

## Thesis Template

### TITLE

- **Marine response to climate changes during the late Holocene.**

Name of the **supervisor**: Roberto Rettori

Name(s) of a **potential co-supervisor(s)**: Giulia Margaritelli, Helena Checa Sánchez

Prospective **assistance** in the supervision (Lab activity, fieldwork, ...): Lab activity

**Prerequisites** based on specialization or specific compulsory courses or (if any): Micropaleontology, biostratigraphy, geochemistry.

Brief **description** of the planned research and references if needed, including the 1) **objectives**, 2) the **study area** and 3) the **research methods** foreseen:

Climate variability reflects the interactions between natural forcing and external forcing and has an important influence on the socio-economic development, ecological systems and human issues. For a better prediction and understanding of possible future climate evolution, it is essential to understand the mechanisms, causes, and amplitude of natural climate variability. Paleoclimate information facilitates understanding of Earth system feedbacks on time scales longer than a few centuries, which cannot be evaluated from short instrumental records (IPCC 2013).

In this framework, the Mediterranean area is considered one of the most responsive regions to global change. In the Mediterranean area the effects of the climate change, likely supplemented by human activities, are rapidly transferred to the deep sea via an effective thermohaline circulation, pointing to the exceptional sensitivity of the coupled ocean and atmosphere dynamics to combined anthropogenic and natural climate forcing in the region.

In this framework, planktonic foraminifera represent the most important tool for monitoring for paleoceanographic, paleoecological and sea-surface temperature reconstructions through the properties of their fossil assemblages or as a substrate for extraction of geochemical signals. The high abundance and the excellent preservation of planktonic foraminifera in marine sediment make them probably the best fossil record on Earth, providing unparalleled archives of morphological change, habitat and ecological variations.