
A novel regional reanalysis of dust aerosols

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Abstract

We present a regional reanalysis of dust aerosols which has been recently released by the Barcelona Supercomputing Center for a 10-year period and at the high spatial resolution of 0.1°. The reanalysis has been obtained by ingesting an innovative dust optical depth data set, derived from the MODIS Deep Blue products, in the dust module of the MONARCH atmospheric model by means of a LETKF with a four-dimensional extension.

We outline the different modelling, observational and assimilation aspects related with the production of the reanalysis, whose unprecedented high resolution has required the use of advanced computing and workflow strategies, which are also described.

By providing an accurate and complete reconstruction of dust for a recent decade, this novel

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reanalysis yields useful information to support operational early warning systems, as well as the development and refinement of environmental monitoring and mitigation strategies, in line with the mission of the WMO Sand and Dust Storm Warning Advisory and Assessment System.

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Keywords: regional reanalysis, mineral dust, aerosol optical depth, high resolution, ensemble data assimilation.