

**Iodine speciation in marine aerosols along a 30,000 km round-trip cruise path from Shanghai, China to Prydz Bay, Antarctica**

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Iodine chemistry plays an important role in the tropospheric ozone depletion and the new particle formation in the Marine Boundary Layer (MBL). The sources, reaction pathways, and sinks of iodine in MBL are not fully understood. Therefore, it is essential to detect and characterize the various iodine species in the sea water, marine air and aerosols.

An online coupling technique of ion chromatography coupled to Inductively Coupled Plasma-Mass Spectrometry (IC-ICP-MS) and its application in water soluble iodine speciation in marine aerosol samples are present. Iodide, iodate and an unidentified iodine species were detected in the marine aerosols (Total suspended particles, TSP) samples, which were collected onboard a round-trip cruise from Shanghai, China to Prydz Bay, Antarctica from November 2005 to March 2006. ICP-MS was also used to measure the total amount of soluble iodine fraction in the samples.

The results reveal that soluble organic iodine (SOI) is the most abundant fraction, accounting for approximately 70 % of total soluble iodine (TSI) on average. One unidentified organic iodine (UOI) signal was present in almost all of the samples and was responsible for up to 38.3% of TSI. The abundance of inorganic iodine species, iodate and iodide, was less than 30% of TSI. Iodide was significantly correlated with SOI Suggesting a link between iodide formation and SOI decomposition. TSI levels varied considerably over the length of the voyage. In the coastal Antarctic enhanced level of TSI were found to be correlated with the air mass transport from the ice front sector.