

Activity Report 2025 – Task Forces / Coordination Committees

Project Title: Global Lithospheric Stress - The World Stress Map in 3D

Project No.: 2021-TF3

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1. Highlights of recent ILP Task Force work/results

In 2025, the team released the new version of the World Stress Map project, which is the most comprehensive database with over 100,000 data records in comparison to 42,870 in the previous release from 2018.

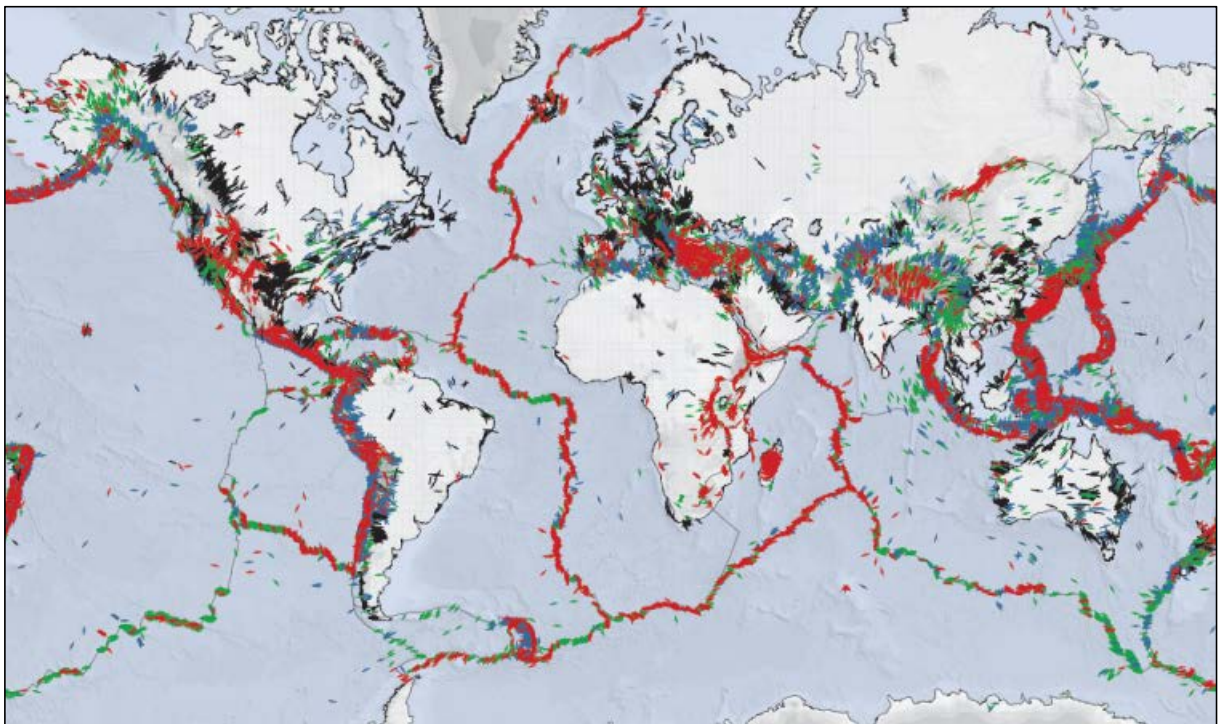


Fig. 1: The World Stress Map (WSM) 2025 (Heidbach et al., 2025) displays the contemporary crustal stress orientation in the Earth's crust based on the new WSM database release 2025.

In addition to this great step forward we implemented a number of technical changes, updates and improvements, as below:

- Development of a new web-based WSM database infrastructure **MaRS** (**M**anagement and **R**epository of **S**tress). MaRS allows us for annual releases of WSM database updates to promptly provide the community with new data.
- Integration of the global earthquake focal mechanism catalogue of the International Seismological Centre (ISC) using data from 01/1964 – 12/2024.
- Updated WSM quality ranking scheme for the S_{Hmax} orientation data records to make criteria programmable within the MaRS framework.
- Presentation of new user templates for submission of new data records. These

- can be uploaded and automatically processed with MaRS to assign data quality.
- Introduction of the new quality class X with three sub-classes for data records with missing information (X_{mi}), stress indicator that are rarely used (X_{ru}), and stress indicator that are not established (X_{ne}).
- Replacement of the 40 km depth limit using instead the global crustal model of Szwilius et al. (2019) to assign if data records from earthquake focal mechanisms are located in the crust or not.

2. Presence at international meetings/workshops in 2025

- April 2025 (EGU-2025): several presentations on different aspects of the WSM project including the new 2025 version of the World Stress Map, Australia's Bowen Basin stress map, several geomechanical models.
- May 2025 (Australian Energy Producers Conference): Two presentations to discuss the pore pressure in the Beetaloo Basin in Northern Australia, and 3D modelling of the Bowen Basin.
- November 2025 (GSNZ Conference, New Zealand): Presented the new release of New Zealand Stress Map.

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

- Heidbach, O., Rajabi, M., Di Giacomo, D., Harris, J., Lammers, S., Morawietz, S., Pierdominici, S., Reiter, K., von Specht, S., Storchak, D., Ziegler, M.O., 2025. World Stress Map Database 2025. GFZ Data Services. <https://doi.org/10.5880/WSM.2025.002>
- Heidbach, O., Reinecker, J., Diehl, T., Desroches, J., Ziegler, M.O., Reiter, K., Vietor, T., Giger, S.B., 2025. The present-day crustal stress field of the Molasse Basin in Switzerland. *Swiss J. Geosci.* 118, 17. <https://doi.org/10.1186/s00015-025-00487-6>
- Rajabi, M., Sliwa, R., Esterle, J., 2025. Beneath the surface: 3D geological model of northern Bowen Basin. *Australian Energy Producers Journal* 65. <https://doi.org/10.1071/EP24214>
- Ranjarkarami, R., Rajabi, M., Tavoosiiraj, P., 2025. Pore pressure in the Beetaloo Sub-basin. *Australian Energy Producers Journal* 65. <https://doi.org/10.1071/EP24099>
- Rajabi, M., S. Lammers, and O. Heidbach (2025), WSM database description and guidelines for analysis of horizontal stress orientation from borehole logging, WSM TR 25-01, 118 pp, GFZ Helmholtz Centre for Geosciences, <https://doi.org/10.48440/WSM.2025.001>

4. New contacts in 2025

- Ms. Parisa Tavoosiiraj, the University of Queensland, Australia
- Dr Indira Shatyrbayeva, Technical University of Munich, Germany
- Mr Aditya Velagala, GFZ Helmholtz Centre for Geosciences, Germany
- Dr. Gerd Klee, SolExperts/Mesy, Bochum, Germany
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5. Usage of ILP funding in 2025

- 3,540 Euro for business trip visiting the EGU conference and WSM meetings
- 254 Euro for printing a professional roll-up of the new World Stress Map 2025 for presentations at meetings and as background for television interviews

6. Activities planned for 2026

- EGU session on Stress in the Crust – Quantification, Modelling and Uncertainties, EGU 2026, Vienna
- PI Rajabi aims to conduct a research visit to GFZ-Potsdam to work on the stress magnitude and pore pressure data for the new WSM 2026 release
- Co-editing a special issue of the Geological Society of London on Lithospheric stress including a WSM review paper for its 40 years anniversary