4. Offshore seismic stratigraphy

2.5 km

Seismic reflection data from offshore

Fig. 3A (GIBFRAN46, marinetraffic.com).

Institute of Geoscience and Mineral Resources (KIGAM) and Brazil's Coordination Republic of China Ministry of Science and Technology (MOST), the South Korea IODP members are platform providers, the U.S. National Science Foundation (NSF), Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), and ECORD. Additional funding is provided by the Australia-New Zealand IODP Consortium (ANZIC), India's Ministry of Earth Sciences (MoES), the People's Republic of China Ministry of Science and Technology (MOST), the South Korea Institute of Geoscience and Mineral Resources (KIGAM) and Brazil's Coordination for Improvement of Higher Education Personnel (CAPES) programme.

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Credits: front cover, the Corinth Canal; insets from top, westward perspective view of the structure of the rift of Corinth (credit Rebecca Bell), eastward view of the landscape of the Gulf of Corinth. Inside, map and logo: ECORD Science Operator (ESO), drillship (GIBFRAN46, marinetraffic.com).
Continental rifting is fundamental for the formation of ocean basins, and active rift zones are dynamic regions of high geohazard potential. The Corinth Rift, Greece is a unique laboratory situated in one of the most seismically active areas in Europe. Geologically the Corinth Rift is a young rift, forming in the last 5 million years. The main rift today is situated across a marine basin, which with its closed drainage system and high sedimentation rates, makes it an ideal location to examine early rift development and how the landscape responds to tectonic and climate forcing factors.

What is exciting about this project is that with high strain rates across the rift, extension rates up to 10-15 mm/yr, and high sedimentation rates, it may be possible to gain an insight into the rifting process with unprecedented resolution in both space (1-10's kms) and time (20-50 kyr).

The team will also be able to look at the fluctuations between the rift being a marine basin and an isolated lake. It is hypothesised that this environmental fluctuation relates to 100,000 yr climate cycles, making the basin a lake when sea levels are low in glacial times. However, the only way to address this and obtain dates for these cyclic sediment packages is by coring.

The scientific team will core in three different locations, up to a depth of 750 m below the seabed, with the aim to address questions on four main themes:

- **Structural Evolution** - How does the rift actually evolve and grow and over what timescale? How does the activity on faults change with time?
- **Surface Processes** - How does the development of the rift and movement on the faults modify the drainage of sediments into the rift? How does the landscape respond to tectonic and climatic changes?
- **Natural Hazards** - As one of the most seismically active areas in Europe, what are the implications for earthquake activity in a developing rift?
- **Paleoclimate reconstruction** - What was the climate and paleoenvironment in the Eastern Mediterranean like in the past? Can we provide high-resolution records for past environments and climates from the sediments deposited within the rift?

The offshore coring phase will last for 47 to 56 days and involve coring deep beneath the seafloor from a specialised geotechnical vessel. Approximately 30 scientists, including two Greek participants and the two Co-chief Scientists, will participate in the expedition Science Party, which is planned and conducted by the European Consortium for Ocean Research Drilling (ECORD) as part of the International Ocean Discovery Program (IODP).

Due to the limited facilities available offshore, only a minimum number of measurements will be made on the vessel. For this reason, not all members of the Science Party will participate offshore. The entire team will meet for an onshore phase (the "Onshore Science Party") held at the IODP Bremen Core Repository and MARUM laboratories in Germany, planned for early 2018. Here, the core will be split into a working and an archive half. The working half will be described, analysed and sampled by the scientists. The core materials will be preserved at the IODP Bremen Core Repository for future research needs by the global scientific community. The initial results from the expedition will be published in peer-reviewed journals, the IODP Proceedings, and in the ICDP-IODP Journal "Scientific Drilling". One year from the end of the onshore phase, the cores and all shipboard data acquired during the expedition become available for use by any scientist who wishes to study them.