



## **Jniversität Bremen**

### **1. Introduction & Motivation**

- Air temperature in the Arctic increases twice the rate of the worldwide mean. This phenomenon is called Arctic Amplification [1]. ozone, changing the oxidizing capacity of the atmosphere.
- **BrO** to its sources and driving mechanisms.



![](_page_0_Figure_14.jpeg)

- Potential changes in the relationship of tropospheric BrO to its driving mechanisms
- \*Potential changes in transport patterns and polar cyclones may affect the performance of the neural network

# An Artificial Neural Network Approach for Simulating Tropospheric BrO over the Arctic (P3.5.2)

**Ilias Bougoudis<sup>1</sup>**, Anne-Marlene Blechschmidt<sup>1</sup>, Andreas Richter<sup>1</sup>, Sora Seo<sup>1,2</sup>, John P. Burrows<sup>1</sup> <sup>1</sup> Institute of Environmental Physics, University of Bremen, Germany (ibougoudis@iup.physik.uni-bremen.de) <sup>2</sup> German Aerospace Center (DLR), Oberpfaffenhofen, Germany ATMOS 2021, 22-26 November 2021, Virtual Event

• During polar spring, bromine is released from young sea ice, blowing snow & frost flowers, and through an autocatalytic chemical cycle known as bromine explosion (Fig. 1), depletes

• A consistent long-term tropospheric BrO satellite dataset was developed, showing that the spatial patterns of Arctic BrO plumes have been changing over the recent years [3]. • Our goal is to train an artificial neural network with the long-term BrO dataset in order to simulate tropospheric BrO, assess the ozone loss and reveal the relationship of tropospheric

![](_page_0_Picture_29.jpeg)

![](_page_0_Picture_30.jpeg)

![](_page_0_Picture_31.jpeg)

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Tropospheric BrO VCDs [10 <sup>13</sup> molec/cm <sup>2</sup> ]	
										6.0 5.5 5.0 4.5 4.0	
										3.5 3.0 2.5 2.0 1.5 1.0	
Fig. 9: Arctic MAM map comparisons between observations and simulations											

3. I. Bougoudis et al: Long-term time series of Arctic tropospheric BrO derived from UV-VIS satellite remote sensing and its relation to first-year sea ice (2020) 4. A.-M. Blechschmidt et al: An exemplary case of a bromine explosion event linked to cyclone development in the Arctic (2016)

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Fig. 8: Unsuccessful spatial reproduction of the enhanced tropospheric BrO