Atmospheric
Chemistry
and Physics
Discussions

ACPD

Interactive
comment

Interactive comment on "A complex aerosol transport event over Europe during the 2017 Storm Ophelia in CAMS forecast systems: analysis and evaluation" *by* Dimitris Akritidis et al.

Anonymous Referee #2

Received and published: 16 July 2020

The authors analyse an interesting meteorological/aerosol event named Ophelia, that took place in mid-October 2017 over western Europe. They use CAMS global day-1 forecast data to assess the aerosol spatiotemporal distribution and determine the source and type of aerosol species. Validating the performance of CAMS in these kind of events is quite crucial to understand the current limitations in CAMS aerosol forecast system and the possible upgrades that need to be planned (e.g. assimilating more and different kinds of aerosol observations). The manuscript is well written providing all the necessary information to introduce the event to the reader. I would recommend for publication in ACP after addressing some minor comments below:

CAMS AOD is evaluated using dependent observations (as mentioned at P7, L10-11) from MODIS Dark Target and Deep Blue algorithms showing reasonable agreement with the observations and improvement in both correlation and bias in comparison to the no assimilation experiment. The paper does not provide a comparison with independent observations to prove that data assimilation improves AOD. I would suggest to mention again in conclusions that this is a dependent evaluation (P10, L28-31) or perform a small analysis using independent observations (e.g. AERONET AOD) to prove that CAMS AOD really improves, although the latter option may be out of the scope of this paper.

Figure 6 and discussion starting at P8, L1: A very interesting analysis highlighting the contribution of each species to AOD. Nevertheless the contribution of each species to AOD may differ depending on the aerosol-species optical properties. Black carbon AOD is low (and Absorption AOD high) in comparison to the other species. A 15% to 25% contribution of black carbon AOD to the total AOD might seem mediocre, but climatologically is only observed during fire season in the Tropical band. Maybe the authors would like to comment on that.

Figure 7 and discussion starting at P8, L17: Although this is more of a qualitative comparison to discuss the vertical distribution of aerosols per species, the depiction of CALIPSO and IFS are very different above 4km in both tracks. Is it possible to conclude something about the observations or the model? For example is CALIPSO unable to retrieve trustworthy measurements during the pass of Ophelia above 4km or is IFS overestimating aerosol mixing ratio above a certain height?

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-467, 2020.