

Fate of organic priority substances accumulated in the sediment of a Mediterranean temporary river: the case of Celone stream (Puglia, Italy)

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Climate change has been strongly influencing the hydrological regimes of Mediterranean rivers. It will lead to a more vigorous hydrological cycle, with changes in precipitation and evapotranspiration rates. These changes will in turn affect water availability and runoff and thus may affect the discharge regime of rivers.

The implementation of the Water Framework Directive (WFD) in catchments with temporary rivers presents a significant challenge for watershed managers which are facing considerable uncertainties on future demand and availability of water. The MIRAGE EU FP7 project is comprehensively investigating the applicability of specific management options under the characteristic flush and drought conditions of temporary streams. One of the key project objectives of MIRAGE is to determine effects of dry periods on accumulation and transformation of hazardous substances accumulated on banks and sediment of the river channels, at selected sites with test catchments. This paper presents the preliminary results of the studies on going under MIRAGE project about the fate of selected classes of organic priority substances in Celone, a temporary stream belonging to the Candelaro river basin in Puglia, South of Italy. Classes of substances (PAH, alkylphenols,) have been selected on the basis of a pressure analysis and survey campaigns on sediment, water and particulate concentrations. Sampling sites were chosen along the Celone stream from a reference site to the basin closure. Whenever possible, sediment have been collected from the river bed, under riffle condition and from river banks or pools where the sediment could remain dry under drought conditions. Different kind of sediments have been collected in the same site on the same campaign, showing significant differences in pollutant concentrations. Sampling campaigns have been carried out in two periods, before and after the drought period in order to follow the fate of sediment accumulated compounds.

The aging of the air exposed sediment under high irradiation conditions can affect the partitioning and bioavailability of hydrophobic compounds whenever the water begins to flow again on the river bed. The role of suspended matter in the remobilisation of hazardous substances has also been investigated. In some cases, resuspension of sediment during high

flow conditions leads to overcome the environmental quality standards (EQS) of selected compounds checked against the whole water concentration.

Field data are evaluated in comparison with laboratory experiments under simulated conditions.

Experiments has been carrying out under laboratory controlled conditions utilising natural river sediments and native biological communities. Target compounds have been spiked and their persistence has been tested. Transformation processes resulting from experimental studies will be compared with field data and hypothesis on goal substances fate and dynamics will be discussed.



Fig. 1: The Celone stream at Castelluccio Valmaggiore (FG) under different flow conditions