# Title: Plio-Quaternary volcanoclastic sedimentation in core successions of the Tyrrhenian Basin, IODP Leg 402: stratigraphic and volcanological implications

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**Proposal**

This proposal is addressed to the study of more than 400 samples of volcanoclastic deposits found along the successions drilled along a transect during the IODP Leg 402 (Tyrrhenian Continent-Ocean Transition) and already available for the shore-based scientific team. The main objectives of this research can be summarized as follows:

* Building a tephrostratigraphic framework of the area to provide a chronology of the Plio-Quaternary sedimentary pile covering the basement. This is mandatory within Objective 1 of the proposal: “To determine the kinematics and geometry of the extensional deformation in space and time in the basin”.
* Defining an “event stratigraphy” and mapping major “megabeds” in the area (with or not interim storage) integrating petrophysical and seismic data. This implies a properly discrimination between primary and secondary volcaniclastic deposits and the understanding of transport and depositional mechanisms, which are, up to date, one of the main key points for volcanoclastic sedimentology and hazard assessment.
* Reconstructing the Italian explosive volcanic history from the marine record, possibly older than the Pleistocene and including the activity occurred at Sardinia region. The achieving of this objective is favoured by the availability of long (ca 300 m) and well preserved sedimentary sequences.
* Developing new emerging analytical methods on ancient tephra to discriminate between volcanic sources related to different geodynamic settings.

# Research Program

Research plans can be organized as follows:

* The **First year** will bededicated essentially to the study of those samples selected along the most continuous and best preserved drilled sequence, which should ensure a preliminary chronological framework. Samples from volcanoclastic units characterized by large volume and correlated throughout the deep basin sequences (megabeds) will be also characterized chemically and lithologically. This will be possible through the integration of our data with those deriving from other disciplines (e.g. micropaleontology, petrophysics) and attending meetings with the onboard scientific party.
* During the **Second year** the number of analysed samples will be intensified. This will be done according to selected time windows of particular stratigraphic interest and to occurrences of good potential isochrones from other sites. In case of need, extra samples will be available at the IODP core repository in Bremen. For key topics, the submission of papers is planned according to IODP data policy.
* The **Third year** will focus on the elaboration of results, submission of papers and dissemination.

Type of data on volcanoclastics (glasses and minerals), techniques and collaborations:

Morphology and Major-elements content: SEM-EDS at DiSTAR, WDS at an external lab to be defined.

Minor and trace-element content: LA-ICP-MS at CNR-IGG (dott. Alberto Zanetti)

Isotope Composition (Pb, Sr-Nd) : MC-ICP-MS at Distar (Prof. Massimo D’Antonio)

Petrophysical properties: CNR-ISMAR (dott.ssa Filomena Loreto)

XRF: Walter Menapace, MARUM-Università di Brema