



The effect of shallow groundwater on soil temperature and soil heat flux near land surface

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Using soil temperature oscillations, the present study investigates the effect of shallow groundwater on land surface. Although some previous studies restricted the effect of shallow groundwater on soil temperature to one meter depth, this study showed that this effect can be up to the very near land surface. Soil temperature readings (taken every ten minutes for six days at two depths -approximately 5 and 10 cm- and in seven locations of different water table depth) were analysed and correlated to water table depth. The results showed strong relations between water table depth and both average and amplitudes of soil temperature oscillations at land surface. This study also showed that shallow groundwater can affect the energy balance at land surface by affecting the magnitude of soil heat flux. These effects were explained using both conceptual and numerical models.

The findings of this study pave the way for future studies of detecting shallow groundwater depth using remote sensing. Also they recommend further attention to including the effect of shallow groundwater on energy balance in land surface models.

Keywords: Shallow groundwater, Soil temperature, Soil heat flux.