

## ***Interactive comment on “2-D mineral dust radiative forcing calculations from CALIPSO observations over Europe” by Maria José Granados-Muñoz et al.***

### **Anonymous Referee #2**

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General comments The paper focuses on analyzing the dust radiative effects in SW and LW spectral ranges combining satellite data (CALIPSO, MODIS, etc) and radiative transfer modelling (GAME). The authors use also ground-based aerosol profiles, taking advantage of the simultaneous and quasi-collocated EARLINET stations, for validation. Despite this, the most interesting part of this work is the application to CALIPSO profiles. The radiative forcing and heating rates obtained show good agreement when comparing with the obtained using ground-based aerosol profiles and the same GAME RTM. I think the paper of interest for aerosol research and modelling community due to the great potential of CALIPSO data to be operationally used in model assimilation. Therefore, the argument and application of this paper is solid and then suitable for pub-

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lication in ACP. However, several minor issues should be addressed before the paper is published.

Specific comments Abstract L8: What does the forcing efficiency variability depend on? solar zenith angle, surface type and albedo? Pag 11. L9: At Granada, we cannot consider EARLINET and CALIPSO as collocated measurements, since the distance between both is more than 100km. What implications could this distance have in the operational assimilation of CALIPSO data by the modelling community? Pag 12.L22: I do not understand why the authors describe so detailed the meteorological variables, even using a big plot, if then, this variables are not taken into account neither related to the radiative forcing analysis. Pag 12.L25: The sentence "...general, even though a stratospheric O3 intrusion is affecting 25 the GR orbit increasing the O3 concentration in some regions." is difficult to understand can you rewrite it, please?

Pag 13.L14: What constrained by MODIS AOD really means? Is not clear if you are using the alfa profile by CALIPSO or you are inverting the Lidar raw data using MODIS AOD? Pag 15.L10: Please, remove the second "increasing" in the sentence

Figure 1 is confusing, can you use different colors for the EARLINET stations and for the CALIPSO track to better distinguish them? can you include more lat and long values to improve the visual appreciation of the distances? Figure 10. Caption: Please specify "Average heating rate profiles and standard deviation"...

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