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Biogeochemical impacts of storm-caused forest disturbances in a mountainous Austrian karst system

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Karst systems contribute around 50% to Austria's drinking water supply. Future climate trajectories indicate increasing temperature and a higher frequency of hydrological extremes. Both will influence the availability and quality of water provided from karst regions. Forest disturbances such as storms disrupt the nitrogen cycle and cause pronounced nitrate losses from the soils.

This presentation considers the time period before and after storm Kyrill (early 2007) and several other storm events (2008) that hit Middle Europe. A new type of semi-distributed model that reflects the subsurface heterogeneity of catchment by distribution functions is applied to compare the hydrological and hydrochemical behavior (DOC, DIN) of the system before and during the wind disturbing period.

Calibrated and validated before the disturbance the model is used to quantify the impact of the storms by the deviations between the simulated and the observed DOC and DIN. The results indicate that there was a significant shift in N mobilization, its seasonal amplitude and its timing. In addition, transit time distributions derived from the simulations show that the hydrological system smoothed and delayed the impact on water quality at the system outlet.