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# Dehydration in the tropical tropopause layer: A possible sink of inorganic bromine?

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Recent studies have shown the importance of bromine very short-lived substances (VSLS) for the stratospheric bromine budget and their potential impact on ozone depletion. In this study, bromine loading in the tropical upper troposphere/lower stratosphere (UTLS) due to VSLS is investigated with a 3D chemical transport model with a detailed chemistry scheme, including parametrizations of particle adsorption and scavenging as well as heterogeneous reactions on corresponding surfaces. On the source gas side, the long-lived halons and methyl bromide and the two most important bromine short-lived substances, bromoform and dibromomethane, are included. On the other hand, the partitioning of inorganic bromine product gases (Bry) is also explicitly calculated. Our results suggest that loss of soluble inorganic bromine in the tropical UTLS due to dehydration is negligible, in contrast to most earlier studies. The main reasons can be summarized as follows: The majority of bromine short-lived source gases is still intact at the UTLS and is therefore not susceptible to dehydration. Furthermore, the fraction of inorganic bromine which is actually adsorbed on ice particles is generally lower than 25%. Finally, the model shows that the small amount of adsorbed bromine that could be scavenged is released efficiently into gas phase by heterogeneous reactions.