



Quantification of water budget components of land surface elements at provincial scale

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Based on the observed soil moisture data at 33 agro-meteorological stations at 5 cm, 10cm, 20cm, 50cm soil layer from 1992 to 2005, the vegetation available soil moisture (ASM) in the unit of depth within the soil layer is analyzed. It is found that ASM shows strong spatial variability with the values increasing from northwest (Shanxi) to south, east and southeast (Henan). Soil moisture status is poor in the loess plateau, with the minimum at Suide, Shanxi. Soil moisture status is rich in the south of Shanxi and Henan, with the maximum of the average value being at Xinyang, Henan. The vertical variation of ASM is not obvious. By using principal component analysis and linear correlation between the ASM and the influential factors, it is found that there is a positive relationship between ASM and field capacity, soil density, longitude, irrigation, precipitation, and a positive relationship between ASM and latitude and elevation above sea level. The correlation between ASM and irrigation is stronger than the correlation between ASM and precipitation. Generally speaking, ASM at lower elevation above sea level is higher than the ASM at higher elevation level. This correlation becomes stronger with the increasing of soil depth. The correlation between ASM and soil density is weaker than the correlation between ASM and field capacity. The correlation between ASM and soil density at the deeper soil layer is stronger than the correlation between ASM and the soil density at the surface soil layer. With the com-

parison between the two provinces, to most of the soil moisture stations, the effect of field capacity and soil density on soil moisture at the two provinces is equivalent. The effect of climate on soil moisture in Shanxi is weaker than that in Henan. However, the comprehensive effect of all the influential factors on soil moisture in Shanxi is stronger than that in Henan.