



Quantifying methane emissions using mobile FTIR spectrometry during CoMeT

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Methane (CH_4) emissions from coal production are one of the main sources of anthropogenic CH_4 in the atmosphere. Poland is the second largest hard coal producer in the European Union with the Polish side of the Upper Silesian Coal Basin (USCB) as a part of it. Emission estimates for CH_4 from USCB for individual ventilation shafts range between 0.03 kt CH_4/yr and 25.9 kt CH_4/yr , amounting to a basin total of roughly 465.85 kt CH_4/yr (E-PRTR database, 2014). During CoMeT (Carbon Dioxide and Methane Mission 2018) five ground-based, portable FTIR (Fourier transform infrared) spectrometers EM27/SUN were deployed in the USCB. We operated four instruments in fixed locations in the North, East, South, and West of the USCB in approx. 50 km distance to the center of the basin. This set-up ensures both, upwind and downwind measurements of CH_4 for the prevailing wind directions. The fifth instrument was deployed on a small truck sampling coal mine ventilation shafts during stop-and-go patterns to cross-out methane plumes at 1 to 10 km distance. These transects allow to determine the source strength of methane emitters with methods using only wind information, width of the plume, and measured CH_4 enhancements. Here, we report on first results on emission estimates and on comparison exercises with co-deployed in-situ ground-based instruments, in-situ and remote sensing aircraft as well as with the satellite measurements by Sentinel-5 Precursor/TROPOMI.