



## **Land-climate interactions from models and observations**

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This presentation provides an overview on recent results investigating the role of land processes for the climate system based on model experiments and observations, with a special focus on their role in the context of climate change.

The importance of land-atmosphere interactions for the climate system is increasingly being recognized. Similar to the oceans, land areas provide the lower boundary for the atmosphere, with which they exchange energy, water and chemical compounds such as CO<sub>2</sub>. Storage of water on land (e.g. as soil moisture, ground water, snow, surface water or ice) constitutes a significant memory component within the climate system, similar in many ways to heat storage in the oceans. Moreover, anomalies of soil moisture (positive or negative) and vegetation processes have strong effects on the land energy and water balances in regions where evapotranspiration is limited by soil moisture availability. Recent studies have highlighted how land-atmosphere interactions can be critical in modulating variations in climate on a range of temporal (seasonal to centennial) and spatial (local to global) scales, in particular with regard to precipitation, temperature and the carbon cycle. These findings highlight the need for a more detailed investigation and monitoring of land surface processes and land-atmosphere exchanges, and open new perspectives in the fields of atmospheric, climate, hydrological and ecosystem modeling.