



Retrieval of free-tropospheric BrO from MAX-DOAS measurements at the high-altitude alpine station of Jungfraujoch

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There are currently many open questions about the sources, transport, and photochemical processing that control the abundance of BrO and its precursors in the global troposphere. Recent experimental studies based on various platforms and instrumentations indicate contrasting results reflecting the scarcity of the measurements and the experimental challenge of quantifying the typically low abundance levels of BrO. Modeling studies indicate however that the presence of only 1-2 pptv levels of reactive bromine has important consequences for free tropospheric ozone with indirect climate implications.

The MAX-DOAS technique offers high sensitivity for near-surface trace gas measurements and it is well suited to BrO detection. From a high altitude site such as the Jungfraujoch which is located in the Swiss Alps at about 3600 m ASL, the free-troposphere can be sampled under favourable conditions. We report on attempts to quantify the free tropospheric BrO level based on MAXDOAS measurements performed by BIRA-IASB in the period from June 2010 until December 2012. Retrievals are based on the DOAS method followed by vertical profile inversion using an Optimal Estimation scheme. The possible sources of bias that can affect the spectral retrieval of BrO are carefully investigated and various sensitivity tests are performed to assess the stability of the inversion. Results are compared with independent estimates of the mid-latitude tropospheric BrO based on satellite measurements.