



**Call for Participation in the ICDP Workshop**  
**“Probing the heart of an earthquake and life in the deep subsurface”**  
on 16-17 October 2025 at Klerksdorp, South Africa

ICDP-PROTEA (Probing the heart of an earthquake and life in the deep subsurface) is proposed to examine the nucleation site of the M5.5 earthquake and the microbial ecosystem in and around the brine fissure in a deep South Africa gold mine. It will also conduct a seismic structure survey using a 3D network deployed along tunnels and in boreholes. PROTEA is driven by key questions related to seismogenesis and deep life, including:

1. How do variations in the mechanical properties and conditions along faults affect earthquake nucleation, propagation, and termination?
2. How do interactions between continental and mantle-derived rocks and fluids, under the pressure-temperature conditions at or below natural seismogenic zones, generate rheological diversity?
3. What is the extent of microbial ecosystem diversity in an environment that simulates the expected Martian underground conditions?

The preceding project, ICDP-DSeis (Drilling into seismogenic zones of M2.0-M5.5 earthquakes in deep South Africa gold mines) successfully probed metamorphic minerals in an altered ultramafic dike that hosted the aftershocks of an M5.5 earthquake through full-core drilling from a depth of 2.9 km at the Moab Khotsong mine. Friction tests and stress measurements were conducted using the recovered cores to investigate the termination of mainshock rupture and the generation of aftershocks. A long-isolated (1.2 Ga), hypersaline (24 wt% Na-Ca-Cl), high-temperature (54°C) brine fissure was found in a mafic dike. The discovery of microbial ecosystems in the brine opened a new window for the deep life exploration at the Witwatersrand basin.

The ICDP-PROTEA workshop will be held in the hybrid format of in-person and online on 16-17 October 2025 at Protea Hotel Klerksdorp, South Africa, with co-sponsoring from Tohoku University, University of the Witwatersrand, South African National Committee of ICDP, South African Department of Science and Innovation, the Spanish Embassy in Pretoria, and Association of Spanish Researchers in Southern Africa. Scientific objectives, potential drill sites, operations, logistics and funding will be discussed. The workshop will be followed by an optional field trip on 18 October to the underground drilling site and the Vredefort meteorite impact site where the same stratigraphy as that recovered by the DSeis and PROTEA projects outcrops.

Members of the international scientific community who wish to contribute to the ICDP-PROTEA are invited to submit an application form (<https://forms.gle/Qzo7sebgGHve3UTB6>, QR code on the top-right) in which contact details and a summary of relevant expertise and intended contribution (max. 2000 chars) are required. The in-person participants will be limited to a maximum of 50 persons. Full or partial travel support will be available. Preference will be given to early career researchers, to scientists from ICDP member countries and those with interest in joining ICDP, and to scientists whose expertise complements that of existing project participants. Application will be closed on 10 August 2025.

**If you have any questions, please contact us at [icdp-protea@ml.tohoku.ac.jp](mailto:icdp-protea@ml.tohoku.ac.jp)**