

## **Anthropogenic influence on drying trends in northern hemispheric land areas**

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Changes in soil moisture can have significant impacts on water availability and food security. Future changes in the water cycle can be better estimated if we understand how it has responded to historical warming. Using soil moisture simulated by land-surface models forced with observations, we find that from 1951-2005, northern hemispheric land areas have become drier. This drying trend is particularly strong in areas that are already dry. At the same time, the area affected by drought has become larger. A comparison between soil moisture simulated by land-surface models and CMIP5 model output under different external forcings suggests that anthropogenic forcing contributed significantly to the observed drying and could explain the increase in the area affected by drought. As increases in atmospheric greenhouse gas concentrations will continue in the near future, dry areas are projected to become drier and larger in extent, which could negatively impact future water supply and food security