Geophysical Research Abstracts
Vol. 19, EGU2017-8647, 2017
EGU General Assembly 2017

Integrated impact assessment of climate change, land use, and adaptation policies on water quality in Austria

Helen Trautvetter (1,4), Martin Schoenhart (2), Juraj Parajaka (3,4), Erwin Schmid (2), Matthias Zessner (1,4)

(1) TU Wien, Institute for Water Quality, Vienna, Austria (mzessner@iwag.tuwien.ac.at), (2) University of Natural Resources and Life Sciences Vienna, Institute for Sustainable Economic Development, (3) TU Wien, Institute of Hydraulic Engineering and Water Resources Management, (4) TU Wien, Centre for Water Resource Systems

Climate change is one of the major challenges of our time and adds considerable stress to the human society and environment. A change in climate will not only shift general weather patterns, but might also increase the recurrence of extreme weather events such as drought and heavy rainfall. These changes in climatic conditions will affect the quality and quantity of water resources both directly as well as indirectly through autonomous adaptation by farmers (e.g. cultivar choices, fertilization intensity or soil management). This will influence the compliance with the good ecological and chemical status according to the EU Water Framework Directive.

We present results from an integrated impact modelling framework (IIMF) to tackle those direct and indirect impacts and analyze policy options for planned adaptation in agricultural land use and sustainable management of land and water resources until 2040. The IIMF is the result of an interdisciplinary collaboration among economists, agronomists, and hydrologists. It consists of the bio-physical process model EPIC, the regional land use optimization model PASMA[grid], the quantitative precipitation/runoff TUWmodel and the surface water emission model MONERIS. Scenarios have been developed and parameterized in collaboration with stakeholders in order to facilitate multi-actor knowledge transfer. The set of climate change scenarios until 2040 includes three scenarios with equal temperature changes but varying precipitation patterns. They are combined with potential socio-economic and policy development. The latter include water protection measures on fertilization management, soil management, or crop rotation choices.

We will presented the development of interfaces among the research, the definition of scenarios and major scenario results for Austria. We will focus on nutrient emissions to surface waters, which are the major link between the different models. The results, available at watershed level indicate the significant impact on future precipitation development on the risk of not achieving nutrient criteria of the good ecological water quality status of surface waters. Policy measures show relatively low impacts for nitrogen, while they may highly affect the phosphorus emissions and hence the compliance with environmental quality standards for phosphate phosphorus.