



Troposphere to stratosphere transport. Importance at the global scale of convective uplift above southern tropical continents and tentative explanation

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Convective overshooting over tropical land areas is a key contributor to troposphere-to-stratosphere exchange, known to inject in the lower stratosphere adiabatically cooled air, trace and chemically active gases, ice water and tropospheric clean air diluting the aerosols in the stratosphere up to 20-21 km altitude. But unexpectedly, all studies are displaying more intense signal during the austral summer over southern continents where those events can reach 20-21 km, in contrast to the northern tropics where they are limited to altitude below the tropopause, suggesting much more vigorous convective overshooting in the Southern than the Northern Hemisphere.

The tentative explanation for that is the stronger and faster daytime development of Convective Available Potential Energy (CAPE), in the cleaner small aerosols AOD of the southern tropics compared to that of the northern tropics where pollution is reducing the solar radiation.

Shown in the presentation will be experimental evidence from various observations of the difference of convective transport intensity between the two hemispheres at local and global scale, and a tentative explanation of the origin of the CAPE difference by its relation with aerosol optical depth.