



## **A multidisciplinary approach for studying the forest reserve of Metapontum (southern Italy) affected by salt water intrusion phenomena.**

A. Satriani, A. Loperte, T. Simoniello, M. D'Emilio, C. Belviso, V. Lapenna.

Institute of Methodologies for Environmental Analysis, National Research Council, Tito scalo, Potenza, Italy.

Forest Natural Reserve of Metapontum (Basilicata, southern Italy, N 40° 22', E 16° 51') was affected by wildfires, droughts and saltwater intrusion phenomena, which have caused the decline of the existing pine forest with the consequent ecological and environmental problems. The soil salinity in this coastal area is a serious problem and it is mainly due to marine water intrusion. A multidisciplinary study based on chemical-physical, geochemical, geophysical and satellite observations was carried out to evaluate the seawater intrusion effects in the forest reserve of Metapontum. In April and in June 2006 two geophysical field campaigns were performed by integrating soil and groundwater samplings, electrical resistivity topographies and resistivity maps (ERT and SEV). The aim of geophysical surveys and sampling was the characterization of saltwater intrusion process into the forest reserve and its effects on vegetation. Laboratory measurements on soil and water samples confirmed results from geophysical surveys giving a contribute for better evaluating the chemical and physical soil parameters. Moreover, the geochemical analyses identified a sub-alkaline pH with values ranging from 7.60 to 8.10 that is not a limiting condition for the diffusion of the forest species, but the presence of a high concentration of soluble salts, probably, turn out to be the limiting factor. Furthermore, the analysis of satellite images was performed for obtaining information about the time-dependent changes of vegetation canopy in the study area. After a first period of vegetation recovery diffused all over the area, in the second stage we identified stabilization for vegetation affected by salty water and a further increase in vegetation vigour in the neighbouring areas. Such first results show that the decline in vegetation activity of the forest reserve is mainly a consequence of the saline contamination, despite of the arrangement works originally

executed to preserve tree roots from sea water intrusion.