



Aircraft borne combined measurements of the Fukushima radionuclide Xe-133 and fossil fuel combustion generated pollutants in the TIL - Implications for Cyclone induced lift and TIL physical-chemical processes

Frank Arnold (1,2), Hans Schlager (1), Hardy Simgen (2), Heinfried Aufmhoff (1), Robert Baumann (1), Sigfried Lindemann (2), Ludwig Rauch (2), Frank Kaether (2), Liisa Pirjolla (2), and Ulrich Schumann (1)

(2) Max-Planck-Institute, Atmospheric Physics, Heidelberg, Germany (frank.arnold@mpi-hd.mpg.de), (1) DLR IPA, Oberpfaffenhofen, Germany (Hans.Schlager@dlr.de), (3) University of Helsinki, Helsinki, Finland

The radionuclide Xe-133, released by the March 2011 nuclear disaster at Fukushima/Daiichi (hereafter FD), represents an ideal tracer for atmospheric transport. We report the, to our best knowledge, only aircraft borne measurements of FD Xe-133 in the Tropopause Inversion Layer (TIL), indicating rapid lift of Xe-133 rich planetary boundary layer air to the TIL. On the same research aircraft (FALCON), we have also conducted on-line measurements of fossil fuel combustion generated pollutant gases (SO_2 , NO_x , HNO_3 , NO_y), which were found to have increased concentrations in the TIL. In addition, we have conducted supporting model simulations of transport, chemical processes, and aerosol processes. Our investigations reveal a potentially important influence of East-Asian cyclone induced pollutants transport to the TIL, particularly influencing aerosol formation in the TIL.