Comparing POSIDON Observations of Water Vapor to MLS Measurements

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POSIDON observations of water vapor with MLS interpolated onto aircraft altitudes show some surprising differences. The aircraft relative humidity fields show a much tighter distribution as a function of altitude compared to MLS and there are more frequent observed occurrences of super saturated air in the observations than in MLS. This is consistent with ATTREX data. MLS consistently underestimates the water vapor in the upper troposphere. Three day back trajectories of the flight data when the cyclone was present show that higher altitude air comes from the extra tropics having passed over China/ Korea / Japan whereas lower altitude air arrives from the east. On non-cyclone days air arrives from the east at all levels. Cloud processing of the air along the back-trajectories through local cloud formation and convective intersection mostly explains the observed distribution of water vapor.