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The prediction of mountain wave turbulence

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Breaking topographically generated gravity waves or mountain waves are a major source of turbulence encounters by commercial and general aviation aircraft. A new method for forecasting mountain wave-induced turbulence (MWT) is presented. The procedure uses recent scaling laws for second-order structure functions calculated from numerical weather prediction (NWP) model output. It is easily implemented as a postprocessing step on any NWP model; for example it has been successfully implemented on the WRF, GFS and RUC NWP models. Accuracy assessments are provided through comparisons to thousands of pilot reports of turbulence over mountainous areas in the U.S. Probabilities of detection (PODs) and False Alarm Rates (FARs) average about 0.8 and 0.2 respectively, from mid troposphere to lower stratosphere, which seems to be superior to other model-based or empirical methods.