

Water quality and radium isotope results from the Souss-Massa basin, Morocco

T. TAGMA¹, L. BOUCHAOU^{1*}, W. NATHANIEL²,
D. VISON², Y. HSISSOU¹, S. BOUTALEB¹, G. DYWER²,
Z. LGOURNA¹, N. ETTAYFI¹ AND A. VENGOSH²

¹Ibn Zohr University, Agadir, Morocco

(*correspondence: lbouchaou@yahoo.fr)

²Duke University, USA

³Hydraulic Agency of Souss-Massa basin, Morocco

Groundwater and surface waters in the Souss-Massa basin located in the west-southern part of Morocco are characterized by large variations in salinity, up to levels of 37 g L⁻¹. The data show that the water quality of groundwater in the western Souss-Massa basin is degraded by two sources; (1) seawater intrusion into the aquifer; and (2) mixing with geothermal water that is characterized by a distinguished chemical composition (high calcium and sulfate concentrations relative to seawater intrusion). The different calcium to chloride and sulfate to chloride ratios provide a simple, yet powerful geochemical tool that is able to delineate the source of salinity for each of the investigated wells. The preliminary radium isotopes data indicate that geothermal water in the Souss-Massa basin is characterized by relatively high radium (combined ²²⁸Ra and ²²⁶Ra of 9.3 pCi/L) and thus future utilization of geothermal water as an alternative source to the local groundwater degraded by seawater intrusion should be carefully examined given the relatively high level of radioactivity. Salinization of water resources in the Souss-Massa region is also associated with high concentrations of toxic trace metals, with high correlation between salinity, chromium, and uranium. These findings indicate that salinization of water resources may be associated with occurrences of other inorganic contaminants in groundwater and thus investigation of a large spectrum of inorganic contaminants is required to assess the water quality in the Souss-Massa basin.

New insights into the biogeochemical cycling of iron from *in situ* measurements in marine sediments

M. TAILLEFERT*, D. MEIGGS, M. JONES AND J. BECKLER

School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA 30332

(*correspondence: mtaillef@eas.gatech.edu)

The solubility of iron in marine sediments is generally controlled by redox processes, either through the oxidation of ferrous iron by dissolved oxygen, the anaerobic respiration of iron oxides, or the chemical reduction by dissolved sulfides. Ferric iron, however, may remain soluble in seawater if it is complexed by organic ligands. In this investigation, *in situ* voltammetric measurements with gold/mercury (Au/Hg) microelectrodes deployed over long time scales in salt marsh sediments and on a benthic lander in estuarine sediments have been used to study the transformation of soluble organic-Fe(III) complexes near the sediment-water interface. Our results reveal that soluble organic Fe(III) complexes can reach near millimolar levels in pore waters and that the flux of these complexes across the sediment-water interface probably contributes to the significant concentration of dissolved iron in surface waters. Seasonal variations suggest that sulfate reduction and hydrological processes may indirectly control the release of iron from these sediments and thus the supply of an important nutrient to coastal waters.