New Measures of Gravity Wave Contributions to the Atmospheric Momentum Budget Utilizing COSMIC RO and HIRDLS Temperature Profiles

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Climate models have common wind biases due to insufficient resolution of the waves necessary to describe the atmospheric momentum budget. Common methods to control these biases involve parameterization of small-scale atmospheric gravity wave drag forces. We describe new estimates of gravity wave contributions to the atmospheric momentum budget utilizing GPS RO temperature profiles. Previous work utilizing GPS temperature profiles for gravity wave studies revealed that the current global space-time sampling was insufficient to resolve and characterize most gravity waves. High-inclination limb sounding data instead have provided the better sampling for gravity wave studies, and the measurements with the best resolution to date were made by the High Resolution Dynamics Limb Sounder (HIRDLS) on the Aura satellite. However, HIRDLS limb sounding data alone are unable to characterize the three-dimensional properties of the waves, resulting in large uncertainties in the magnitude of their contribution to the momentum budget and no information on the direction of the momentum flux needed to infer wave effects on circulation. We report here on new work utilizing the two measurement types together to reduce uncertainties in previous work, and map new estimates of vector momentum flux for global circulation studies.