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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water vapour variability in the high-latitude upper troposphere – Part 2: Impact of volcanic emissions" *by* C. E. Sioris et al.

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My objective in commenting is to support the recommendations of Anonymous Referee #3 and to identify other major concerns not included in the earlier referee reports.

The title is specific and restrictive to tropospheric water vapor. This, and the fact that their Part I paper is similarly entitled, implies intent to limit the scope thusly. However the body of the paper includes stratopsheric as well as tropospheric water vapor observations. E.g. Page 25881, L14-25; P25885, L4-5. If the authors' intent is to reflect the title, the entire stratospheric part of the paper is out of scope. Otherwise the titles and motivation of both papers need to change.

Regarding VEI - No citation is given for the VEI construct. VEI is not discussed in the

cited Smithsonian report for Puyuhue Cordon Caulle . Moreover, VEI is qualitatively proportional to injection height, with VEI of 5 or more being strictly stratospheric. Of what relevance is a 5+ VEI to upper tropospheric water vapor?

The abstract gives information that is found nowhere in the paper and which is incorrect: that the Cordon Caulle eruption was "the most explosive eruption in the past 24 years." Clearly several volcanic eruptions since 1991 have been more explosive, including Pinatubo.

The authors inexplicably ignore the high-latitude Grimsvotn (Iceland) eruption of May 2011. The Grimsvotn material was in the UTLS at high latitudes even before Nabro woke up. It would seem that any discussion of volcanoes and UT water vapor at high northern latitudes in 2011 has to involve Grimsvotn, which had both a head start and preferable latitude w.r.t. Nabro.

Regarding "recent eruptions such as Kasatochi" (in the paper's wrap-up section) the authors claim that these other eruptions had little impact on stratospheric water vapor. Several issues with respect to this: 1. the authors presented no analysis of these other eruptions, 2. they give no citation, and 3. the stratosphere is of questionable relevance to the theme of upper tropopsheric water vapor.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 25873, 2015.