Project:	**1104**
Project title:	**Atmosphärische Spurenstoffe (ATS)**
Project PI:	**Johan Strandgren**
Report period:	**1.1.2019 - 31.12.2019**

Last year's proposal was driven by the need to find new storage space for already existing data from another project. In addition we requested some minor resources for hindcasts with the global EMAC model (Jöckel et al., 2016) to support the analyses of SO_2 measurements from different aircraft campaigns.

As a first step we compared measured SO_2 for one campaign (OMO; Lelieveld et al., 2018) with an existing simulation. It turned out that the discrepancies are too large for further pursuing the proposed work (figure 1).

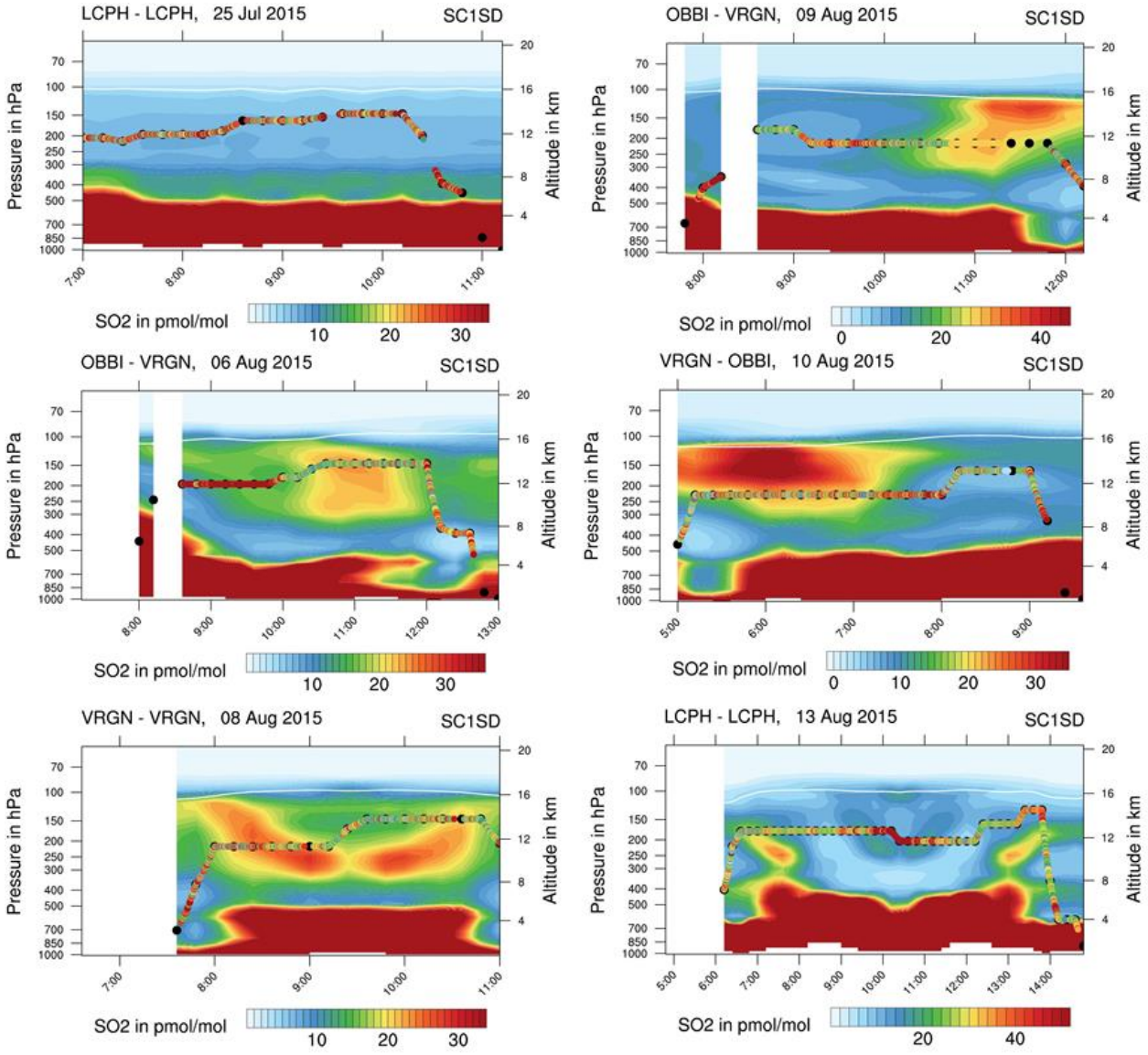

Figure 1: The curtain shows EMAC-simulated SO_2 mixing ratios along the flight track of the HALO research aircraft (resolution = time step = 12 min; the abscissa shows UTC time) and the pipe follows the HALO flight altitude, filled with measured trace gas mixing ratios in the same colour coding. Each panel corresponds to a flight during the OMO campaign (LCPH = Paphos, Cyprus, VRGN = Gan, Maldives, OBBI =Bahrain). The white line shows the simulated tropopause.

Biases might be diminished by using updated emission inventories, but lack of spatial and temporal resolution would still be an issue. Global simulations with the requested T42 resolution were sufficient for the interpretation of trace gas distributions determined by large scale

processes in the Asian summer monsoon anticyclone (Gottschaldt et al., 2017; Gottschaldt et al., 2018), but the SO_2 measurements show a lot of comparatively small scale variation not resolved by the global simulations. Furthermore we learned that other groups are already working with highly resolved models on some of the SO_2-related questions we wanted to address, e.g. (Ma et al., 2019). Therefore we decided to redefine this DKRZ project with a focus on high-resolution modelling and update the scientific focus of the short-lived trace species WP when the modelling system is set up.

Colleagues from a junior research group focusing on long-lived greenhouse gases and mainly working with the regional WRF model were invited to join the project in September in preparation for an expansion of this project for the upcoming allocation period 01.01-31.12.2020. The focus of the project is still on analyses of trace species measurements with numerical modelling, but shifted somewhat from short- to long-lived trace species. This is reflected in the change of the PI.

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