

## SATELLITE VALIDATION OF TROPOMI-SO<sub>2</sub> OVER THE BALKAN REGION BY AIRBORNE SO<sub>2</sub> MEASUREMENTS OF COAL-FIRED POWER PLANTS

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The first airborne in situ measurements of sulphur dioxide (SO<sub>2</sub>) emissions (plumes) from two coal-fired power plants in Bosnia-Herzegovina (Tuzla) and Serbia (Nikola Tesla) were carried out with the German research aircraft *Falcon-20* in cooperation with local partners during the METHANE-To-Go field experiment in autumn 2020. Downwind of the power plants, SO<sub>2</sub> mixing ratios exceeding 100 ppb were measured in a distance ~20-40 km from the sources. The plumes were trapped in well-defined inversion layers between ~500-1000 m altitude. Our airborne measurements can be used to validate synchronously, spaceborne SO<sub>2</sub> measurements from the TROPospheric Monitoring Instrument (TROPOMI) onboard the Sentinel-5P satellite. A first intercomparison indicates some problems with dense smoke clouds frequently covering these countries in winter. However, one part of the Nikola Tesla flight is well suited for TROPOMI-SO<sub>2</sub> validation, since it was obtained during cloud-free conditions with a well-defined vertical extension of the probed SO<sub>2</sub> plume (needed to estimate the Vertical Column Density, VCD). These airborne measurements and model simulations can also be used to determine the SO<sub>2</sub> emission strength of the power plants. First estimates (mass balance approach) show that the SO<sub>2</sub> mass flux from Tuzla is about twice as high as indicated by common emission inventories. Our outlook will give a first glance of further TROPOMI validation measurement attempts carried out with a *Cessna Caravan* aircraft in northern Scandinavia in August 2021 focusing on methane from wetlands.