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Landscape co-evolution effects on river discharge.

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Fresh water is crucial for human society and ecosystems. However, our ability to secure fresh water resources under climatic and anthropogenic change is impaired by the complexity of interactions between society, ecosystems, soils, and topography. These interactions cause landscape properties to co-evolve, continuously changing the water flow through the landscape. Such co-evolution driven flow path changes and their effects on river runoff are still poorly understood.
In this presentation we introduce a spatially distributed hydrologic model that incorporates a growing vegetation and its effect on evapotranspiration, interception, infiltration, soil permeability, groundwater-surface water exchange and erosion. The model is calibrated to evolve towards well known empirical organising principles such as the Budyko curve and Hacks law under different climate settings. By changing the climate input of the model, we analysed the responses of landscape properties and river discharge to climate change, which we summarized through change trajectories in Budyko space. We will presents our initial findings and relate processes to modelled and observed change trajectories in Budyko space.