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Ort: HS 1 (UZA 2, Raum 2A120, Althanstr. 14, 1090 Wien)

**Prof. Merja Tölle**

Universität Wien und Universität Giessen

## **Land-atmosphere interactions from a climate impact perspective**

In this presentation the anthropogenic induced changes in the interaction of the terrestrial land and climate is explored. According to IPCC a key role is played by land use transformations to adapt and mitigate climate change for future scenarios aiming to stabilize temperature rise up to 2 °C. Land use and cover change (LUCC) impact land surface processes, which determine the turbulent and radiative fluxes between the land and atmosphere. These modifications affect atmospheric temperature and humidity, and thus the planetary boundary layer structure, and cloud processes. Essential for climate projections is a sufficient characterization of associated uncertainties due to LUCC in climate models. Hence, there is a need to improve our understanding of the underlying processes and to reduce model errors, which ensures higher quality climate projections. This can be achieved by assessing the impact of land-atmosphere interactions due to LUCC on regional and local climate.

Uncertainties in climate change projections result due to the spatial resolution of the climate model. Using bias-correction introduces another uncertainty factor resulting out of this methodology. Changes in global temperature and precipitation are related to regional extremes and the impacts of the energy and hydrological

Kontakt: Mag. Herta Gassner, Tel. 01 4277 53702  
[herta.gassner@univie.ac.at](mailto:herta.gassner@univie.ac.at)

cycle. The robustness of different metrics of such changes is explored facing uncertainties due to spatial resolution and bias-correction.

The presentation bridges the gap between idealized and more realistic LUCC studies. Therefore, a series of case and sensitivity studies over different climate regions (Europe and Southeast Asia) exemplify the anthropogenic impacts of LUCCs on the regional and local climate. Idealized LUCC scenarios benchmark the upper and lower limits of climatic changes in a climate model. LUCC studies that are more realistic offer the opportunity to separate between local and regional effects. The effect of land-atmosphere interactions in combination with the effect of the horizontal resolution of the regional climate model is explored. It is found that local effects of land management are more important than previously thought.

These studies show that impact-relevant information can be drawn from LUCC and convection-permitting climate simulations, which is relevant for impact researchers and stakeholder. Future scientific perspectives will be formulated in the presentation.