



In situ measurements of humidity in the tropical tropopause region within anvil outflow and clear air

J. Whiteway (1), C. Cook (1), P. Connolly (2), R. Busen (3), G. Vaughan (2)

- (1) Department of Earth and Space Science & Engineering, York University, Toronto, Canada,
(2) School of Earth, Atmospheric and Environmental Sciences, University of Manchester, UK,
(3) Institute of Atmospheric Physics, DLR, Germany.

Measurements of humidity have been conducted on board the Egrett aircraft in the tropical tropopause region during the EMERALD-2 (2002), ACTIVE (2005) and TWP-ICE (2006) campaigns at Darwin, Australia. The instruments include a Frost Point Hygrometer (FPH), a closed path Tunable Diode Laser (TDL), and an open path TDL. These humidity measurements will be presented within the context of the complementary in situ measurements of dynamics and cloud microphysics, and also laser remote sensing of the cloud structure. Initial comparison of the open and closed path TDL measurements reveals that the closed path TDL has a bias toward extreme humidity in the thickest regions of anvil clouds. The closed path TDL measures supersaturation exceeding 200% while the open path TLD measures more realistic relative humidity in the range 100 to 150%. This is likely a result of the inlet for the closed path system sampling a significant portion of ice which gets evaporated within the instrument and measured as water vapour. The open path system does not use an inlet and thus avoids this problem. Results will also be shown from the transit flights between Darwin and Adelaide in which the Egrett aircraft flew laterally across the tropopause.