



Lidar and in-situ observation of aerosol layers above the top of tropical convection

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We present evidences for overshooting aerosol layers, emerging from the top of a strong tropical convection. Such overshooting aerosol layers penetrate the stratosphere and may deposit ice particles at altitudes reaching 420 K potential temperature. In such way, these convective events may have a hydrating effect on the lower tropical stratosphere, whereas there were no signs of convectively induced dehydration. The evidences for overshooting layers are based on lidar and in-situ detection of ice particles in the tropical stratosphere found during the high-altitude research aircraft “Geophysica” campaigns TROCCINOX and SCOUT-O3. The detection of the scattering ratio above the top of the convection and below the flight level of the aircraft was performed by a backscatter lidar, with correction of the overlap function. This correction is based on the detection of the pure molecular backscatter. The lidar probes downward from the flight level the top of the convection and the overshooting layers. The particle number and particle total surface at the flight level are detected by a Forward Scattering Spectrometer Probe FSSP-100.