

## Relationship between relative humidity and cirrus clouds in the tropical tropopause layer over Indonesia

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The relationship between relative humidity and cirrus clouds in the tropical tropopause layer (TTL) is investigated using balloon-borne cryogenic frost-point hygrometers (CFH) and quasi-collocated measurements of space-borne Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) at two stations in Indonesia in January 2007 and 2008: Biak (1.17S, 136.06E) facing the western Pacific and Kototabang (0.20S, 100.32E) facing the eastern Indian Ocean. High supersaturations have been measured inside cirrus clouds. At Kototabang, thin layers of high supersaturation, up to ~160%, are often observed co-existing with cirrus clouds at altitudes of 15-18 km. At Biak, relative humidity over ice (RHi) inside the TTL cirrus is around 100% or less without large supersaturation layers, and most clouds are limited to altitudes below 16 km. Analysis of background meteorological fields and convective activity suggests that high supersaturations in cirrus clouds in this study are produced away from deep convective regions and where a well-developed transition layer exists between convective and highly stratified regions.