



The Sentinel-4 Mission: Instrument Description and Atmospheric Composition Products

Ben Veihelmann, Yasjka Meijer, Paul Ingmann, Rob Koopman, Grégory Bazalgette Courrèges-Lacoste, and Hendrik Stark

ESA/ESTEC, Earth Observation Programmes, Noordwijk, Netherlands (Ben.Veihelmann@esa.int)

The Sentinel-4 mission, together with Sentinel-5 and the Sentinel-5 Precursor missions, is part of the Global Monitoring for Environment and Security (GMES) space component covering the Earth's atmosphere. The primary objective of the Sentinel-4 mission is the observation of the diurnal cycle of tropospheric species in support of the air quality applications of GMES Atmosphere Services. The presentation focuses on the Sentinel-4/UVN instrument and its related Level-2 atmospheric composition products.

The Sentinel-4 instrument is an Ultra-violet Visible Near infrared spectrometer (S4/UVN) which is embarked on the geostationary Meteosat Third Generation-Sounder (MTG-S) platforms. Key features of the S4/UVN instrument are the spectral range from 305 nm to 500 nm with a spectral resolution of 0.5 nm, and from 750 nm to 775 nm with a spectral resolution of 0.12 nm, in combination with a low polarization sensitivity and a high radiometric accuracy. The instrument shall observe Europe with a revisit time of one hour. The spatial sampling distance varies across the geographic coverage area and takes a value of 8 km at a reference location at 45° N. The expected launch date of the first MTG-S platform is 2019, and the expected lifetime is 15 years (two S4/UVN instruments in sequence on two MTG-S platforms).

ESA will develop products based on the S4/UVN measurements for the key target species, which are NO₂, O₃, HCHO, SO₂, aerosols, and CHOCHO, and for cloud and surface properties (mainly intermediate products). Also a synergetic O₃ vertical profile product is foreseen based on observations from the S4/UVN and the MTG InfraRed Sounder (IRS) on-board the same platform. Synergetic aerosol and cloud products are foreseen based on observations from the S4/UVN and from the MTG Flexible Combined Imager (FCI) on-board the MTG-Imager (MTG-I) platform. Current pre-development studies are dedicated to a daily surface reflectance map product that treats the surface directionality as to avoid diurnal biases in the key target products, and to the retrieval of aerosol height information from high spectral resolution measurements in the O₂A-band. Subsequent development activities resulting in the operational Sentinel-4 Level-2 processor are in preparation.