Geophysical Research Abstracts
Vol. 12, EGU2010-13844, 2010
EGU General Assembly 2010

Water Table Depth and Potential Capillary Flux to the Land Surface in the Iberian Peninsula

Lucía Gestal-Souto (1), Gonzalo Miguez-Macho (1), and Ying Fan (2)

(1) Non-linear Physics Group, Universidade de Santiago de Compostela, Santiago de Compostela, Galicia, Spain (lucia@fmares.usc.es), (2) Department of Earth & Planetary Sciences, Rutgers University, New Brunswick, NJ 08854, USA (yingfan@rci.rutgers.edu)

The Iberian Peninsula is characterized with a long, dry, and warm growing season, but ecological studies show that trees maintain high transpiration rates in the dry season and that they are resilient to droughts due to their use of groundwater. In this study, we assess the potential role of the groundwater in sustaining vegetation through upward soil capillary flux from the water table. First, we present the available observations of water table depth and the result of a groundwater model simulation constrained by these observations. The simulation is performed at the 9" resolution to adequately resolve the topography-driven groundwater convergence which creates regional wetlands in inland Iberia despite the aridity. The results show a heterogeneous pattern in the water table depths, organized largely by topographic forcing, with 18% of the Iberian Peninsula bounded by shallow water tables (< 10m). We then estimate the theoretical maximum upward water fluxes that different water table depths can support by capillarity, for different soil textures. The results suggest that the potential groundwater contribution to land surface flux is insignificant (<0.5 mm/day) where the water table is deep (>10 m), but indeed very significant (>2.5 mm/day) where the water table is shallow (<5 m), the latter sufficient to explain the observed ecosystem resilience in the long, dry growing season of inland Iberia. The results point to the importance of including groundwater in the land surface component of climate models if the latter are used to represent the ecosystem resilience in parts of the world with a long dry season.