

Travelogue from Down Under. Bowen Basin Coal Mapping 2023 (BBCMap23)

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Methane (CH₄) is, after carbon dioxide (CO₂), the second most important anthropogenic greenhouse gas in our atmosphere. It also has an important role in future climate mitigation strategies due to its stronger greenhouse warming potential compared to that of CO₂, despite its relatively short atmospheric lifetime. Consequently, knowledge about CH₄ sources is essential to reduce its atmospheric abundance. Beside emissions from oil and gas production, emissions from coal production are of equal relevance and expected to increase globally due to the increasing global coal demand.

One of the CH₄ hotspots worldwide is a coal mining area in the Bowen Basin located in Queensland in north-east Australia. In this region, surprisingly high CH₄ emissions have been observed by the TropOMI instruments (Sadavarter et al. 2021), which were primarily emitted by a mixture of several underground and open-pit coal mines. In order to get further insides into those emissions, the MAMAP team from the IUP Bremen together with Australian colleagues from Airborne Research Australia (ARA) executed a research campaign in that area in August and September this year, funded by the United Nations Environmental Program (UNEP) within the International Methane Emissions Observatory (IMEO) initiative. Two motorgliders were deployed, one equipped with an in-situ payload for measurements of atmospheric CH₄ and CO₂ concentration as well as 3D winds, and the second one equipped with a remote sensing payload including the passive remote sensing imaging MAMAP2D-Light instrument for CH₄ and CO₂ column measurements, a LIDAR altimeter to map the surface elevation, and an RGB camera to link observed emission hot spots to certain activities on ground.

The talk will give an initial overview of the campaign.