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Investigating the S-Shape – Ozone Profiles in the Tropics

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It is well established that ozone profiles of tropical stations are curved like a S up to the tropopause, with small ozone values in the boundary layer, higher ozone values in the free troposphere and decreasing values of ozone just below the tropopause. This can be explained by the uplift of low ozone air from the boundary layer by convection. This is not necessarily a local effect but can also be the result of transport of ozone-poor air which has been uplifted in another region. The ozone-poor air leaves its signal around the main outflow level of convection @ 345 K potential temperature.

We are using tropical ozonesonde profiles from 12 stations of the SHADOZ network from 1998-2006 to look into the spatial and seasonal differences of the shape of the ozone profiles. In addition to trajectory calculation we use thermodynamic quantities like CAPE or equivalent potential temperature in order to assess the differences in shape for the 12 stations.

This will provide a background climatology for the assessment of existing and forthcoming campaign data and will aid the validation of the next generation of chemistry-climate models.