



Analysing satellite data for IO vertical columns in polar and tropical regions

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A few years ago it has become possible to observe columns of iodine oxide, IO, from space using the SCIAMACHY sensor onboard the ENVISAT satellite. Several years of data have been analysed and above some regions on Earth enhanced IO amounts are detected, e.g. above the Antarctic in spring time, where IO abundances have shown to be more widespread than previously expected.

Iodine species have attracted a lot of attention as they show substantial impact on tropospheric composition. The oxidative capacity is altered, ozone concentrations may be strongly decreased, and iodine oxides lead to the formation of new fine particles. The entire cycle of iodine emission, conversion, recycling and deposition is not yet fully understood. However, gradually more information is gathered and contributes to the understanding of the biogeochemical cycling of iodine species in various regions. Satellite observations remain an important tool to complete our picture of boundary layer halogen chemistry due to their long term data sets and large spatial coverage, which is especially valuable in remote areas such as the Antarctic.

Striking differences between the distributions of iodine and bromine oxide as well as interrelations between IO and sea ice as well as between IO and biological activity (e.g., chlorophyll-a concentrations) further contribute to the discussion of the tropospheric role of iodine. The present study focuses on the latest results of IO observations from satellite, covering up to eight years of SCIAMACHY data. By applying reasonable assumptions for the radiative transfer, IO vertical columns are calculated. Influences and uncertainties in this processing step are discussed. The regions of main focus are the Antarctic and the tropical oceans. In addition, sensitivity studies of the final IO vertical columns are presented. Due to the smallness of the IO signal, precaution needs to accompany the entire analysis in order to prevent misleading scientific results. This is demonstrated by suitable examples.