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Mesoscale characteristics of stratosphere-troposphere exchange in the vicinity of tropical cyclone

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Recent studies have suggested that ozone transients in the tropics were associated with convective activity and that stratosphere - troposphere exchanges (STE) can take place around tropical convection (cyclones, upper level depressions, ITCZ). Reunion island is located in the southern subtropics in the Indian ocean (55.5˚E, 20.8˚S), and is ideally located to observe dynamical mechanisms associated with the tropical convection during austral summer. Since 1992, around 300 measurements of ozone, humidity and temperature have been performed by radiosounding (Thompson et al., 2003), and since 1998, around 150 measurements of tropospheric ozone by Lidar (Baray et al., 1999). In this in-situ database, several case studies of ozone enhancement in the upper troposphere have been detected in the vicinity of tropical convection. As example, Marlene cyclone (April 1995) was an exceptional case of ozone contamination, observed on radiosoundings launched from both Reunion island and the Malcolm Baldridge INDOEX (Indian Ocean Experiment) ship. Mesoscale simulation carried trough the french mesoscale non hydrostatic model Meso-NH allowed us to identify filamentation structures near the tropopause in the vicinity of the cyclone.

In this poster, we will review this case study of STE near tropical cyclone in the South Western part of the Indian ocean. A discussion about the role of deep convection and downward STE processes in order to improve our understanding of this phenomenon and detail the signatures of STE around tropical convection on chemical and dynamical tracers (O_3, H_2O, potential vorticity) will be done.

The understanding of the transport of trace chemical species between the stratosphere and the troposphere is necessary for global change prediction. Then these mecha-

nisms of STE induced by tropical convection are important to identify and quantify since changes in the vertical distribution of ozone, a greenhouse gas, influence the atmospheric radiative balance.