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Estimation of actual evapotranspiration in two pine forests along the Túria river basin (Eastern Spain), an eco-hydrological approach

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Land use changes in coastal areas of Mediterranean regions are likely to have had a critical effect on local accumulation and feedback of tropospheric water vapor and atmospheric pollutants. The estimation of the contribution of the evapotranspirated water vapor to the total mixing ratio values along the sea-breeze circulation from coast to inland is a key-issue to understand and quantify the critical threshold for the occurrence of convective and orographically aided summer storms in the region. In order to estimate the contribution of water vapor from vegetation cover (Eta) to the perceptible water vapor in breeze circulations along the river valley, we have studied two pine forests (experimental sites) along the Túria river basin (located at the Eastern coasts of Spain). One experimental site is located in the littoral zone (30 km from the coast, at 200 m.a.s.l.), and another in the inland mountain regions (85 km from the coast, at 1200 m.a.s.l.). Both pine forests are composed of Pinus halepensis Mill. with Quercus coccifera L., Pistacia lentiscus L., Erica multiflora L., Rhamnus lycioides L., and Rosmarinus officinalis L. In each experimental site we have established three plots where rainfall, air temperature, relative humidity, solar radiation and soil moisture have been automatically monitored. In one plot per site sap flow of a sample of pine trees has been measured, which allowed estimating the pine transpiration. Using HYDROBAL, we have estimated the daily actual evapotranspiration (Eta) of the pine forest. Sap flow measurements were used as reference data for pine transpiration. This study presents the preliminary results from monitoring the seasonal changes from winter to summer (from January 2017 to July 2017) within a larger research project that aims to improve a regional system for the surveillance and the forecasting of atmospheric risks in an eastern coastal region of Spain. Improved knowledge of the hydrological activity along the basin could strengthen the meso-meteorological forecasts for extreme weather events.

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