Carbon Mapper: performance predictions and airborne prototyping Riley Duren Carbon Mapper Daniel Cusworth (Carbon Mapper) Alana Ayasse (Carbon Mapper) Kate Howell1 (Carbon Mapper) Tia Scarpelli (Carbon Mapper) Daniel Bon (Carbon Mapper) Oral

Efforts to mitigate methane (CH4) and carbon dioxide (CO2) emissions are complicated by inconsistencies between estimates derived from atmospheric measurements, greenhouse gas inventories, and self-reporting programs. Contributing to these discrepancies are a relatively small number of industrial facilities that emit anomalously high amounts of greenhouse gases, often in an unpredictable and intermittent fashion. Lack of transparency, spatio-temporal completeness, measurement sensitivity and costs are barriers to diagnosing and mitigating point-source emissions at scale across geographically dispersed infrastructure.

We present the predicted on-orbit performance of the Carbon Mapper program, a constellation of small satellites designed to track individual CH4 and CO2 point-source emitters in priority regions globally. Carbon Mapper is implemented as a public-private partnership with an open data policy for CH4 and CO2. The first two satellites are funded for launch and will characterize the global distribution of point-sources in priority regions at 30m spatial resolution with visible-infrared imaging spectrometers. The system is designed for expansion to a larger satellite constellation offering sub-daily to weekly sampling. We also present findings from prototype airborne surveys of diverse regions and emissions sectors including lessons learned from follow-up site-level measurements and mitigation by facility operators. We also describe advances with a new operational multi-sensor analysis framework that combines airborne and satellite (e.g., EMIT) observations for routine publication through a global data portal with implications on the emerging multi-scale (tiered) observing system of systems.

Meeting homepage IWGGMS-20 Workshop Download to PDF