



EGUsphere, referee comment RC1  
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## **Comment on egusphere-2022-474**

Anonymous Referee #1

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Referee comment on "On the impact of Himalaya-induced gravity waves on the polar vortex, Rossby wave activity and ozone in CMAM30-SD" by Ales Kuchar et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-474-RC1>, 2022

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This paper analyses the impact of the GWD due to the Hymalayas on various important climatic phenomena, like the polar vortex, the Rossby wave activity and Ozone.

The methodology mainly consist in doing composite maps according to the orographic gravity wave tendency applied at 70hPa averaged over the Himalayas. Composite are made of the NAM, the EP fluxes, refractive indexes of Rossby wave activity. These are very specific diagnostics, picked up at convenience, to a certain extent, the authors trying to make a picture out of them.

As confidence intervals in the maps are often quite weak (95% significance occurring out of 20 days of realisations in Fig. 1A, can simply be due to chance) the quantitative arguments should be made stronger. In fact, it well may be that the large scale flow changes seen are manifestation of a strong mountain torque, due to large scale Rossby wave mountain interaction, and that the associated large scale conditions leads passively to a large subgrid scale Himalayan torque. These types of passive relation are not considered at all in the paper, and should be discussed. As an illustration, the composite maps in Fig.4, and Fig.5 never shows the negative lags, it would be important to see if something is present at negative lag before discussing causality.

Also, there exist simulations CMIP type among others, where centuries of TEM data are provided, far much more than the 30 years shown here, the authors should consider these type of simulations to consolidate their correlations: 95% confidence out of 30 years low resolution runs are a little out of date according to the present day standards. Also looking at other models could tells if the OGW in CMAM are representative of what is parametrized in other models.

Many caveats are placed in the conclusion, somehow in line with what is said above about correlations not necessarily implying causality, but the titles and abstract are not that humble and strongly suggest that a particular model behaviour translates something that occurs in reality.