

SALTWATER CONTAMINATION IN THE VENICE LAGOON MARGIN, ITALY. 1: THE INFLUENCE OF THE GEOMORPHOLOGICAL SETTING

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The coastal area bounding the southern margin of the lagoon of Venice, Italy, was reclaimed for agricultural purposes between the end of the XIX century and the beginning of the XX century. Presently, it is a precarious environment subject to both natural changes and anthropogenic pressures. One major environmental problem is the saltwater contamination of the shallow aquifers and soils that yields a strong negative effect on the productivity of the farmlands. Saltwater intrusion is enhanced by a land elevation well below the mean sea level, the seawater encroachment along rivers and channels during the dry periods, the drainage activities implemented to keep dry the farmland, and the presence of several ancient sandy fluvial ridges and buried paleo-channels. As part of a research project aimed at understanding the dynamics of the saltwater intrusion and its effects on the soil productivity by an experimental and a numerical approach, a 25-ha basin was selected just south of the Venice Lagoon and approximately 6 km far from the Adriatic Sea. The contribution reports on an accurate investigation carried out to characterize the geomorphological features of the area, identifying possible pathways of saltwater intrusion. The task was carried out by photo-interpretation of historical aereophotographs, geophysical surveys (i.e., electro-tomography, electromagnetic induction), and about 60 shallows cores distributed in the area according to the variability of the apparent electrical conductivity in the upper 1.50 m soil profile. The results point out a significant depth and areal variability of the soil deposits and the presence of a few sandy paleo-river beds. These latter cross the farmland with a main direction from inland to the lagoon boundary and can act as preferential pathways for groundwater flow and solute transport from the nearby salty waterbodies.