

Interactive comment on “The Lagrangian analysis tool LAGRANTO – version 2.0” by M. Sprenger and H. Wernli

Anonymous Referee #1

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General comments:

This is a thoroughly-written documentation of the utility and flexibility of this new version of the well-established and well-used trajectory tool LAGRANTO. The examples are nicely chosen to illustrate the range of possibilities with this model. It will be a valuable resource to existing users and encourage wider adoption by new users.

Specific comments:

1. While generally well-written the paper contains numerous small English language errors which need to be corrected. I have pointed out many (hopefully most) of these below under technical errors.
2. It would be helpful if a few more sentences could be added on the difference be-

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tween this version of LAGRANTO and previous version(s). Are the differences just those described as the ‘enhanced functionalities’ in the abstract or do other differences exist? Would this version of LAGRANTO produce exactly the same trajectory set as the previous version for an example case (given the same starting positions etc.).

3. Several other trajectory tools are mentioned in the introduction. In the conclusion 3 special features of LAGRANTO compared to other trajectory tools are listed. Can you be more precise as to whether any of the other trajectory tools you’ve mentioned incorporate any of these special features i.e. if the user required one of these special features is LAGRANTO the only option?

Technical corrections:

1. Abstract: the second sentence of the abstract covers a whole 11 lines and the use of semicolons doesn’t seem quite right. It would be better just to use them to distinguish the list labels i.e. prior to (ii) and (iii) and to use other punctuation (commas or brackets) to separate other items. Alternatively it would improve readability to separate this long sentence into multiple sentences.
2. UM should be changed to MetUM throughout the text as this is the standard acronym for this model.
3. Abstract L18: ‘example’ -> ‘examples’
4. Abstract: I found this difficult to follow in terms of the example cases initially as it isn’t immediately obvious that orographic blocking is one of the examples in the paper (which makes the reference to the resolution needed to represent this rather meaningless). A simple change in L19 to ‘...are needed for the next example to adequately...’ would improve this.
5. p1896, L1: ‘application’ -> ‘applications’
6. p1896, L25: change to ‘LAGRANTO was first used...’

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7. p1897, L4: 'helped analyzing' -> 'helped analyze'
8. p1897, L16: I'd remove the comma after 'themes'
9. p1998, L2 and elsewhere: The colon is not usually used in times in Met. papers (i.e. 1200 UTC rather than 12:00 UTC) so I suggest changing this unless the convention is different for this journal.
10. p1898, L14: 'available in netCDF.' rather than 'available on netCDF.'
11. p1898, L26: Strictly, the suffix .eqd tells LAGRANTO that the starting positions should be equidistantly distributed within the box with a spacing of 80km 'in this example' (rather than generally).
12. 1898, L28: change to '...equidistant pressure levels...'
13. p1899, L18: you say that the input files could in principle be available every minute, have you tested that this works?
14. p1900, L2: I don't understand the relevance of the sentence starting 'Note...'. What do you mean by 'the entries are not separated by an empty line'? What are the 'entries' in this case?
15. p1900, L6 and in lots of other places: The verb 'allow' is used incorrectly throughout this article. For example here instead of 'which allows to trace meteorological fields' you should use 'which allows one to trace meteorological fields' or, probably better, 'allows meteorological fields to be traced...'
16. p1901, L11: change to 'A well-established WCB can be...'
17. p1901, L12: change to 'near the surface'
18. p1902, 13: 'ECMWF is given' ?
19. p1902, L20: It took me a while to work out that (i) referred back to 'ECMWF hybrid sigma-p level type' – perhaps better to say this explicitly.

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20. p1905, L17: 'fix' -> 'fixed'
21. p1905, L18: change to 'proceed on its course'
22. p1906, L16: spelling of 'calculation' is incorrect.
23. p1906, L24: This should be 'parcels' position' since the position belongs to the parcels.
24. p1906, L25: change to 'surroundings'
25. p1907, L12: 'being part in both sets' -> 'that are part of both sets'
26. p1908, L15: 'a field' -> 'this field' since you are referring to field RTOT in this example.
27. p1908, L15: 'it's...' 'its'
28. p1910, L10: Why can the command 'ALL' only be applied with the label field of 'select'? Table 2 lists examples without the label field.
29. p1912, L21: Don't you need to have at least 3 timesteps to ensure that a criterion applies for a minimum of 12 h (i.e. timesteps at 0, 6 and 12 h)?
30. p1912: In the code 'GT:LABEL(NONZERO):2:ALL' how does LAGRANTO know which label is being tested given multiple labels could be defined?
31. p1912, L23: 'loose' -> 'lose'
32. p1913, L 7: 'ist' -> 'is'
33. p1913, L14: change to 'which has been'
34. p1916, L2: change to 'was chosen to be larger...'
35. p1916, L9: change to '...vertical coordinates. It is one of the main features of startf...'

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36. p1917, L22: need to define PBL here (currently not defined until p1921).
37. p1918, L10: 'very' -> 'many'
38. p1919, L20: change to 'help predict.'
39. p1921, L12: DPBL = P – PBL, thus if a trajectory has had contact with the boundary layer its pressure must have exceeded that of the PBL and so I think DPBL should be positive (rather than negative as stated).
40. p1923, L4: 'version' -> 'versions'
41. p1923, L14: what is meant by 'geographic coordinates'? For the MetUM at least the non-rotated coordinates are normally referred to as equatorial coordinates.
42. p1923, L25: 'list' -> 'lists', also consider using a comma after 'file'
43. p1925, L26: How can you partly need python as a software tool? Do you mean that you need python for some bits of LAGRANTO but other bits work without it?
44. p1926, L6: 'since almost 20 years' -> 'for almost 20 years'
45. table 1: the last sentence in the caption doesn't make sense and has a spelling error. This sentence could be changed to match the equivalent sentence in the caption of table 2.
46. table 2: The use of bold is not consistent here e.g. the first example is for PV greater than 2PVU at any time and the second for PV greater than 2 at all times and yet different bits of the criterion are written in bold in the first column for these examples. I suggest removing the selective use of bold font in this table.
47. fig 2 caption: 'allows studying of' -> 'allows study of'
48. fig 3: why is there a colon after the equals sign in the figure? Also, the use of superscripts * and ** for the different iterations of the forward steps is inconsistent with the text where subscripts (1) and (2) are used.

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49. fig 4: 'starting position' -> 'starting positions' in caption
50. fig 5: should strictly note that the orography is in 'm' and also note that this field is shown in panel b as well as panel a
51. fig 6: please add units of both pressure and density to the caption.

Interactive comment on Geosci. Model Dev. Discuss., 8, 1893, 2015.

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