

## ***Interactive comment on “Effects of aerosols on solar radiation in the ALADIN-HIRLAM NWP system” by E. Gleeson et al.***

### **Anonymous Referee #1**

Received and published: 27 January 2016

#### General comments:

The paper addresses relevant scientific questions within the scope of ACP. The authors do not clearly support to present novel concepts, ideas, tools, and data, but they are interested about an important topic, i.e. the sensitivity of shortwave model outputs on aerosol and relative humidity. The overall presentation is neither well-structured nor clear; improvements in the structure and the content of each section are needed. There are three main issues that need careful attention prior to publication: 1) the language is not always fluent and precise. In particular, several phrases remain colloquial and simplistic. The repetition of the same words within the same phrase has not been eliminated. Indicative paradigms are highlighted in yellow or commented or replaced within the attached file, 2) there description of the tools and methods used is not precise and

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clear. The use of numerous names and/or acronyms throughout text makes the reader confused about the actual model system used, as well as the number of applied scenarios and their scope and 3) subsequently, the presentation of the scenarios, their inter-comparison and their differences is not clear and the main findings are not easily traceable. To my view, once the results are rewritten in a clearer and straightforward way, they will most probably be sufficient to support the conclusions. More interpretations are needed for some statements. All of the above comments (plus more) are specifically described below and/or in the attached file.

Specific comments:

**Title:** The title does not clearly reflect the contents of the paper. To my view, this study does not only aim at investigating the aerosol radiative impact, but also the sensitivity of model outputs on specific parameters. Thus, I would suggest the invention of a more appropriate title, which would reflect the principal motivation and focus of the authors.

**Abstract:** the abstract should be revised after all comments are taken into account, so that it serves as a concise and complete summary of the article. Indicative rewording is shown in the attached file.

**Introduction:** Each paragraph should have a clear and concise concept that serves to cover a specific aspect covered by this work. Also, they should (in-)directly try revealing the new/original contribution of the current study. Apart from these general statements, specific comments are given in the attached file. The authors give credit to related work and indicate their own contribution. Nevertheless, I would suggest an ultimate search in previous relevant studies (cf. attached file).

**Sect. 2:** There are cases when the scientific methods and assumptions are not clearly outlined. Specific comments are given in the attached file.

**Sect. 3:** here, my main concern is that the overall explanation of the concept and description of the model runs should answer and summarize the following: what is the

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scope of each scenario? Which are inter-compared? What is their code name, which should be easily translated to their main feature (in table 1) and in parallel should be analytically described (in the text). By the end of this section, the reader must have realized the structure of the setup of this study and the necessity of each scenario. It should also be clear that when he/she proceeds to the results and conclusions, he can follow without getting lost with the names of the simulations. This concern, plus other suggestions are highlighted in the attached file. Some comments about the description of experiments are also given. Please bear in mind that they should be sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results).

Sect. 4: Again, the reader is at a loss on the topic of each subsection, the inter-comparisons made and the results of them. Suggestions for improvements are highlighted in the attached file. Although the results seem sufficient to support the interpretations, their current way of presentation is rather chaotic.

Sect. 5: To my view, conclusions should be clearer and more concise. Comments for improvement are given in the attached file. I would expect that the revision will point out the substantial conclusions of this work.

Comments in tables and figures are given in the attached file.

Several questions are posed by the reviewer in the attached file. They mainly serve as a motivation to revise the respective document and not merely to be answered by the authors. A lot of the comments and questions are put in specific parts of the document, but they seemingly refer to the whole manuscript, i.e. to other similar parts, as well.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/15/C12013/2016/acpd-15-C12013-2016-supplement.pdf>

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