

Surface wind fluctuations driven by clouds

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In cooperation with

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Range of phenomena



ICON HErZ - NARVAL-II - HD(CP)² Simulations: 20160817 +12.5h





"Calms and Tornado's"





Edmond Halley 1686

Connection between surface and clouds





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MODIS – NASA worldview

Connection between surface and clouds



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MODIS – NASA worldview



Outer Dom 1

res. 1200 m





Outer Dom 1

res. 1200 m





Spatial vs. temporal wind fluctuations



High temporal and spatial correction of wind fluctuations with thermodynamic fields

Cold pools: Conceptual

1. Initial cloud formation





2. Mature cloud, precip. onset



4. Cold pool dynamic lifting





3. Low level Precip evaporation



Influence of model resolution

res. 150 m







Conclusion & Open questions

- Clouds and convection are major drives of surface wind fluctuations
 - Surface fields, i.e. wind, greatly reflect clouds and convection
 - This new focus helped to find a major bug in ICON LEM
- How much of the wind variability can be explained by cold pool dynamics?
 - How realistic are the simulated wind fluctuations?
- What happens if cold pools are even more vigorous and collide?

