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DISTURBANCE - Modeling extreme events and disturbance regimes in forest ecosystems under climate change

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Forests in the temperate zone are mainly disturbed by climate related factors as well as biotic disturbance agents. (e.g., storms, drought, bark beetles). So a changing climate will unfold a growing potential to alter disturbance regimes.
The project DISTURBANCE aims at the development of integrated ecosystem models for temperate alpine forest systems which explicitly include climatic drivers (e.g heat, drought, windstorms), the interactions of disturbances by wind and bark beetles, forest structure and the composition as well as the management history.
Here we will focus on storm events exceeding some threshold values. Wind on a daily base over the whole of Austria is modeled on a 3.75kmx3.75km grid with a Regional Climate Model (CCLM). CCLM is driven by the ERA40 reanalysis data. The CCLM runs are carried out from 1980 onwards as prior that time no forest damage data are available. Maps showing the exceedance of definite threshold values identify rather connected regions northwards the Alps.
To estimate the development of storminess in the decades to come the Analog Method (AM) is applied. This approach is reasoned by the needs of the ecosystem model that projects the possible future development of forest damages.
To produce estimates covering the decades ahead, ensemble simulations with ECHAM5-MPIOM are used. As they are entered into the AM possible future maps of storminess are generated. The possible change of the number of storm events and hence the thread to the forest are shown within a region containing two specific forest management regions. Possible management adaptions and implications on the ecosystems are discussed.