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Interactive comment on "Wind extraction potential from ensemble Kalman filter assimilation of stratospheric ozone using a global shallow water model" *by* D. R. Allen et al.

Anonymous Referee #1

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== general comments == This manuscript represents a significant contribution to the topic of wind retrieval using data assimilation. It addresses specific aspects not present in previous studies, in particular the issue of imbalance in the analysis depending on which variable is assimilated. The overall quality of the manuscript is very high, but some minor points may still need to be clarified.

== specific comments == 1) Regarding the "perturbed-observation" EnKF methodology, it is not clear how the data are assimilated. Specifically, at a given assimilation step, are all observations assimilated at once or are observations assimilated sequentially by batches ? If the latter is true, in the experiment where both ozone and height

data are assimilated, considering that the height assimilation effectively acts as a gravity wave filter, does the order of assimilation (i.e., assimilating ozone first and height afterwards, or vice-versa) has a significant impact on the final analysis balance ?

2) In the height-only assimilation experiment, looking at Fig. 9, the optimal localization length seems to be beyond the 5000km value. Have there been tests done with longer localization lengths ? Also, considering that ozone assimilation and height assimilation products behave differently when varying localization lengths, why has a single localization length parameter strategy been retained for the combined ozone and height assimilation experiment ?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 3955, 2015.