

Special Issue in **Earth System Dynamics (ESD)** on **“Social dynamics and planetary boundaries in Earth system modelling”**

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Objectives

Human actions play an increasing role in shaping the Earth's planetary environment, from the physical climate system to biogeochemical cycles to the functioning of the land surface. To understand and predict the future evolution of the Earth system, it is thus critical to understand the planetary boundaries of the human playing field, as well as socio-economic dynamics and their interactions with climate, and the consequences for the planetary system. There is a range of urgent questions related to this topic, from the definition of planetary boundaries, the safe operating space for humanity, thresholds and critical transitions in the global socio-environmental system, and the identification of sustainable pathways for future development.

However, the current Earth system modeling landscape lacks the tools to adequately address these challenges. Either societal dynamics is tightly constrained by economic optimization paradigms (Integrated Assessment modeling) or present only as prescribed scenario input in physical Earth system models. Furthermore, feedback loops between social and environmental processes are largely absent in current Earth system models.

What is needed is a more dynamic societal sphere allowing for social tipping points, major reorganizations, revolutions and collapse in conjunction with a description of the fully coupled co-evolutionary dynamics of human societies and the natural Earth system. In this special issue, we seek novel and innovative approaches that deal with modeling socio-economic phenomena in the Earth system, their dynamics, interactions, and boundaries.

We welcome contributions applying concepts and methods that include, but are not limited to:

- Earth and social systems thermodynamics and stoichiometry (e.g., socio-industrial metabolism)
- Socio-ecological systems modeling
- Conceptual, empirical, or agent-based models from the social sciences
- Adaptive and temporal networks
- Dynamical and evolutionary game theory

Special issue open period for submission

May 1st, 2014 – April 30th, 2016

For the submission process, see <http://www.earth-system-dynamics.net/submission>

Costs

As ESD currently does not have page charges in 2014, there are no page charges for manuscripts submitted in 2014.

About the journal Earth System Dynamics (ESD)

Earth System Dynamics is an international, interdisciplinary scientific journal for the publication of original research that takes a systems perspective of the functioning of the whole Earth system and global change. **ESD** aims to publish fundamental and applied research that seeks to better understand the interactions between the atmosphere, oceans, and land, the effects of global change, as well as the biosphere and human activity. ESD is published by the European Geosciences Union (EGU).

The scope of **ESD** encompasses contributions that investigate these various aspects and their underlying mechanisms, ways how these can be conceptualized, modelled, and quantified, and the predictions of the overall system behavior. Contributions range from complex systems theory, physical climatology, global climate modelling, atmosphere-biosphere interactions, biogeochemical cycling, scenarios of global climate change, geoengineering, renewable energy, land use change, to impact assessments.

ESD is listed in the Web of Science (Thomson-Reuters ISI index).

ESD employs the innovative two-stage publication process of the EGU that enables the rapid publication of a manuscript after editorial review in Open Discussion (ESDD) that is citable. The open discussion period for ESD is 6 weeks during which the reviewers post their comments, as well as any member from the broad scientific community, followed by the author's response. The final paper is published online in ESD as a peer-reviewed publication as soon as it is accepted. All papers are published in open access.

More information on ESD can be found at: <http://www.earth-system-dynamics.net/>