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A European vision for hydrological observations and experimentation

OMERE: A Long-Term Observatory of Soil and Water Resources, in Interaction with Agricultural and Land Management in Mediterranean Hilly Catchments

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This communication is dedicated to the Mediterranean agro-hydrological observatory OMERE (Mediterranean Observatory of Rural Environment and Water). It aims to explain the observation strategy and to highlight how this strategy and the associated research have contributed to a better understanding of the impact of agricultural and land management on water and soil resources in Mediterranean catchments.

OMERE is a Franco-Tunisian observatory based on two agricultural catchments, one in northern Tunisia and the other in southern France, representing the diversity of agricultural and ecosystem situations in hilly Mediterranean regions. The observatory was created more than twenty years ago to answer key scientific questions concerning the impact of global changes on soil and water resources (Voltz and Albergel, 2002). More specifically, the motivation has been to study how hydrological processes involved in water cycles and in the mass transport, such as contaminants and sediments, are affected by changes in farming practices and landscape management . The processes underlying these changes may be slow, such as in land use or contaminant dynamics, or infrequent over time, such as erosion. Understanding these processes and their relationship requires long-term observations to capture slow dynamics or infrequent events, which motivated the OMERE observatory.

The OMERE observatory belongs to the French national network OZCAR, dedicated to the observation of the critical zone. The observation strategy is motivated by monitoring the flow of water, sediments and contaminants and hydrological and climatic variables at different spatial scales from cultivated plots and landscape elements to the catchment scale (Molénat et al., 2018). These measurements were made with fine temporal resolution on a long-term scale and examining land use, agricultural practices and soil surface characteristics. The long-term observation strategy aims to support multidisciplinary integrative research to elucidate the conditions that improve soil and water management and the provision of ecosystem services in the Mediterranean context of rain-fed agriculture. The observatory helped to address three scientific questions: (i) better understand water flows, erosion and contaminants, in particular

pesticides, and their natural and anthropogenic factors in the short and long term; (ii) analyze the overall effects of agriculture and land management on mass flows at different scales, from the plot to the watershed or the landscape; and (iii) develop new scenarios for sustainable agricultural management and better delivery of ecosystem services. Some of the main scientific advances of research conducted using the observatory obtained through OMERE are presented. The main perspectives in matter of the observation strategy are also drawn.

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