International Lithosphere Program

Regional Coordinating Committee TOPO-EUROPE
Leader(s): Sierd Cloetingh, Todd Ehlers, Istvan Kovacs

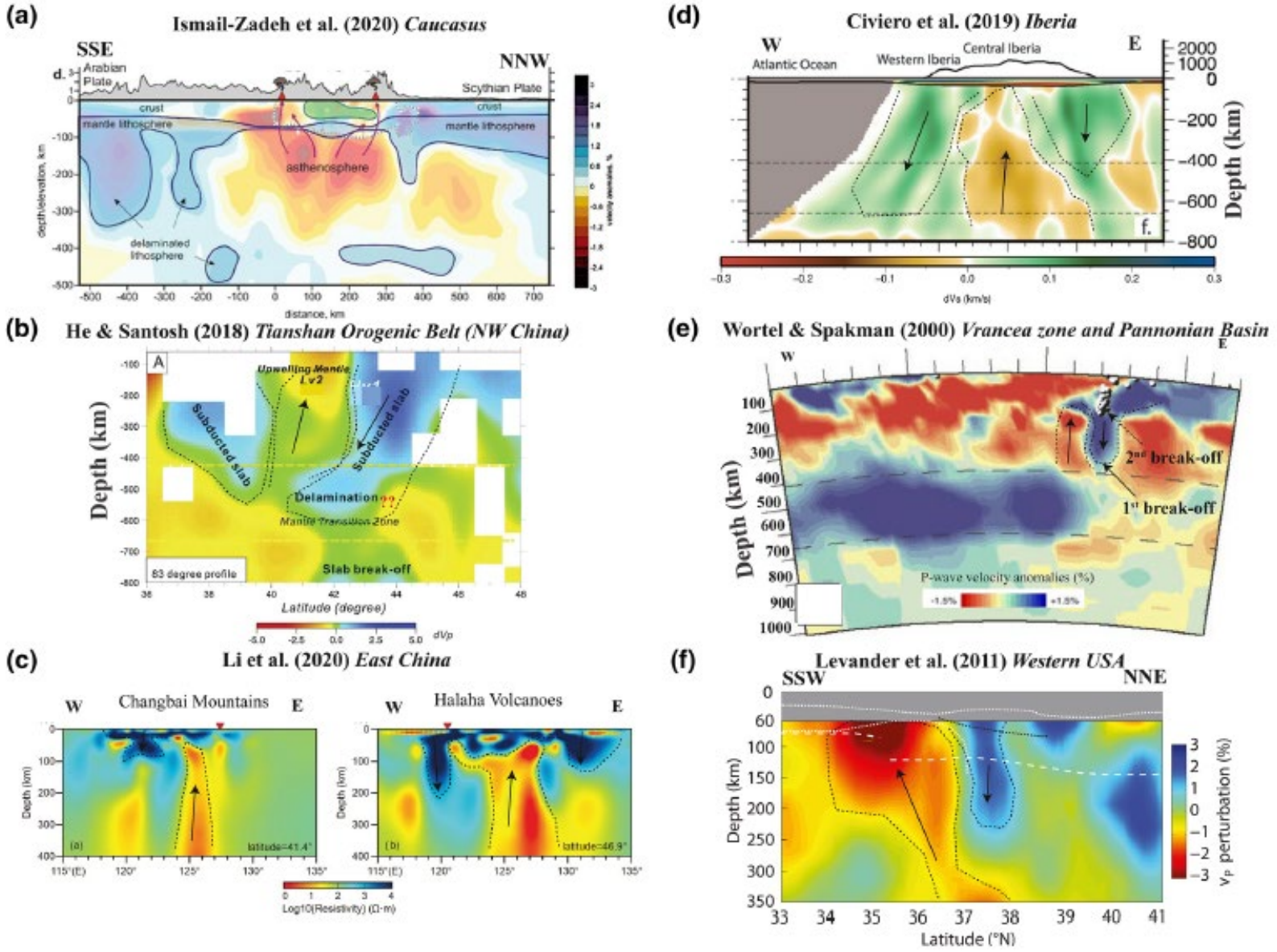
Highlights of recent work/results

- Development of new models for plume-lithosphere interactions and initiation of subduction and application to lithosphere of Europe and its continental margins
- Development of pargasosphere concept and testing on the Pannonian/Carpathian system of Central and Eastern Europe

Some important TOPO-EUROPE publications

- Cloetingh,S., Koptev,A., Kovacs, I. et al., 2021. Plume-induced sinking of intracontinental lithospheric mantle: An overlooked mechanism of subduction initiation? Geochemistry, Geophysics, Geosystems.
- Cloetingh, S., 2020. TOPO-EUROPE, the geoscience of coupled deep Earth and surface processes. In H. Gupta (Ed.) Encyclopedia of Geophysics. Springer.
- Cloetingh, S., Ehlers, T., 2020. TOPO-EUROPE: from the deep Earth to the Earth's surface. Indian Journal of Geosciences.
- Kovacs, I., Patko,L., Liptai, T.P., Taracsak, Z., Cloetingh, S., 2020. The role of water and compression in the genesis of alkaline basalts: inferences from the Carpathian-Pannonian region. Lithos, 354, 105323
- Kovacs, I., Liptai, N., Koptev, A., Cloetingh, S., 2021. The pargasosphere hypothesis: looking at global plate tectonics from a new perspective. Global and Planetary Change.
- Koptev, A., Cloetingh, S., Ehlers, T. A., 2021. Longevity of small-scale ("baby") plumes and their role in lithospheric break-up. Geophysical Journal International.

Plume-induced subduction initiation: observations



Cloetingh, S., Koptev, A. & ILP team. (2021). Plume-Induced Sinking of Intracontinental Lithospheric Mantle: An Overlooked Mechanism of Subduction Initiation? Geochemistry, Geophysics, Geosystems, 22(2), e2020GC009482.

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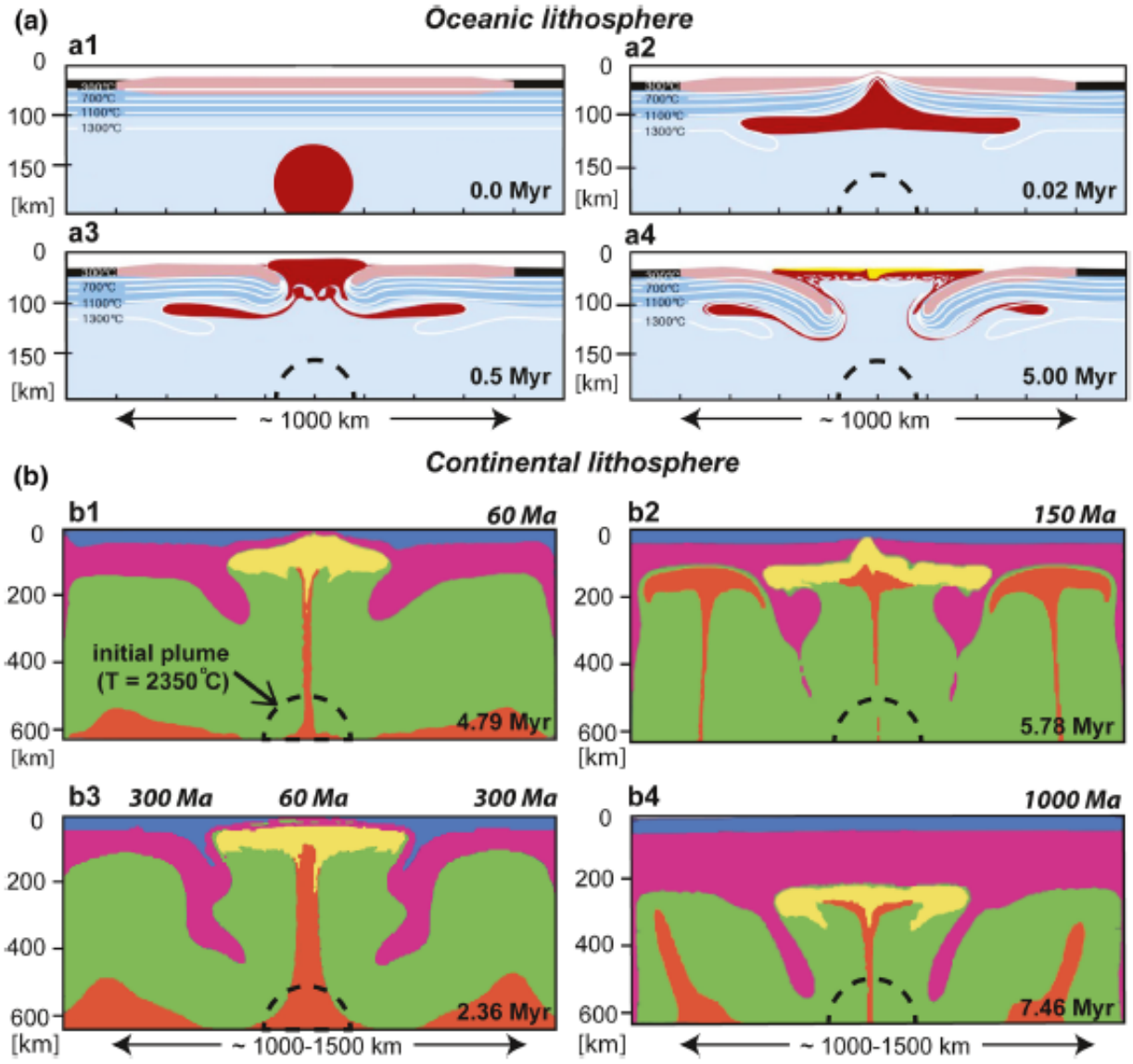

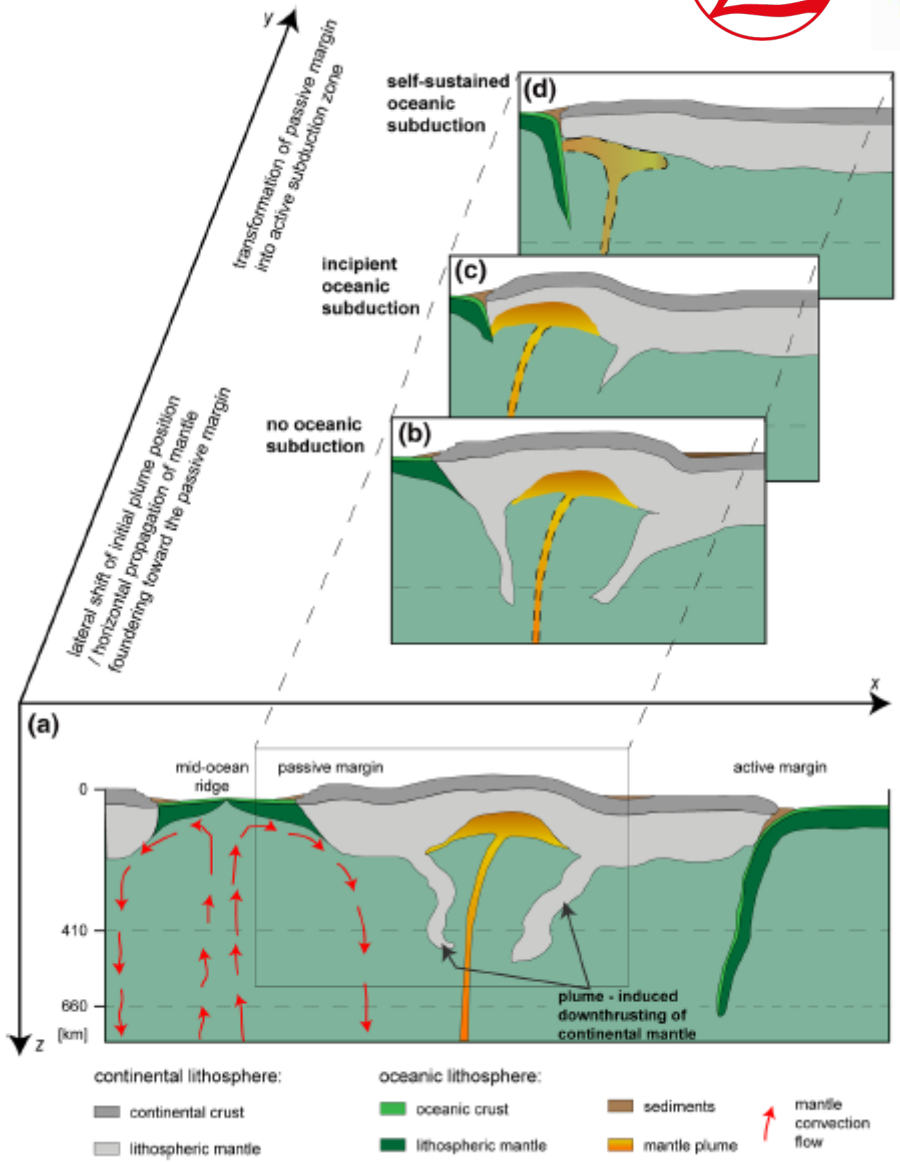

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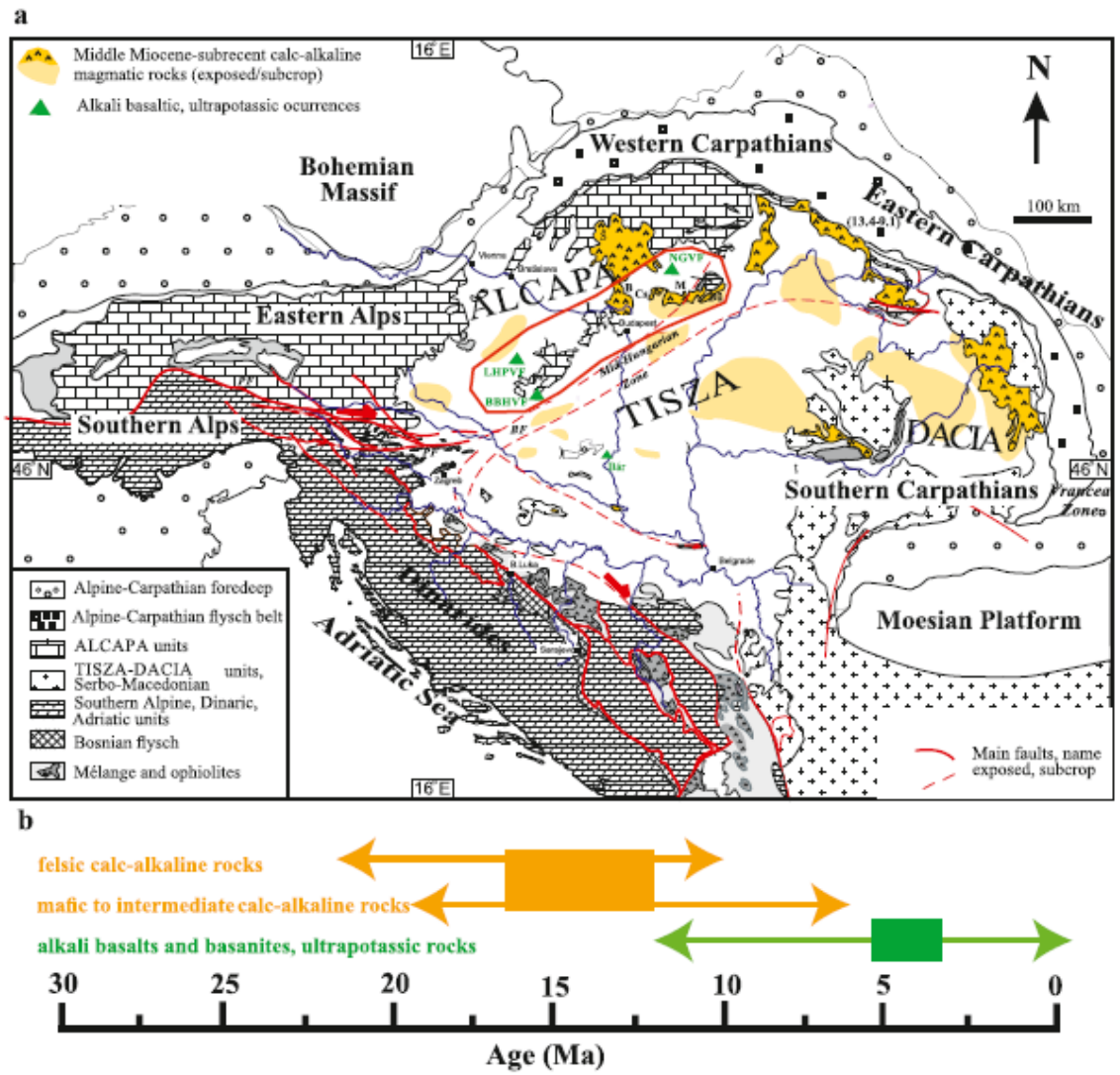
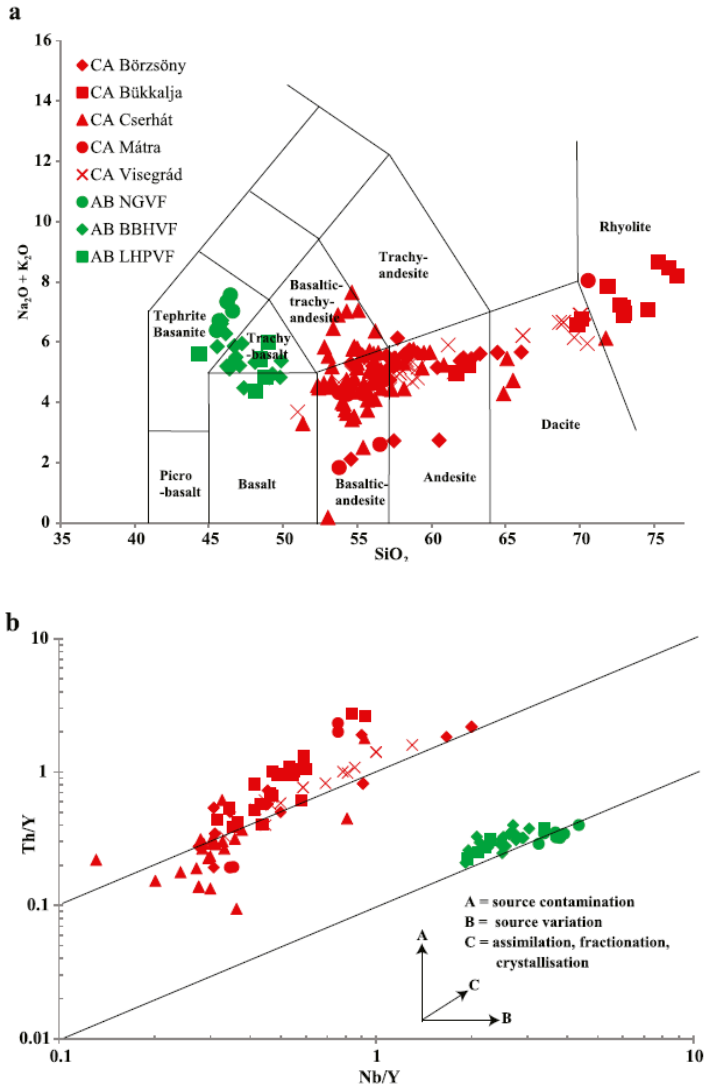
Magmatic evolution and geochemistry of the Pannonian basin: observations





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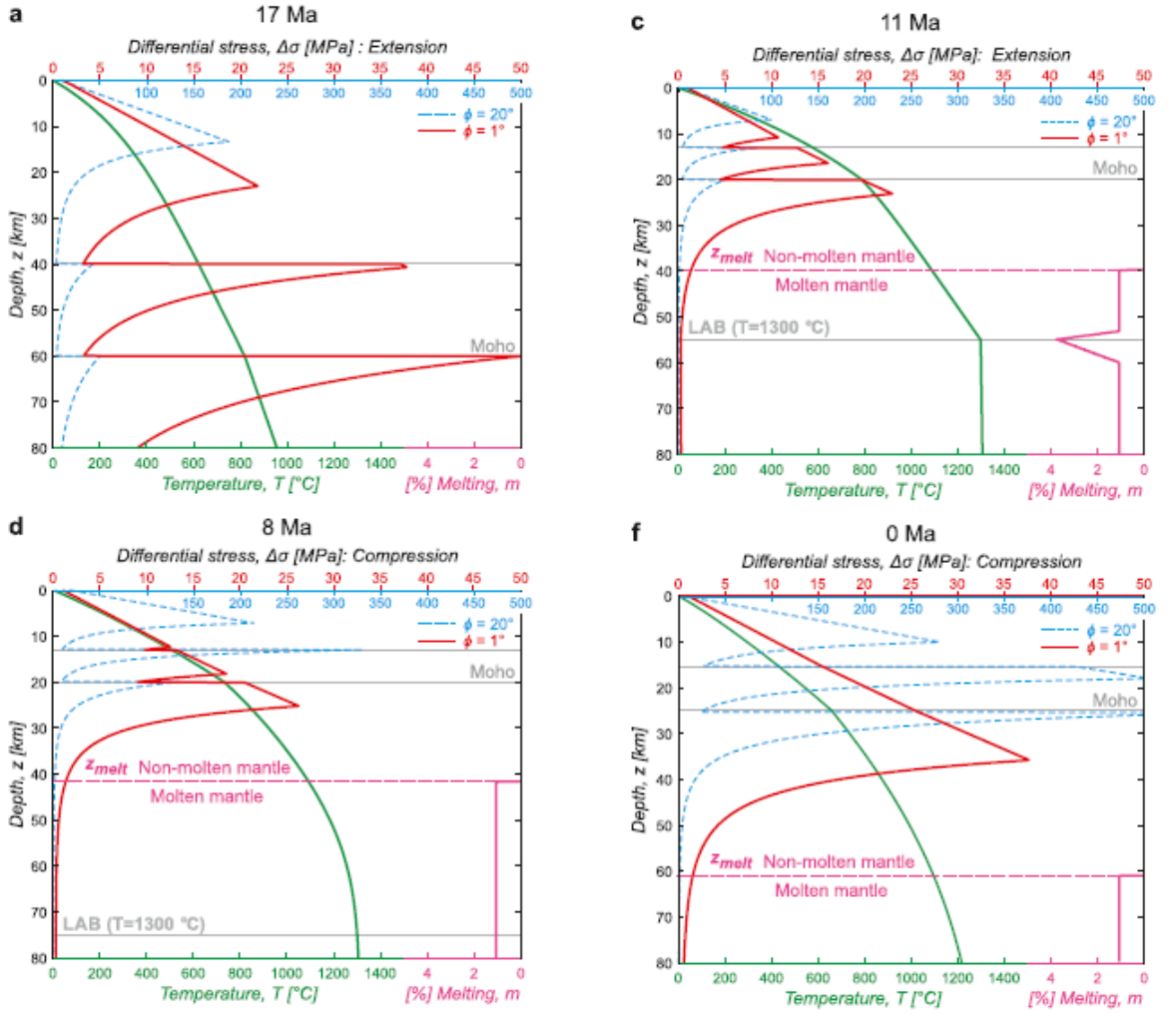
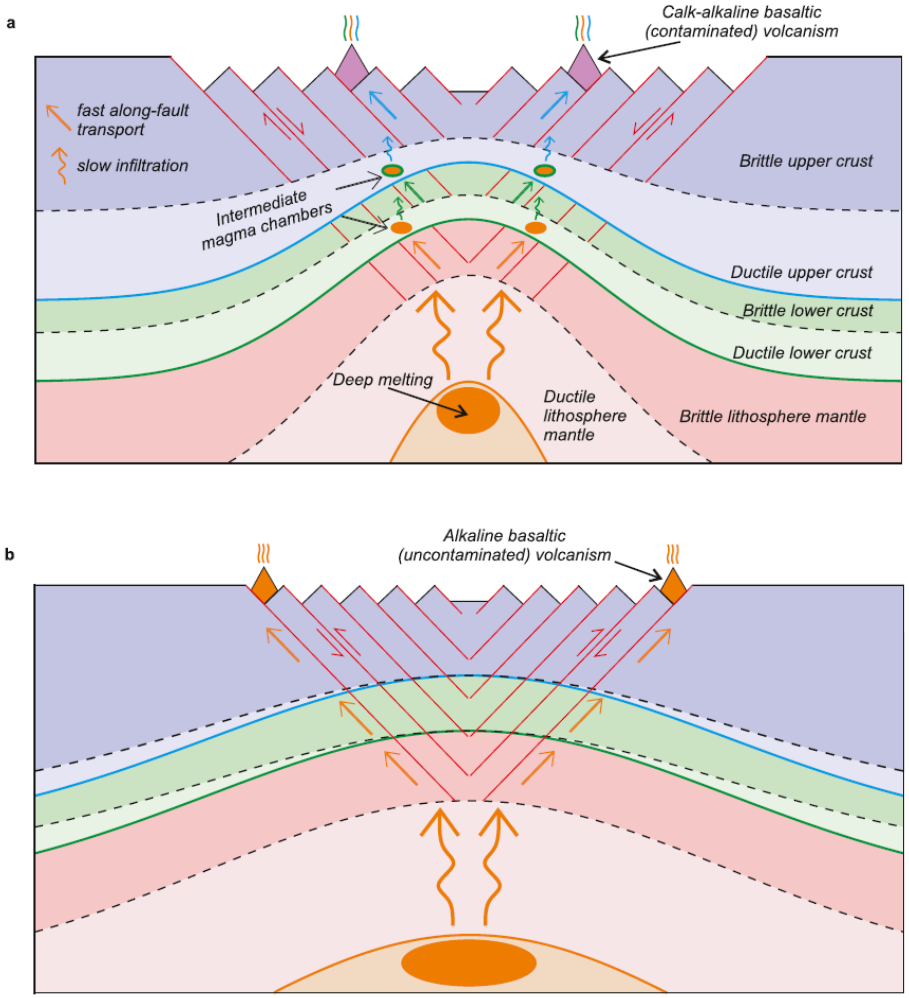
Magmatic evolution and geochemistry of the Pannonian basin: modelling and concept





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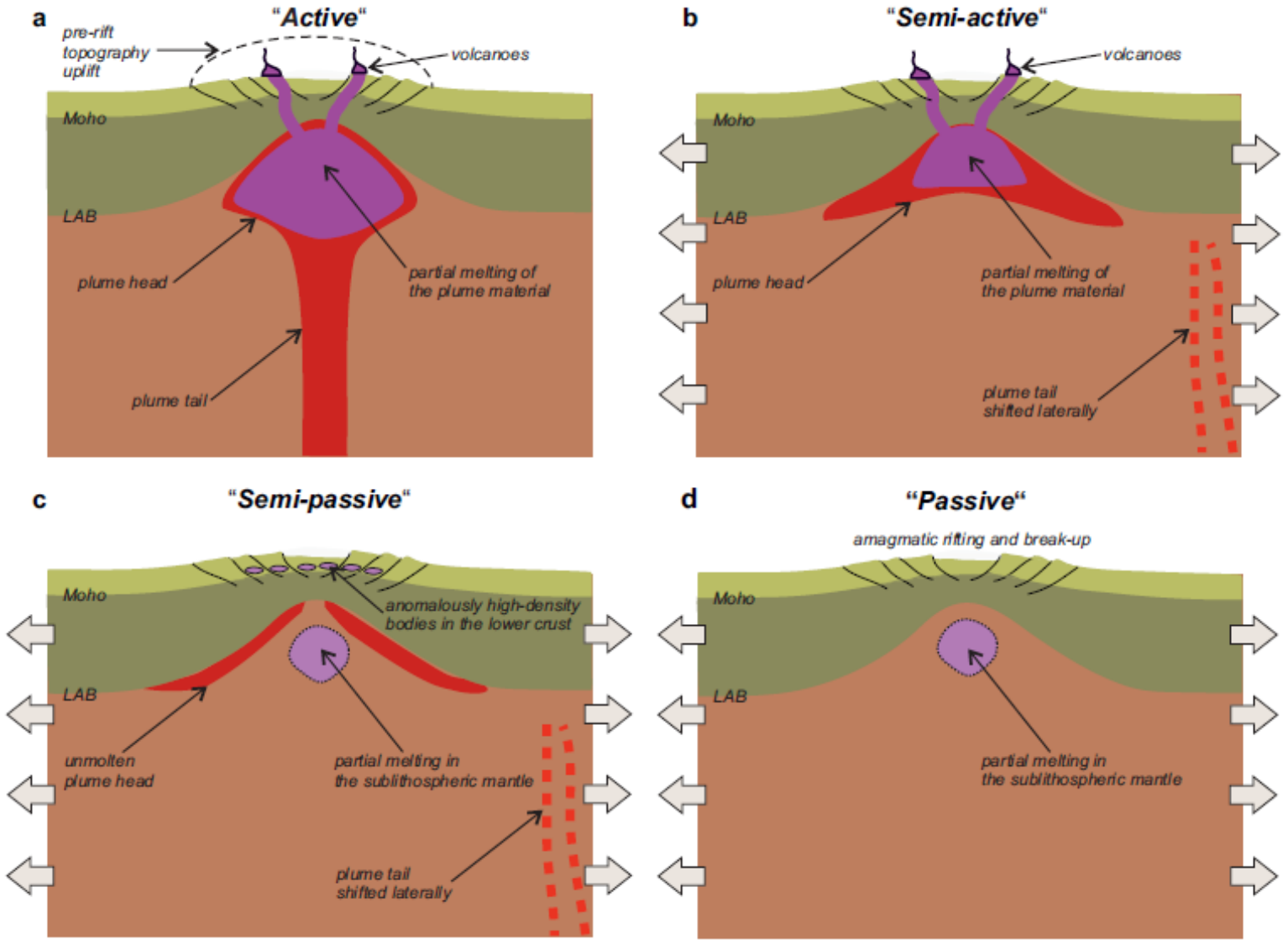
Continental rifting and break-up systems: a new classification



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Continental rifting and break-up systems: a new classification

Mode of rifting and break-up	Pre-break-up widespread magmatism: Large Igneous Provinces (LIP)	Syn-break-up volcanism: seaward-dipping reflectors (SDRs)	Syn-rift intrusive magmatism: high velocity lower crust bodies	Examples: Break-up area (associated LIP, if applicable)
"Active"	Yes: preceding onset of rifting or changing extension direction	Yes	Yes	South Atlantic (Parana-Etendeka) India-Madagascar (Madagascar) India-Seychelles (Deccan) Arabia-Africa (Afar)
"Semi-active"	No or Yes but preceded by rifting co-directional with final break-up	Yes	Yes	Central Atlantic (CAMP) South Africa-Antarctica (Karoo) North Atlantic (NAIP)
"Semi-passive"	No	No	Yes	Northern South Atlantic (Parana-Etendeka?) Australia-Antarctica (Kerguelen?)
"Passive"	No	No	No	Iberia-Newfoundland Equatorial Atlantic South-East India-Antarctica

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Lithospheric Dynamics and Evolution of the Sedimentary Basin Fill

from 28th March to 1st April, 2022, Sopron, Hungary

Institute of Earth Physics and Space Science

ACADEMIA EUROPAEA

New contacts

- Expansion of the TOPO-EUROPE community with new members from the petrological research domain. Development of new contacts with marine geoscientists active in the Northern and Central Atlantic Ocean and its margins in testing novel concepts for continental break-up.

Usage of ILP funding

- Planning meetings, seminars, work visits, and workshops with support of Academia Europaea in Tuebingen, Germany; Sopron, Hungary

Thank you!