



Integration of remote sensing and ground-based techniques for the study of land degradation phenomena in coastal areas.

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Land degradation processes, such as salinization and waterlogging, are increasingly affecting extensive areas devoted to agriculture threatening the sustainability of farming practices. Soil salinization typically appears as an excess accumulation of salt generally pronounced at the soil surface. Commonly, soil salinity is defined and measured by means of laboratory measurements of the electrical conductivity of liquid extracted from saturated soil-paste or different soil-water suspensions. Lab measurements are generally time consuming, costly, destructive, untimely for practical situations where the determination of the causes and/or the assessment of management practices are of interest. Recently, emerging survey techniques proved to be powerful tools to support soil salinity appraisal reducing costs and increasing the amount of spatial information.

In the frame of PRO-LAND project (PO-FESR Basilicata 2007-2013) the research activities have been focused on the study of a complex salinization phenomenon occurring in a coastal environment of the Basilicata region (Southern Italy) as a result of natural and anthropic disturbances.

The study area is located in the southernmost part of the Bradanic Trough along the sandy Ionian coastal plain. The hydrogeological conditions affect shallowness of the aquifer (45-50 cm below the ground) allowing the occurrence of seawater intrusion. Moreover, during last century, human activities, i.e. built-up of dams, the emergence of farms and industries, played a relevant role in the alteration of soil and groundwater quality of the area.

In this work, both ground-based and remote sensing data were used. First, a geophysical mapping of electrical conductivity was carried out using a multi-frequency portable electro-magnetic induction (EMI) sensor. Based on the geophysical mapping and on optimization sampling approach, a number of locations were identified to collect soil samples for the geomineralogical characterization. Airborne images were acquired on the study area by the hyperspectral Compact Airborne Spectrographic Imager (CASI) - 1500 to derive indices sensitive to soil degradation.

The main aim of this research activity was to improve the knowledge about the most relevant driving forces, contributing to the analyzed degradation process, and their interplay within the study area.

In the light of this, we also would like to suggest the most appropriate best practices and restoration activities to be undertaken.