



Tibetan Plateau permafrost change during the past 40 years

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Permafrost is a climatologically important feature of the Tibetan Plateau, and it has been treated as an indicator of climate change and is highly sensitive to climate changes. Changes in permafrost are likely to influence local energy exchanges, hydrological processes and carbon budgets and hence global climate system. In this study, we use the regional climate model WRF forced by ERA-interim to study how the Tibetan Plateau permafrost changes during the last four decades, and diagnose the permafrost extent, active layer thickness and related soil organic carbon budget changes. The WRF model used in this study adopts several permafrost focused features on land surface processes, such as surface organic layer, deep soil column representation, and vertical resolved soil organic carbon dynamics. We also compare the regional climate model WRF simulated historical Tibetan Plateau permafrost change with results from six offline land surface models participated in Permafrost Carbon Network Model Intercomparison Project (PCN-MIP). This study indicates that the WRF model could well simulate the regional climate and environmental change over the Tibet Plateau, although more efforts still need to put on improving its parameterization schemes on land-atmosphere interaction.