



Rio Quequén Grande basin (Argentina): impact of geological, environmental and human activities on water quality

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In spite of the low urbanization and industrialization density of the Rio Quequén Grande basin, the socio-economical development of the last decades has produced a high environmental impact with a degradation of the water resources. This degradation is progressively increasing in intensity and expanding towards more internal zones of the basin. In the present research, we carried out a geochemical characterization of the superficial and underground water of Rio Quequén Grande basin. The Rio Quequén Grande drainage area is about 10.000 km², located in the south-eastern sector of the Buenos Aires Province. It mainly consists of a flat environment of Quaternary aeolian sediments and it flows into the Atlantic Ocean close to Necochea, the principal city within the area. The superficial waters of the principal fluvial branches and the groundwater of the Rio Quequén Grande basin have been sampled during the end of the 2001 and the beginning of the 2002. For the determination of the geochemical composition of the water resources samples from the superficial hydrographic network and wells were collected and analysed in the laboratory. In particular, a) electrical conductivity, temperature and pH have been measured in situ; b) Mg⁺⁺, Ca⁺⁺, Cl⁻, SO₄⁻ and NO₃⁻ anions and cations have been measured using spectrophotometer methods and c) Al, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Mo, Ag, Cd, Pb, and U have been measured using a ICP-MS standard procedure. The integrated analysis of the obtained geochemical results allows us to infer the following: a) The geological setting has a strong influence on the water geochemical composition. b) The intense anthropogenic activity (predominantly farming) heavily contribute to the environmental resource quality. c) The high-risk pollution zones have been recognised. In particular the water analyses show high variations of the physico-chemical characteristics. Also, near the river outlet, Cl

values of about 700 mg/l can be observed due to the intrusion of oceanic salty water.

d) In some of these locations a remarkably high concentration of toxic elements was found. Among those, the arsenic content reaches a concentration higher than 100 $\mu\text{g/l}$ in the north-eastern sector of the hydrographic basin principally due to the lithological composition of the Quaternary deposits locally rich in grains of volcanic origin.