

Towards air quality monitoring from geostationary satellites

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During the last years GOME on ERS-2 and SCIAMACHY on ENVISAT have successfully demonstrated the routine observation of air quality relevant tropospheric parameters like CO, NO₂, SO₂ and HCHO from space. In parallel, several user consultations initiated by EUMETSAT, WMO, ESA and other agencies have identified and formulated requirements on measurements of the composition of the lower part of the atmosphere with a focus on air quality and related issues. To address air quality issues from space there is a clear need for high spatially (< 10 km x 10 km) and temporally resolved (~ hourly) measurements of the composition of the troposphere. No measurement system is currently in place or planned to fulfil the relevant requirements. Measurements from Geostationary Orbit (GEO) offer a very attractive approach to the observation of the high tropospheric variability from space, as already demonstrated by meteorological applications. In response to the data needs, studies were performed during the last years to investigate capabilities and feasibility of instrumentation and mission concepts in geostationary orbit to meet the above mentioned user requirements. This talk will summarise the results of studies investigating the concepts and capabilities of instruments measuring the solar backscatter radiance to derive the chemical composition of the troposphere (O₃, NO₂, CO, HCHO, SO₂, Aerosol, etc.) as well as implementation options. The feasibility and limitations of the concepts will be discussed and it will be shown that important user requirements can be addressed and fulfilled by a geostationary atmospheric chemistry mission.