Geophysical Research Abstracts
Vol. 16, EGU2014-15892-1, 2014
EGU General Assembly 2014

Role of vegetation cover on soil water balance in two Mediterranean areas: semiarid and dry at southeastern of Spain.

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Water is a limited resource in the semiarid areas, which affects both, the population services, the economic growth, like the natural ecosystems stability. In this context, an accurate knowledge of soil water balance and role of the vegetation cover contribute to improve the management of resources water and forest. These studies are increasingly important, if we consider the latest Assessment Reports of the Intergovernmental Panel on Climate Change. In this paper the main objectives were focused on:(1)To determine the soil water balance on two different climatic conditions, semiarid and dry climate and(2) Assess the effect of vegetation (structure and cover) on soil water balance under the studied climatic conditions. For this purpose we used HYDROBAL ecohydrological model, which calculates at a daily resolution the water flows through of the vegetation canopy, estimates daily soil moisture and predicts deep drainage from the unsaturated soil layer into the aquifer. In order to achieve these objectives, we have selected two sites in the south-eastern of Spain, on soils calcareous and different climatic conditions. Ventós site in a semiarid Mediterranean area and Confrides site in a dry Mediterranean area, with 303 and 611 mm of annual precipitation respectively. Both sites, the predominant vegetation are afforestations with Pinus halepensis on dry grasslands with some patches of thorn shrublands and dwarf scrubs; but it show difference on trees density, cover and height of pines.Soil water balance was determined in each site using HYDROBAL ecohydrological model on one hydrological year (October 2012 and September 2013).Model inputs include climatic variables (daily rainfall and temperature), as well as soil and vegetation characteristics (soil field capacity, soil wilting point, initial soil water content and vegetation cover index). Model outputs are interception, net rainfall, runoff, soil water reserves, actual evapotranspiration, direct percolation, and deep percolation (or aquifer recharge). In the last decade, HYDROBAL model has been used successfully in semiarid conditions, to assess the soil water balance on different vegetation cover types, and the effect of different land-use scenarios on water resources and aquifer recharge. Results highlight the role of vegetation cover type and volume of annual rainfall on the soil water balance. Both sites present similar percentage of vegetation cover(>80%), however in Ventós site (semiarid area), a lower pine cover (44%) and lower volume of annual rainfall produced differences in the soil water balance. In Confrides site (dry area), in spite of show the twice of annual rainfall, a higher pine cover (78%) reduced the net precipitation and consequently affected the soil water balance. An understanding the role of vegetation cover on soil water balance is a very useful tool to implement an optimal management of forest and water resources.