The paper of Mokhtari and co-authors is an interesting study discussing the seasonal cycle and optical properties of dust over north Africa. They used the atmospheric model ALADIN and a set of remote sensing and in-situ measurements. The paper is well written and structured and should be published in Atmospheric Chemistry and Physics after taking into consideration the suggestions given below. My reviewer opinion is « minor revisions ».

General comments :

The aim of this paper is to provide a database of dust optical properties, however only the aerosol extinction is discussed. Authors should include some discussions on the single scattering albedo and size distribution which are also key parameters for dust impact and life cycle. As dust optical efficiency strongly depend on the wavelength, the wavelength dependence of these two optical parameters should be analysed.

Discussions are full of vague terms as « compares well », « in good agreement », « reproduces well ». Statistical comparisons between simulations and observations should be added in order to have a better view of the performance of ALADIN in simulating the dust life cycle.

It is stated in Section 3.3 that « we show that the use of a three dimensional NWP model such as ALADIN significantly improves the climatology of wet deposition of dust aerosols. » However, no comparisons with other models are made to support this statement. I suggest to compare the ALADIN statistical scores with the ones published for chemistry-transport models. Does a two-way meteorology-chemistry coupling give a better representation of dust life cycle than a state of the art chemistry- transport model off-line driven by meteorology ?

Several aerosol climatologies are mentioned in the introduction and are considered by authors as not well adapted due to their coarse resolution. Does the climatology obtain in this study with a finer resolution (20x20 km) give a better estimation ?

Specific comments :

Page 5753 L 2 : A new IPCC report has been published
Page 5753 L 18 : To identify and quantify
Page 5753 L 20-23 : Could you explain this positive impact ?
Page 5755 L 17-23 : Could you add some details on these initiatives ?
Page 5757 L 11 : « are explicitly represented « Even at a 20x20 km resolution ?
Page 5757 L 18-23 : The calculation of aerosol optical properties should be described in more details.
Page 5758 L 17-20 : This part should be rephrased
Page 5766 L 11 : How this combination has been constructed ?
Section 4.1 et 4.2 : Simulations take only into account mineral dust while AERONET and MODIS measurements take into account all possible aerosol species. This could induce a bias in the comparisons. Can you quantify it ?
Page 5767 : A figure showing the AERONET sites used in the study should be added.
Page 5769 L24-25 : Do you have an explanation ?
Page 5770 L 10 : There is also a model overestimation during July.