The ecohydrological effects of dew in a desert environment,northwestern China

*Yanli zhuang[1,2,3]

1.Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, 2.Linze Inland River Basin Research Station, 3.Key Laboratory of Inland River Basin Ecohydrology

Dew, as a supplementary water source, may have an important ecological role in arid and semi-arid regions. During August and September of 2007, 2008 and 2013, measurements on dew formation amount and duration were carried out in three different habitats (dunetop, footslope and interdune lowland) of a fixed sand dune in Northwest China. The results indicated that there was a positive correlation between dew amounts and relative humidity, but a negative correlation between dew amounts and mean temperature. Clear mornings were characterized by higher dew amounts and longer dew duration, whereas less dew was recorded during cloudy and especially windy mornings. Dew continued to condense even after sunrise, although a shorter warming time after dawn is also of vital importance in dew formation. The higher average maximum dew quantities (0.06 mm) and longer average dew duration (2.3 h) occurred in the interdune lowland; the lower and shorter average dew amounts (0.048 mm) and duration (1.9 h) were obtained at the dune top. The footslope habitat exhibited intermediate values. Clearly, the differences in dew deposition can be partially attributed to the distinguishing characteristics of the microhabitats. The present study highlighted the impacts of these characteristics on near-ground dew condensation accumulation and evaporation in a fixed sand dune, and may facilitate evaluation of the role of dew in arid and semi-arid environments. In addition, the ecological implications of dew as a water resource in the desert ecosystem cannot be neglected. Dew may improve survival rate of desert plant species and reduce plant transpiration rates, as well as to help in priming the seeds of annual desert plant species during dry seasons.

Keywords: Dew amounts, Dew duration, The ecohydrological significance

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