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Halogen oxide observations in the marine boundary layer: From the Tropics to the Antarctic

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To determine the presence of bromine oxide (BrO) and iodine oxide (IO) in the marine boundary layer, a mobile Multi-Axis Differential Optical Absorption Spectroscopy (MAX-DOAS) instrument was employed during several measurement campaigns. The MAX-DOAS technique uses scattered sunlight received from multiple viewing angles to obtain information of the abundance and altitude distribution of the trace gas of interest. Ground-based MAX-DOAS is highly sensitive to absorbers in the lowest 1-2 km of the atmosphere.

The results from several car-based measurement campaigns along the Malaysian (6N - 1N) and New Zealand (36S - 46S) coastline during 2009 to 2011 are presented together with shipboard observations made during a cruise from Singapore to New Zealand (1N – 41S) and a second cruise off the coast of New Zealand (approx. 41S - 45S). First results indicate a small but persistent presence of IO. BrO, however, is for most of the observation sites and periods clearly below the measurement threshold. These low to mid-latitude observations are discussed in context with halogen oxide measurements made on Ross Island (78S) in the Antarctic.

The sites along the New Zealand coast were selected for high biomass concentrations of marine algae exposed at low tides. Environmental factors that potentially modulate the emissions of halogen oxides in the marine environment, such as local macro algae type, ozone concentration, tidal height, incident sunlight, temperature and wind speed and direction have been investigated as well.