

Reviewer #2

Overall evaluation: The paper presents the evaluation of a lightning data assimilation, implemented in the RAMS model. Overall, the manuscript is well written and the methodology and results are well discussed relative to the available international literature. The subject is of high interest. I suggest acceptance of the manuscript, subject to some minor comments and technical corrections, which are summarized in the following.

Minor comments

1. L64-76: I believe that the three paragraphs could be merged in one, as they all present briefly examples of lightning data assimilation studies.

- The three paragraphs will be merged in the revised version of the paper.

2. I suggest that Table 1 is removed from the manuscript. Instead of presenting this detailed information on the domain configuration of RAMS, it could be of more usefulness for the reader to add a simple plot showing the domains or stick to the two figures that are already referenced for giving an overview on domains. The respective description of the domain configuration in L120-126 can remain as is.

-Thank you for this comment, we will follow this suggestion including a new Figure 1, showing the domains. Table 1 will be removed and the Figure 1 caption will include some details on the domains.

Here is the Figure 1:

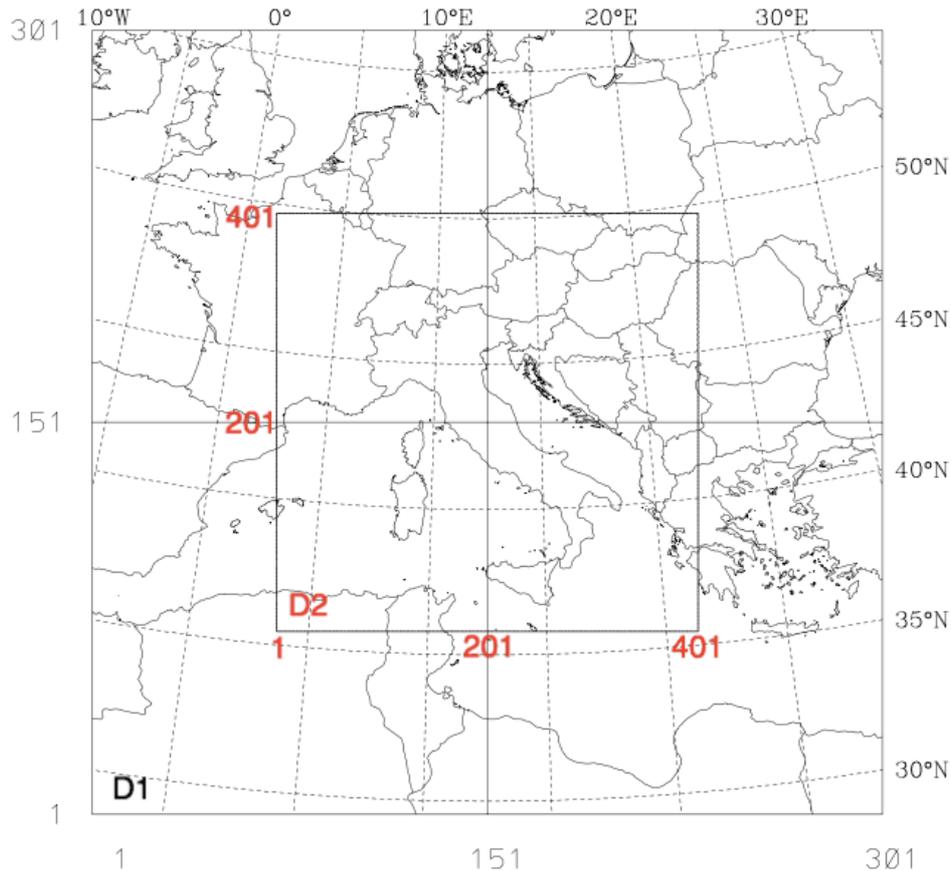


Figure 1: The two domains (D1, D2). D1 has 301 grid points in both the WE and SE directions; D2 has 401 grid points in both WE and SE directions.

3. L123: It would be also proper to include model top in hPa.

- In the RAMS model, the model top is fixed in z , the height above the sea level. Pressure varies on the model top surface, however an estimation of the model top in hPa (40 hPa), from the model output will be given.

4. L151-152: I believe that simply referring to cloud-to-ground (CG) and intra-cloud (IC) lightning is enough, instead of giving the information currently shown in the parentheses.

-We will change the paper according to the comment.

5. L223-227: This particular part of the manuscript presents a result of the study. Hence, it can be removed from Sec. 2, that is devoted to methodology. It can be moved to the Results section, at the appropriate place.

- This part will be moved in the Results section.

6. L259-L263: I think that this paragraph could be removed as it reports information

that is most probably well known to the interested readers. I leave it up to the authors to decide whether it should be removed or stay.

-We agree with reviewer that this part of the paper could be removed because it presents basic definition well known to the large part of readers. Nevertheless, in other papers, we found that reviewers asked for this explanation about the scores and, in the doubt, we will maintain the paragraph.

7. L290-293: Please rewrite this part of the manuscript in a more clear way.

Thank you for noting this point. We will clarify the sentence: "During SOP1, several upper level troughs extended from the Northern and Central Europe toward the Mediterranean Basin or entered in the Basin as deep trough. Few of them developed a cut-off low at 500 hPa; the interaction between the upper level troughs and the orography of the Alps generated a low pressure pattern at the surface in Northern Italy, and usually the whole system moved along the Italian peninsula. The 27 October 2012 case study, also referred as IOP16a, belongs to this class of events, but it eventually evolved in a cut-off at 500 hPa on 28-29 October (IOP16c)."

Technical corrections:

All the technical points below will be corrected according to the comments.

1. L1: "short-range"
2. L18: "set up"
3. L21, L78, L95, L190: "that occurred"
4. L21: "which were..."
5. L23, L244, L313 and throughout the entire manuscript: "rain gauges"
6. L23, L95: "target region" or "target area"
7. L73: "presented" or "introduced" could be a better choice for this sentence.
8. L75: "performed" instead of "made".
9. L131: The correct terminology is "WRF single-moment six-class microphysics scheme"
10. L174, L322: "setup".
11. L174: "trial and error analysis..."

12. L244: The abbreviation QPF (Quantitative Precipitation Forecast) has not been previously defined, should I have not missed it while reading the manuscript.
13. L249: "with" instead of "being".
14. L267, L484: "competing" instead of "competitor".
15. L298-290: Correct the term to "troughs" (it is now written as "through").
16. L290: "cut-off low".
17. L495: "WRF-LTNGDA"