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Foraminiferal proxies for reconstructing the recent environmental evolution of the western Orbetello lagoon (Central Italy)

M.C. Succi (1), L. Bergamin (2), E. Romano (2), M.G. Carboni (1)

(1) Dipartimento di Scienze della Terra, Sapienza Università di Roma, Italia, (2) ICRAM, Istituto Centrale per la Ricerca scientifica e tecnologica Applicata al Mare, Roma, Italia. (mariacristina.succi@uniroma1.it)

Benthic foraminifera are considered good environmental indicators due to their short life-cycle, abundance and diversity in marine and lagoonal sediments. Furthermore, they are preserved in the sedimentary record. Lagoons are characterised by rapid and wide changes of abiotic parameters that determine a natural environmental stress evidenced by changes in foraminiferal abundance and diversity and increase of abnormal specimens. The anthropogenic impact may concur in modifying these foraminiferal features.

Foraminifera from three cores, up to 1 m thick, has been studied in order to reconstruct the recent environmental evolution of the western Orbetello lagoon. The study area is a brackish coastal lagoon situated along the coast of Tuscany, classified as damp zone of national interest after the 1977 Ramsar Convention. Nonetheless, the area was affected in past times by pollutants deriving from sewages, aquaculture, and a plant producing artificial fertilizers.

The statistical analysis (HCA) has been carried out on the quantitative results of foraminiferal analysis. Three distinct assemblages, testifying different ecological conditions, have been recognised. Two assemblages are dominated by *Ammonia parkinsoniana* but show different species diversity, corresponding to different degree of confinement in the lagoonal environment. The third assemblage may be considered as oligotypic, because it includes nearly exclusively *Haynesina germanica* and *Ammonia*

parkinsoniana, and corresponds to the highest degree of confinement in the lagoon.

In the three cores, samples below 40/50 cm are barren. This feature suggests very high environmental stress corresponding to conditions unfavourable for the development of benthic life. Above, the succession of the three assemblages suggests the evolution from restricted conditions characterised by low foraminiferal density and diversity to more open conditions in the top samples of the three cores. The general high occurrence of abnormal specimens, over the natural thresholds, evidences overall conditions of environmental stress. Geochemical analyses are in progress in order to distinguish the natural and anthropogenic component such stress.