



Diurnal cycles of clouds and precipitation in satellite, reanalysis and model data

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The diurnal cycle of clouds and precipitation is of high relevance for the understanding of the climate system and for the verification of climate models. The formation of clouds and precipitation are affected by several physical processes and many feedback cycles are apparent that affect the climate system.

Respective processes involved in cloud formation and precipitation are usually parameterized in the current models. Therefore, there is an essential need to validate the model output, what in turn requires reliable reference data and validation methods.

We compared diurnal cycles of cloud cover and precipitation by means of satellite (ISCCP, CMSAF, TRMM) and reanalysis data (ERA-Interim, MERRA) in Europe and Africa, to check dataset reliability. Afterwards we evaluated COSMO-CLM (CCLM) regional climate model simulations in an European and African domain. It is shown that distinct diurnal cycles of cloud cover and precipitation occur in different climate regimes and that the CCLM partly has difficulties in simulating those. Especially in regions of convective induced clouds, the diurnal cycles in CCLM disagree with the observations. The causes and impacts of the apparent differences between simulated and observed diurnal cycles will be discussed too.