Weather Clim. Dynam. Discuss., community comment CC1
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Reply on RC1

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Community comment on "The three-dimensional structure of fronts in mid-latitude weather systems as represented by numerical weather prediction models" by Andreas Alexander Beckert et al., Weather Clim. Dynam. Discuss., https://doi.org/10.5194/wcd-2022-36-CC1, 2022

Dear Reviewer,

Thank you for providing your comments. We recognize your concern that our manuscript provides too little new insight on dynamic meteorology to the literature, and we would like to use the possibility of this discussion to briefly clarify the goals of our paper. We will reply in more detail after the discussion period has ended.

There were two major objectives that we wanted to achieve with our work: (a) a reimplementation and generalization of the Kern et al. (2019) method such that it is robust when used with current model data and can handle additional filter options, and to document the tool and make it available to the community as an open-source release, alongside the paper (which the original Kern et al. method was not); and (b) provide guidance to researchers on how to use 3-D front detection and visualization by investigating suitable method parameters and by showing the potential of the method for meteorological analyses with selected examples.

Since many people in the meteorological community are not used to working with 3-D visualization, we consider it valuable to demonstrate its potential. We tried to do this using familiar examples that are easily related to conventional 2-D depictions (for example in Fig. 3), but show features that would not be easily seen in the conventional views. It is true that static 3-D images can require significant effort to interpret, but our aim was to help and encourage the reader to make this effort, and eventually to explore the interactive tool. It is helpful in this regard that it is now possible to publish animations along with a paper (as we have done).

We did consider submitting the article to GMD, which would be the usual place to publish descriptions of models and analysis tools, but we chose to submit to WCD in order to reach the audience that is most concerned with analyses of atmospheric dynamics and that would thus benefit from learning how to use 3-D visualization for their work. We agree that we picked up several aspects that would (and should!) require much more in-depth research and could be published on their own – that, however, was not the goal of this paper, and is something we see as future work that could be approached by using our method.

Kind regards,

Marc Rautenhaus, on behalf of the author team