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Sensitivity Experiments of a Mountain-Induced Gravity Wave Drag Parameterizations for Global Weather Forecasting

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The lower tropospheric enhanced gravity wave drag (GWD) parameterization has been operational in Global Forecast System (GFS) since late 1990s. The scheme is based on Kim and Arakawa and further revised with the addition of flow blocking (Kim and Doyle). For UFSR20 project, there have been collaborative efforts to improve the GWD parameterization by revising the mountain induced GWD. Revisions include the updates in GWD and flow blocking (Choi and Hong), and turbulent orography form drag of Beljaars et al. Sensitivity experiments are performed to investigate the importance of partitioning GWD and flow blocking in the skill of medium-range forecasts. Alternative approach for TOFD (Richter et al.) is tested. Importance of the representation of sub-grid orography statistics is also examined.