



## **Sea surface temperature and torrential rains in the Valencia region: modelling the role of recharge areas**

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Heavy rain events are frequently recorded in the Western Mediterranean causing economic and human losses. A main factor in the development of torrential rains is ocean-atmosphere exchange of heat and moisture that can destabilize air masses travelling over the sea. The study of air mass trajectories previous to the rain event permits the identification of sea areas that could probably contribute to the development or intensification of rainfall. From a Mediterranean sea surface temperature climatology, its spatio-temporal distribution patterns have been studied showing two main distribution modes in winter and summer and transitional regimes in spring and autumn. Hence, three heavy precipitation events, for such winter and summer sea temperature regimes and for fall transition, affecting the Valencia region have been selected to study the effect of sea surface temperature in torrential rains. Simulations with perturbed sea surface temperature in different areas along the air mass path were run to compare results with unperturbed simulation. The variation of sea surface temperature in certain areas caused significant changes in model accumulated values and its spatial distribution. Therefore, the existence of areas that at a greater extent favour air-sea interaction leading to the development of torrential rainfall in the Valencia region is shown. This methodology could be extended to other Mediterranean regions to look for such potential recharge areas. The identification of sea areas that contribute to the development or intensification of heavy rain events in the Mediterranean countries could be a useful prognosis and/or monitoring tool.