

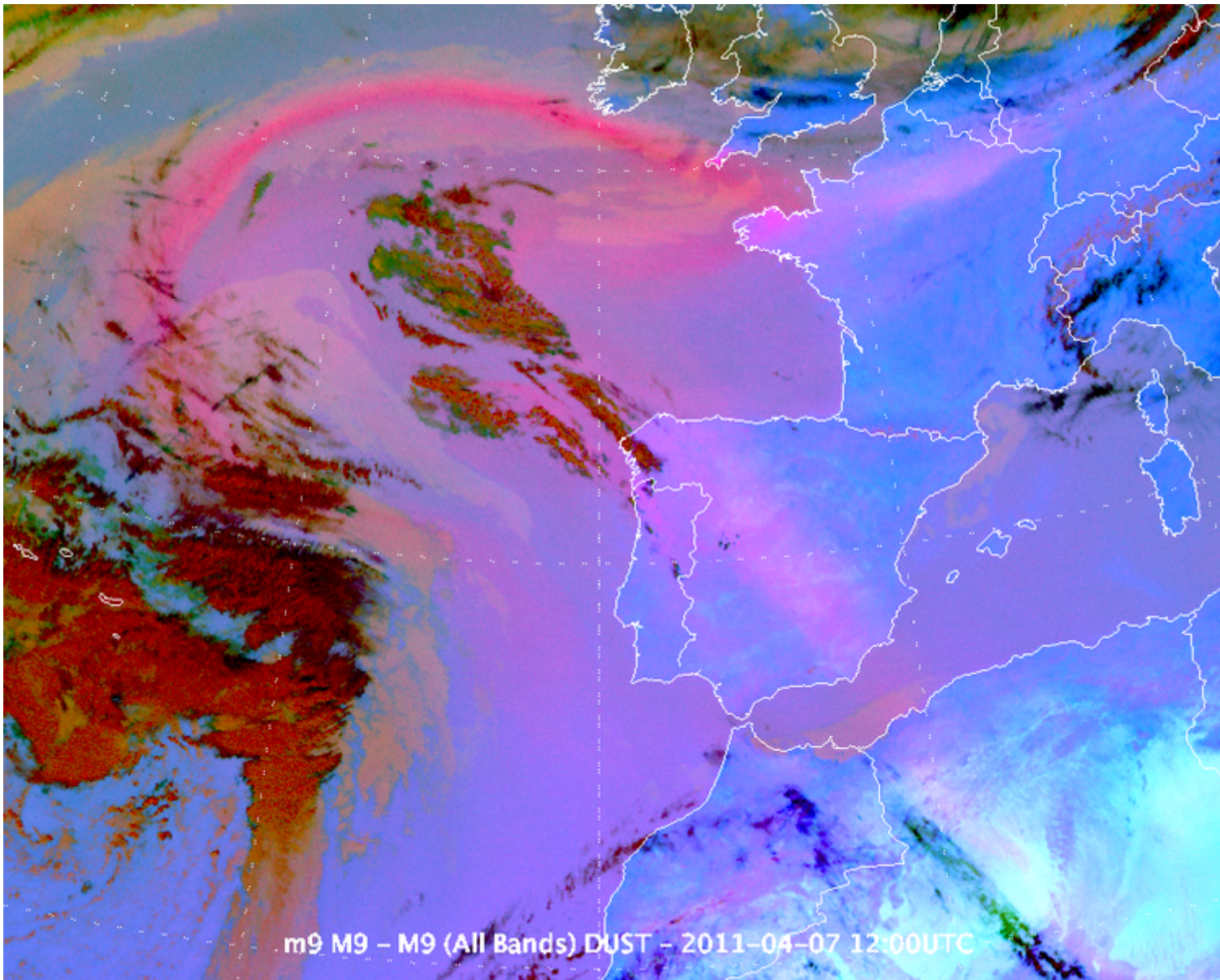
## Saharan dust outbreak towards Europe in April 2011

The well-known publication [Atmospheric Chemistry and Physics](#) (ACP) has recently published the paper titled [Forecasting the North African dust outbreak towards Europe in April 2011: a model intercomparison](#) as a discussion paper in ACPD, the scientific discussion forum of ACP.

This manuscript analyses the capacity of five state-of-the-art dust forecast models to reproduce an intense Saharan dust event which affected Iberian Peninsula and achieved Scandinavia during April 2011 and the BSC Earth Sciences Department is the author together with other international institutions.

**Abstract:** In the framework of the World Meteorological Organisation's Sand and Dust Storm Warning Advisory and Assessment System, we evaluated the predictions of five state-of-the-art dust forecast models during an intense Saharan dust outbreak affecting Western and Northern Europe in April 2011. We assessed the capacity of the models to predict the evolution of the dust cloud with lead-times of up to 72 h using observations of aerosol optical depth (AOD) from the Aerosol Robotic Network (AERONET) and the Moderate Resolution Imaging Spectroradiometer (MODIS), and dust surface concentrations from a ground-based measurement network. In addition, the predicted vertical dust distribution was evaluated with vertical extinction profiles from the Cloud and Aerosol Lidar with Orthogonal Polarization (CALIOP). To assess the diversity in forecast capability among the models, the analysis was extended to wind field (both surface and profile), synoptic conditions, emissions and deposition fluxes. Models predict the onset and evolution of the AOD for all analysed lead-times. On average, differences among the models are larger than differences among lead-times for each individual model. In spite of large differences in emission and deposition, the models present comparable skill for AOD. In general, models are better in predicting AOD than near-surface dust concentration over the Iberian Peninsula. Models tend to underestimate the long-range transport towards Northern Europe. Our analysis suggests that this is partly due to difficulties in simulating the vertical distribution dust and horizontal wind. Differences in the size distribution and wet scavenging efficiency may also account for model diversity in long-range transport.

**Citation:** Huneus, N., Basart, S., Fiedler, S., Morcrette, J.-J., Benedetti, A., Mulcahy, J., Terradellas, E., Pérez García-Pando, C., Pejanovic, G., Nickovic, S., Arsenovic, P., Schulz, M., Cuevas, E., Baldasano, J. M., Pey, J., Remy, S., and Cvetkovic, B.: Forecasting the North African dust outbreak towards Europe in April 2011: a model intercomparison, *Atmos. Chem. Phys. Discuss.*, 15, 26661-26710, doi:10.5194/acpd-15-26661-2015, 2015.



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