

DETRITAL THERMOCHRONOLOGY: A KEY TO CONSTRAIN THE ROSS ICE SHEET DYNAMICS AND THE TECTONIC EVOLUTION OF TRANSANTARCTIC MOUNTAINS

The Ross Sea is a crucial area for a better understanding of the ice dynamics in Antarctica as it records the evolution of both East and West Antarctic Ice Sheets, whose variations are a direct response to climatic changes. Many information are stored in the marine stratigraphic record in which uplift of the Transantarctic Mountains chain, basin formation and ice sheet fluctuation left a diagnostic signature. For this reason, the Ross Embayment have been deeply investigated by numerous drilling projects during the last 30 years and it is considered the main objective of future international drilling projects. In particular, this project will concern two main drillings off-shore the Transantarctic Mountains. The Cape Roberts Project (CRP) drill site is located near the coast (ca. one hundred km to the modern Ross Ice Sheet front) and it yields a nearly continuous Oligocene to early Miocene (34 Ma to 17 Ma) sedimentation history. The CIROS site is located about 50 km more to the south and was drilled in marine glacial strata dating back to the early Oligocene. These cores are therefore crucial for understanding the early history of the Antarctic Ice Sheet and the rise of the Transantarctic Mountains.

The project is based on a multidisciplinary approach to obtain detailed information on provenance of sediments. Data will acquired by thermochronological and geochronological techniques (fission-track, U-Th/He, U-Pb and Ar-Ar analysis) and by more “classical” methodologies (e.g. sandstone and clast petrography). Results will be finally discussed in the framework of possible scenarios depicted by large-scale modelling of the ice dynamics.

The project is funded by a grant from the PNRA 2013 program (“Forzanti climatica e tettonica sui processi di dispersione dei sedimenti nel West Antarctic Rift System della South Victoria Land: uno studio di provenienza “Source-to-sink” e “multi-proxy”; national coordinator: prof. Franco Talarico, Univ. Siena).