Geophysical Research Abstracts
Vol. 21, EGU2019-13132-2, 2019
EGU General Assembly 2019

Modeling the effects of climate changes on soil respiration in the central Qinghai–Tibet Plateau

Yongjie Pan and Yanhong Gao
Northwest Institute of Eco-Environment and Resources, CAS , China (panyongjie@lzb.ac.cn)

Soil respiration (Rs) is a major flux of the CO_2 from terrestrial ecosystems and can act as a feedback to climate change. Many studies state that the permafrost and frozen soil melting due to warming will accelerate the release of CO_2 from soils microbial decomposition in cold region, such as the Qinghai-Tibet Plateau (QTP). However, there is still insufficient understanding on the dominant climate factor of soil respiration changes in the central of QTP, especially for long-term scales. In this study, a control run of 33-year Rs simulation with CLM4.5 was conducted at Beilu River station in the central QTP covered with a land use type of dry alpine meadow in 1980-2012. Four sensitivity simulations of warming and wetting were designed and conducted as well. Differences between sensitivity simulations and control run are utilized to quantify the influences of warming and wetting on Rs changes. From the model output, we find that the seasonal variation of Rs exhibits a significant exponential regression with surface air temperature and a significant linear regression with precipitation. Surface air temperature plays a key role in the seasonal cycle, however precipitation dominants the interannual variability in Rs simulation. The annual mean and the trends of Rs from precipitation increasing case are significantly higher than precipitation decreasing case. Furthermore, those positive impacts of precipitation could be enhanced by wetter climate. Respiratory quotient (Q10) of Rs is positively related to precipitation and negatively related to surface air temperature. Our results highlight the non-negligible influences of precipitation on Rs in the central QTP.