REVIEWER # 1

General comments

In the manuscript under review, the authors have used multistatic specular meteor radars to show the first climatology of momentum flux, horizontal divergence and relative vorticity over middle and high latitudes in central Europe. For this, 7 years of observations from MMARIA/SIMONe Germany and 10 years of observations from MMARIA/SIMONe Norway, were used. The measurements obtained by multistatic specular meteor radars have proven to be a powerful tool for better understanding of the mesosphere-lower thermosphere dynamics by measuring of parameters that help characterize atmospheric waves and turbulence. The techniques and methods used to achieve the results had already been applied in previous studies and proved to be suitable for the required analyses. The manuscript presentation is clear and the scientific contribution is appropriate for this journal. However, there are a few issues that need to be addressed.

We kindly thank this reviewer for taking the time to read and revise our manuscript. We hope our responses help to clarify all the concerns and points raised by this reviewer.

Specific comments

Page 2, line 43

In the sentence: "On the other hand, the ability of the GWs to reach the right altitudes necessary", change the word "right' by "suitable" (only a suggestion).

R. Thanks. We have slightly modified the sentence as follows: "On the other hand, the ability of GWs to reach the altitudes at which they can influence atmospheric processes…"

Page 8, lines 220-221:

This explanation about highest year-to-year variability in Figures 3 and 4, looks confused, mainly for fluxes and vorticity.

R. Our apologies if this sentence was not clear. We have rephrased it as follows: "The dash-dotted blue contour lines bound the regions with highest year-to-year variability, i.e., the areas where the 2σ parameter (with σ denoting the standard deviation) reaches the highest values."

Page 9 lines 245-246

Examining Figure 4 for zonal momentum flux, I see that the summer shows a strong eastward zonal momentum flux above 81 km and below 86 km (not around 81-82 km) of

altitude. Comment the strong westward zonal momentum flux that appear below 81 km during summer.

R. Thanks for this comment. It is not entirely clear to us what may be behind the strong westward zonal momentum flux observed below 81 km during summer at Norway. We think it's the result of anisotropic non-linear gravity waves that propagate with the wind and when breaking accelerate the background zonal wind (notice that those strong westward values approximately coincide with the largest westward values of the mean zonal wind – see bottom left panel in Figure 4). We have observed a similar behaviour at low latitudes (see Conte et al., 2023), but in that case the observations were supported by model simulations exhibiting the same characteristics in the GW drag. Sadly, at the moment we don't have simulations of the same type over Norway. So, our thinking remains only a speculation for now, and we prefer to leave a more thorough investigation of the case for a future study.

Page 10, lines 275-277

In the sentences:

"In summer, our results at high latitudes (northern Norway) show …."

"Above it, vortical motions dominate during the first half of the summer"

Wouldn't it be from mid-spring, instead of summer?

R. Yes, the reviewer is right. Sorry for the mistake. We have modified the sentence as it was suggested.