Evaluation of low-level marine tropical clouds in CMIP6 models: the 'too few too bright' bias

Dimitra Konsta1, Jean-Louis Dufresne2, Helene Chepfer2

Climate models tend to underestimate the cloud cover and overestimate the cloud albedo, a default referred to as the 'too few too bright bias'. In this study we examine whether this bias is still present in the current generation of CMIP6 models for low level tropical marine clouds.

The characteristics of low-level clouds simulated by six climate models participating in CMIP6 are analyzed using the COSP simulator. Key cloud variables are evaluated against different satellite datasets: cloud cover and cloud vertical distribution from CALIPSO lidar observations and cloud optical depth from PARASOL mono-directional reflectance.

It is found that the "too few too bright bias" is still present for low level clouds of the CMIP6 models under study. Common biases are found regarding the co-variation of the cloud properties, their dependence on cloud environmental conditions and in the vertical profile of CMIP6 models, the latest being attributed to the mistreatment of the cloud heterogeneity.