



Spatial and temporal analysis of chloride concentrations in underground water in the coastal wetland of l'Albufera, Spain

Evelina Puhakka, Juan Antonio Pascual-Aguilar, and Vicente Andreu

Centro de Investigaciones sobre Desertificación-CID (CSIC, UV, GV), Degradación y Conservación de Suelos, Albal (Valencia), Spain (juan.a.pascual@uv.es)

Mediterranean coastal wetlands are of great interest for their richness in biodiversity. They are also fragile systems because they are exposed to various human pressures, such as farming systems and urban sprawl. Most Mediterranean coastal wetlands have a transient underground inter phase of continental and marine water. In many cases, the variations of the rain regime towards an increasing dryness and the overexploitation of aquifers in these zones could favour the marine water intrusion, being a source of continental water salinisation and loss of its quality. This process can directly affect the ecosystems and produce loss of biodiversity. Thus, studies to assess the dynamics in time and space of the possible marine intrusion are necessary to evaluate coastal environment health and quality.

The study has been applied to L'Albufera Natural Park, the largest Coastal Wetland in eastern Spain. Due to its importance, it has been included in the list of Wetlands of the RAMSAR Convention. In the area there is a complex relationship between the intrinsic natural importance (endemicity and biodiversity) and the human activities (traditional agriculture and hinterland industrial and settlement development).

The methodological approach is based in the analysis of chloride concentrations time series of thirteen sample water points distributed in and around the boundaries of the Natural Park. All time series, between 1982 and 2008, have been analysed to establish trends both in time and space.

Results show that in samples close to the sea (between 1500 and 2000 metres) chloride concentrations are not too high, with values between 37 mg/l and 213 mg/l. Nonetheless, the shorter is the distance to the sea the higher are the chloride levels, with values between 58 mg/l and 1131 mg/l. For longer distances, more than 2000 from the coast line, values are quite similar in most sample points, from 52 mg/l to 691 mg/l.

Among all the thirteen time series analysed trends are detected in three cases, all found in a distance between 6000 and 10000 metres from the coast line. Two of similar relevance, one is positive ($R^2 = 0.39$) and one negative ($R^2 = 0.34$). The divergent behaviour is possibly explained because the second one has the influence of the water of the Albufera lagoon.

The third case, the most distant samples (more than 8000 metres from the coast line), shows a stronger positive trend ($R^2 = 0.41$) with a major increase in chloride concentrations in the last ten years.

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