



On the social dynamics of moisture recycling

Patrick Keys (1) and Lan Wang-Erlandsson (2)

(1) Colorado State University, School of Global Environmental Sustainability, United States (patrick.keys@colostate.edu), (2) Research Institute for Humanity and Nature, Kyoto, Japan

The biophysical phenomenon of terrestrial moisture recycling connects distant regions via the atmospheric branch of the water cycle. This process, whereby the land surface mediates evaporation to the atmosphere and the precipitation that falls downwind, is increasingly well-understood. However, recent studies highlight a need to consider an important and oft missing dimension – the social. Here, we explore the social dimensions of three case study countries with strong terrestrial moisture recycling: Mongolia, Niger, and Bolivia. Based on our case studies we present a set of three system archetypes that capture the core features of the Moisture Recycling Social Ecological Systems (MRSES): isolated, regional, and tele-coupled. We further explore the heterogeneity of human well-being within MRSES, by examining the characteristics of sources and sinks of moisture. We find that the sources and sinks of moisture can experience very different levels of human well-being, suggesting that power discontinuities must be included in the description of MRSES dynamics. We argue that geophysical tele-connections are complemented by social tele-couplings forming feedback loops, and consequently, complex adaptive systems. This exploration of the social dimensions of moisture recycling is part of an extension of the emerging discipline of socio-hydrology, and a suggestion for further exploration of new disciplines such as socio-meteorology or socio-climatology, within which the Earth system is considered as a co-evolutionary social-ecological system.