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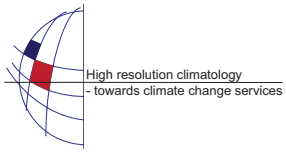


# Synoptic and climatological aspects of extra-tropical cyclones

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Mid-latitude cyclones are highly complex dynamical features embedded in the general atmospheric circulation of the extra-tropics. Although the basic mechanisms leading to the formation of cyclones are commonly understood, the specific conditions and physical reasons triggering extreme, partly explosive development, are still under investigation. This includes also the identification of processes which might modulate the frequency and intensity of cyclone systems on time scales from days to centennials.

This overview presentation will thus focus on three main topics: Firstly, the dynamic-synoptic structures of cyclones, the possibility to objectively identify cyclones and wind storms, and actual statistical properties of cyclone occurrence under recent climate conditions are addressed.
In a second part, aspects of the interannual variability and its causing mechanisms are related to the seasonal predictability of extreme cyclones producing severe storm events. Extending the time frame will mean to deduce information on decadal or even centennial time periods. Thus, actual work to decadal as well as climatological variability and changes will be presented.
In the last part of the talk focus will be laid on potential socio-economical impacts of changed cyclone occurrence. By means of global and regional climate modeling, future damages in terms of insured losses will be investigated and measures of uncertainty estimated from a multi-model ensemble analysis will be presented.