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Special Edition on DYAMOND: The DYnamics of the Atmospheric general circulation Modeled On Non-hydrostatic Domains,

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Plain Language Summary: We intercompared the cloud properties of the seven atmospheric general circulation models with a grid spacing of less than about 5 km over the Atlantic Ocean. The domain averaged outgoing longwave radiation was found to be similar across the models. The vertical structure of cloud water, cloud ice and cloud fraction exhibited large variations across models.

Figure 1. Vertical profiles of the domain-averaged mixing ratio of cloud water (a) and cloud ice (b) at 00UTC for 10 days from 11th to 20th Aug. 2016 among seven models.

- The domain averaged outgoing long-wave radiation (OLR) is relatively similar across the models, but the net shortwave radiation at the top of the atmosphere (NSR) shows large differences among the models.
- The models capture the triple modes of cloud systems corresponding to shallow, congestus, and high clouds, even though their partition in these three categories is strongly model dependent.
- The averaged mixing ratio of ice clouds consistently increased with finer grid spacing in three models, but such a consistent signal is not apparent for the mixing ratio of liquid clouds for shallow and congestus clouds.