

## **Tephrochronology of glaciomarine sediment sequences of the Ross Sea, Antarctica: a tool for the correlation of natural archives**

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### **Abstract**

Marine sediment sequences from the polar regions, offer one of the most important potential archives in terms of paleoclimatic and paleoenvironmental studies. Due to the low water temperature carbonates are not preserved in the water, for this reason it's difficult to obtain a high resolution stratigraphy from Antarctic sediment sequences. But usually, these archives contain tephra layers produced during large explosive volcanic eruptions of Antarctic and peri-Antarctic volcanoes. 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 Antarctica, the tephrochronology can contribute substantially to the improvement of the chronological framework of the area and give a great support to research on local and global paleoclimate. In particular, marine sequences of the Ross Sea can contain tephra produced by volcanoes of the North Victoria Land, which have been very active since 500 ka.

Recent studies, carried out within the Italian Programma Nazionale di Ricerca in Antartide (ROSSTEPHRA project 2010 / A2.12), have demonstrated that marine sediment sampled on the continental shelf of the Ross Sea, along the North Victoria Land, have an extremely high potential for tephrochronological reconstructions (Del Carlo et al. 2015) laying the groundwork for the new research project TRACERS which has as the main focus the tephrochronology-tephrostratigraphy study of selected sediment cores sampled from Ross Sea continental shelf. Here we present the final results of ROSSTEPHRA project and the preliminary results of TRACERS project.

Both 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, their results contribute to gain new knowledge about eruptive history of the Antarctic volcanoes (age, frequency, intensity of eruptions, volume of the material erupted).

**Keywords:** Tephra, Tephrochronology, Ross Sea, Explosive volcanism, North Victoria Land volcanoes, glaciomarine sequences

### **References**

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