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# Reactive halogen species in the troposphere - Are there general principles?

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Reactive halogen species (RHS, e.g. BrO, IO, HOBr) are abundant in many parts of the troposphere (as well as in the stratosphere), these 'halogen compartments' include polar regions, coastal areas, vicinity of salt pans, parts of the free troposphere, and volcanic plumes. These RHS have been shown to have a profound impact on tropospheric chemistry. During the recent years much progress has been made with respect to elucidating the spatial and temporal distribution of RHS, their origin, and their chemical interactions in these compartments as well as in the theoretical understanding of these processes. However many unanswered questions remain, for instance: Why is there an Antarctic - Arctic asymmetry of reactive iodine species? Does the bromine explosion only occur during polar springtime? What is the influence of the shrinking Sea Ice area? What drives the autocatalytic bromine release from halogenides (the bromine explosion)? What is the effect of coupling cycles involving different halogens? How wide-spread are RHS in the free troposphere?
We give an overview of ground- aircraft- and satellite- based observations and recent advances modeling illustrating the above questions. It is attempted to identify common features of the RHS-related processes in the different compartments and thus to derive answers to some of the questions.