Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02070, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02070
EGU General Assembly 2008

A new direction in clear-air turbulence forecasting based on spontaneous imbalance. Part II: Case studies and statistical results

D.W. McCann (1), J.A. Knox (2) and **P.D. Williams** (3)

(1) McCann Aviation Weather Research Inc., Overland Park KS, USA, (2) Faculty of Engineering, University of Georgia, USA and (3) Department of Meteorology, University of Reading, UK (p.d.williams@reading.ac.uk)

Part I of this paper presented how Lighthill-Ford spontaneous gravity wave generation theory can be applied to numerical model data to predict areas of clear-air turbulence. Part II gives two case study examples incorporating spontaneous imbalance theory and some statistical validation results.

The case studies are both from one-hour forecast RUC2 operational model data. The first, verifying 0100 UTC 10 March 2006, is a case of strong turbulence over the Midwest United States with turbulence pilot reports from flight levels in the mid teens to above FL400. The case shows large areas of the Lighthill-Ford indicator and large areas of relatively low Richardson number. Our method to combine these ingredients reduces the threat areas. All positive-turbulence text pilot reports received were within the forecasted threat area. The second case, verifying 1500 UTC 28 December 2005, shows that our method also works well in the lower atmosphere above the boundary layer. The significant pilot reports over the Pacific Northwest were below FL80.

We validated our method over a five month period during the 2005-2006 winter. Results show significant skill at all levels above the boundary layer. Not only does our method verify better than the operational GTG algorithm, it encompasses nearly the entire flight space volume in a conceptually simple model and, therefore, should be a preferred clear-air turbulence guidance tool for aviation forecasters.