Satellite Application Facility on Ozone and Atmospheric Chemistry Monitoring

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The major issues in atmospheric composition and chemistry are oxidising efficiency and air pollution in the troposphere, ozone depletion in the stratosphere and the coupling between atmospheric chemistry and climate change.

The anticipated recovery of the ozone layer will be affected by the climate change. The temperature in the lower stratosphere will decrease due to climate change. Major sources of stratospheric water vapour are oxidation of methane and intrusion of water vapour through the tropical tropopause. Changes in either methane amounts or tropical dynamics will affect water vapour amounts in stratosphere. Also stratospheric humidity increase during last five decades is larger than explained by tropospheric CH4 trends. Decreasing temperatures and increasing water vapour enhances possibility to increase occurrence of polar stratospheric clouds (PSC) in the Arctic stratosphere. Several data sources should be combined in order to efficiently monitor atmospheric composition during polar night. UV radiation is a source of energy in atmospheric chemistry, but harmful for environment and human health. The amount of UV radiation reaching surface is affected by high spatial and temporal variability of the following parameters total ozone, clouds, aerosols and snow/ice cover. Changes in these parameters in future have impact on UV radiation affecting atmospheric chemistry. Aerosols have significant role in stratospheric chemistry e.g. by processing reservoir gases. After the Mt. Pinatubo eruption the ozone depletion was significantly enhanced. Detailed understanding of the space and time distribution of aerosols is required to understand the effects of volcanic eruptions.

Understanding the coupling between climate and chemistry is a challenge which requires an efficient monitoring system of O3, UV radiation, halogen sources, active halogens and their reservoirs, NOx, HNO3, water vapour, methane, distribution and properties of aerosols. EUMETSAT's Satellite Application Facility on Ozone and Atmospheric Chemistry Monitoring (O3M SAF) is former SAF on Ozone Monitoring. O3M SAF is part of the EUMETSAT's Polar System (EPS) Ground Segment. The purpose of the SAF is to produce operationally a set of near real-time and offline products based on Metop data and validation services. Near real-time products are GOME-2 total ozone and ozone profile, and UV clear-sky fields. Offline products derived from GOME-2 data are total column amounts of ozone, NO2, BrO, ozone

profile, aerosol index, aerosol optical depth, and UV fields including cloudiness and albedo, also HIRS total ozone is produced.

This paper describes O3M SAF distributed operational system, current status of the satellite data products and research objectives for the future.