

B. Extreme storms:

Keywords: definition, dynamics, multi-peril, statistics...

Rap.: Peter Knippertz, Ch.: Gregor Leckebusch

DEFINITION

- what is an “extreme storm”?
- purpose of a definition/categorisation (e.g. increase clarity in end-user terminology?)
- based on meteorology or impacts (catalogue)?
- impact highly localized and non-linear
- extreme relative to local background (98% percentile)
- what can we learn from tropical cyclone categorisation?
- problems: more extratropical cyclones, shorter lifetime, lifecycle, multivariate ...
- “best track” dataset for severe ETCs, maintenance by whom?

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DYNAMICS

- dynamical mechanisms to create an extreme storm?
- sources of energy: baroclinic (strong jet) & diabatic
- how do extreme storms use this energy most effectively?
- how deep can it get?
- theory: moist-baroclinic instability
- idealized modelling: high-res, moist lifecycle experiments, periodic boundaries, zonal asymmetries ...
- compare with statistical results on real world cyclones
- key question: extreme storms in changed climate
- simple shift can create more extreme storms locally
- changes in frequency or intensity
- metric: core pressure, wind speed, stormtrack ($Z'500$) ...
- multi-parameter approach, mid-tropospheric aspects
- different types of cyclones: size, diabatically driven, track
- diabatic aspects more important in the future?
- changes to baroclinicity, stormtrack broader, more diverse?

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STATISTICS

- standard approaches (extreme value statistics, return periods) OK
- biggest problem: record too short, inhomogeneities
- typical uncertainty: 3x difference in 100-yr return loss!!
- Solutions: – Additional data (e.g. wave heights, proxies)?
– New developments in multivariate statistics?
- Combined risk assessment