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Long-term variation of characteristics of local land atmosphere coupling over TP and the possible influence of Southern Asian Monsoon

Genhou Sun^{1,2}, Zeyong Hu³, yaoming Ma⁴, Zhipeng Xie⁴, Wei Wei^{1,2}, and Song Yang^{1,2}

¹School of Atmospheric Sciences and Guangdong Province Key Laboratory for Climate Change and Natural Disaster Studies, Sun Yat-sen University, Guangzhou, China(sungh6@mail.sysu.edu.cn)

²Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai)

³Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences

⁴Institute of Tibetan Plateau Research, Chinese Academy of Sciences

This study investigates the long-term variations of local land atmosphere coupling (LoCo) over Tibetan Plateau (TP) by applying a mixing diagram to the observational data at six stations over TP and ERA5 and the possible influence of Southern Asian monsoon. The result indicates that the monthly-mean daily variation in T_{2m} , q_{2m} , H_{sfc} , and LE_{sfc} at Nyingchi, Nagqu, Nam Co, Qomolangma, Ngari, and Muztagata in ERA5 are close to those in observational data. Comparison of mixing diagram analysis using the monthly-mean variables of ERA5 and the observational data indicates ERA5 could provide reliable information of LoCo at six stations. The relationships between H_{sfc} and daytime PBLH, and the variations of LCL deficit at six stations are different due to the differences in the soil states. The long-term variations in the PBL energy budgets, mean daytime PBLH, and LCL deficits at 31°N and 90°E show clear annual variations and have a close relationship between Southern Asian monsoon. The possible influence of the Southern Asian monsoon is also discussed in terms of the relationship between the Webster-Yang index and the PBL energy budgets, mean PBLH and mean LCL over TP.