

## Modeling the river discharge responses to climate variation and vegetation change in the Loess Plateau

\*Dawen Yang<sup>1</sup>

1. Tsinghua University

Simulation of the mutual interaction between hydrological processes and vegetation dynamics is important for understanding and predicting regional hydrological change caused by the climate variability and local land use/cover change. Traditional hydrological models simulate the impact of vegetation change using a simple parameterization scheme. Land surface models emphasize the vertical transfer of energy, water and carbon dioxide in the soil-vegetation-atmosphere continuum, however, some important hydrological processes are over simplified in these models. To fill these gaps, this study chose the Community Land Model version 4 (CLM4) and the Geomorphology Based Hydrological Model version 2 (GBHM2), and replaced the runoff generation and flow routing schemes of CLM4 by the schemes used in GBHM2. The new eco-hydrological model was developed in a study basin with semi-arid climate, the Wudinghe River basin (WRB), which located in the middle reach of the Yellow River with a drainage area of 28706 km<sup>2</sup>. After a comprehensive calibration and validation, the model was applied for simulation of the eco-hydrological changes in the past five decades. Changes in regional hydrology and ecosystem were analyzed using the simulated results, with a special focus on the understanding of the river discharge responses to climate variation and vegetation change in the Loess Plateau during the recent 30 years.

Keywords: eco-hydrological modeling, land use/cover change, climate change, regional hydrological change