



## **Declining water resources in coastal Mediterranean river basins in southern France: climatic forcing and mitigation strategies for agricultural land use**

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The Mediterranean area is particularly sensitive to climate change and has been identified as one of the most noticeable “hot-spots” for future projections. Assessment of the evolution of surface water resources is here a key challenge to manage future socio-economic pressure. For the coastal Mediterranean rivers draining to the Gulf of Lions in southern France, our previous studies already identified a 20% decrease of water discharge for the period of 1965-2004 in relation to global warming (+1.5 °C/ 40 yrs), despite stationary evolutions of precipitation. Statistically significant trends were restricted to specific areas such as the headwater catchments in the Pyrenees mountains where reduced snowfall could explain the decreasing water discharge trends. However, including the most recent years (up to 2017), the time series demonstrate that the decline in water discharge still continued and now uniformly applies to all coastal rivers in this area. Water discharge could consequently have been reduced by more than 40% since the years 1960.

Such a strong decline in the available surface water resources is a major thread for sustainable agricultural land use in this area. In order to test this hypothesis, we first updated our hydroclimatic trend analysis including longer time series (1958-2017) and additional parameters (including the spatialized and gridded climatological stations “Safran-Isba” of Meteo France) in order to better understand the climatic forcing of water discharge and identify the most vulnerable areas to recent climate change. These data will be then compared to the corresponding evolution of agricultural land use practices and the hydroclimatic constraints which are considered to allow optimal productions. For the development of possible mitigation strategies, we finally also focus in a special case study on the Tet River Basin where queries on farmers and agricultural institutions will supply additional information. This river basin is particularly interesting as agriculture relies here strongly on a sophisticated and water consuming irrigation network.