NCAR | ATMOSPHERIC CHEMISTRY OBSERVATIONS & MODELING

ACOM Seminar

The Role of Satellite Observations of the Atmospheric Composition for Policy Making

Pepijn Veefkind
Royal Netherlands Meteorological Institute KNMI

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Links: https://operations.ucar.edu/live-acom

ABSTRACT

Human activities change the composition of the atmosphere on all scales, from local to global. The resulting environmental challenges include not only climate change but also reduction in air quality, water quality and biodiversity. In recent years these environmental problems are high on the political and societal agenda, for example the Paris Agreement (COP21), the Global Methane Pledge (COP26) and the discussions on reactive nitrogen in Europe.

Satellite observations of the atmospheric composition play a role in different parts of the policy making cycle. For example, the strong visual impact of satellite images plays a role in providing urgency for environmental problems, while satellite data records can also be used to monitor the effectiveness of policies. Consequently, the satellite data of the atmospheric composition will be used beyond the traditional scientific arena.

The European Copernicus programme is the largest Earth observation programme in the world. It includes ground-based and satellite measurements, as well as data assimilation and long-term monitoring. The Copernicus Sentinel satellites include Sentinel 5P/TROPOMI (launched in 2017), the geostationary Sentinel 4 mission (to be launched in 2024), the Sentinel 5 mission (to be launched in 2025) and the CO2M mission (to be launched in 2026). On top of these large backbone mission, it is expected that small satellites will become more important. The data from these missions will be assimilated together with other datasets by the Copernicus Atmospheric Monitoring Service (CAMS) and the Copernicus Climate Change Service (C3S).

With a resolution of 3.5 x 5.5 km2, TROPOMI is the state-of-the-art instrument for observing trace gases such as NO2, SO2, O3, CO and CH4. The spatial resolution of TROPOMI has boosted the research on deriving emissions from spaceborne data, using different methods that vary strongly in complexity. It is expected that more high-spatial resolution data will become available in the coming years, and that the derived emission will be used for monitoring emissions of greenhouse gases and air pollutants.

For more information please contact Shaun Bush, sbush@ucar.edu, phone 303-497-8060.