An intercomparison of tropical clouds using global storm resolving simulations over the Atlantic

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The representation of clouds has a large uncertainty in global climate models (GCMs). The results of GCMs depend on a cumulus parameterization. Several global storm resolving models (GSRMs) such as NICAM have developed to reproduce convections with a few kilometers horizontal resolution. It is important to intercompare GSRM simulations and investigate the characteristics for cloud and precipitation. One of the intercomparison projects for GSRMs is the DYAMOND (DYnamics of the Atmospheric general circulation Modeled On Non-hydrostatic Domains).
It is known the three typical cloud types like shallow cumulus, cumulonimbus, and congestus (e.g. Johnson et al. 1999). In this study, we investigate the vertical cloud structures over the Atlantic using DYAMOND data..
The purpose of this study is an intercomparison of GCRMs and an understanding of the characteristics of NICAM for the performance of tropical clouds.
The selected domain is over the Atlantic with 30˚W –50˚W and 0˚N –20˚N.
The cloud fraction of shallow, congestus, and deep clouds in DYAMOND data are intercompared and investigated. The resolution dependency on the vertical structure of cloud types is examined. The cloud fraction of DYAMOND data are evaluated using cloud mask data from CALIPSO and CloudSat.

Keywords: Intercomparison, Global storm resolving simulations, tropical clouds

