



Identification of major sources of moisture and precipitation over Southern Spain

P. Ribera, D. Gallego and C. Peña

Departamento de Sistemas Físicos, Químicos y Naturales, Universidad Pablo de Olavide, Seville, Spain (dgalpuy@upo.es)

Most precipitation studies over Mediterranean regions focus on classical analysis of the spatial and temporal rainfall variability. These studies agree in the strong hydrological stress of the Mediterranean basin, a stress that becomes critical in some highly populated areas as Southern Spain. In addition, most climate models forecast greater precipitation shortages in future scenarios of climate change in these areas.

While the identification of the moisture sources is of the utmost importance to fully characterize the precipitation origin, this topic has historically received much lower attention, in part due to the instrumental difficulties associated to this kind of analysis. Motivated by the excellent skills of the recently developed Lagrangian diagnosis methodologies to analyze the transport of several atmospheric components, a dynamical analysis of the water transport has been implemented. We tracked air masses residing over Southern Spain, computing their humidity changes along its trajectory. The results show that most of the precipitation in the area seems related to water recycling but in addition, important seasonal and interannual differences have been detected. While water recycling is essential along the entire year, a significant humidity transport arrives from as far as the eastern North American Coast during winter. This humidity source appears clearly linked to the position of the Gulf Stream. On the contrary, between September and November, the Western Mediterranean becomes an important water source for Southern Spain.