CONCLUSIONS AND OUTLOOK

Outlook: The sea surface microlayer represents a potentially very significant source for halocarbons due to its unique DOM composition, with direct contact to the air-sea interface. This will be investigated during the ASTRA cruise to the Peruvian upwelling in October 2015.

POSSIBLE CONTRIBUTION TO IO

Fig. 1: Contributions of iodine to the formation of iodocarbons due to the unique DOM composition. 

INTRODUCTION

aerosol, ultra-fine particles, HOx and NOx chemistry, ozone chemistry

Fig. 1: Iodine in the case of photolysation production of CHI and biological production of CHI, CH2I, and CH3I contributing to the tropospheric iodine (I) loading, with HOx and NOx as additional reactive sources for I.

Research: How does the tropical, very biologically active Peruvian upwelling contribute to the tropospheric iodine loading of the tropical East Pacific? Which factors contribute to the regional distribution of oceanic and tropospheric CHI, CH2I, and CH3I?

M91-CRUISE

Fig. 2: Cruise track for M91 with SST (PC) in the eastern Pacific. The four upwelling regions (Callao, Peru to Callao, Peru, December 1 to 26 2012) were identified.

RESULTS FROM THE CRUISE

Fig. 5: Indicators in sea surface water (upper panel), the lower tropospheric (lower panel), along with a map of CHI (see colorbar).

• Mean (max) CHI = 10.9 (58.1) pmol L⁻¹, CH2I = 8.8 (35.4) pmol L⁻¹, CH3I = 7.7 (32.0) pmol L⁻¹ very elevated, lead to enhanced fluxes (Fig. 7).
• Large atmospheric mixing ratios: CHI = 0.4 (25) ppt (latime: few hours), CH2I = 1.5 (3.2) ppt (latime: days), CH3I = 0.2 (3.3) ppt (latime: few minutes).
• Distribution of longer lived atmospheric CHI also strongly influenced by MABL heights (high when MABL is low, low when MABL is high (Fig. 6).

RELATIONSHIP TO BIOLOGICAL PARAMETERS

Fig. 3: Spearman’s rank correlation coefficients (r), of the three iodocarbons with DOM constituents in the sub-surface (CHI), CH2I, CH3I co-linear and explained by DOM.

The accumulation of DOM in the sea surface in regions of high iodocarbons (Fig. 3) suggests potential production of these compounds in the very surface with direct link to the air-sea interface.

CONCLUSIONS AND OUTLOOK

Fig. 4: Contribution of iodine to the formation of iodocarbons due to the unique DOM composition.