Announcement of a topic for:

Seminar Research	✓	
Seminar Methods	✓	
Master Theses	✓	(please mark one or more)

Topic	High-resolution global models: Representation of vertical velocity field and implications for atmospheric dynamics.
Release Date	2024/07/18
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Description:	During the model intercomparison projects DYAMOND and nextGEMS, different global atmospheric models were applied on spatial resolutions of up to 2 km. On such fine-scale grids, processes like convection do not need to be parameterized anymore, in contrast to coarser grids typically used in climate simulations or global weather forecasting (~10-100 km). These models have a high potential for improved representation of several weather phenomena and their evolution and hence their forecasting capability. However, the results of these non-parameterized model simulations need to be evaluated comprehensively. The offered master thesis will analyze the vertical velocity fields (as a key component of convection) of the available simulations and compare these to observations e.g., from remote sensing. Research questions to be answered are: What are the differences in vertical velocity statistics (e.g., frequency distribution) between the different models and resolutions? How does this compare to observed statistics? Are there any effects due to parameterized convection?
Literature:	Satoh, M., Stevens, B., Judt, F. *et al.* Global Cloud-Resolving Models. *Curr Clim Change Rep***5**, 172–184 (2019), https://doi.org/10.1007/s40641-019-00131-0. Stevens, B., Satoh, M., Auger, L. *et al.* DYAMOND: the DYnamics of the Atmospheric general circulation Modeled On Non-hydrostatic Domains. *Prog Earth Planet Sci* **6**, 61 (2019), https://doi.org/10.1186/s40645-019-0304-z. https://easy.gems.dkrz.de/DYAMOND/index.html https://easy.gems.dkrz.de/DYAMOND/NextGEMS/index.html