Geophysical Research Abstracts
Vol. 12, EGU2010-8711-1, 2010
EGU General Assembly 2010

Halocarbon sources and emissions in the western Pacific

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Natural, short-lived halocarbons play a role in the stratospheric ozone budget, besides the anthropogenic emitted, long-lived chlorine- and brominefluorocarbons. The tropical oceans are a known source of reactive iodine and bromine to the atmosphere in the form of iodinated and brominated methanes (VSLS), as e.g.methyl iodide (CH3I), dibromomethane (CH2Br2) and bromoform (CHBr3), which contributes to reactive bromine within the lower stratosphere. Elevated atmospheric concentrations above the oceans are related to oceanic supersaturations of the compounds, caused by photochemical and biological production. The tropical Western Pacific is of special interest since it is a largely uncharacterized region for the oceanic compounds and in certain regions a projected hot spot for their emissions and transport pathways into the stratosphere.
From 9 to 25 October 2009 the IFM-GEOMAR (Kiel, Germany) conducted a cruise with RV Sonne in the tropical western Pacific to investigate trace gas emissions on a 4030 nm (7,500 km) and 60 degrees latitude covering transit between Tomakomai (Japan, 42°35,4‘N/ 141°37,5‘E) and Townsville (Australia, 19°06,6’S/ 146°50,5‘E). The ships cruise crossed various biogeochemical regimes of the northern and southern western Pacific Ocean, which differ in seawater properties, currents, productivity and atmospheric dynamics (e.g. Kuroshio Front, Northern Pacific Gyre, Pacific warm pool and Coral Seas). We will present highlights of the oceanic and atmospheric halocarbon measurements during the ships campaign, halocarbon emissions from the western Pacific Ocean, sources and the relationship between VSLS emissions and various phytoplankton functional groups, as being derived from in situ and satellite measurements.