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## ***Interactive comment on*** **“Stratosphere–troposphere exchange (STE) in the vicinity of North Atlantic cyclones” by P. Reutter et al.**

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We thank both reviewers for their supportive and constructive feedback. Both reviewers commented on our cyclone region identification, which is currently based on surface pressure alone, and indicated that the results would be more meaningful and robust if the cyclone areas could be somehow extended to reflect also the upper-level structure of the cyclones. We fully agree with this criticism/suggestion and we thought about how to address this point and to extend our cyclone regions such that they also reflect the structure of the cyclones at upper levels. The approach we are currently trying to realise uses anomalies of geopotential height on different pressure levels, in addition

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to the sea level pressure field. Anomalies are calculated from running mean temporal averages and first tests indicate that such an approach might work. The main idea is to identify regions with negative geopotential height anomalies bounded by closed anomaly contours (similar to our approach used for sea level pressure) and then to regard the cyclone region as the area encompassing the identified objects at the different vertical levels. With this approach we will obtain larger cyclone regions and therefore the STE fluxes attributed to cyclones will increase. We think that such an approach will consider the criticism/suggestions by the reviewers and lead to a more robust estimate of cyclone-related STE. The detailed computations for the long ERA-Interim time period will take some time and we will submit our detailed responses to the reviewers' comments and a revised manuscript after we have done all the new evaluations.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 2535, 2015.

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