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Cloud system variability over West Africa in summer 2006 as seen from Meteosat Second Generation satellite and a regional forecast model

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Three-hourly brightness temperatures (BTs) at 10.8 μm from Meteosat Second Generation (MSG) satellite are used to document the cloud system variability over West Africa in summer 2006 and to evaluate the quality of the Meso-NH model to forecast this variability in the African Monsoon Multidisciplinary Analysis (AMMA) framework. Cloud systems are observed over the Guinean and Sahelian bands with larger occurrence and patchier structures in the afternoon. Some intraseasonal variations of the number of cloud systems is found, possibly related to the activity of African Easterly Waves (AEWs). Compared to the MSG observations, the Meso-NH model well reproduces the overall variation of the BT at 10.8 μm at D+1 forecast. The model captures the BT diurnal cycle under conditions of clear-sky and high cloud cover, but misses the lowest BT values. Forecasted cloud systems are more numerous and smaller, hence patchier, than those observed. These results suggest some deficiencies in the model's convection and cloud parameterization schemes. The use of meteorological scores further documents the performance of the model to predict cloud systems. Beyond some systematic differences between simulations and observations, such as a too slow propagation of simulated MCSs and a shift of MCSs location southwards, preliminary analysis also suggests that the model high-cloud forecast is improved under specific synoptic-forcing conditions possibly related to AEW activity. This indicates that room exists for increasing weather forecast skills over West Africa.