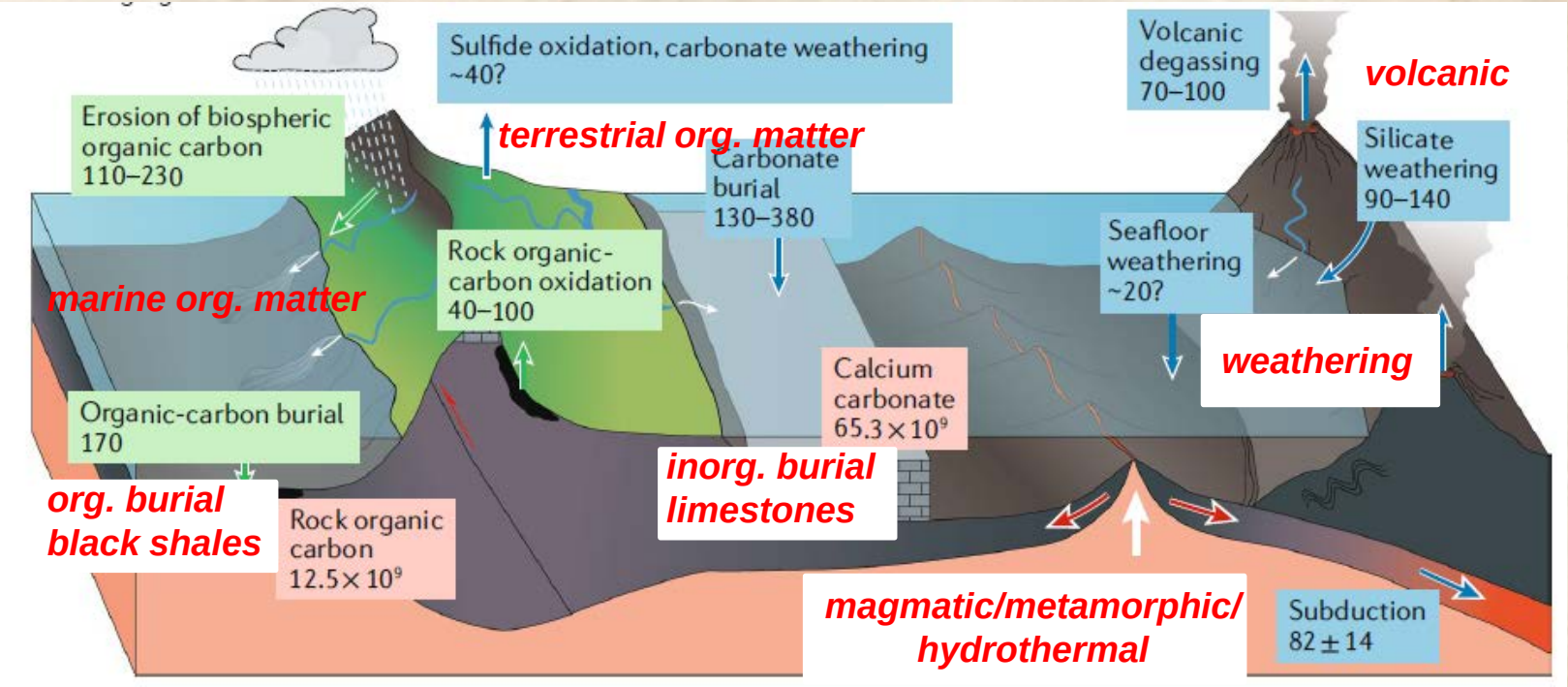
33 citations


Stratigraphy, phaleria communities, and magnetic proxies at the Jurassic-Cretaceous boundary in the Pieniny Klippen Belt (Western Carpathians, Slovakia)

25 citations


Accessory minerals and evolution of tin-bearing S-type granites in the western segment of the Cameric Unit (Western Carpathians)

18 citations



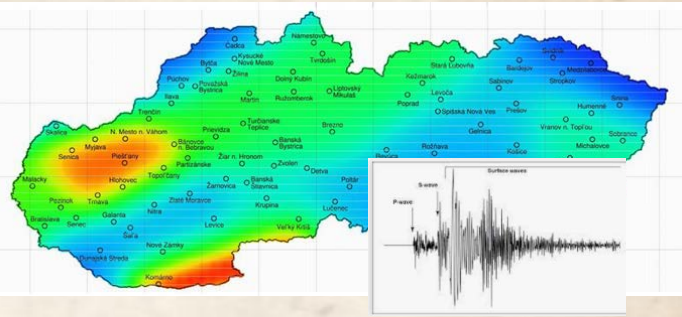
Hilton and West 2022 – long-term carbon cycle

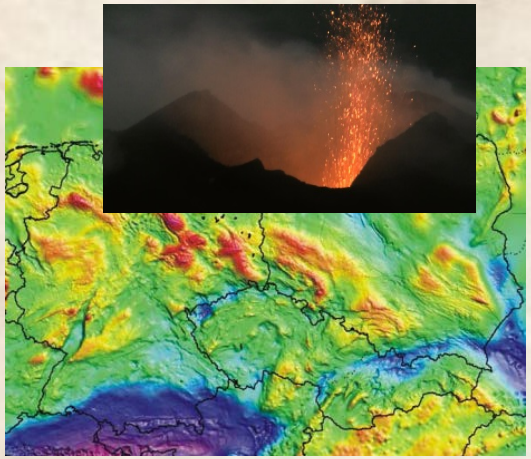
Geophysics Division
01.2016 – 12.2021

SIGNIFICANT OUTPUTS AND TOP ACHIEVEMENTS

FOCUS Geophysics Division

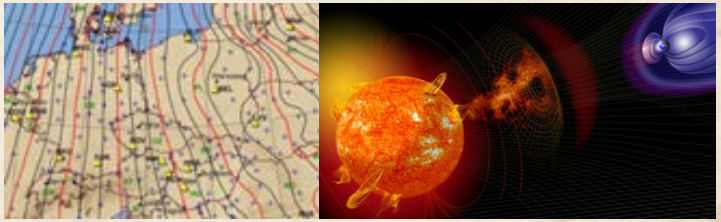
Seismology:
monitoring, seismic hazard assessment,
seismic waves propagation
(supervisors:
Moczo, Kristek, Csicsay)

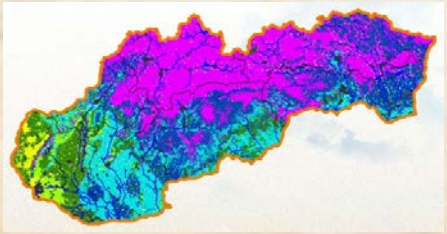




Gravimetry and geodynamics:
integrated structural geophysical modelling (crust and lithosphere)
methodology (data processing and inversion), volcano gravimetry
(supervisors: Vajda, Bielik, Vozár, Zahorec, Bezák)

Geomagnetism:
EM methods, geomagnetic field variations, monitoring,
space weather (supervisors: Vozár, Valach, Revallo)





Physics of the atmosphere:
(bio)climate changes and extreme weather
phenomena
(supervisors: Nejedlík, Onderka)

TOP RESULTS (PUBLICATIONS)

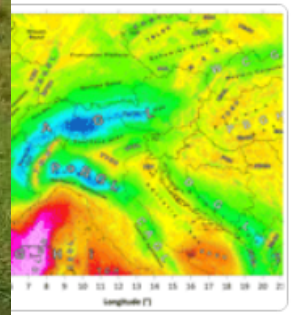
DATA PROCESSING AND METHODOLOGY IN GRAVIMETRY

Zahorec P. et al. (2021)

33

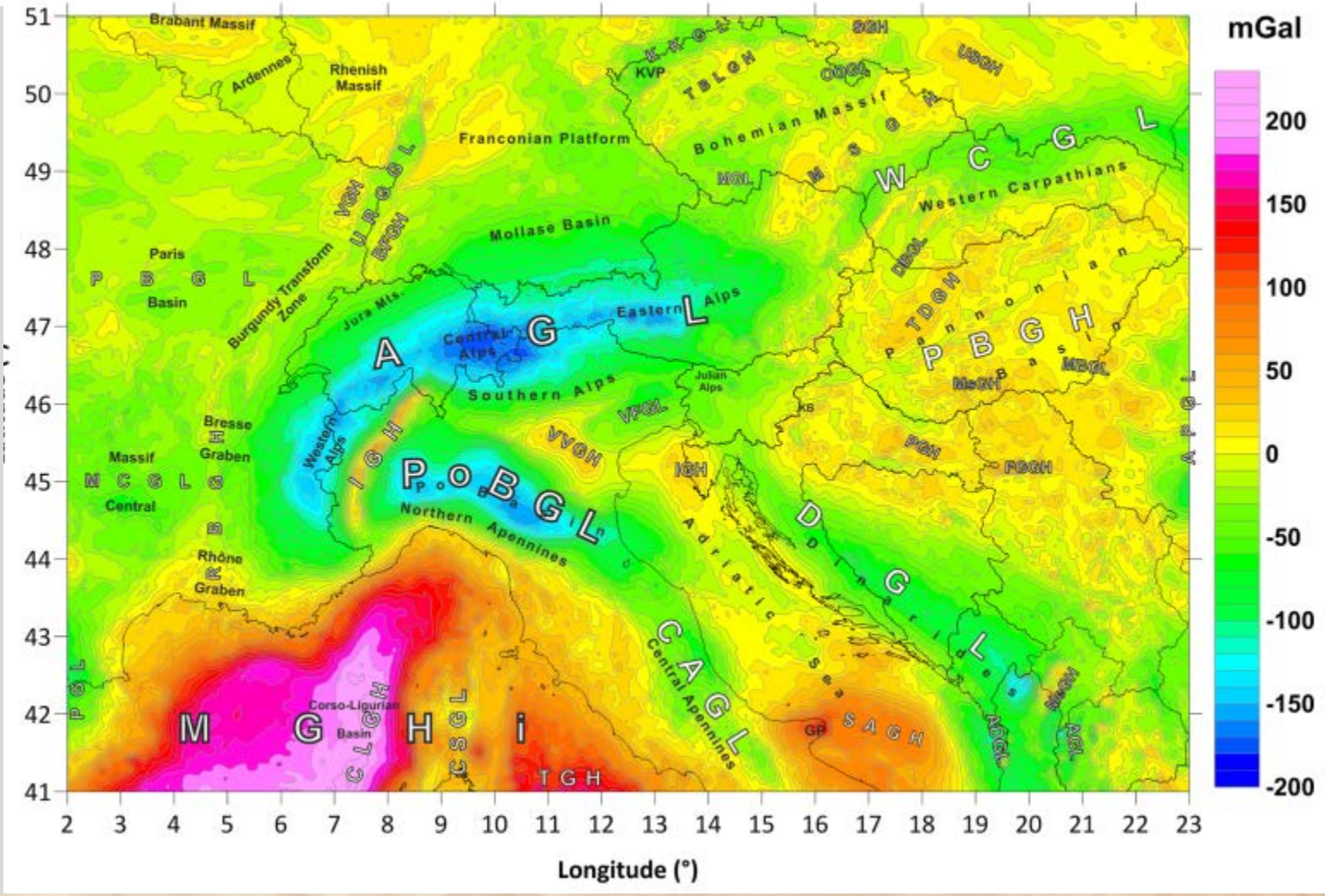
Earth System Science Data

The first pan-Alpine surface-gravit database, a modern compilation t crosses frontiers



Pavol Zahorec[1], Juraj Papčo[2], Roman Pašteka[2], Miroslav Bielik[1,3], Sylvain Bonvalot[4], Carla Braitenberg[6], Jörg Ebbing[7], Gerald Gabriel[8,9], Andrej Gosar[10,11], Adam Grand[4], Hans-Jürgen Götze[7], György Hetényi[12], Nils Holzrichter[7], Edi Kissling[13], Urs Marti[14], Bruno Meurers[15], Jan Mrlina[16], Ema Nogová[1,3], Alberto Pastorutti[6], Corinne Salaun[17], Matteo Scarponi[12], Josef Sebera[7], Lucia Seoane[4,5], Peter Skiba[8], Eszter Szűcs[18], and Matej Varga[19]

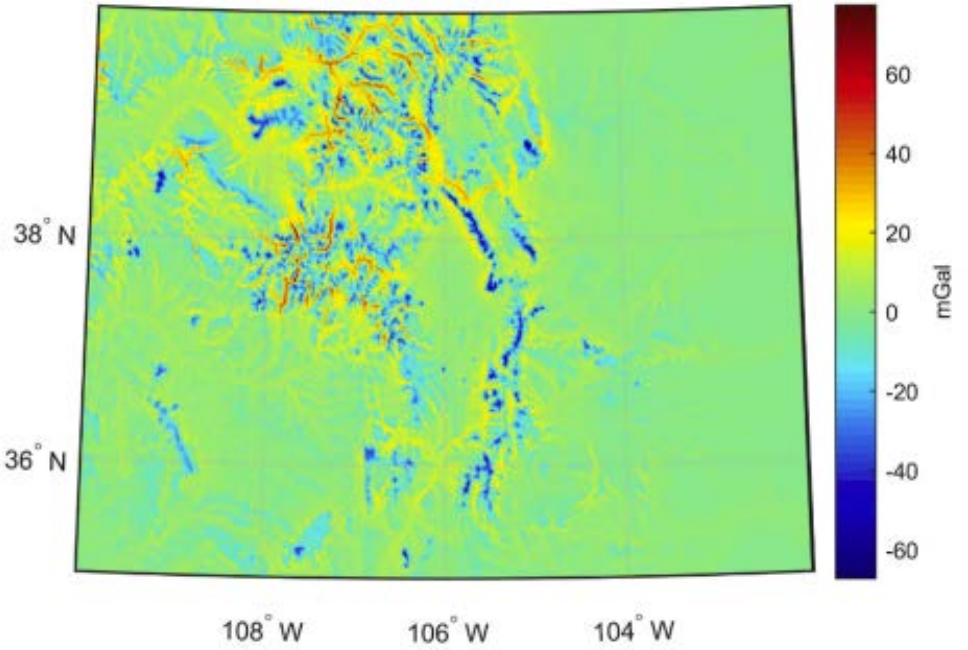
new pan-Alpine Bouguer gravity anomaly map and grid



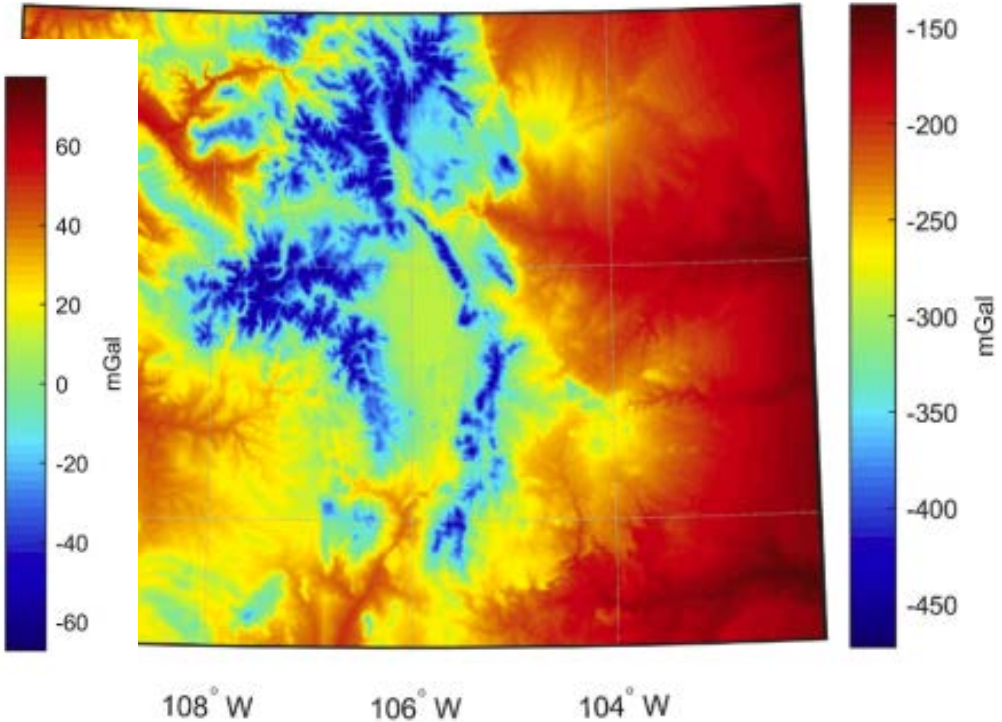
TOPOGRAPHIC CORRECTIONS (METHODOLOGY)

GEOPHYSICS, GEODESY GEODYNAMICS

Peter Vajda [a,*], Ismael Foroughi [b], Petr Vaníček
Michael Sheng [b], Mehdi Goli [c]

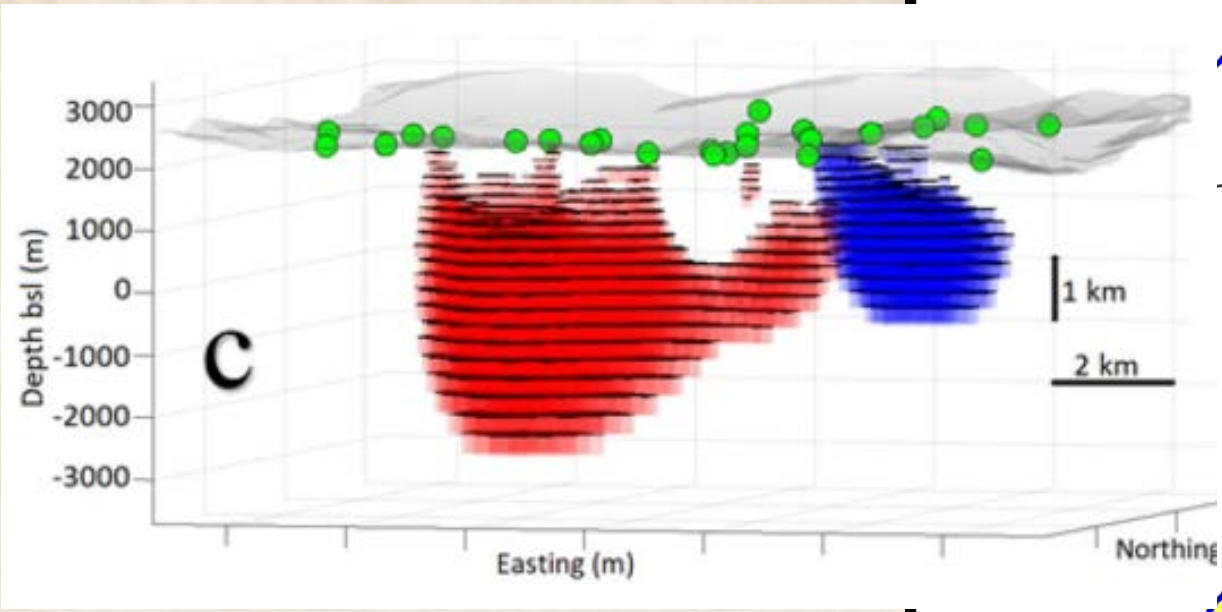


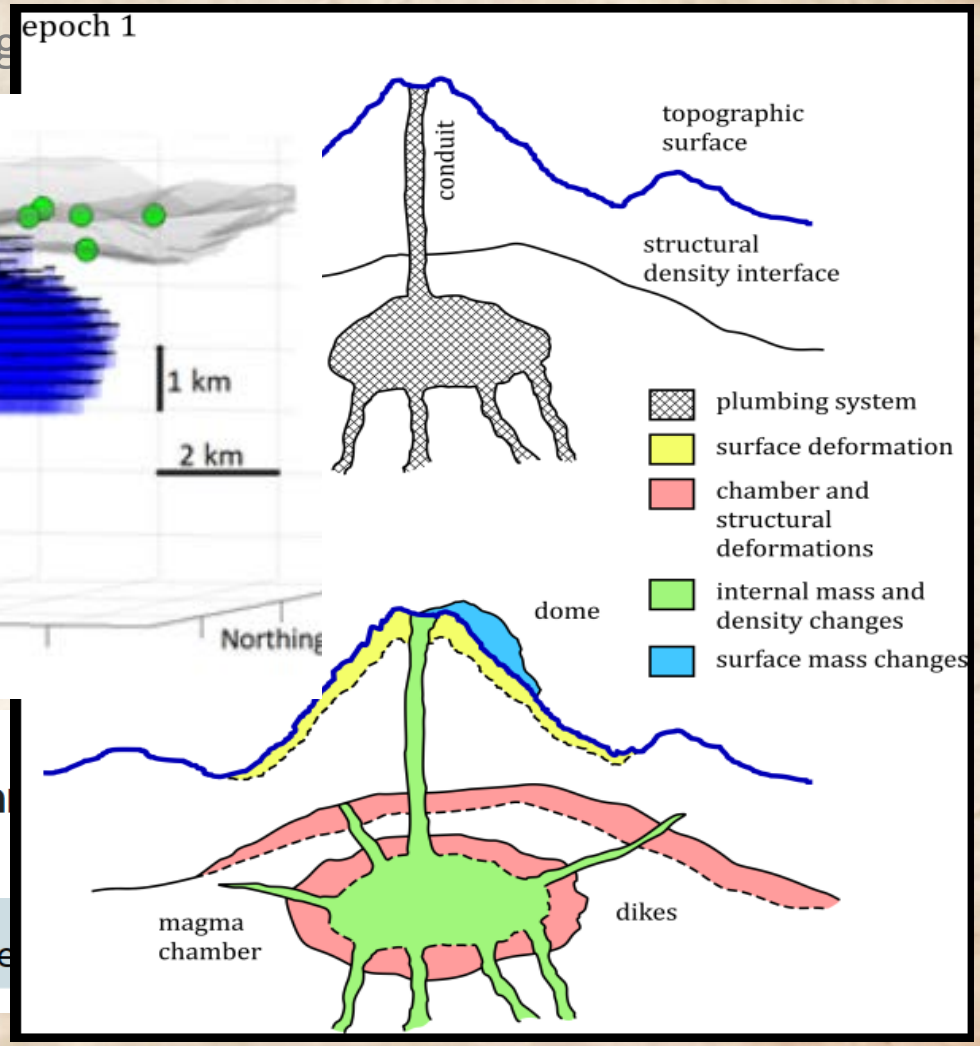
DTE of Helmert space (b)



DTE of NT space (a)

Geophysics Division (gravimetry and g





A free-geometry geodynamic modelling gravity changes using Growth-dg softwa

Antonio G. Camacho, Peter Vajda, Craig A. Miller & José Fernández

www.nature.com/scientificre

accurate DITE (compilation of residual gravity changes) – APPLICATIONS

Contents lists available at ScienceDirect

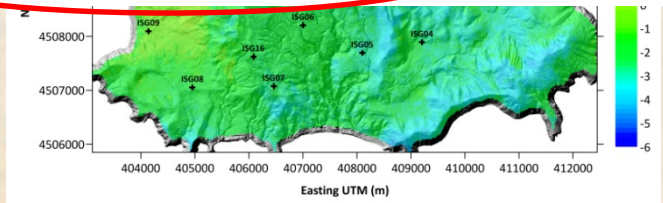
Journal of Volcanology and Geothermal Research

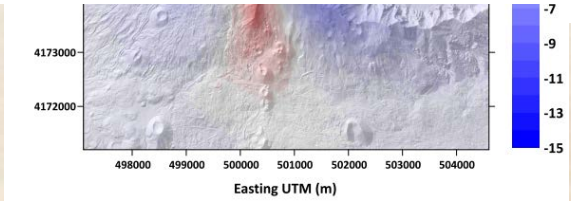
journal homepage: www.elsevier.com/locate/jvolgeores

Invited Research Article

Novel treatment of the deformation–induced topographic effect for interpretation of spatiotemporal gravity changes: Laguna del Maule (Chile)

Peter Vajda [a,*], Pavol Zahorec [a], Craig A. Miller [b], Hélène Le Mével [c], Juraj Papčo [d], Antonio G. Camacho [e]

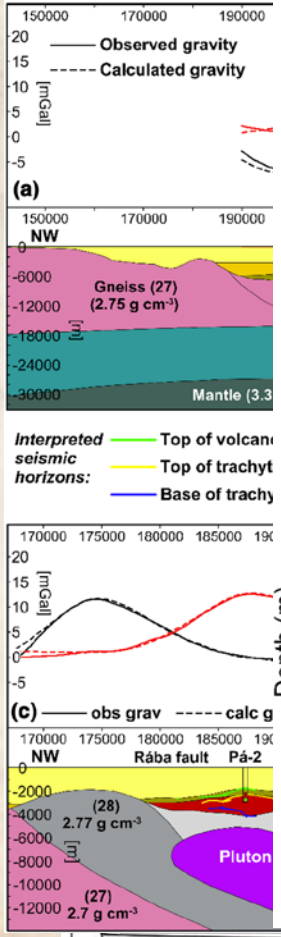




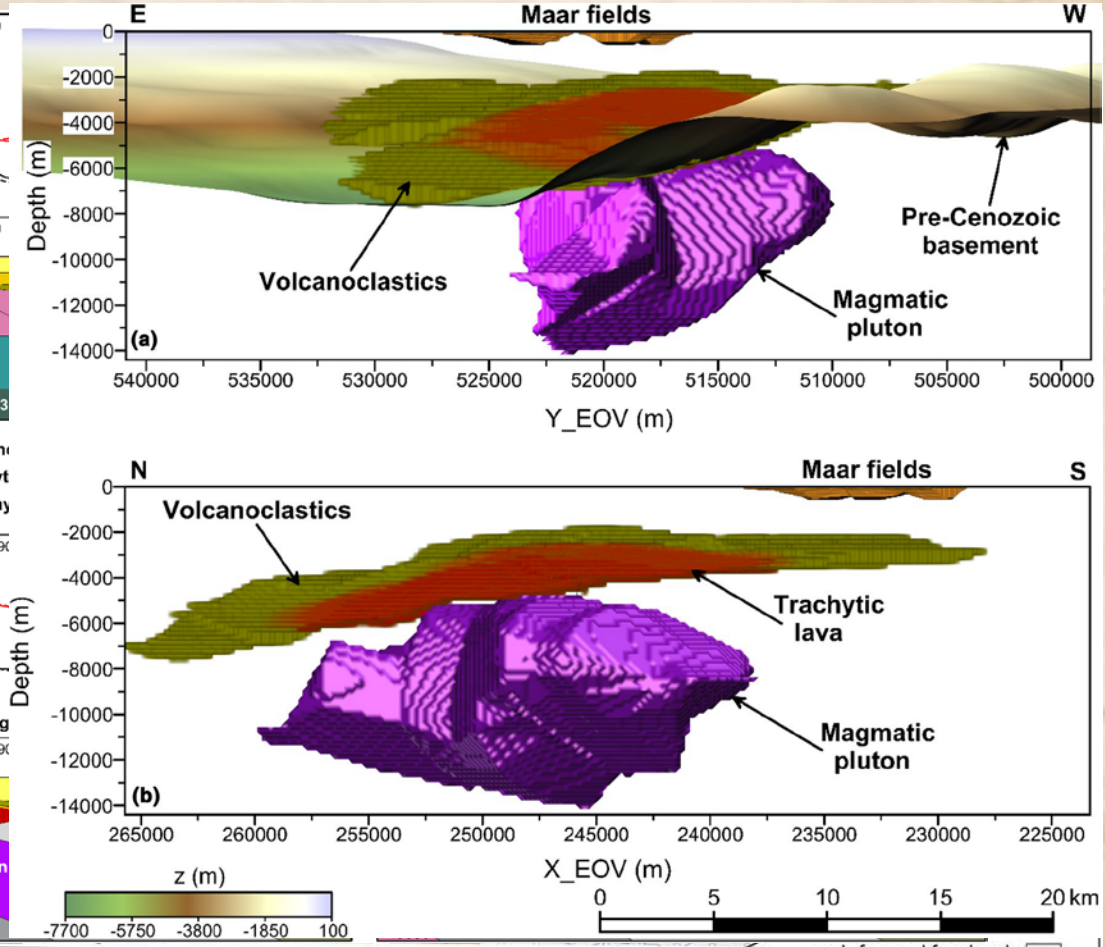
Integrated geophysical modeling (crustal structure)

2018

Pánisová, J., Bielik M., Horváth, F., Harangi, S., Schmidt, S., Götze, H.J.**, 2018: Intraplate volcanism in the Danube Basin of NW Hungary: 3D geophysical modelling of the Late Miocene Pásztori volcano. International Journal of Earth Sciences, 2018, 107, 5, 1713–1730.**



BURIED PASZTORI VOLCANO (Danube Basin)



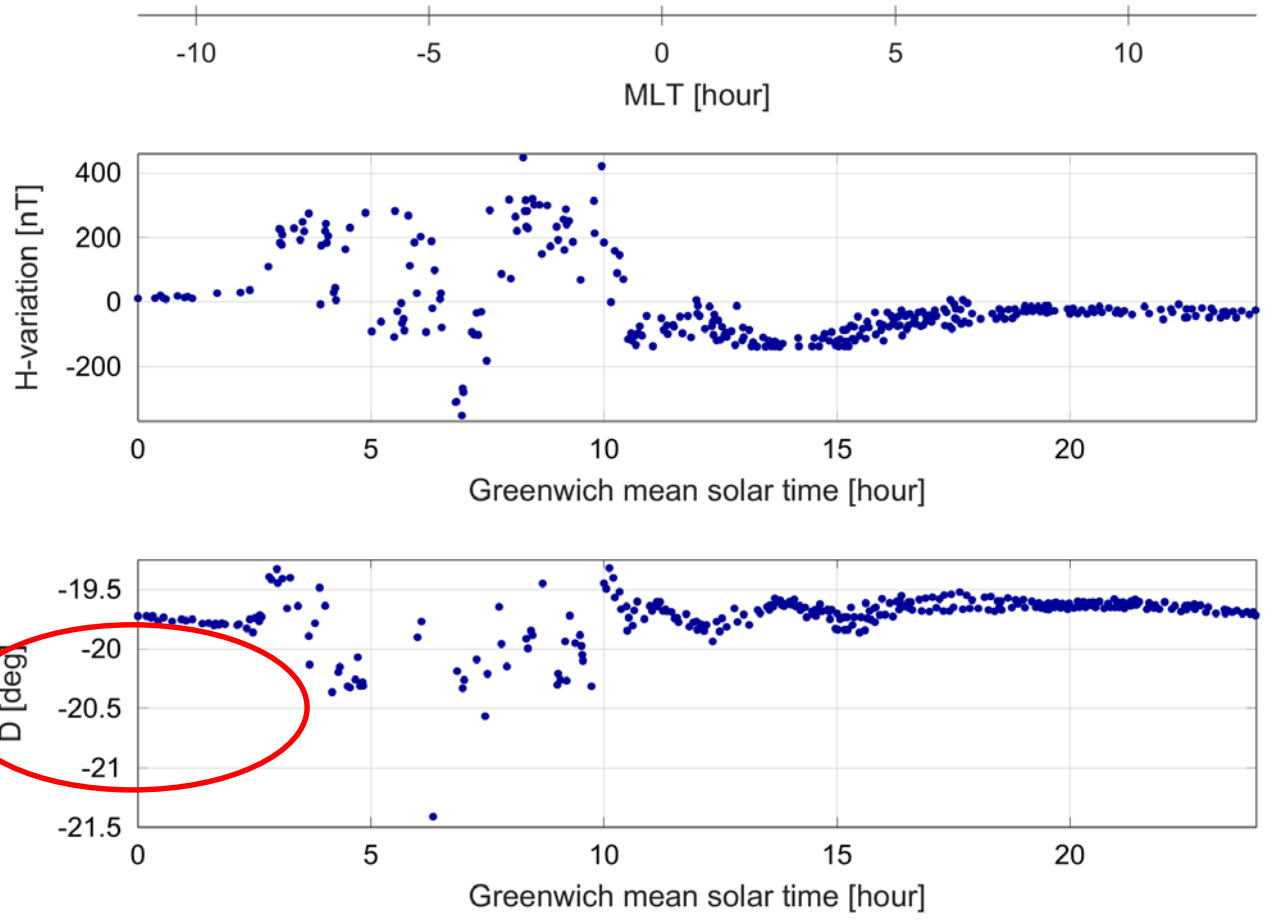
J. Space Weather Space Clim. 2019, 9, A11
© F. Valach et al., Published by EDP Scien
https://doi.org/10.1051/swsc/2019008

Agora – Historical space w

Possible role of auro magnetic storms rec Clementinum and Gr

Fridrich Valach[1,*], Pavel Hejda[2],

[1] Geomagnetic Observatory, Earth Science
[2] Institute of Geophysics, Academy of Scie
[3] Earth Science Institute, Slovak Academy



Research in Climate Change Adaptation and Mitigation:

IF = 3.645, Q1

Journal of Hydrology: Regional Studies 32 (2020) 100747

Contents lists available at ScienceDirect

Journal of Hydrology: Regional Studies

journal homepage: www.elsevier.com/locate/ejrh

On how rainfall characteristics affect the sizing of rain barrels in Slovakia

Milan Onderka [a,b,*], Jozef Pecho [b,c], Pavol Nejedlík [a]

[a] Earth Science Institute of the Slovak Academy of Sciences, Dúbravská cesta 9, Bratislava, SK-840 05, Slovakia
[b] Slovak Hydrometeorological Institute, Jeséniova 17, Bratislava, SK-83315, Slovakia
[c] Comenius University, Faculty of Mathematics, Physics, and Informatics, Mlynská dolina F1, Bratislava, SK-842 48, Slovakia

ARTICLE INFO

Keywords:
Rainwater harvesting
Rain barrels
Design values
Inter-event time
Analytical probabilistic model

ABSTRACT

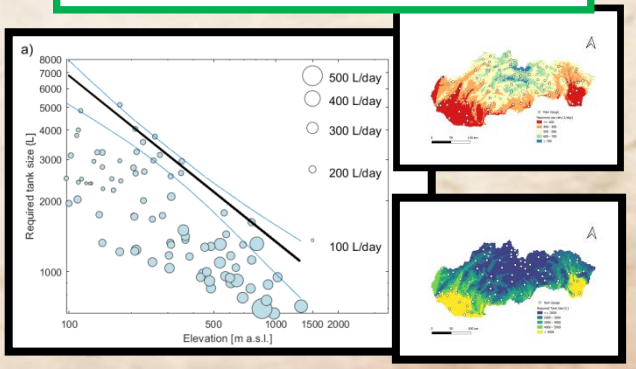
Study region: The study area (Slovakia) is to a great extent a part of the Carpathian mountainous system, where lowlands dominate the southwest and southeast of the region and are part of the Pannonian basin.
Study focus: Rainwater harvesting can reduce vulnerability of urban areas to climate change by storing water for rainless periods and by reducing surface runoff. The efficiency and reliability of water harvesting systems depends on the local climate. Analysing rainfall characteristics is therefore essential for a proper sizing of any rainwater collecting project. A total of 84 rainfall records from climatologically distinct regions of Slovakia were separated into statistically inde-

PROCESSING ATMOSPHERIC PRECIPITATION

ANALYTICAL HYDROMETEOROLOGICAL MODELLING

SPATIO-TEMPORAL ANALYSES

DESIGN VALUES FOR BLUE-GREEN INFRASTRUCTURE IN SLOVAKIA



Atmospheric Research: Milan Onderka

IF = 5.369, Q1

Atmospheric Research 259 (2021) 105671

Contents lists available at ScienceDirect

Atmospheric Research

journal homepage: www.elsevier.com/locate/atmosres

Sensitivity of selected summertime rainfall characteristics to pre-event atmospheric and near-surface conditions

Milan Onderka [a,b,*], Jozef Pecho [b,c]

[a] Earth Science Institute of the Slovak Academy of Sciences, Dúbravská cesta 9, Bratislava SK–840 05, Slovakia
[b] Slovak Hydrometeorological Institute, Jeséniova 17, Bratislava SK–833 15, Slovakia
[c] Department of Astronomy, Physics of the Earth and Meteorology, Faculty of Mathematics, Physics and Informatics, Comenius University, Mlynská dolina F1, Bratislava SK–842 48, Slovakia

ARTICLE INFO

Keywords:
Atmospheric stability
Rainfall
Soil erosion
Dew point temperature
Wind shear

ABSTRACT

Predicting the erosive potential of rain events and the overall risk of soil erosion (and other hydrologic phenomena triggered by or related to extreme rainfall) requires understanding of the background meteorology that affects rainfall characteristics. The sensitivity of total rainfall kinetic energy, 15-min peak intensities, and event total depth were evaluated with respect to pre-event atmospheric conditions in the northern part of the Pannonian Plain. Five static stability parameters: the Convective Available Potential Energy (CAPE), Convective Inhibition (CIN), Total Totals index (TT), K-index, and the composite CAPE-shear parameter were used as proxies describing the atmospheric static stability and the effect of wind shear on the development of convective precipitation. In addition to these stability parameters, near-surface air temperature and dew point temperature at 2-m above the ground were used as additional covariates in bivariate quantile regression. The primary objective of this paper was to determine the sensitivity of the rainfall characteristics to changes in the analyzed covariates and their ability to explain changes in the distribution of the considered rainfall characteristics. The analyses revealed a strong responsiveness of rainfall kinetic energy and 15-min peak rainfall intensities to dew point temperature with incremental changes following the super-CC (7–14%K^{-1}) scaling regime when near-surface dew point temperature exceeds ~288 K. The findings have important implications for forecasting the erosive

ERA5-LAND [Re-analysis]

Pre-event condictions

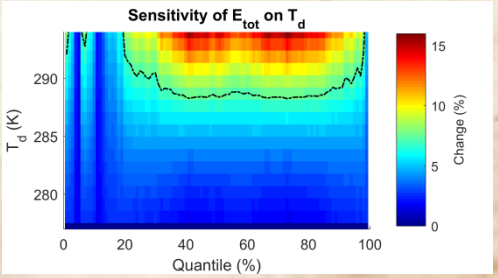
Convective available energy (CAPE)

Convective inhibition (CIN)

Total water content of the air column

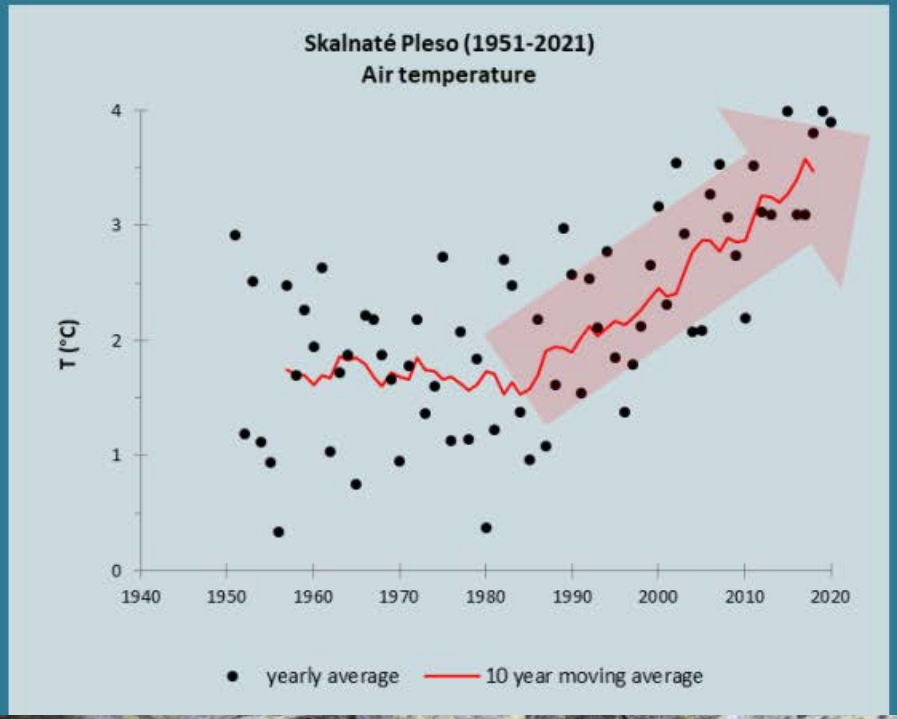
Near-surface dewpoint temperature

RAIN CHARACTERISTICS
[total kinetic energy, peak Intensities]



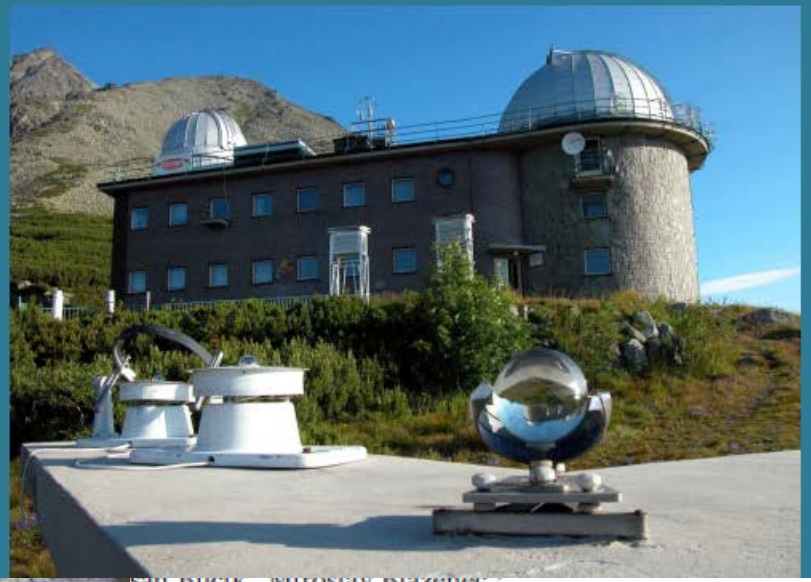
Alpine Atmosphere—Biosphere—Hydrosphere interactions

CLIMATE WARMING



1.7 °C • average annual air temperature for normal period **1961-1990**

2.8 °C • average annual air temperature for normal period **1991-2020**



NEW METHODOLOGY & DATA PROCESSING with APPLICATION

JOURNAL ARTICLE

The Finite-interval Spectral Power method for detecting underground cavities using seismic ambient noise

Get access

Miriam Kristekova, Jozef Kristek, Peter Moczo, Peter Labak

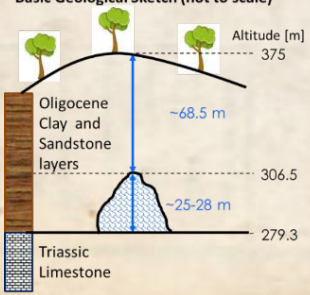
Volume 224, Issue 2
February 2021

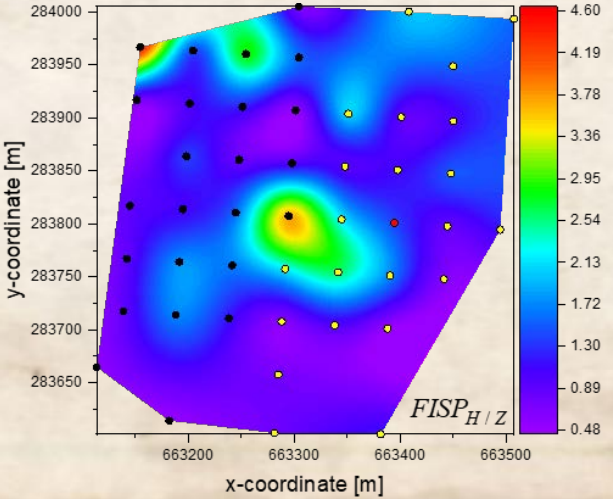
Detection of underground cavities based on FISP method

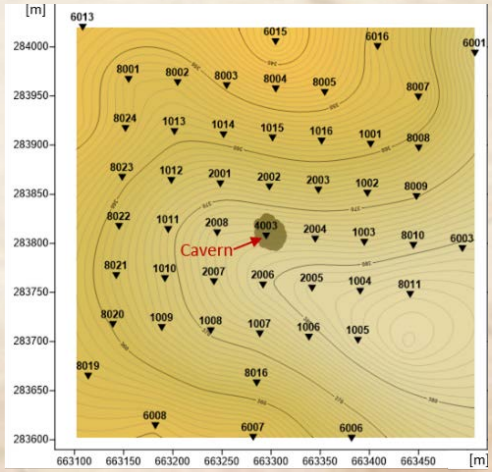
The Great Cavern
Felsőpetény, Hungary

Diameter: 20-30 m
Height: 25-28 m
Depth from surface
Top: 68 m
Bottom: 93-96 m

Basic Geological Sketch (not to scale)







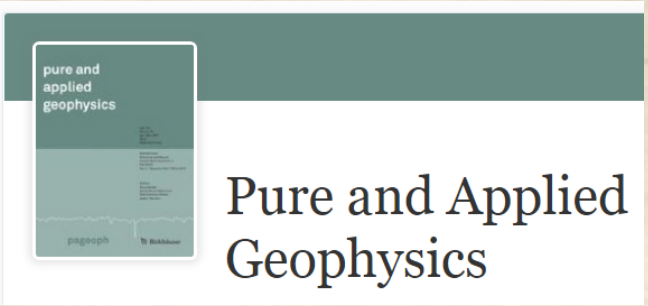
APPLICATION OF NEW METHODOLOGY & DATA PROCESSING

Open Access | Published: 09 February 2018

Tectonic stress regime in the 2003–2004 and 2012–2015 earthquake swarms in the Ubaye Valley, French Alps

Lucia Fojtíková

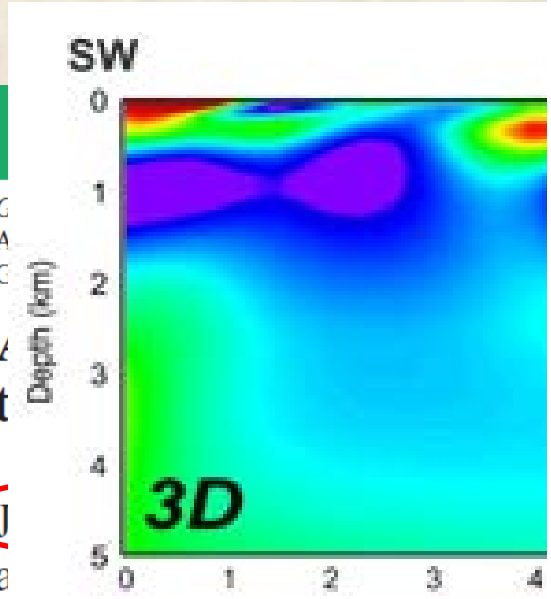
Pure and Applied G

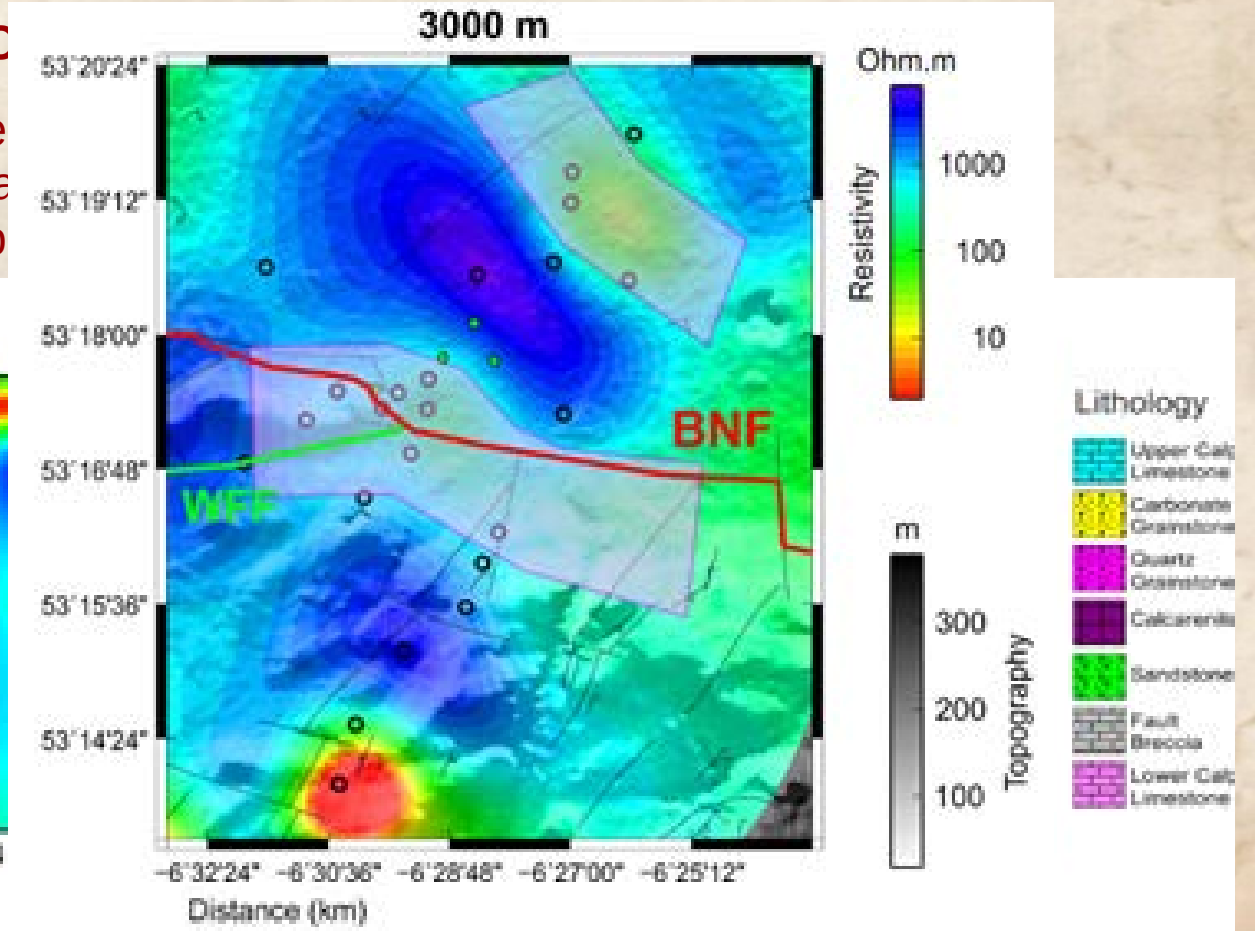


Iterative joint inversion for stress and fault orientation to determine tectonic stress regime and faults activation (application to Ubaye valley, French Alps)

ADVANCES IN ELECTRO

- Understanding of geothe
  (compilation of electroma
- New methodological app



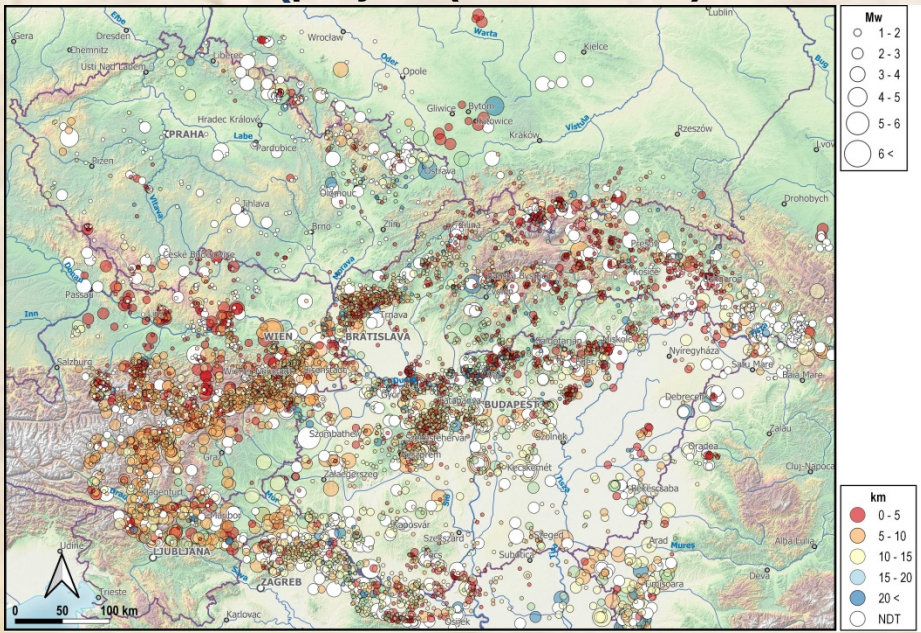


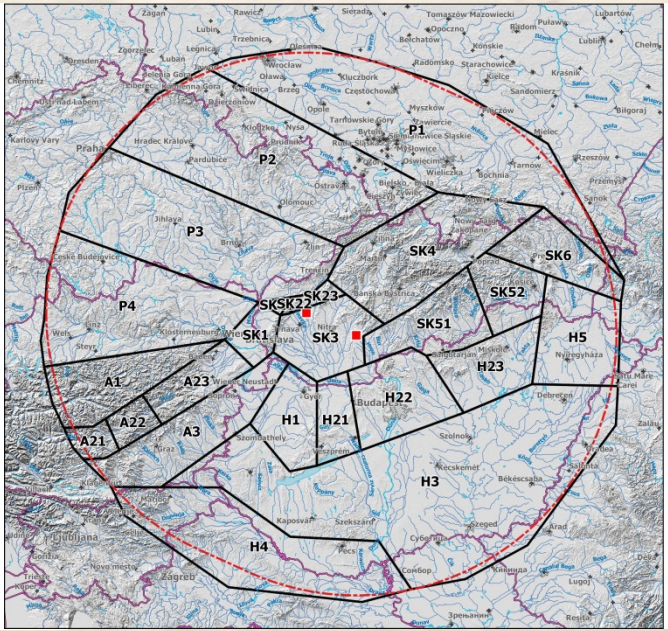
KEY NATIONAL SERVICES FOR CRITICAL INFRASTRUCTURE

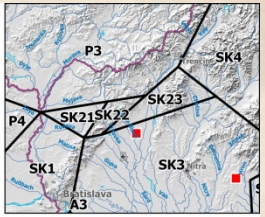
Contracts and research projects with industrial and other commercial partners

Computational determination of seismic hazard to critical infrastructure sites: Two nuclear power plants: Jaslovské Bohunice and Mochovce

(project (2020—2021) for Nuclear Regulatory Authority of the SR)







EQS

Monitoring precipitation by BTS signal

A unique method using 1 GHz signal frequency, not based on signal attenuation

INTERNATIONAL PROJECTS AND COOPERATION

CTBTO

Comprehensive Nuclear-Test-Ban Treaty Organization

CTBTO
PREPARATORY COMMISSION

Long term cooperation with CTBTO

- 3 seismologists (Kristek, Kristekova, Moczo) are members of the group of experts for resonance seismology at international organization CTBTO (Comprehensive Nuclear-Test-Ban Treaty Organization).

  Cooperation in field of numerical simulations and analysis of seismic wavefield in the media altered by underground nuclear explosions ➡ development of non-invasive FISP method for the identification of underground cavities using seismic ambient noise published in GJI(2021).

  Another real data set (from the profile in vicinity of the former underground nuclear test site in Nevada, USA) was recently analyzed for CTBTO using our FISP method during autumn 2021 and we were again able to identify the corresponding anomaly in the FISP values. (53pp. Report to CTBTO, 2022)

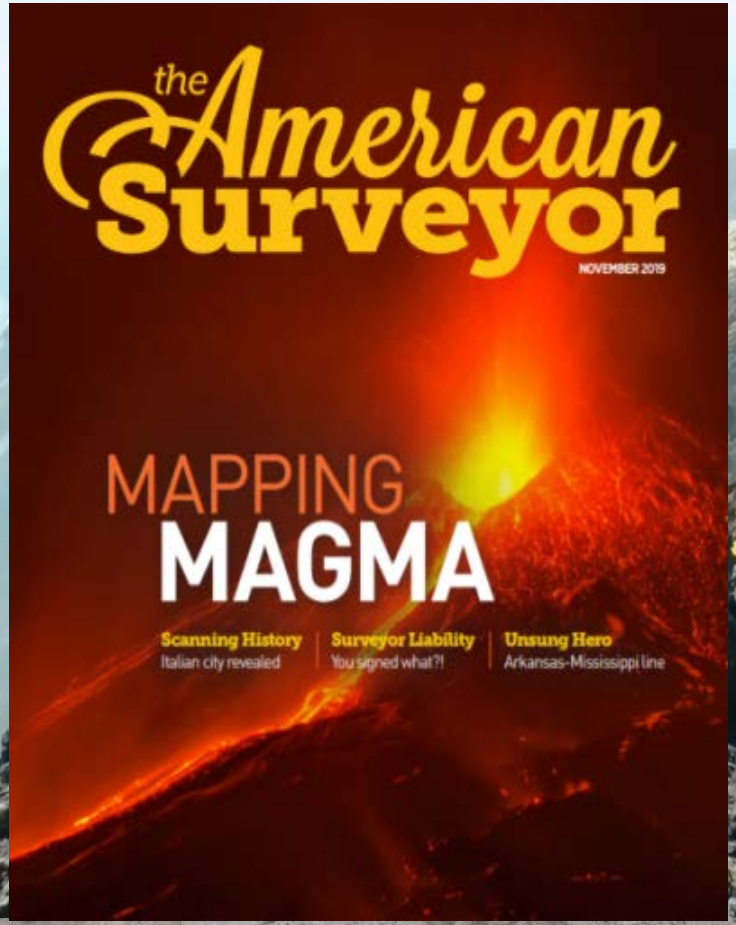
- another seismologist (Kysel) is a trained inspector of OSI (On site inspection) team of CTBTO

FIELD WORK EXPEDITION TENERIFE 2016

- cooperation with IGN Puerto de La Cruz, Tenerife, Canary Islands, Spain

FIELD WORK EXPEDITION ETNA 2018

- cooperation with Osservatorio Etneo INGV Catania, Sicily, Italy


the American Surveyor
NOVEMBER 2019
MAPPING MAGMA
Scanning History
Italian city revealed
Surveyor Liability
You signed what?!
Unsung Hero
Arkansas-Mississippi line


CASE STUDY | JANUARY 2019
Tracking Mount Etna's Magma
Precise GNSS helps researchers understand the behavior of active volcanoes.
Trimble positioning services provide accurate location data in challenging and remote locations.
Solution
Trimble CenterPoint® RTX Correction Service
Trimble R10 GNSS Receiver
Trimble Business Center Software
TRANSFORMING THE WAY THE WORLD WORKS
Trimble

ALP ARRAY

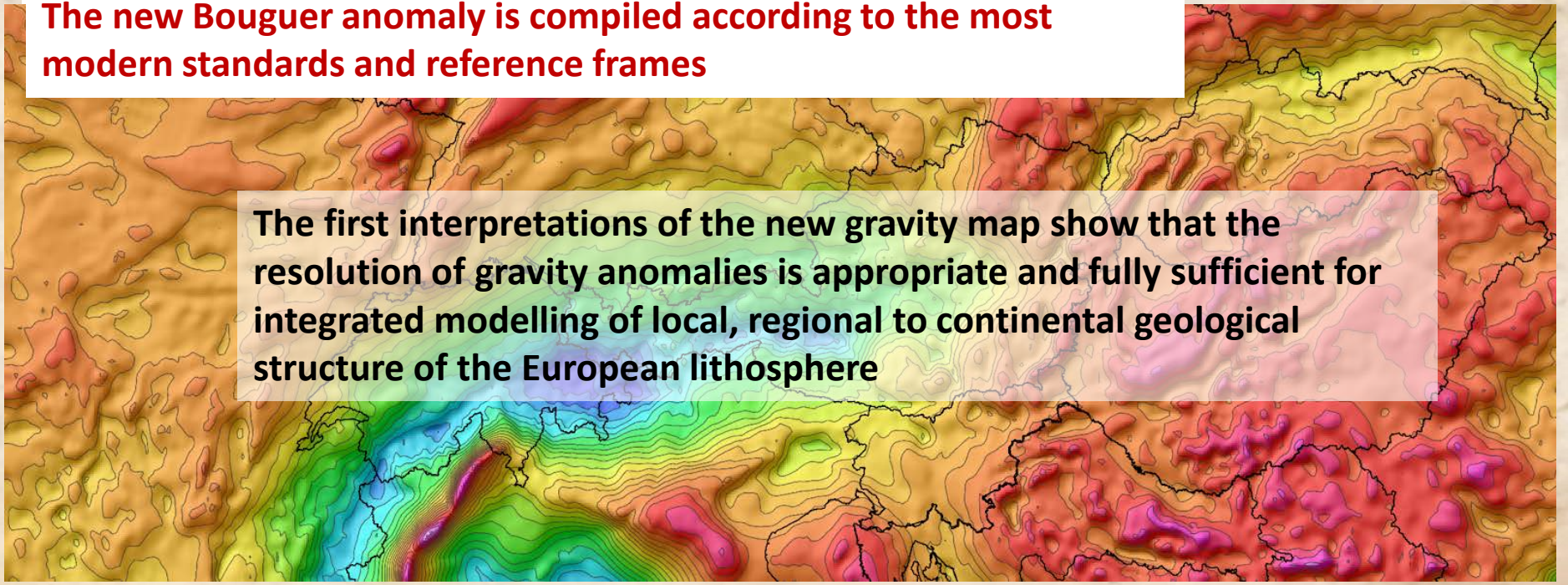
Gravity research group

AAGRG

AlpArray

The European initiative, launched in 2015, aims to improve our understanding of the geological development of the Alps and the seismic risk in the Alps-Apennines-Carpathians-Dinarides mountain system

AlpArray Gravity Research Group (AAGRG) was established to compile a homogeneous gravity data set in the wider Alpine region. The new Bouguer anomaly is compiled according to the most modern standards and reference frames

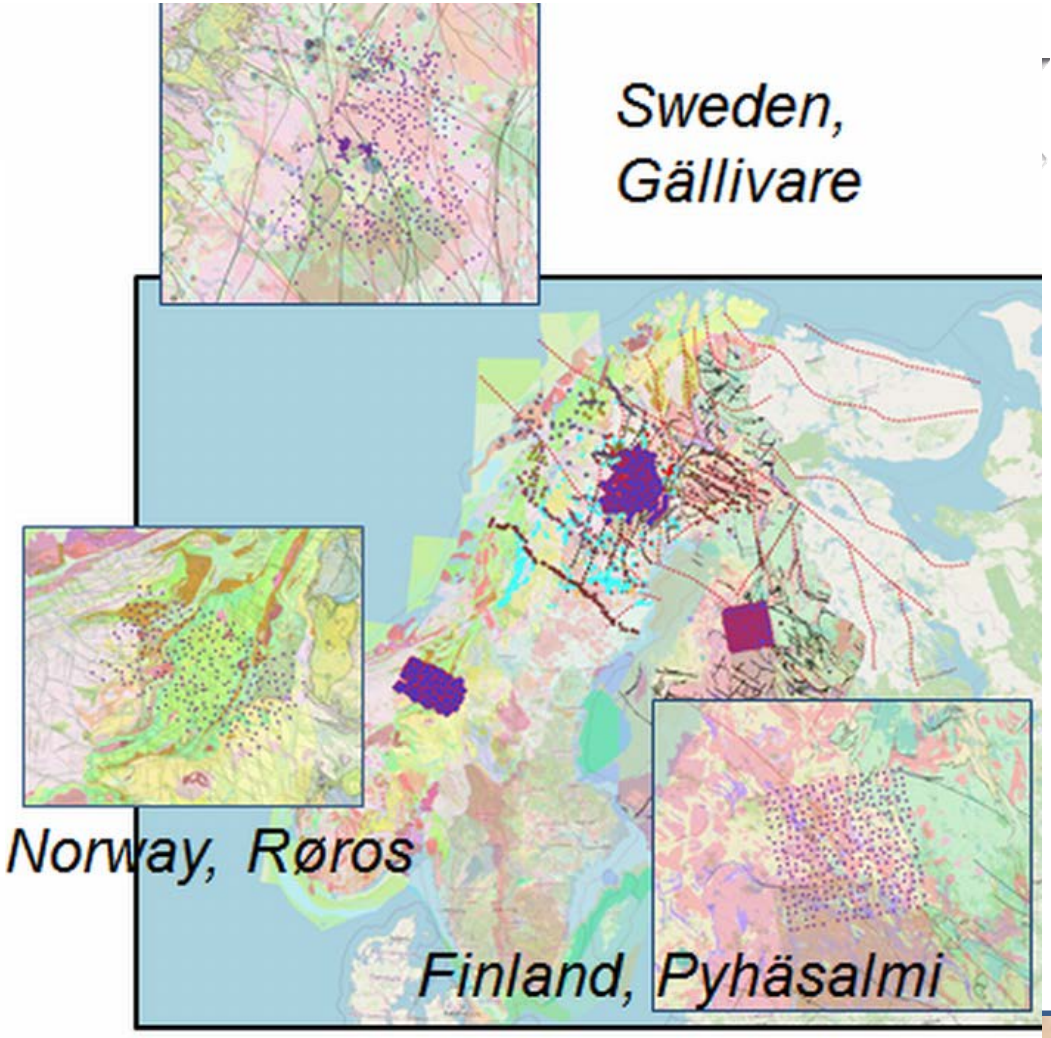


The first interpretations of the new gravity map show that the resolution of gravity anomalies is appropriate and fully sufficient for integrated modelling of local, regional to continental geological structure of the European lithosphere

ERA.net (H2020)
ERA-MIN-2
D-Rex

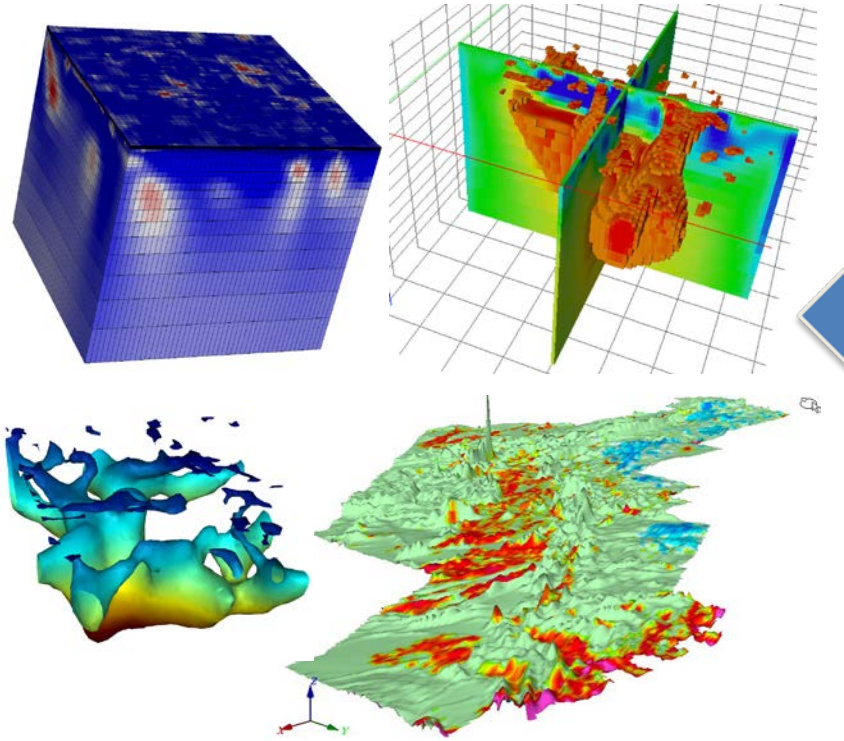
2.4 mil €

D-Rex
regional
magnetotelluric
measurements

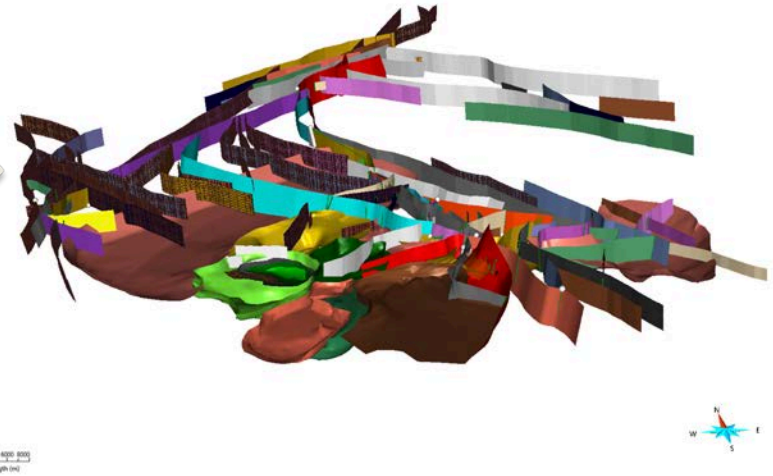


Co-funded by the Horizon 2020
programme of the European Union

Building Unified Earth model at regional and deposit scales



Geophysical models



Initial geological model

R-REX

EUROVOLC
(H2020)
TRANS NATIONAL ACCESS PROJECT
G-ET-SUMMIT

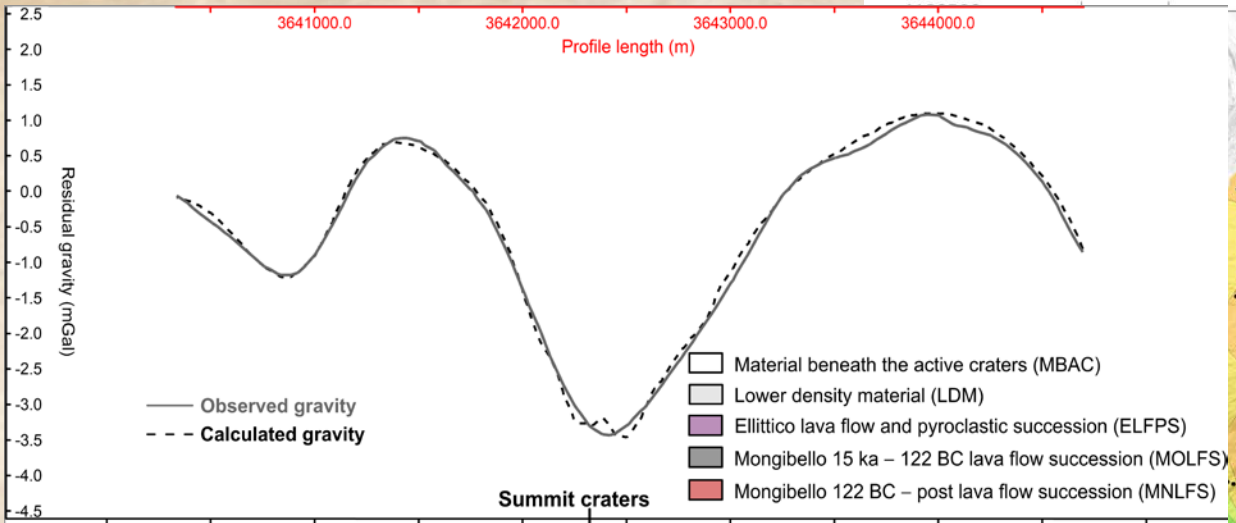
EUROVOLC
European Network of Observatories and Research Infrastructures for Volcanology

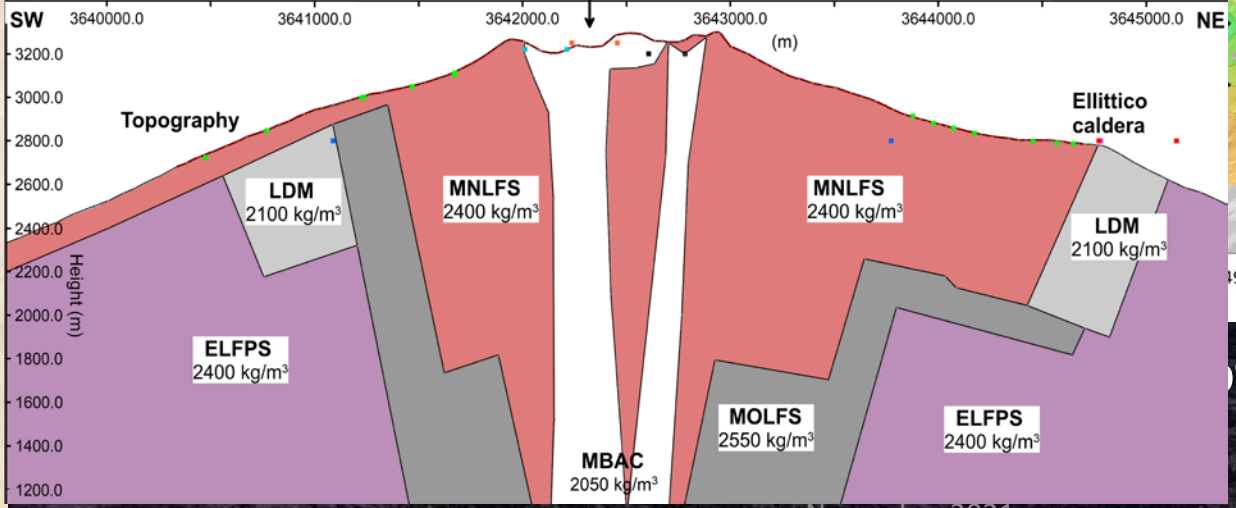
EUROVOLC

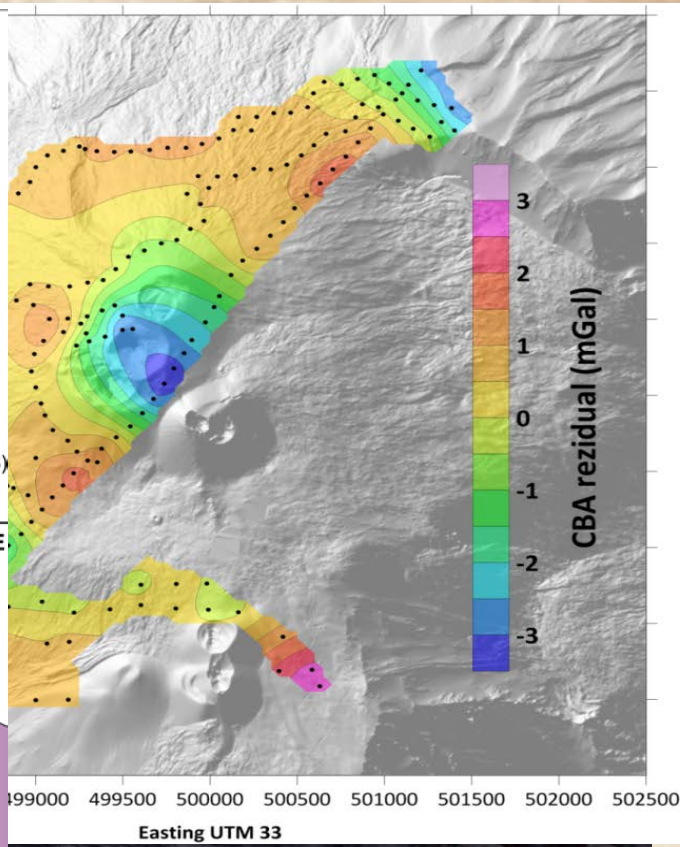
2020—2021 **Transnational Access Project** financed from H2020

Gravimetric investigation of the structure of the Etna summit craters system

EUROVOLC final meeting, Reykjavík 16th -18th of November 2021







f Etna

November 2021

COST

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

COST Actions

2 actions running **2 actions finished**

CA20108 - FAIR NEtwork of micrometeorological measurements (FAIRNESS)

ESI SAS **grant holder**, running

CA20136 - Opportunistic precipitation sensing network (OPENSENSE)

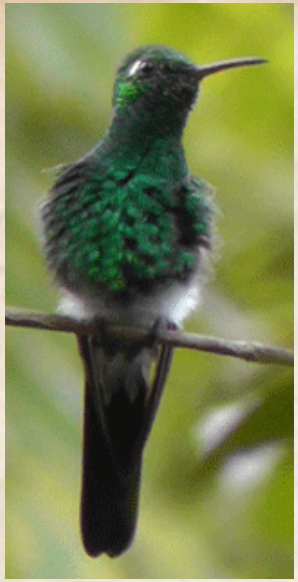
ESI SAS participant, running

ES1404 - A European network for a harmonised monitoring of snow for the benefit of climate change scenarios, hydrology and numerical weather prediction

ESI SAS participant, finished

ES1106 - Assessment of EUROpean AGRIculture WATer use and trade under climate change (EURO-AGRIWAT)

ESI SAS grant **holder,** finished



CoLiBrI –
Continental Lithosphere: a Broadscale Investigation

International Lithosphere Program (ILP)
2021-2025

György HETÉNYI	Helena ŽLEBČÍKOVÁ	Miroslav BIELIK	Juan Carlos AFONSO
University Lausanne	*Czech Academy of Sciences*	*Slovak Academy of Sciences*	*Macquarie University*
Switzerland	*Czech Republic*	*Slovak Republic*	*Australia*

20 000 € (EU)

Objectives

1. Matching structure and physical properties across disciplines
2. Lithospheric discontinuities
3. Orogenic continental lithosphere

APPLYING FOR EU PROJECTS

application (2019, coordinator): HORIZON 2020 19 institutions 15 countries

Call: H2020-SFS-2018-2020 (Sustainable Food Security) **Topic: SFS-23-2019 Type of action: RIA Proposal number: SEP-210574150 Proposal acronym: MITAGRI**
MULTI-SCALING INNOVATIVE TOOLS FOR INTEGRATED WATER MANAGEMENT IN AGRICULTURE TOWARDS SUSTAINABILITY AND CLIMATE CHANGE ADAPTATION
Budget: 6 980 000

Horizon 2020 Call: H2020-SFS-2018-2020 (Sustainable Food Security) **Topic: LC-SFS-19-2018-2019 Type of action: RIA Proposal number: SEP-210573871 Proposal acronym: FARMIX**
MULTI-SCALING AND MULTI-OBJECTIVE TOOLS TO IMPROVE RESILIENCE OF MIXED FARMING AND AGROFORESTRY SYSTEMS TOWARDS SUSTAINABILITY UNDER CLIMATIC UNCERTAINTY
Budget: 6 740 000

application (2019, participant): HORIZON 2020 17 institutions

application (2022, participant): HORIZON 2020 16 institutions

Call: HORIZON-CL6-2022-GOVERNANCE-01 (Innovative governance, environmental observations and digital solutions in support of the Green Deal) **Topic: HORIZON-CL6-2022-GOVERNANCE-01-11** **Type of Action: HORIZON-RIA** **Proposal number: 101086319** **Proposal acronym: AGRISENSE**
Multi-scaling AGRI-environmental SENSor-based monitoring towards sustainable and resilient agriculturE
Budget: 4 992 937

EU STRUCTURAL FUNDS

- ❑ prepared 2021
- ❑ applied for early 2022
- ❑ approaved and financed

Development of a System for Flash Floods Evaluation and for Blue-Green Concept Support (FLEFLASK)

ESI SAS Coordinator (Dpt. of Atmospheric Physics)
Geophysics and Geology Divisions involved

Cooperation with private sector (project partner)
Foreign experts involved (Austria, CR, Hungary)

930 000 €

YOUNG SCIENTISTS, PHD STUDENTS, WOMEN IN SCIENCE

towards Young Scientists
towards Women in Science

- Veronika Lukasová (postdoc,
- Anna Buchholcerová (PhD, pr
- Jozef Bódi (part time, PhD as
- Lenka Kubišová (PhD, gradua
- Anna Kubová (PhD, interrupte
- Barbara Porubčanová (PhD, g
- Dominika Godová (PhD, struc
- Ema Nogová (PhD, gravimetry
- Lenka Ondrášová (PhD, magn
- Michal Hoffmann (PhD, EM er
- Eduard Koči (PhD, intense ge
- Martin Šugár (PhD, seismolog
- Zuzana Chovanová (PhD, sei

Young Scientists (and Women in Science) – results

BIOCLIMATOLOGICAL RESEARCH: Veronika Lukasová
Stefan Schwarz Fund, VEGA project 02/0093/21 (2019—2021)

Springer Link

Original Paper | Published:

Regional and a
heatwave inter
Carpathians

Veronika Lukasová, Jana
Helena Hlavatá, Peter Borsa

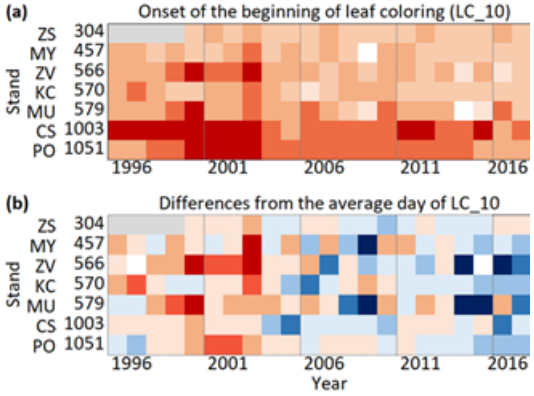
Theoretical and Applied Cli

water 2019: 2.544 - IF, Q2

Article

Autumn Phenological Response of Eu
Summer Drought and Heat

Veronika Lukasová [1,*], Jaroslav Vido [2], Jana Škvareninová [3], Svetl
Helena Hlavatá [1], Peter Boršányi [5] and Jaroslav Škvarenina [2,*]

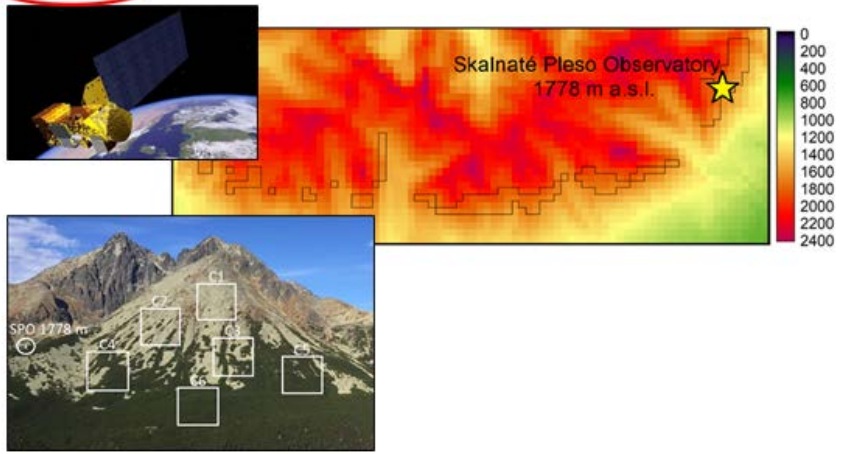


remote sensing 2020: 4.848 - IF, Q1

Article

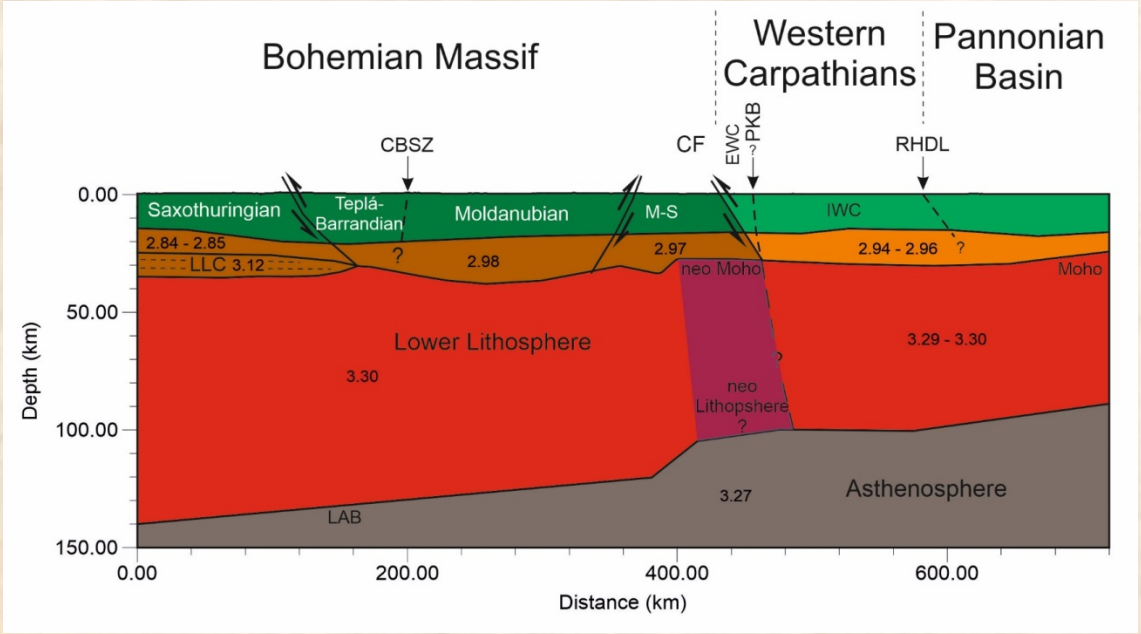
Changes in the Greenness of Mountain Pine (*Pinus mugo* Turra)
in the Subalpine Zone Related to the Winter Climate

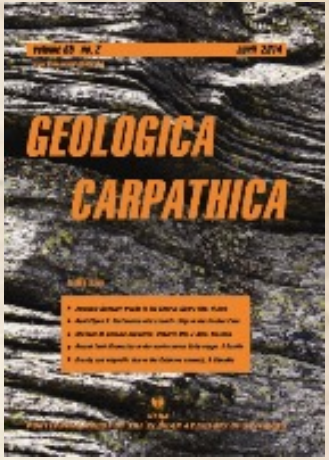
Veronika Lukasová [1,*], Tomáš Bucha [2], Ľubica Mareková [3], Anna Buchholcerová [4] and Svetlana Bičárová [1]



PhD students – results – Godová

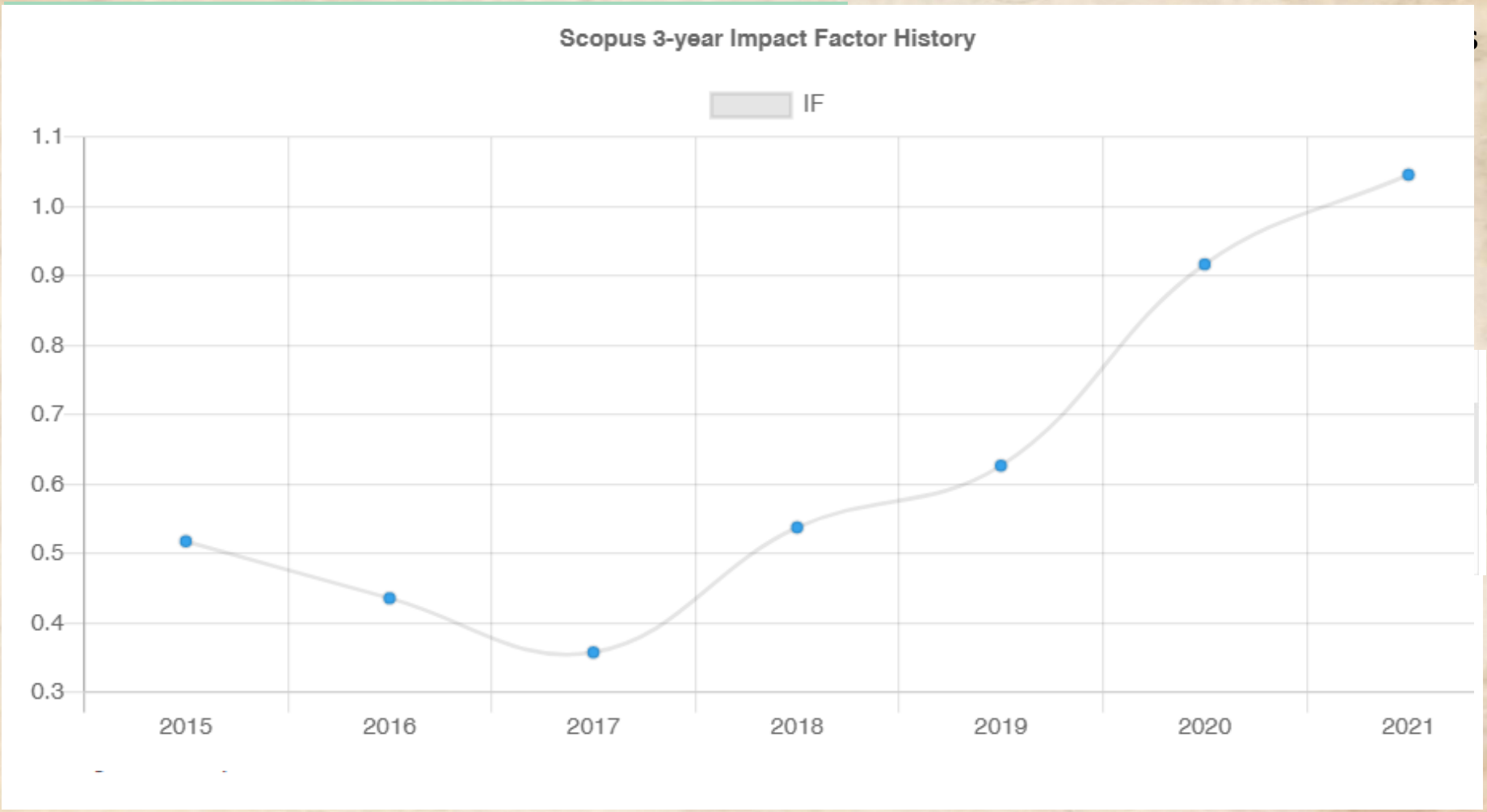
2D lithospheric density model along the CEL09 profile and its geological implications





Godová, D., Bielik, M., Hrubcová, P., Šimonová, B., **Dérerová, J.,** Pašteka, R., 2021: Geologica Carpathica, 72, 6, 447–460.

OPEN ACCESS SCIENCE JOURNAL CONTRIBUTIONS TO GEOPHYSICS AND GEODESY


Scopus 3-year Impact Factor History
IF
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
2015
2016
2017
2018
2019
2020
2021

PANEL PRINCIPAL COMMENTS AND QUESTIONS ASSESSMENT OF SAS RESEARCH INSTITUTE

Evaluation Period: January 1, 2016 – December 31, 2021

EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

Bratislava, October 17, 2022

Scientific quality and productivity

1. After 6 years of merging to an Earth Science institute – where do you see positive/negative impacts

(Adam Tomašových)

Positive:

→ Overall mission of the ESI SAS towards integrated research of litosphere/atmosphere/biosphere is clearly less specialized than before;

→ ESI SAS is conceptually and methodologically more diverse;

→ An increase in the number of formal project collaborations (both APVV and VEGA);

→ An increase in the frequency of informal communication/discussion among colleagues from formerly distinct organizations (councils, seminars, meetings);

→ Explicit merit-based evaluation at individuals level since the merger - we implemented an explicit, 5-year-window evaluation of international publications and citations (updated every year), with the top 20% of researchers receiving additional salary benefit.

Negative:

→ Connectivity is more difficult among geographic locations (Bratislava, Banská Bystrica, Stará Lesná, Hurbanovo);

→ The lack of appropriate building and lab facilities in Bratislava (in five buildings at Bratislava - Patrónka campus).

Scientific quality and productivity

2. Please formulate major points for a future joint Institute mission statement (not two separate ones as you did this time)? (Igor Broska)

Further systematic advancement of the Earth Science Institute (ESI) by developing project that would integrate geophysical as well as geological methods of research. Continuous efforts in systematic resolution of the geological history and formation of Central Europe by integratated methods of geoscience research.

→The ESI carries out and develops basic and applied research on geosciences and geophysics. Scientific activities are oriented towards comprehensive research integrated the fields of geology, geophysics and climatology. The research is interdisciplinary and is not bounded just to the territory of the Slovak Republic. Institute collaborates with Earth science institutions abroad. It participates in the transfer of scientific information into practice. It contributes to the growth of knowledge and cultural level of society by popularizing the science and public educational activities;

→The ESI is the only worksite in the Slovakia, which systematically monitors seismic activity, measures the magnetic field, slow deformations of earth's crust and performs non-standard meteorological investigations;

→The ESI provides a PhD study program within the framework of the valid Slovak legislation;

→The ESI is a publisher of international scientific journals Geologica Carpathica and Contributions to Geophysics and Geodesy.

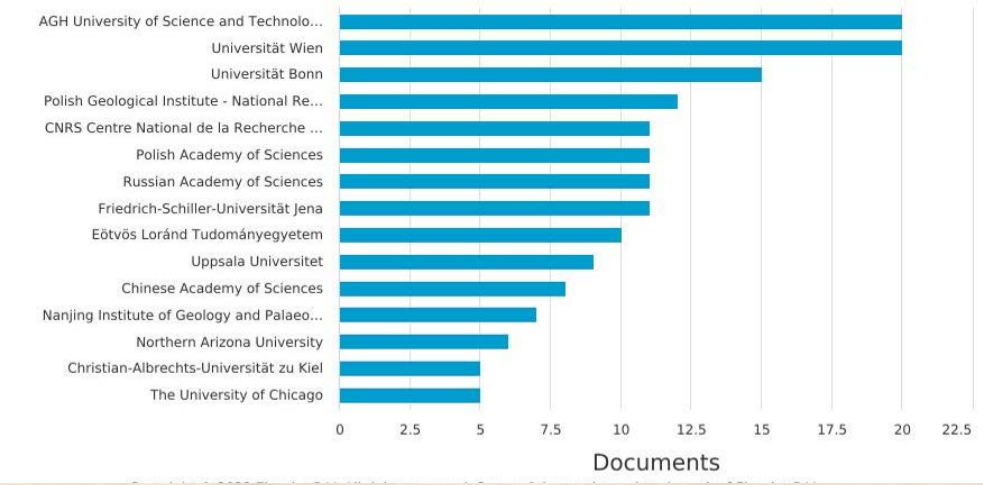
Scientific quality and productivity

3. Research performance: Do you have plans for improved international collaboration and acquisition of international funds (as several researchers ESI already have done)? (Adam Tomašových)

→ International collaboration is extensive as directly shown by coauthors on our outputs (see top 15 institutions, primarily from Europe, also US and Asia), and the majority of researchers are involved in international collaborations;

→ We will more encourage/incentivize higher exposure of young researchers at significant international conferences (to unroll international feedback and networks);

→ International funds –support for proposal preparation and pre-selection of applicants will be needed/active use of networks to be able to enter consortia.



Excluding Slovak and Czech Institutes
ESI (2016-2021)
total Scopus publications = 373

Scientific quality and productivity

4. Geophysics/Climate: Comment on the degree of collaboration with other institutes having focus on water, climate and what is your opinion about potential future intensification of collaboration in environmental/climate/water sciences. (Milan Onderka)

Department of Atmospheric Physics already actively collaborates with:

→ The national weather service (the **Slovak Hydrometeorological Institute** in Bratislava) - currently our major partner for studies related to meteorology and climatology. There is an ongoing collaboration especially with the Climatology Division but we are planning to reach out to the Hydrological Division to cover a broader range of climate change related topics;

→ Within the SAS alone, we have rather good personal relations with researchers from the **Institute of Hydrology SAS.** We are planning to build research projects joining researchers from both institutes, and potentially include also the **Institute of Landscape Ecology SAS**, as the research conducted at these three institutes often overlaps especially in climate-change related research;

→ Outside the SAS our important partner is the **Faculty of Mathematics and Physics, Comenius University** - currently the only institution in Slovakia with a PhD program in Meteorology and Climatology. Two researchers from our institute are involved in PhD mentorship at the faculty;

→ The institute is collaborating even with the private sector – **ESPRIT** Banská Štiavnica; and climate experts from 3 neighbouring countries. As of September 2022 we are starting a project focused on hydrometeorological applications (such as flash floods and soil erosion). The project is financed from EU Structural Funds;

→ In addition, we are making every effort possible to be involved in collaborative projects with all institutions covering the climate change topics, as combining knowledge from atmopsheric sciences, meteorology, climatology, water related disciplines (hydrology), soil science and ecology is essential especially in the context of the ongoining climate change and how the society can adapt to it.

Scientific quality and productivity

5. Number of PhD's stays rather small, but good gender balance is reached. How can number of PhD's be further increased? Why are there, for example, still rather few SAS participants at EGU (with strong Early Career Program)? (Iveta Smetanová)

→ Future hiring of PhD students will require:

1. stronger international advertisement of PhD topics will be needed, also stronger promotion of PhD topics on the ESI website (promote topics, supervisors and their research);

2. popularization lectures for high school students (why to study geosciences) and participation on activities like "**Open days at ESI**" „ **Weekend with SAS**" „**Petržalka Super school"**or **European Researchers' Night** (these activities are already taking place);

3. popularization lectures for master students and excursions to our labs (these activities are already taking place);

→ Students are encouraged to participate in broader (not just specialized) EGU-like conferences. However, they are ultimately subjected to time and financial constraints - ideally some intersection so that students expose their research to relevant international audience;

→ Independent researchers decide between general EGU-like conferences (GSA, AGU), less general, but still large-scale meetings (IAS), and more specialized meetings. EGU also does not completely overlap with all our branches;

→ Early Career Program opportunities at EGU – we will encourage participation, we will ask for higher information flow about these options for students.

Scientific quality and productivity

6. Please, comment on low teaching activities in the last years (Fridrich Valach)

→ Some researchers at our institute are also employed at universities (Comenius University in Bratislava and Matej Bel University in Banská Bystrica), and their teaching contribution is thus not listed in the Questionnaire. We only listed the teaching activities of our employees, who are not affiliated with universities (and often teach pro bono, voluntary activities);

→ The option to teach at universities is conditioned by the actual availability of – as the number of students is gradually decreasing and is extremely low now, university departments even compete for teaching among themselves;

→ We published an academic/university textbook on the physical foundations of magnetic storms (in Slovak language) and several monographs in the English – all are useful materials for teaching;

→ Extracurricular teaching activities are extensive (not for credits, difficult to quantify) – we teach students how to use instruments or devices or are taken to the field, and we organize informal block courses in Analytical methods in geology, micropaleontology, lasting for one or two days.




Societal, cultural or economic impact

7. You have some good industrial contacts. Earth Sciences are relevant for a society.

(Radovan Kyška – Pipík)

• ESI built modern analytical infrastructure primarily for scientific research. Because this infrastructure is in some cases unique, like microCT or limnic platform, we offer our free time capacity to industrial sector;

• This way we connect the science and applications. It is also important to say, this activity is necessary, because we have very limited institutional sources to ensure operation of all technologies.

technical upgrade

maintenance, also of other laboratories and technologies without commercial potential

increase the income of employees

top scientists

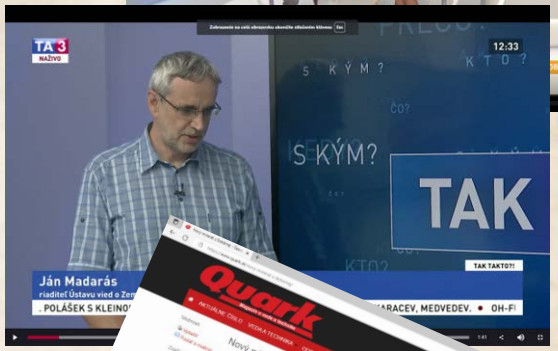
modest social politic

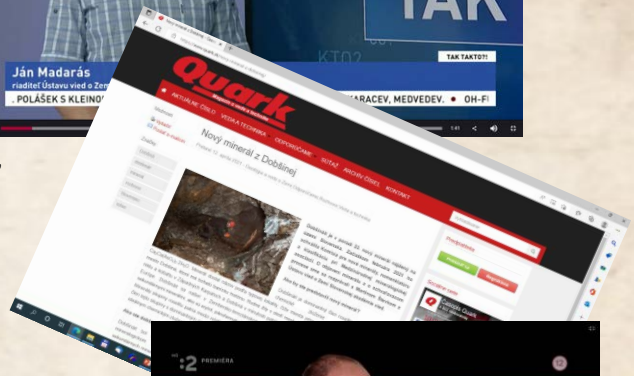
Societal, cultural, or economic impact

8. How can image of Earth Sciences in Slovak society be improved (or, does it need to be improved?) (Stanislava Milovská, Ján Madarás)

ESI is active in several ways:

- Presentations in media:
  - interviews and reports in TV, broadcast, press;
  - informations on SAS web News, FB, articles in popular science magazines, books, short movies, SAS „Open Academy“ project;
- Public talks, excursions for schools, discussions, field excursions;
- Collaborations with museums (exhibitions, sample collections, lectures);
- Collaborations with institutions of nature protection, Geoparks, cultural heritage, restoration of monuments, archaelogy, architecture...
- Cooperation with the decision-making sphere, regional self-administration (Project Waters, Environmental strategy 2030)...

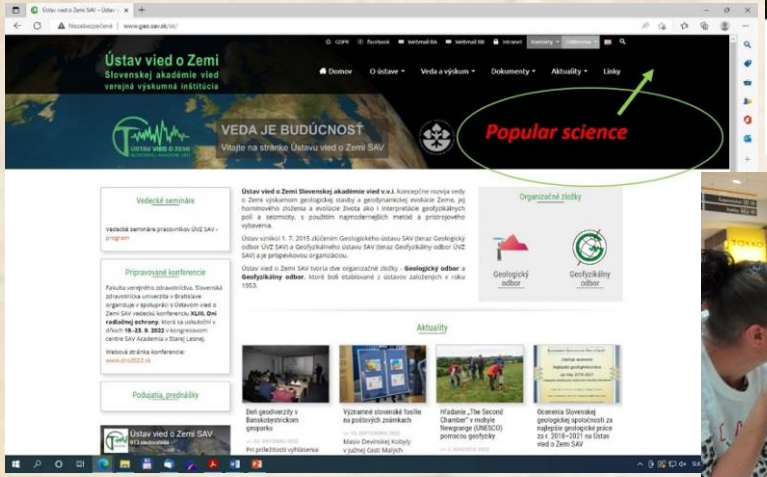




- ➢ Not all outreach activities are published or released...
- ➢ Improvement is needed

We plan...

- **to complete our website** and add a link to “popular science” section with our scientific news, curiosities and upcoming events for public;
- **continue the attractiveness of the institute's Facebook page**: it currently has 913 followers from 10 countries, most in the 25-44 age group;
- **more offer** our facilities and supervision for motivated students of secondary schools – competitions, Olympiads;
- **make the cooperation with industry more visible** to tax-payers and show them that science is useful;
- **collaborating institutions** should always mention input of ESI.



- to engage a person responsible for public relations: arrangement of public talks, school-children visits, interviews with our scientists for popular science magazines (Quark, Vesmír…)

Public communication

Journalists communication

Institutions communication

Societal, cultural, or economic impact

8b: ... And can you comment on decreasing number of public lectures (already before COVID)?

2.7.2. Table of outreach activities according to institute annual reports

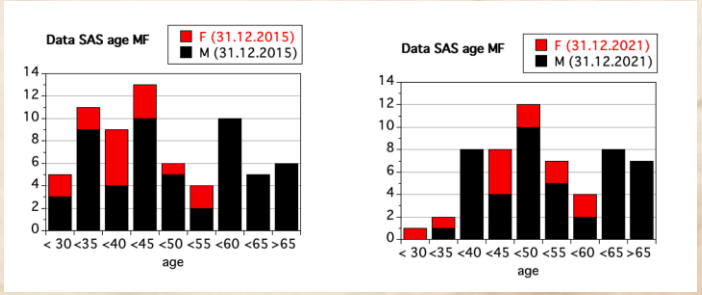
Outreach activities	2016	2017	2018	2019	2020	2021	total
Articles in press media/internet popularising results of science, in particular those achieved by the Organization	18	26	36	10	36	33	159
Appearances in telecommunication media popularising results of science, in particular those achieved by the Organization	23	24	15	4	17	16	99
Public popularisation lectures	37	28	60	15	7	6	153

- Change in the methodology of reporting popularization lectures for the public from 2019. Repeated activities within one topic (e.g. gold panning courses for elementary school students) are reported as one popularization lecture.

Societal, cultural, or economic impact

9. Women are still widely underrepresented in staff/executive body/external advisory board – what plans for improvement do you have? (Radovan Kyška – Pipík)

- ESI is equal-opportunity employer, and constitutionally cannot hire anybody on the basis of gender. We underscore a family-friendly working environment and allow for breaks in daily working schedules that are related to parenting and children. Parents with young children can have flexible working schedule adjustable according to their needs;
- All positions in executive bodies are based on voting. Of course, we encourage women to participate so that they can be elected;
- Among PhD students, the women are frequent and we will make an effort to keep them in academia. However, many of our former students decided to leave academia after the maternity-leave or during the family buildup owing to significantly better salaries outside of academia;
- We note that several outstanding women scientists that developed their careers at our institute later moved to universities – this partly generated the gap in the contribution of women in the older cohorts;
- The representation of women in the institution also depends on the type of work: e.g. Research laboratories (9), Economic department (4) is represented exclusively by women. Women also occupy working positions in the library (2) and at the administration (5).
- Women are also exclusively represented in bioclimatology research (3).



Strategy and potential for development

10. Where do you see your institute on the European Science Map? Importance, Strength, international impact? (Ján Vozár, Martin Števko)

- The ESI is involved in broad international/European projects with actual high importance that directly addresses Europe's goal to become self-sufficient in terms of food sovereignty and security (bioclimatology), climate changes (paleoclimatology, paleobiology), raw materials (critical metals, deposit surveys and exploitation) and natural disaster mitigation across Europe (seismology, volcanology);
- The laboratories in Banská Bystrica are playing an important role as research hub, bringing together various institutions (from 25 countries around the world), accelerating our international cooperation as well as developing collaboration with industrial partners;
- We will focus on maintaining key international networks and making our institute more attractive for high quality research scientists. Besides financial part, we should focus on essential condition, which the institute has in its own hands, to facilitate the easier coordination and management of big international projects, like electronic administration and communication.

25 countries around the world in BB lab

Strategy and potential for development

11. Where do you see future joint geophysics-geology projects? (Ján Madarás)

- The effect of the merger of the former institutes began to manifest itself gradually. Currently, the institute handles - in the form of leadership or joint partnership mainly with universities - 11 projects of the Agency for the Support of Science and Research (APVV). Four of them are connected between geophysics and geology within the research team, because they have multidisciplinary character.
- Two projects out of the 26 solved projects of the Scientific Grant Agency (VEGA) had direct cooperation. Necessary consultations are of course common.
- Within the framework of the 10 projects with international participation, two are linked by personnel between the two divisions. However, it should be emphasized that among the geophysicists, who are mainly graduates of the Faculty of Mathematics, Physics and Informatics, there are up to 7 graduates geologists and applied geophysicists from the Faculty of Natural Sciences. Before 2006, not a single geologist worked at the Institute of Geophysics. So the interconnectedness is evident.
- Currently (September 2022), the institute has signed a project of the EU Structural Funds focused on meteorology and climatology, where the proportional representation of both divisions is balanced.

Strategy and potential for development

12. Where do you see future partners of Atmospheric Physics, which seems thematically somewhat isolated in the Earth Science Institute? (Pavol Nejedlík)

- The department of Atmospheric physics collaborates randomly within the ESI, mostly with the geological departments (atmosphere – surface interactions) and with the department of Geomagnetism (atmospheric conditions during measurement campaigns). This activities will continue;
- Nevertheless, the collaborating partners are coming mainly from other scientific bodies and universities mostly described in previous question Geophysics/Climate and also from private sector;
- Part of the work is done in collaboration on specific methodologies for meteorological operational processes within **Slovak Hydrometeorological Institute** (Methods for Drought monitoring system and there is ongoing collaboration in precipitation monitoring);
- Further activities which are going on, and will continue, focus on the climate change impacts by bringing specific data and information for the adaptation strategies (ongoing BLEPOSK project with a private company and collaboration with National forestry centre in other projects);
- International collaborative partners are mostly from surrounding countries. Among them **Global Change Research Institute of Czech Academy of Science, Hungarian Meteorological service, University of Natural Resources and Life Sciences, Vienna, AT;**
- Wide international cooperation is going on within the COST Actions in which is the Department of Atmospheric physics actively involved. They are oriented on micrometeorology and precipitation monitoring at present;
- The working capacity of the department does not allow us to perform “all-inclusive” atmospheric research, it is rather focused on the specific targeted problems with the partners working on similar topics.

Other questions and comments

13. Specify how the questionnaire was created, who participated on review of the results and on the strategy and potential development. (Ján Madarás)

- All the organizational components of the institute participated in the preparation of the Questionnaire, more than 20 employees in total;
- Economic, financial and personnel indicators were taken from the institution's published annual reports, as well as a selection of the most important publications. They are selected annually by the ESI Scientific Council according to established criteria;
- The lists of the most cited publications according to the established criteria were taken from the database of the Central Academic Library and compared with the ESI library;
- Key representatives of researchers from the both divisions were selected to compile the texts, i.e. heads of departments, chairman of the scientific council, scientific secretary, heads of divisions, general director. The selection was intended to cover all professional activities;
- Other activities (e.g. lists of implemented projects, organized conferences, selection of popularization activities, awards, etc.) were selected from the ESI databases by the director's secretariat and subsequently checked by the general director;
- The strategy and potential development of the institute were basically taken from the approved Action Plan for the development of the institute until 2020 and updated until 2025.