



TRACERS project: preliminary results tephrochronology study of the Ross Sea, Antarctica

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Marine sediment sequences from the polar regions, in addition to offering the highest potential paleoclimatic and paleoenvironmental archives, may contain deposits produced during large explosive volcanic eruptions e.g. tephra. These materials are usually dispersed over wide areas, as large as thousands of km². Tephra layers are isochronous marker horizons and can provide important time-stratigraphic information if geochemically fingerprinted and tied to a known, dated eruption, or used as cross-correlated time horizons between natural records, offering an accuracy difficult to achieve with other methods. In addition, the study of tephra provides significant data and constraints for volcanological reconstructions e.g. the age of eruptions, their recurrence, dynamics, as well as the spatial and temporal evolution of volcanic activity.

ROSSTEPHRA project, carried out within the Italian PNRA (2010/A2.12), demonstrated that marine sediment of the Ross Sea, Antarctica, contain a number of primary tephra layers (Del Carlo et al. 2015) that are datable and correlatable to on-land volcanic sources. This project laid down the groundwork for the new multidisciplinary research project TRACERS aimed at the tephrochronology-tephrostratigraphy study of selected sediment cores sampled in Ross Sea, downwind the principal volcanic edifices.

Here we present the preliminary results of TRACERS project. In the framework of XXXII PNRA - Antarctic campaign in the Ross Sea, Late Quaternary sediments sequences deposited on the continental shelf of the Ross Sea were recovered; in particular, 8 piston cores and relative box cores were sampled in 5 areas strategically positioned as a function of the possible dispersion of volcanic products, resulting in more than 48 m of sediment sequences sampled. In these sequences, sedimentological characterization, magnetic susceptibility analysis and XRF core scan in-continuum geochemical characterization allowed to found a conspicuous number of primary tephra and cryptotephra layers. The geochemical fingerprinting and dating of tephra layers is in progress.

Preliminary results of TRACERS projects have proven the validity of the multidisciplinary approach in polar region to contribute substantially to the improvement of the chronological framework of the area. In addition, the future result may contribute to gain new knowledge about eruptive history of the Antarctic volcanoes (age, frequency, intensity of eruptions, volume of the material erupted).