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Diurnal cycle of dust and cirrus over West Africa as seen from Meteosat Second Generation satellite and a regional forecast model

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A brightness temperature difference (BTD) technique is used to evaluate the dust and cirrus forecasts of a regional meteorological model. The technique based on a contrasted absorption property of dust and cirrus at two wavelengths within the atmospheric infrared window is applied to 3-hourly Meteosat Second Generation (MSG) observations in the 10.8- and 12-μm bands over West Africa. The satellite observation of dust coverage over the Sahara shows a well marked diurnal cycle associated with the boundary layer activity peaking at 15 UTC. A similar signature is obtained from the regional model when the dust scheme is activated. The cirrus cover over West Africa is maximum at 12 UTC as seen both from MSG and the model. The use of prognostic dust aerosol, instead of climatology, furthermore better captures the observed convective activity.