

Operational Assimilation of Dust Optical Depth

Bruce Ingleby^a, Yaswant Pradhan^b, Malcolm Brooks^b, and Roger Saunders^b

^a Weather Science, Met Office, UK, bruce.ingleby@metoffice.gov.uk, ^b Weather Science, Met Office, UK

In desert regions mineral dust has a large effect on radiation and visibility and impacts on human health and safety and transport including aviation. Dust has been included in the operational Met Office global forecast model since July 2011 and the forecasts contribute to an international intercomparison (see <http://www.metoffice.gov.uk/research/news/dust-forecasting> and <http://sds-was.aemet.es/forecast-products/dust-forecasts/compared-dust-forecasts>). Originally there was dust uplift, transport and deposition [1] but no data assimilation. More recently a dust assimilation system was included, partly based on [2]. Trials have been performed assimilating Aerosol Optical Depth (AOD) retrievals from the SEVIRI instrument on Meteosat Second Generation (MSG) [3,4] and the MODIS instrument on the Aqua satellite [5,6]. The 4D-Var assimilation of MODIS AOD retrievals over land areas, where dust is expected to be the primary aerosol, became operational on 30 April 2013. (In some areas discrimination of dust and other aerosol types is problematic.) Overall the results show an improved fit to satellite AOD and to the sparse AERONET network [7] for short range forecasts. However by day five of the forecast the benefit has largely disappeared, this is expected given the relatively short residence time of dust in the atmosphere. The results [8] and future development options will be discussed.

References

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