



Water vapour profile observations in the tropics

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Tropical water vapour profiles measured using the Juelich fluorescence hygrometer FISH onboard the Geophysica high-altitude aircraft during three projects are compared: Over the Indian Ocean during APE-THESEO in January-February 1999, over Southern Brazil during TROCCINOX-2 in January-February 2005, and in the Northern Australian region during SCOUT-O3 in November-December 2005. In the three experimental periods, the cold point tropopause and the hygropause were nearly coincident. During the APE-THESEO and SCOUT-O3 campaigns, saturation and cirrus cloud occurrence was common at the cold point. During both projects, the minimum H₂O mixing ratios were 1.5 ppm. Over Southern Brazil, however, the lowest water mixing ratios were usually slightly higher, but due to the higher temperatures the cold point was for most observations well above the frost point. Cirrus clouds at the cold point except in the vicinity of deep convection were not observed. During TROCCINOX-2 and SCOUT-O3, deep convection penetrating the tropopause was observed. In the environment at the top of this convective systems, particularly low mixing ratios of water were found, though, on the other hand, plumes of enhanced water vapour are embedded in these dry airmasses. We will compare the profiles measured in the vicinity of convection, in aged convection-impacted air and for background conditions to determine the impact of deep convection on the water vapour budget at the tropical tropopause.