

bm0362 The cloud-climate feedback: Analysis in the Earth System Model

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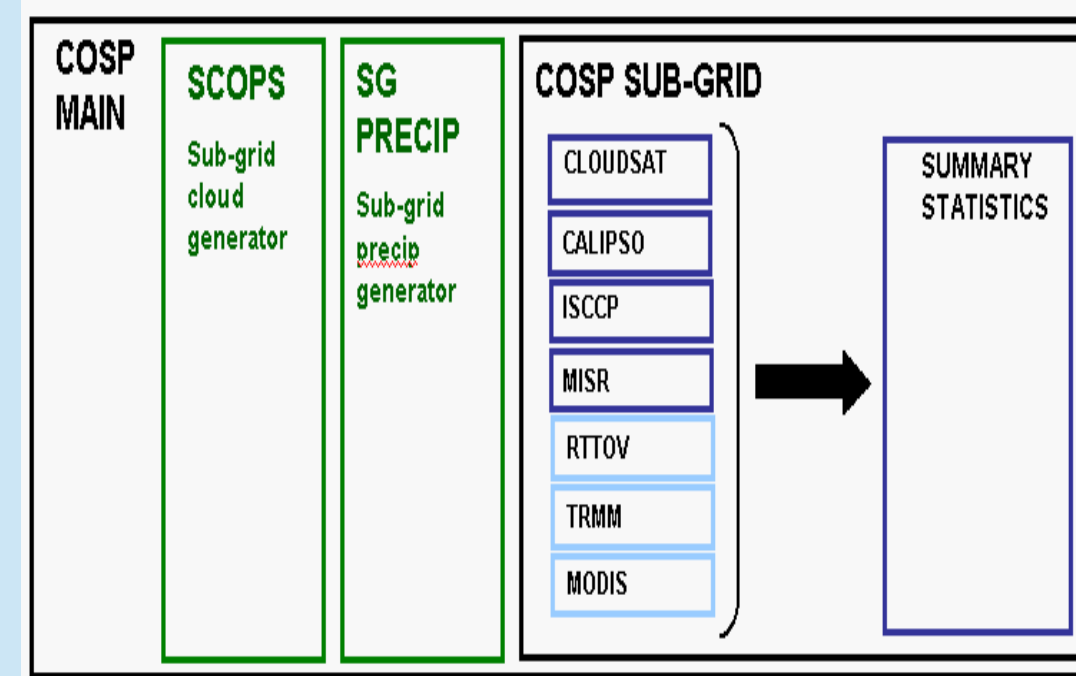


Summary

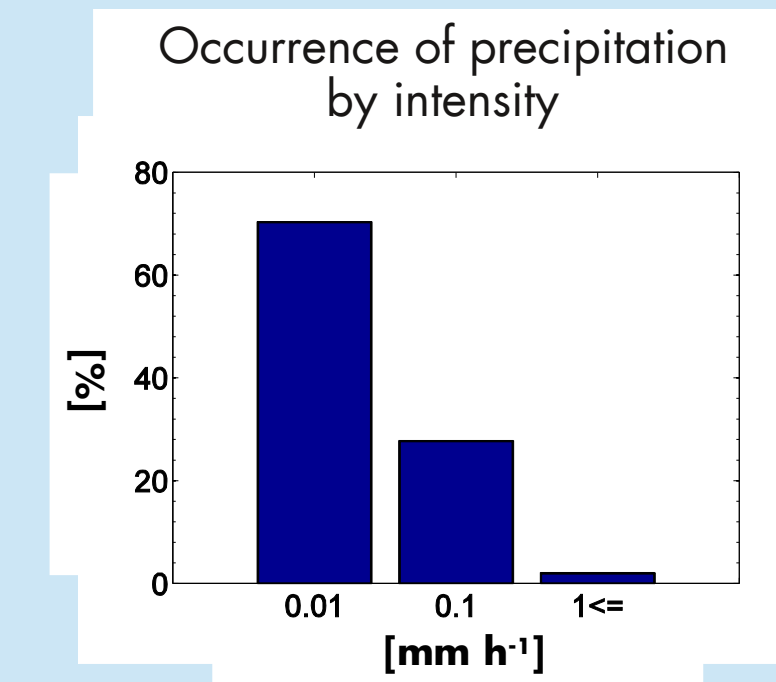
- Evaluation and improvement of cloud parameterisations for ECHAM
- Funded by the German Research Foundation (DFG) in an Emmy Noether Junior Research Group project (2006 – 2011), by the CLiSAP cluster of excellence (2008 – 2011) and by the German Weather Service (DWD, 2010 - 2013)

Satellite simulators

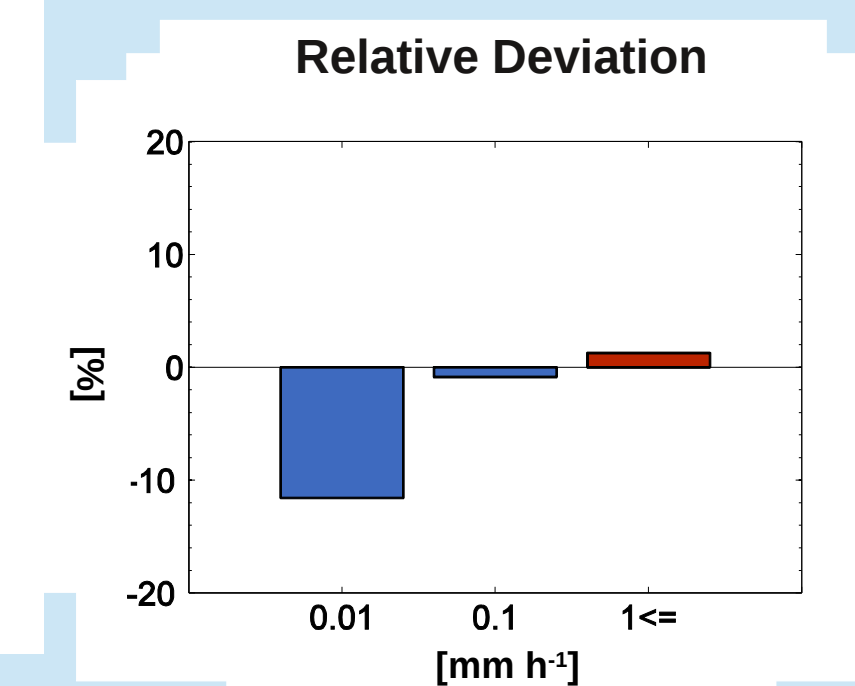
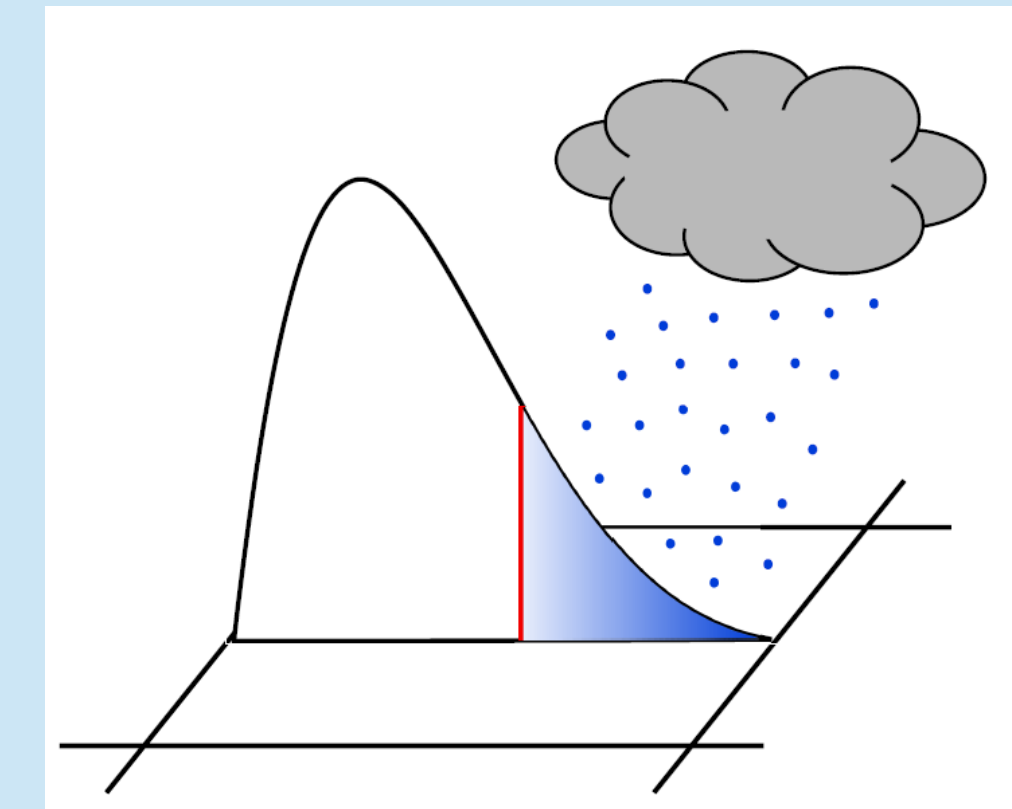
- 1) subgrid sampling
- 2) mimic retrievals
- 3) summary statistics



Use of statistical cloud scheme for precipitation

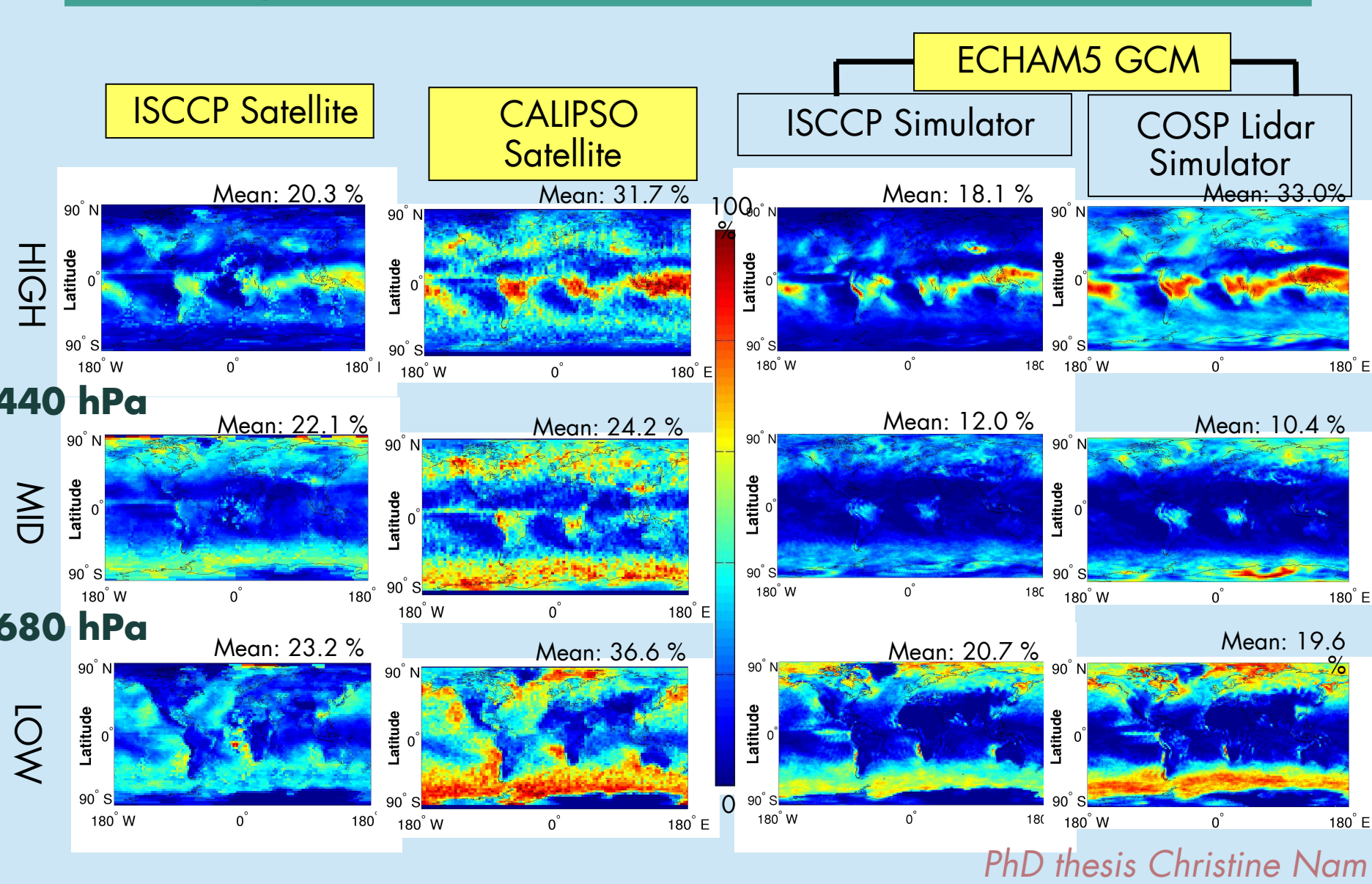


Precipitation formation process: autoconversion
 $Q_{AUT} \propto q_t^{4.7}$
strongly non-linear: biased when only for grid-box mean value for cloud water q_t is used

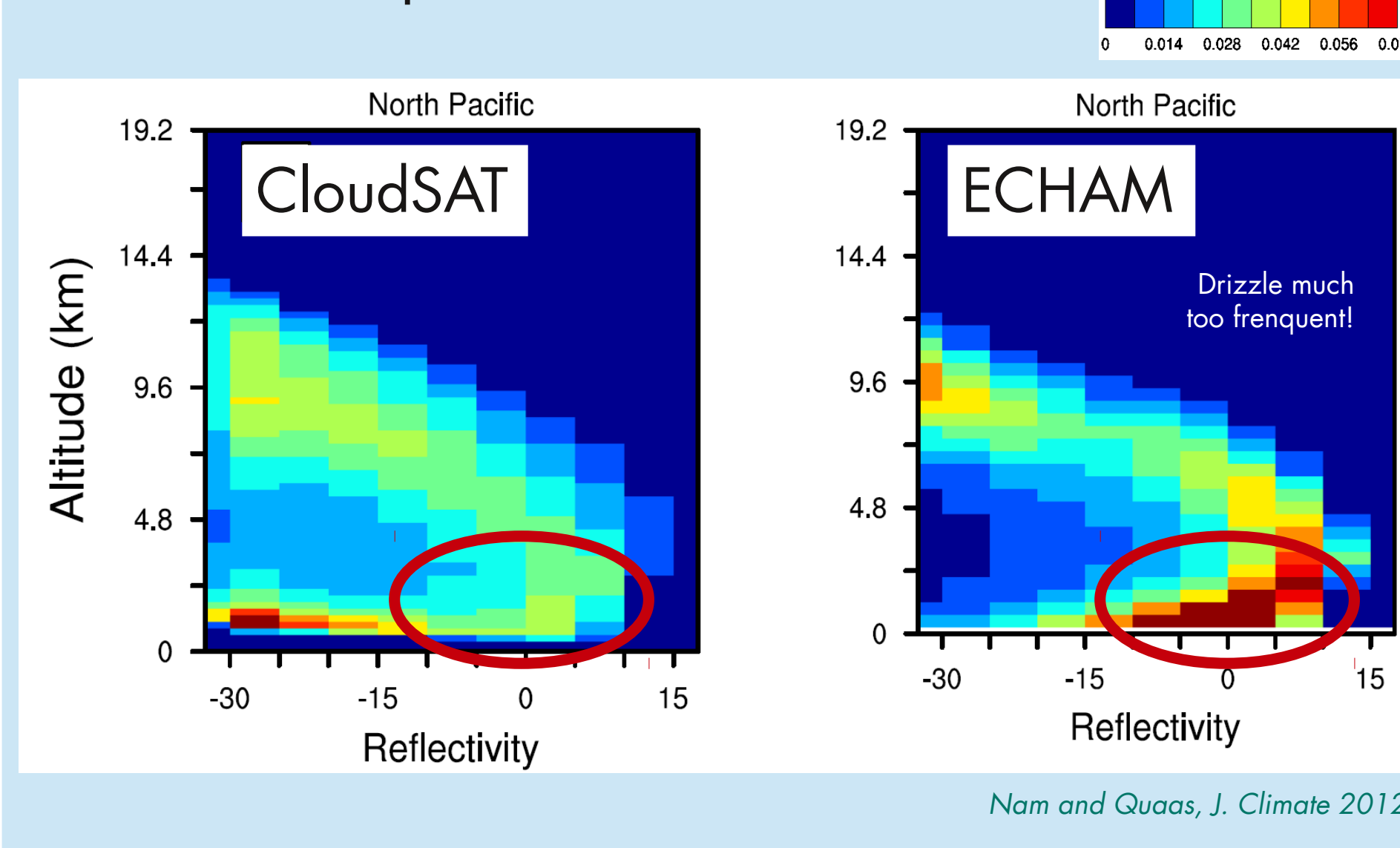


- apply the information about cloud subgrid-scale variability (see below) in autoconversion
- frequency of occurrence of light rain reduced, compensated by slightly more intense events

Comparison with Satellite Data - JFM 2007



The drizzle problem

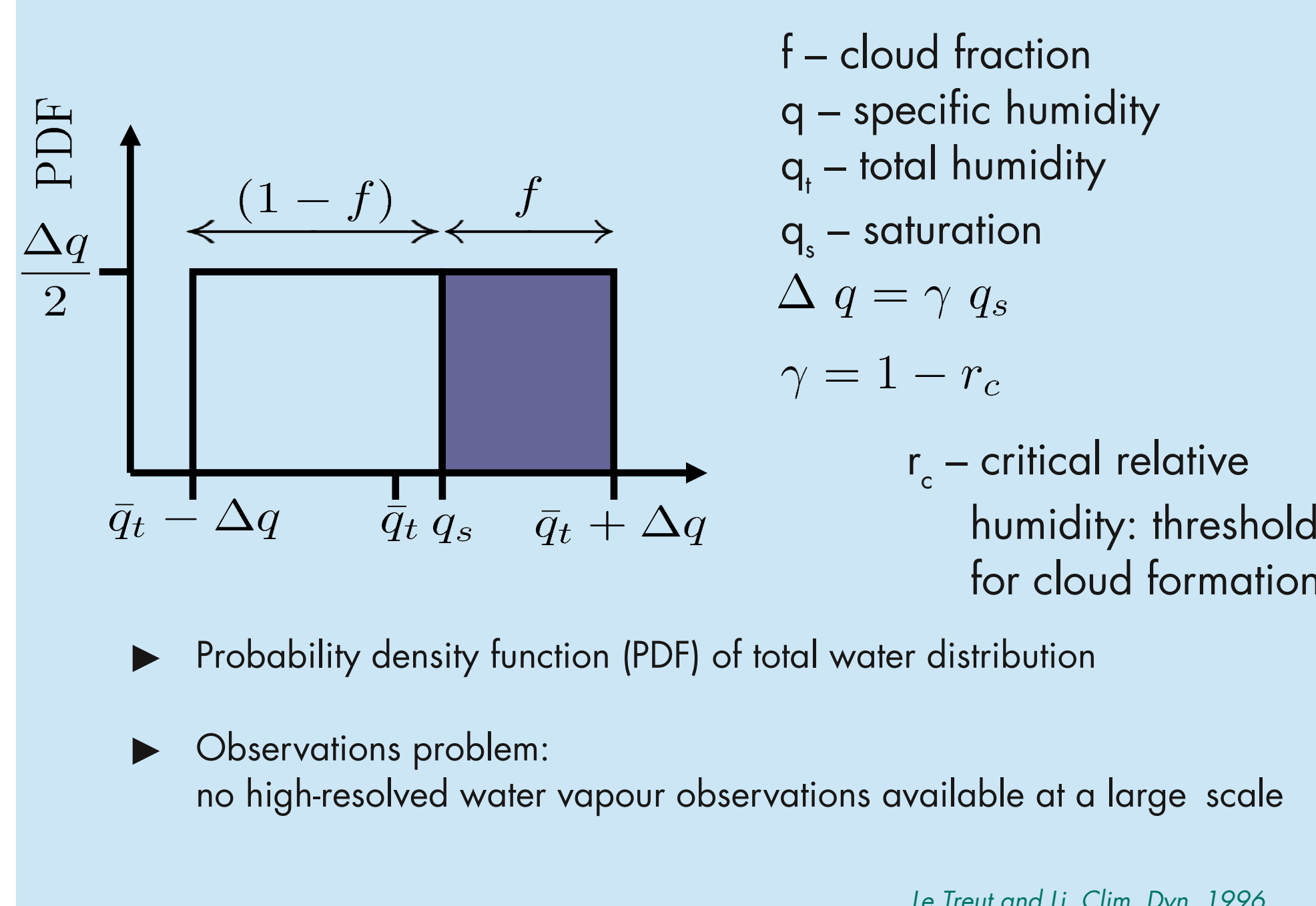
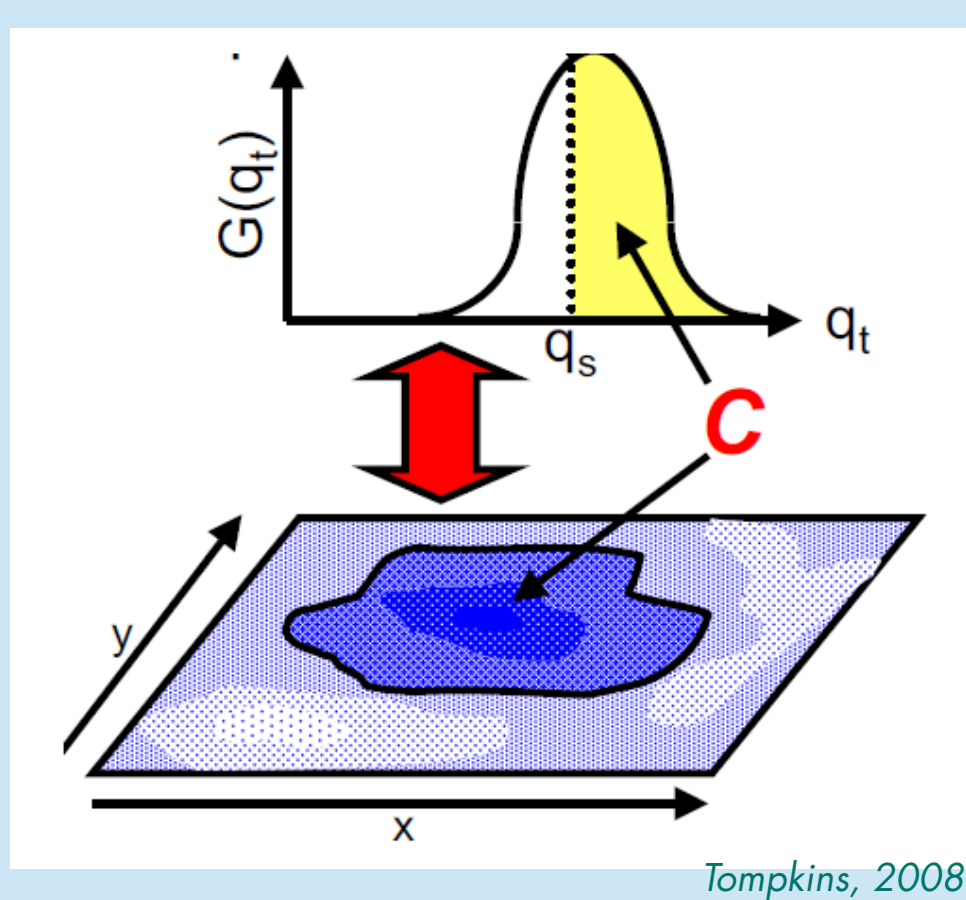


bb0838 High Definition Clouds and Precipitation for Climate Prediction – HD(CP)² S6 – PDF Cloud Schemes

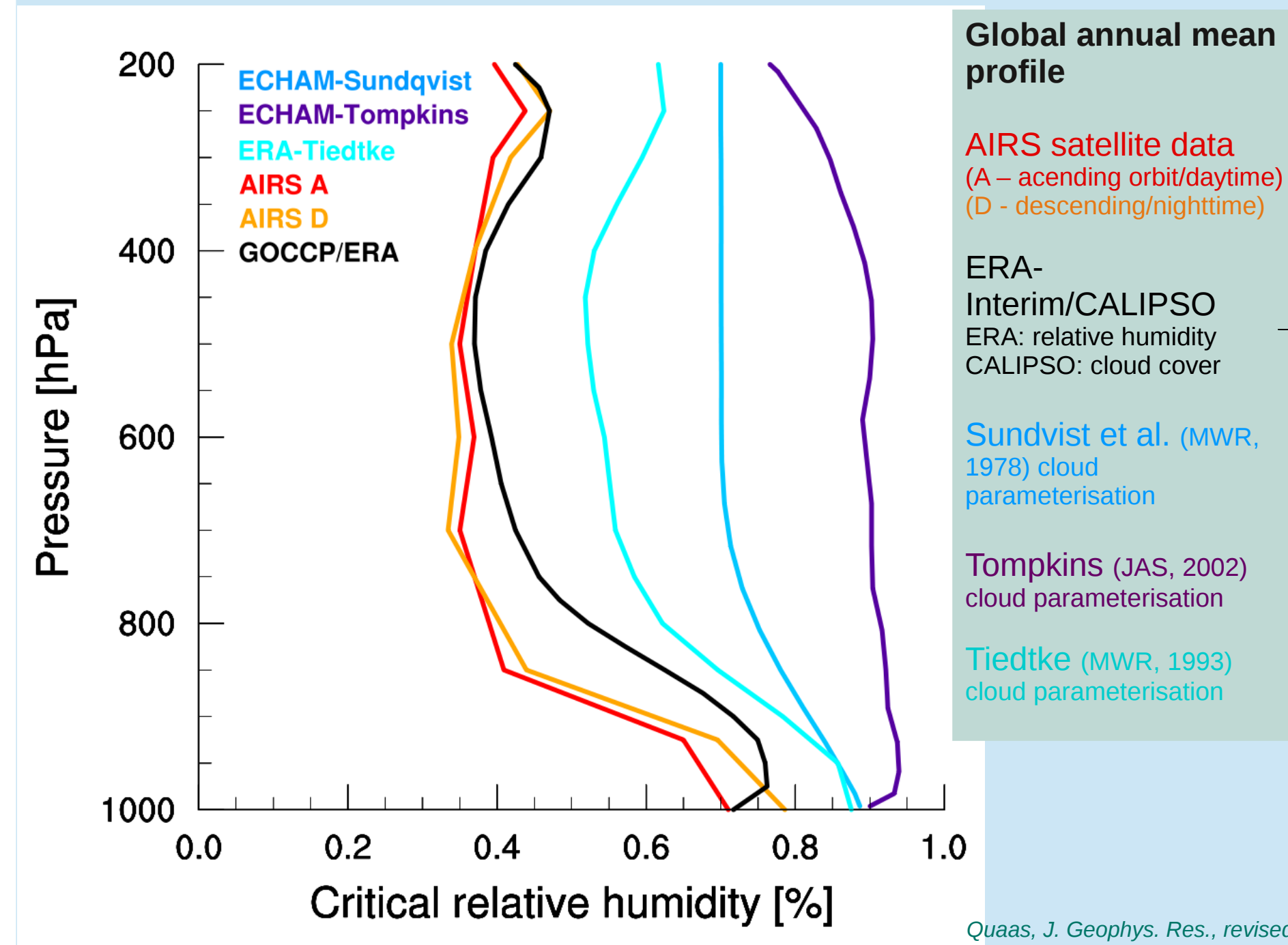
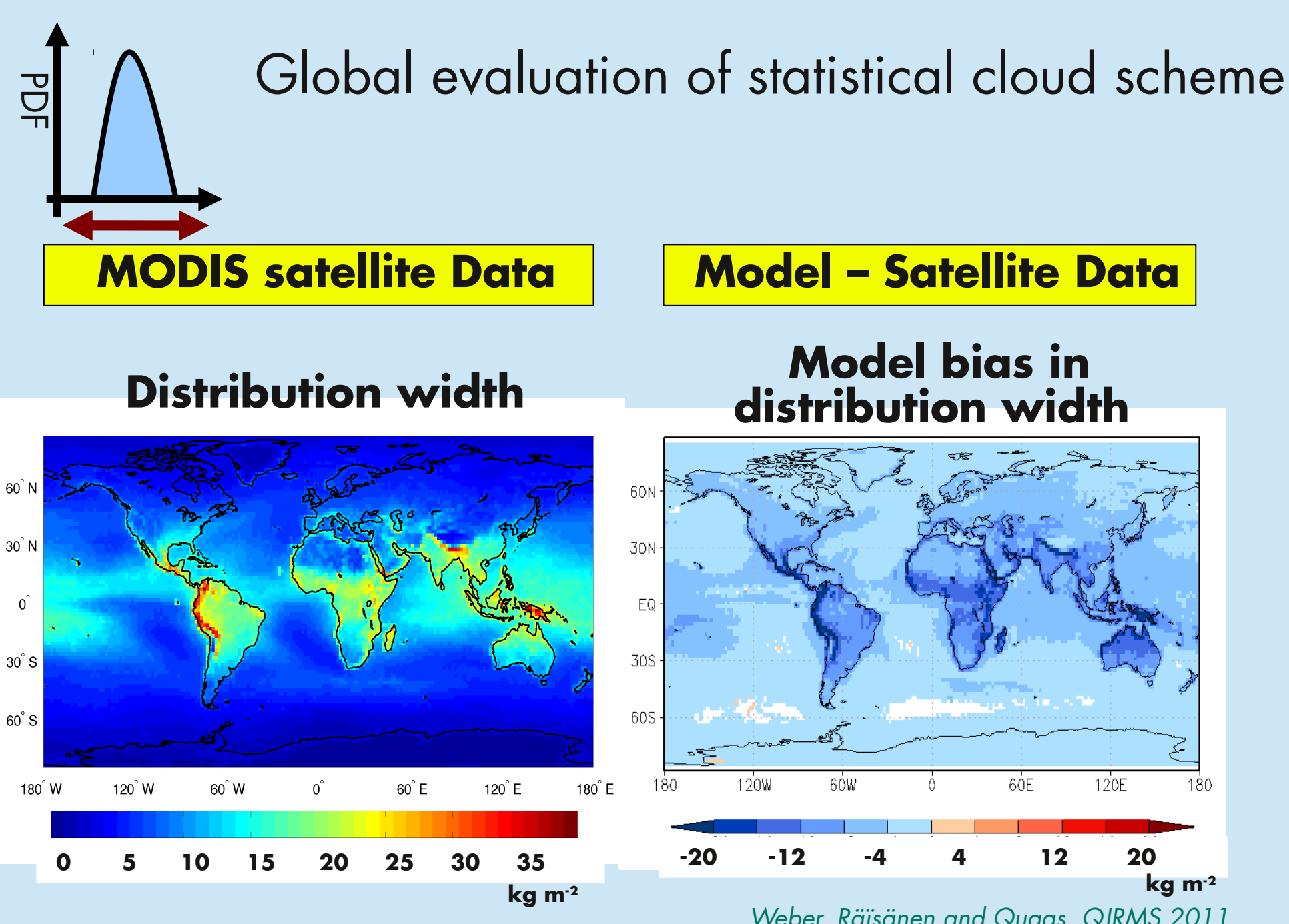
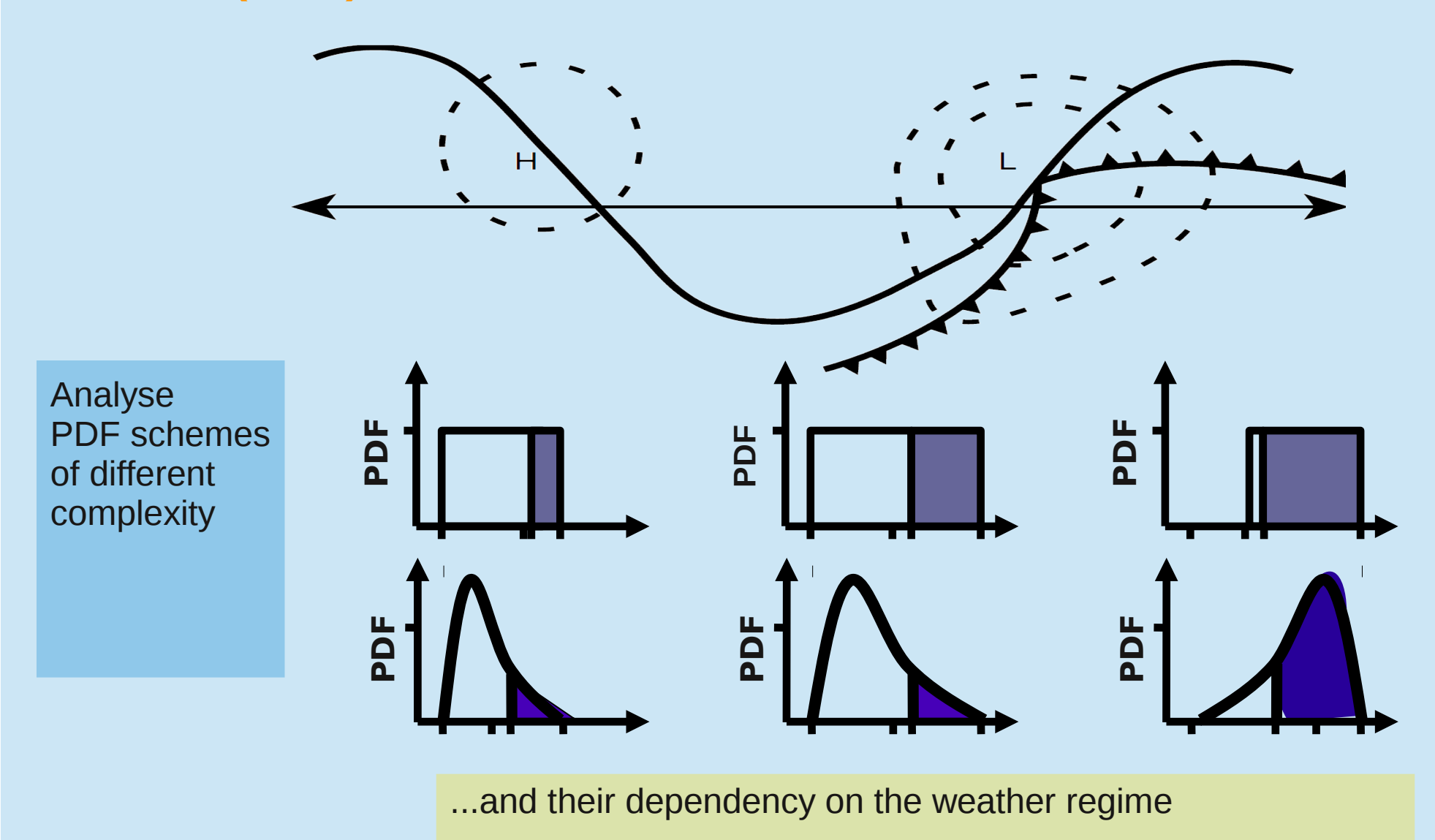
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- BMBF-funded national project
- aims at a cloud-resolving (LES) simulation over middle Europe
- complemented by observations
- for cloud parameterisation development
- lead: Bjorn Stevens, MPI-M
- sub-project S6: focus on cloud parameterisations relying on PDFs of subgrid-scale variability



HD(CP)² PDF cloud schemes



- HD(CP)² model provides high-resolution "virtual reality"
- HD(CP)² observations provide unique dataset over middle Europe
- satellite data
- ground-based networks
- supersites