

SENSITIVITY OF AMV HA METHODS TO CLOUD PROPERTIES USING SIMULATED MSG RADIANCES

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Abstract

This paper presents the sensitivity to various atmospheric parameters of the two Atmospheric Motion Vectors height assignment methods that aim to retrieve the cloud top height of semi-transparent clouds. The use of simulated Meteosat-8 radiances has the advantage that the pressure retrieved by a given method can be compared to the initial pressure set to the cloud in the model, which is exactly known. The methods retrieve the pressure of opaque cloud to within few hPa. However, considering more realistic ice clouds, methods are sensitive to all the tested atmospheric parameters, and especially to the cloud microphysics which can bias the results of the CO₂ slicing method by several tens of hPa. The cloud top pressure retrieval is especially difficult for thinner clouds with optical thicknesses smaller than 2, for which the biases can reach several tens of hPa. The methods have also been tested after introducing realistic errors in the temperature and humidity profiles and on the clear sky surface radiances. In multi-layer cloud situations the height assignment methods do not work properly, placing the cloud top height somewhere between the two cloud layers for most cirrus cloud layers with optical thickness between 0.1-10.

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