



An Objective Climatology of Tropical Plumes

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Tropical Plumes (TP) are continuous bands of high and mid-level clouds that extend over thousands of kilometres from the Tropics pole- and eastward into the subtropics or even mid-latitudes. They often develop at the eastern flank of an upper-level trough penetrating to low latitudes. TP-related poleward moisture transports may lead to extreme precipitation events in the outer Tropics or subtropics and the enhanced cloudiness associated with TPs affects the Earth's radiation budget.

Previous studies of TPs were based on a visual inspection of infrared satellite images and were therefore quite elaborate with respect to climatological investigations. For the first time we have now developed an objective algorithm that is based upon definitions of TPs in the literature.

This algorithm is applied to the brightness temperature dataset of the Cloud Archive User Service (CLAUS), which provides global data on a uniform latitude-longitude grid at a spatial resolution of 0.5 by 0.5 degrees and a temporal resolution of three hours. Using this novel approach a global climatology of TPs is constructed for the time period 1984-2001. The spatial distribution of TP occurrence frequencies and their seasonal variations are presented as well as statistics of different TP attributes such as size, life time, tilt, etc. In the future we plan to examine the relationship between TP occurrence and large-scale atmospheric modes such as the El Niño/Southern Oscillation and the North Atlantic Oscillation.