

IPO-Funded Airborne Lidar Experiment: TODWL 2003

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For 2003, the Twin Otter DWL (TODWL) objectives are MM5 validation, to provide NAST under flights, serve as a dry run for THORPEX, and producing winds from cloud returns for comparison to cloud-motion vectors (CMVs). Aircraft and instrument characteristics were reviewed. The lidar can measure sea wave spectra as well as wind components, and will be part of the IPO cal/val suite. The MM5 validation campaign was conducted at the Naval Postgraduate School at 4 km and used for prediction of smoke transport for burning near Fort Ord. For land data, Dave has used a threading approach to discriminate between land peak and true wind in spectrum, based on a direct comparison of vertical radial velocity to check DC offset of VAD.

For NAST (and GIFTS) validation, four hours of ER-2 hours of flight are available, with underflights by TODWL. Though these are not flown at the same height or speed, the CMV compared well to direct TODWL data. General agreement with buoys and scatterometer has been found, too. Organized large structures are being investigated, for example, layers in the range/attenuation through the PBL, and low level jets and shears. Shear causes spectra to smear in a non-Gaussian manner, for which advanced signal processing techniques will be needed. Comparison between models and the actual DWL performance is being done iteratively, with modeling that includes the instrument and the atmosphere. In summary, TODWL's sensitivity is close to what was expected, with water surface returns higher than thought. It achieves accuracy of 0.2 m/s and is becoming more reliable, though not turn key yet. Future activities include WindSat Validation work scheduled for Fall 2003, participation in THORPEX-4, and perhaps a role in a DWL hybrid demonstration with NASA/GSFC.