

Submitted Abstract

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Abstract

Nexus approaches help establishing linkages between phenomena requiring contributions from several, so far distant, scientific fields in order to develop a deeper understanding of patterns and trajectories. Sustainability of complex society-nature interactions is an important case in point, and several resource nexus phenomena are high on the agenda, e.g. the food - water - energy nexus. Recently, the stock-flow-service (SFS) nexus has been proposed to tackle the interrelations between social metabolism (SEM) and the provision of services that are of key importance for societal wellbeing and decent living. Socio-metabolic research analyzes the flows of biophysical resources such as materials and energy as well as the quantities and patterns of material stocks such as buildings, infrastructures and machinery. Build-up and use of material stocks requires large amounts of resources and strongly affects a society's ability to deliver services that are crucial for their wellbeing, e.g. shelter, mobility, health care, water and food supply, education and many more. The SFS nexus has gained substantial interest as a heuristic means to analyze resource requirements for decent living standards, as well as important aspects of SEM in conjunction with specific services, e.g. those associated with mobility or lighting. Recently, the complimentary concept of a stock-flow-practice (SFP) nexus has been proposed. Practices are routine activities embedded in societies' material and institutional structures. Most resource-intensive consumption occurs as part of practices, e.g. those related with feeding oneself, using living space or being mobile. As shown in recent conceptual work, the practice approach offers attractive opportunities to link social-science centered approaches with SEM. This proposed presentation will review these recent conceptual advances and take things further by showing how SFS and SFP nexus phenomena can be tackled through integrated socioecological models that combine agent-based with ecohydrological models. Agent-based models help bridging the gap between formal but restrictive models and rich but imprecise qualitative descriptions. Moreover, agent-based models are particularly well suited for incorporating detailed, multi-layered empirical data about human behaviour and the social and physical environment, and can thus comprehensively represent those aspects of human decision-making that are reflected in practices. Drawing on two decades of local and regional-scale research where this methodological approach has been applied we will demonstrate how these methods can be employed to model SFS and SFP-related ecohydrological phenomena at local and regional scales.