Natural Hazards
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Discussions

Interactive comment on "Simulating lightning into the RAMS model: implementation and preliminary results" *by* S. Federico et al.

Anonymous Referee #2

The paper "Simulating lightning into the RAMS model: implementation and preliminary results", by S. Federico and coworkers, presents the results of the application of a methodology to simulate lightning activity, implemented into the Regional Atmospheric Modeling System (RAMS). The methodology is a refined version of an already published algorithm and is applied to two case studies over central Italy, that are analyzed with some detail, while a more significant statistics (obtained over a larger number of simulation) is discussed. Lightning ground network is used to validate the simulations and to highlight how to improve the technique. The paper is interesting, well written and within the scope of NHESS. My suggestion is to publish the paper, after few modifications I indicate below.

Abstract. I suggest to be more quantitative in the abstract, including some number to

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show to the reader the overall quality of the results, not only saying "the model predicts reasonably well. . ." which is rather meaningless in scientific context.

I suggest to change the title of section 2 (Material and methods) to a more proper "data and methodology" or "data and algorithm".

Section 3.3. The Authors make use of POD FAR and TS indicators to assess the model performances in detecting lightning. Some concern can be raised on the use of TS, since it is not equitable. Basically, TS overestimate the error for rare events, and gives a values higher than 0 for a random assignment of yes/no values in the maps. To overcome partially these drawbacks, other indicators such as Hansen and Kuiper or equitable threat score should be used. See a discussion on indicators in Hogan et al., 2010, Weather and Forecasting. The Authors should either compute ETS/H&K instead of TS, either justify the choice of a not-equitable skill score.

A possible way to overcome the limitations pointed out in lines 10-13 on page 3374 could be to restrict the computation of the skill parameters to those areas where convection is correctly forecasted by the model. I suggest to compare model derived precipitation maps to some ground based precipitation rate measurement (i.e. form radar or raingauges) and to perform model flashes validation only in the areas where forecasted and observed convective precipitation are in reasonable agreement. This would result in a more direct verification of the "flash" module in the model with lesser impact of model timing and position errors, especially at finer scales.