



Paleoclimatic changes occurred during the last two centuries in the Gulf of Gaeta (central-eastern Tyrrhenian Sea): a contribution of NEXTDATA project

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A high-resolution integrated study, which includes tephrochronology (tefra layer associated to 1906 AD Vesuvius event) and radionuclide dating method (^{210}Pb and ^{137}Cs), has been performed in a super-expanded marine record (sedimentation rate of 0.47 cm/yr) from the continental shelf of the Gulf of Gaeta (central eastern Tyrrhenian Sea). Planktonic foraminifera, calcareous nannofossils, pollens and oxygen stable isotope data performed on *Globigerinoides ruber*, revealed environmental changes occurred during the last two centuries. In detail we recognise four paleoclimatic changes. From ca. 1800 to ca. 1865 AD, d18O G. *ruber* signal combined with evidences of abundance increase of planktonic foraminifera *Globorotalia inflata* and *G. truncatulinoides* and of calcareous nannofossils *Emiliana huxleyi* document cold-temperate phase. Between ca. 1865 and ca. 1882 AD, d18O G. *ruber* record document a short warm interval associated with a turnover from carnivorous to herbivorous-opportunistic planktonic foraminiferal species and an increase in abundance of calcareous nannofossil *Florisphaera profunda*. At ca. 1935 AD, d18O G. *ruber* data indicate a gradually warming, concomitant an evident turnover from carnivorous to herbivorous-opportunistic planktonic foraminiferal species, and associated to the increase of calcareous nannofossil *F. profunda*. From ca. 1950 AD to the present day the warm phase documents a further strong increase in *G. ruber alba*, *G. quadrilobatus* and *F. profunda* abundances.

The pollen analysis carried out on the same core revealed a two-step increase in arboreal vegetation, this is mostly related to a rise of *Olea*, *Quercus* evergreen and riparian trees (*Alnus* and *Salix*) from ca. 1882 AD, and increase in conifers (*Pinus* and *Cupressaceae*) from ca. 1980 AD. The short lived warm interval documented by d18O between ca. 1865 and ca. 1882 AD may triggered the increase in *Olea* and the coeval general decrease in deciduous trees. Among herbs, *Cyperaceae*, along with ferns, show a progressive decline in the upper part of the record, especially from 1935 to the present, suggesting a reduction of wetlands. Since 1920 AD, significant frequencies of dinoflagellate cysts may reflect both a nutrient loading and temperatures increases, as also documented by d18O and micropalaeontological records.

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