Geophysical Research Abstracts
Vol. 12, EGU2010-8129, 2010
EGU General Assembly 2010

Spatial and temporal variation of the water quality of an intermittent river – Oued Fez (Morrocco)

Jean-Louis PERRIN (1), Meriem BELLARBI (2), Rémi LOMBARD-LATUNE (1), Naoual RAIS (2), Nanée CHAHINIAN (1), and Mustafa IJJAALI (2)

(1) IRD, Hydrosciences, Montpellier, France (perrin@msem.univ-montp2.fr), (2) FST-USMBA, Fez, Morrocco

In the South of the Mediterranean basin, many rivers are characterized by an alternation of very long dry periods only cut by short flood events. Currently, the socio-economical development of these zones is limited by the water scarcity but also by the poor quality of the water resources. In fact, human activities, generally concentrated in overpopulated cities, generate large quantity of domestic and industrial effluents which are directly rejected in the environment without any treatment. In Morocco, the well known city of Fez illustrates perfectly this situation observed in all the Maghreb countries.

During the dry period, the Oued Fez which crosses the city, is only fed by non-treated anthropogenic inputs. Accumulation of pollutants is observed in the river bed sediments. Domestic and industrial effluents (200 000 m3/day) pollute all the down stream water bodies some of which are used for irrigation and other for fresh water supply. During floods, mainly generated by urban runoff, river bed sediments could be remobilized and a significant flush effect could occur.

This study aims at characterising and quantifying the pollutant concentrations and fluxes in various points of the Oued Fez hydrological network and assessing its impact on the Sebou River; water resources of this river being considered as national priority in Morocco.

Due to the peculiar Mediterranean hydrological regime, specific observation networks are set up to assess the temporal and spatial variability of pollutant fluxes in the river and to rank water and pollutant sources. The sampling sites on the Fez and Sebou oueds are selected based these criteria. A reference station is chosen upstream of the Oued Fez less than 300 metres from the direct anthropic inputs. Water quality is evaluated through nutrients (Total nitrogen, and total phosphorus essentially), heavy metals (essentially chromium) and suspended solids.

The results of 4 sampling campaigns indicate that: in terms of nitrogen, phosphorus and chromium, the pollution levels are high (> 60 mg/l N, > 10mg/l P, > 0,5mg/l Cr, respectively) at the most polluted sites. The nitrogen, phosphorus and chromium fluxes, in steady state conditions, show that more than 500 kg/hour of nitrogen, 60 kg/hour of phosphorus and 2,5 kg/hour of chromium are flushed by the Oued Sebou downstream of its confluence with the Oued Fez. In spite of the high flux values, a significant fraction of the particulate form of studied pollutants are stored in the riverbed sediments, and can be remobilized by the urban flash floods which occur after each rainfall event.