



Representation of the life cycle of high clouds in the LMDZ AGCM

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The life cycle of high clouds in the LMDZ Atmospheric General Circulation Model (AGCM) is controlled by two parameters, the precipitation efficiency and the sedimentation speed of ice crystals. Now, these parameters are currently not well constrained by observations. To improve the representation of high cloudiness and more generally the representation of the water cycle in the high troposphere in the LMDZ AGCM, we developed a methodology based on the comparison of simulated cloud properties with those retrieved from AIRS observations. The method calculates from model outputs the cloud pressure and cloud emissivities that would be seen by the satellite, by taking account of the differences in horizontal resolution of the model and the observations, the specific observation time windows, the selection of high clouds with specific cloud optical thickness ranges detected by AIRS. In a second step, cloud clusters are defined from both simulated and observed cloud pressures and emissivities. The properties of these cloud clusters, such as their size distribution, are shown to be strongly dependent on the LMDZ parameters mentioned above, and provide thus an interesting information to improve the representation of the life cycle of high clouds in the LMDZ AGCM.