

## Review

of the paper by F. Lilienthal et al. “Interaction of Small-Scale Gravity Waves with the Terdiurnal Solar Tide in the Mesosphere and Lower Thermosphere”

The paper is devoted to the implementation of a parameterization of Gravity wave (GW) effects to the numerical model of the atmospheric general circulation. The authors included a new version of GW spectral parameterization into the Middle and Upper Atmosphere Model (MUAM). The methods and assumptions are valid and clearly described. The results of the model testing are sufficient to support the interpretations and conclusions. The code of the model is included into an open database and it is accessible for any reader. The descriptions are sufficient for practical usage of the model. The paper contains sufficient number of references to previous related papers. The title and abstract reflect the content of the paper. The model name is included in the paper. The paper is clearly structured. The language is enough precise.

The paper contains descriptions of numerical experiments for studying sensitivity of the simulated circulation and tidal amplitudes to GW momentum flux scenarios. The results are new and valuable for the developers of atmospheric dynamical models. The paper corresponds to the scope of the “Geoscientific Model Development” and can be published in this journal after minor modifications.

A few main comments could be made about the manuscript text:

Lines 95 – 100. The authors refer the GW spectrum used previously by Yigit and Medvedev. However, there is no information about reasons of using this spectrum. May be it was described in previous papers. However, it would be useful to give short summary of these reasons.

Also, the authors use spectral function of horizontal speed only. However, for complete GW characterization a second parameter (period or wavelength) is required. How much the GW parameterization is sensitive to changes in periods or wavelengths?

Lines 100 – 105. The authors perform three numerical experiments (labeled as EXP1 – EXP3) using different values of GW momentum fluxes and different spectra of GW phase speed shown in Figure 1. It would be desirable to give a short description and instructions for readers, how considered GW parameters can correspond to different typical meteorological situations.