



Identifying the sensitive parameters in carbon cycle of terrestrial ecosystem using the LPJ model

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In this study, an approach of conditional nonlinear optimal perturbation (CNOP) is employed to identify which a parameter is the most sensitive and important within the Lund-Potsdam-Jena (LPJ) dynamical global vegetation model (DGVM) according to the effect of terrestrial ecosystem to parameters in China. The aim to determine the sensitive and important parameters values among all parameters is to reduce the uncertainty of simulation and improve the forecasting skill. The CNOP approach and the sensitive analysis method are applied to identify the sensitivity and importance of each parameter. The numerical results demonstrate that there are different to identify each parameter sensitivity and importance using the CNOP approach and the sensitive analysis method in arid and semi-arid region in China. Although the most important parameter is different for the different regions of the arid and semi-arid regions, these parameters describe the photosynthesis and the canopy conductance in the soil hydrology. It also indicates that the photosynthesis and the canopy conductance in the soil hydrology are important physical processes. The above numerical results show that the more sensitive and important parameter may be different for the different regions for each parameter, especially for water-limited and water enough regions. The above results also suggest that the CNOP approach is recommended as to identify the parameters sensitivity and importance in the complex physical process.