

## Activity Report 2024 – Task Forces / Coordination Committees

Project Title: Continental Lithosphere: a Broadscale Investigation (CoLiBrl)

Project No.: 2021-TF4

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### 1. Highlights of recent ILP Task Force work/results

Related to the ICDP Drilling the Ivrea-Verbano zone (DIVE project):

- Organization of the DIVE Science Workshop 2024 in Romagnano Sesia (see Appendix A)
- Drilling of the DIVE 5071\_1\_A borehole in Italy (great success, numerous outreach actions)
- Open gravity-modelling contest on the Balmuccia peridotite body ([weblink](#))

Related to the AlpArray, AdriaArray programs:

- Continued involvement in the AdriaArray program
- Expansion of the AlpArray gravity database to the AdriaArray area (see Appendix B)

Other major achievements:

- Special issue on Seismic Anisotropy published in Journal of Geodynamics: “Seismic anisotropy – from rock samples to large-scale imprints in the lithosphere-asthenosphere system“, in memory of Vladislav Babuška; Editors: Jaroslava Plomerová, Shun-ichiro Karato, foreword from ILP by Hans Thybo, accessible at <https://www.sciencedirect.com/special-issue/10L7XRDG7N4>
- **Beno Gutenberg EGU Medal to Jaroslava Plomerová**

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

Broad presence at EGU General Assembly 2024 in Vienna, for example:

**Hetényi G**, Baron L, Scarponi M, Subedi S, Michailos K, Dal F, Gerle A, Petri B, Zwahlen J, Langone A, Greenwood A, Ziberna L, Pistone M, Zanetti A, Müntener O (2024) Participative gravity-modelling challenge to constrain the Balmuccia peridotite body (Ivrea-Verbano Zone, Italy). doi:10.5194/egusphere-egu24-6402

**Hetényi G**, Scarponi M, Baron L (2024) Challenges to implement an open, free, participative gravity-modelling initiative. doi:10.5194/egusphere-egu24-6386

**Plomerová J** (2024) Seismic images of the continental lithosphere. doi:10.5194/egusphere-egu24-9250

**Žlebčíková H**, **Plomerová J**, Vecsey L, AlpArray Working Group (2024) Anisotropic tomography of the upper mantle beneath the Eastern Alps and the Bohemian Massif. doi:10.5194/egusphere-egu24-8928

Two invited talks:

**Hetényi G**, Molinari I, Piromallo C, **Plomerová J**, AlpArray Working Group (2024) AlpArray: from nucleation to growth, lessons learnt and legacy. 39th General Assembly of the European Seismological Commission, 22-27 Sep 2024, Corfu, Greece.

**Hetényi G**, Greenwood A, Li J, Lemke K, Luo Z, Caspari E, Holliger K (2024) Geophysical versus petrological lower crust: how close are they? Granulites & Granulites 2024 conference, 3-6 Sep 2024, Verbania, Italy.

Other:

Paniso J, **Bielik M**, Huraiova M, Godova D, Bezak V, Hurai V (2024) 3D geophysical-petrological model of the continental lithosphere in the Novohrad-Gemer region (northern Pannonian Basin, SK-HU). TOPO-EUROPE with an emphasis on climate- and energy-related societal challenges. 14-17. October 2024, Sopron, Hungary.

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

Greenwood A, **Hetényi G**, Baron L, Zanetti A, Müntener O, MOS field team (2024 in press) Active seismic surveys for drilling target characterisation in Ossola Valley: International Continental Scientific Drilling Program (ICDP) project Drilling the Ivrea-Verbania zone (DIVE) phase I. Sci Drill 33:219-236. <https://doi.org/10.5194/sd-33-219-2024>

Plašienka D, **Bielik M** (2024) The Kolárovo gravity and magnetic anomaly body in a subcrop of the Danube Basin: A new geological interpretation. Geologica Carpathica 75(1): 49-59. <https://doi.org/10.31577/GeolCarp.2024.03>

**Plomerová J** (2024) Patchwork structure of continental lithosphere captured in 3D body wave images of its anisotropic fabrics. J Geodyn 161, in press. <https://doi.org/10.1016/j.jog.2024.102041>

Scarponi M, Kvapil J, **Plomerová J**, Solarino S, **Hetényi G** (2024) New constraints on the shear-wave velocity structure of the Ivrea geophysical body from seismic ambient noise tomography (Ivrea-Verbania Zone, Alps). Geophys J Int 236:1089-1105. <https://doi.org/10.1093/gji/ggad470>

Schlömer A, **Hetényi G**, **Plomerová J**, Vecsey L, **Bielik M**, Bokelmann G, Csicsay K, Czuba W, Fojtíková L, Friederich W, Fuchs F, Grad M, Janik T, Kampfová Exnerová H, Kolínský P, Malinowski S, Meier T, Mendecki M, Papčo J, Šroda P, Szűcs E, Süle B, Timkó M, Gyarmati A, Wéber Z, Wesztergom V, Žlebčíková H, AlpArray-PACASE Working Group (2024). The Pannonian-Carpathian-Alpine Seismic Experiment (PACASE): network description and implementation. Acta Geod Geophys 59:249-270. <https://doi.org/10.1007/s40328-024-00439-w>

### 4. New contacts (this year)

- AdriaArray working group (further contacts and members)
- Further contacts through the DIVE project

### 5. Usage of ILP funding (this year)

- 600 EUR to support Merjema Genjac-Zukić (early-career female scientist) to attend the annual AdriaArray workshop in Sofia
- 1144 EUR contribution to the organization of the 2024 DIVE Science Workshop in Romagnano Sesia, 10-12 July 2024
- 231.65 EUR contribution to Dr. Judith Confal to attend the above workshop

Thank you for allowing the later use of ILP funds.

## 6. Activities planned for 2025

- Complete the final video-recorded contribution on the LAB
- Session 22 “Discontinuities (incl. LAB)” at the IASPEI 2025 meeting in Lissabon, Portugal (J Plomerová, D Kalmár, L Petrescu)
- AdriaArray workshop, March, near Venice
- DIVE Science Workshop, not yet planned
- It will be the final year of our TF and we have leftover money to spend. We are currently exploring further options and how to share the resources among them. A likely contribution will be the educational seismology program in Nepal.

## Appendix A



*Group photo of (most) participants at the 2024 DIVE Science Workshop*

## Appendix B

Expansion of the AlpArray gravity database to the AdriaArray area

In 2024, the AlpArray database was combined on a larger scale with the EIGEN-6C4 global model to compile a map of complete Bouguer anomalies (CBA) on a larger area (the size of the area was taken from the extended initiative - AdriaArray). The global model used has been tested and selected as the most suitable of the currently available models up to the high grade/order of 2190. The methodology for calculating the CBA was used uniformly as in the original AlpArray database, correction density

of  $2670 \text{ kg/m}^3$ . The CBA map represents anomalies in the range of  $-180 \text{ mGal}$  (Alpine gravity minimum) to  $+320 \text{ mGal}$  (gravity maxima in the Mediterranean Sea).

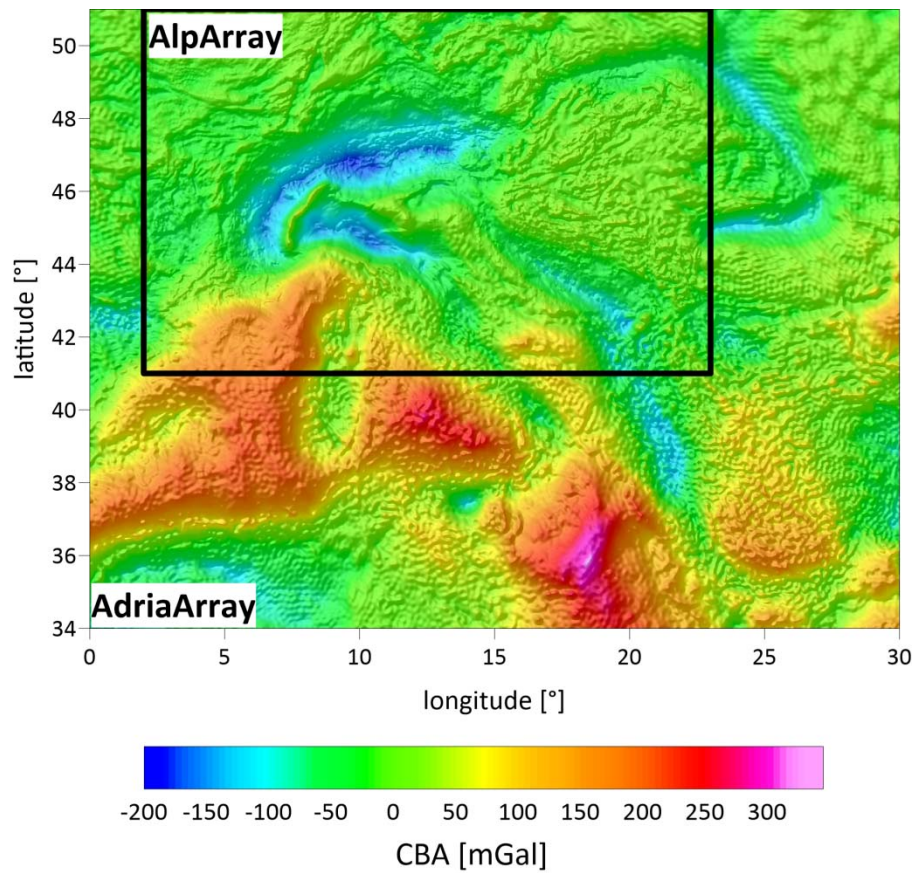


Fig. 1. Map of the CBA compiled from the original AlpArray database and the EIGEN-6C4 global model in a wider area (boundaries of the AdriaArray project).