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Study on the Land-Atmosphere Interaction in the Coordination Effect of Westerly Wind and Monsoon

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Different underlying surfaces have differing diversities, complex compositions and uneven distributions and contribute to diverse and complex land surfaces. As the main input factor for atmospheric energy, the surface greatly affects the various interactions between the ground and the atmosphere and even plays a key role in local areas on the Tibetan Plateau. The characteristics of the atmospheric boundary layer structure of the plateau and the land-atmosphere interaction under the control of different wind fields in the south branch of the westerly wind and the plateau monsoon are discussed. Results show that the height of the atmospheric boundary layer at each station under the westerly south branch wind field is higher than that under the summer monsoon wind field. The height of the convective boundary layers of Mount Everest, Nyingchi, Nagqu and

Shiquan River in the southwest wind field are 3250 m, 2250 m, 2760 m and 3500 m. while the height of the convective boundary layers of Mount Everest, Nyingchi, Nagqu and Shiquan River under the plateau monsoon field are 2000 m, 2100 m, 1650 m and 2000 m. The specific humidity of the surface layer at all site is larger on July than it on other months. The specific humidity of the surface layer in Linzhi area is larger than that of the other three regions, and it reaches 12.88 g·kg-1 at the maximum. The wind direction on Mount Everest over 1200 m is dominated by westerly winds in May and October. The wind direction on Nyingchi above 1500 m is dominated by westerly winds in May and October, and in July, winds above 1200 m is dominated by southerly winds. The wind direction of Shiquan River in May and October is dominated by west-southwest wind, and the wind direction of Shiquan River in July is dominated by west-northwest wind. Secondly, variation characteristics of surface fluxes were analyzed by using the eddy covariance observations from four stations of Pailong(entrance of Canyon), Danka (middle of Canyon), Kabu (end of Canyon) , and Motuo (end of Canyon) in the southeastern gorge area of Tibet. The changing trend of monthly averaged daily sensible heat flux at Kabu station is fluctuating. Sensible heat flux and latent heat flux at Motuo station have the same variation characteristics. Latent heat fluxes increase first and then decrease at all four stations. Seasonal variations of soil heat flux are obvious, characterizing positive values in spring and summer and negative values in autumn and winter. The diurnal variation intensity of net radiation flux is summer>spring>autumn>winter. Energy closure rates of Danka, Pailong, Motuo, and Kabu stations are 70.86%, 68.91%, 69.29%, and 67.23%, respectively. Latent heat fluxes and soil heat fluxes increase, and sensible heat fluxes decrease as increasing precipitation at the four stations. The sensible heat flux and soil heat flux respond synchronously to precipitation changes, and the changes in latent heat have a significant lag in response to precipitation changes.