

Interactive comment on “Validation of the METEOSAT storm detection and nowcasting system Cb-TRAM with lightning network data – Europe and South Africa” by T. Zinner et al.

Anonymous Referee #2

Received and published: 27 March 2013

The problem of objective validations in the atmospheric research is well acknowledged, in particular in the field of the thunderstorm forecasting. Generally, the validation of thunderstorm nowcasts can be performed more or less objectively by means of radar measurements, data from lightning detection networks and/or (especially for hailstorms) insurance loss data. For this reason, it can be considered that the topic of the paper is in line with the current status of the research, it is important at an international level and it is particularly relevant for the scientific community dealing with thunderstorm nowcasting systems. Therefore, the overall goal of the proposal can be considered as solid and the paper should be definitely divulgated to the scientific community. Goals of the paper are twofold: 1) To present the latest improvements of the

C457

thunderstorm detection of the expert system called Cb-TRAM 2) To objectively validate the detection and nowcasts provided by Cb-TRAM by means of independent data from two lightning detection networks over two different regions with completely different climate conditions. The authors provide a detailed and complete description of the system and a comprehensive description and analysis of the problematic. The results are very interesting: not only simple POD and FAR values are provided, but they are also discriminated, analysed and discussed according to the spatial and temporal characteristics of the storms. I found particularly interesting the separation between the pixel- and object-based approach. The paper is well structured, the tables and the figures are understandable. Unfortunately, even without being a native English speaker, I found several linguistic problems in the text. The sentences are often too long and some of them are quite complicated. The text contains also language mistakes. Even if I ticked off the “minor revision box” I would strongly recommend a careful language check (proofreading) during the revision procedure of the paper. Several comments concerning the language as well as some scientific comments and questions are provided.

Editorial comments:

- Abstract: specify the acronym DLR
- Abstract: approximately -> approximately
- 1271, line 3: specify the acronym SEVIRI
- 1271, line 8: allows -> allow
- 1271, line 23: Rapid Developing Thunderstorm Tool -> Rapid Developing Thunderstorm system
- 1271, line 23: specify the acronym SAF
- 1272, line 28-29: (...) data source of choice for the presents analysis -> (...) data source for the presents analysis

C458

- 1273, line 11: The following expands(. . .) -> This study expands(. . .)
- 1273, line 14: Why till now it is called Cb-TRAM and now Cb-TRAM METEOSAT? Use only one form for the whole manuscript.
- 1273, line 15: Sect. or Section? Use only one form for the whole manuscript.
- 1273, line 17: maybe is better to use “according” instead of “depending”
- 1273, line 17: maybe is better to use “variation” instead of “spread”
- 1274, line 1: Fig. or Figure? Use only one form for the whole manuscript.
- 1274, line 4: (. . .), but also first(. . .) -> (. . .), and also for first (. . .)
- 1275, line 1: Split into two sentences: The complete detected area is sub-divided into objects. An object is defined as a continuous groups of pixels.
- 1275, line 3: (convective initiation, rapid growth, mature) -> this repetition is not necessary
- 1275, line 12-27: I would consider the possibility to move this description before, for example to the line 27 page 1273
- 1279, line 20: contiguous -> contiguous
- 1280, line 22: combined into -> combined with? In any case I do not understand in which manner they are combined. Please specify.
- 1280, line 23: (. . .)areas in constitute(. . .) -> complete or correct
- 1281, line 3: al.owed
- 1282, line 11: I think is not necessary to write “i.e.” here.
- 1285, line 19: (. . .) contain sl intense (. . .) -> what does sl mean?
- 1286, line 7: (. . .) apart from any (. . .) -> (. . .)apart from any(. . .)

C459

- 1287, line 15: On the one hand (. . .) -> On one hand (. . .)
- 1287, line 15-18: sentence to long and complicated. Split in two sentences.
- 1287, line 19: heavy -> severe
- 1287, line 21: necessarily -> necessarily
- 1287, line 27: Figures 6 show (. . .) -> Figure panel 6 shows (. . .)
- 1288, line 2: (. . .) bottom of 6. -> (. . .) bottom of figure 6.
- 1288, line 20: substitute “That means, e.g. . . . “ This means, that . . . ”
- 1292, line 10-13: please revise the sentence. The expression “given the fact that the vast majority of all strong potentially harmful cells. . . . ” is very complicate!
- 1292, line 19: “Although probably most. . . . ” -> Although probably the most. . . . ”
- 1292, line 25-28: Revise and correct the sentences. For example, you can start the sentence with : “One of the reason for the slightly better. . . . ”
- 1293, line 1-4: simplify and split sentences

Technical / Scientific comments:

- 1271, line 18: you can mention the *official* definition of convection initiation: “CI=first occurrence of a 35-dBZ (S-band weather radar) echo from a new convective cloud.” -> Reference: Mecikalski et al, 2010.
- 1271, line 25-26: Mention that thunderstorm detection and nowcasting is important also for applications outside the aviation. Think about the effect of hailstorms, flash floods, severe wind gusts. As a matter of fact, on line 3, page 1272, you speak about “other users”.
- 1273, line 25: specify here the criteria for using HRV. You mention this on page 1277, line 6 but it is too late.

C460

- 1273, line 27: the “convection initiation” and “mature stage” are considered stages of convective cells. The “rapid growth” cannot be considered a stage, since it is a particular feature of some convective cells (not all!). See also the sentence on page 1293, line 11 where you write that rapid development is not supposed to be a reliable sign of intense convection. Have a look at the reference of the ESSL EUMETSAT Convection working Group: http://www.essl.org/cwg/res/pdf/BP-EUMETSAT_20120730.pdf
- 1274, line 1: Nowcasts are provided up to one hour -> Since you are not using the Rapid Scan Mode, I think that these nowcasts are provided / refreshed every 15 min for the next 15, 30, 45, and 60 minutes? Is that right? Please specify.
- 1274, line 14-29: could you add a reference for this procedure?
- 1274, line 21: extrapolation: persistence is assumed (Lagrange)? Please specify a bit more.
- 1275, line 5: parallax correction: how do you transform CTT in CTH / which kind of data you use (NWP, standard atmosphere, MPEF CTH, SAFNWC CTTH, or others?) Please specify.
- 1278, line 14-15: IC strokes can be subdivided into intra-cloud and inter-cloud strokes. I think you should mention both.
- 1280, line 19: “10 flash reports within a Meteosat pixel and a 15 min time period” -> how do you calculate this value?
- 1281, line 21: “European thunderstorm activity is often connected to fronts.” -> Insert a reference if possible.

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 6, 1269, 2013.

C461