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Convection, thin cirrus, and dehydration in the tropical tropopause layer (TTL) observed by MLS and CALIPSO.

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Since May 2008, the measurement tracks of the CALIPSO cloud profiling LIDAR and MLS constituent measurements of atmospheric trace grases (e.g. H2O) and temperature are nearly aligned. The cloudiness of all the MLS H2O measurements is known which provides insights into the processes by which dehydration is occurring. CALIPSO also determines whether the clouds are of convective origin or isolated thin cirrus. We find, particulary during the Boreal winter, that a high percentage of the driest and coldest air occurs in convective and thick layered cirrus clouds situated above the nominal clear sky level of zero radiative heating (~120~hPa, LZH). The Boreal summer shows fewer such events and hence the height-of-convection shows a strong annual cycle. The mean zonal IWC at altitudes below the LZH shows a weak annual cycle. We will also show some initial results from CH3Cl, a new MLS v3 product. CH3Cl, like CO, is enhanced in biomass burning activities, but has a much longer chemical lifetime in the TTL than CO. Because of this, CH3Cl will be a better tracer of convective transport and supply into the TTL than CO. Preliminary results from measurements and a comparison with a simple 2 D model will be shown.