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The Bulk Transfer Coefficient and Characteristics of ground heat source on Alpine Grassland at Naqu

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The bulk transfer coefficient for heat and vapour are key parameters for estimating surface fluxes between the land surface and the atmosphere in land processes models. This paper investigates the seasonal variations of the bulk transfer coefficients and their performance in estimating surface fluxes over alpine grassland in Tibetan Plateau based on the data from the Naqu Station of Plateau Climate and Environment in the Norther Tibetan Plateau, Chinese Academy of Sciences and the Naqu Weather Station of the China Meteorological Administration. The results suggest that the monthly average of the relative humidity close to the underlying surface at Naqu Station was the highest in September, reaching 62.18%, and the lowest was in February, which was 32.86%. The monthly mean bulk transfer coefficient for heat C_H at Naqu Station vary from 1.6×10^{-3} to 2.7×10^{-3}, and the monthly mean bulk transfer coefficient for vapour C_λ at Naqu Station vary from 1.0×10^{-3} to 2.0×10^{-3}. The surface fluxes at Naqu Weather Station from 1980 to 2016 are calculated, the annually averaged sensible heat fluxes H from 1980 to 2016 showed a significant decreasing trend, and the mutation occurred in 2004. The trends of annually averaged H opposite in the year before and after 2014. The annually averaged LE from 1980 to 2016 showed a segmental uptrend, and a sharp drop occurred in 2005-2007. And the annually averaged of surface heat sources showed a fluctuant trend. The seasonal variation of latent heat flux at Naqu Station is more obvious than the change in sensible heat flux. The work will be helpful to obtain reasonable coefficients for heat and vapour over Tibetan Plateau in the numerical models as well as the thermal effect of Tibetan Plateau.