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ESA CAMELOT study: Challenges in future operational missions for GMES atmospheric monitoring, sentinel 4 and 5

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Dedicated atmospheric chemistry observations from space have been made for over 30 years now, starting with the SBUV and TOMS measurements of the ozone layer. Since then huge progress has been made, improving the accuracy of the measurements, extending the amount of constituents, and by sensing not only the stratosphere, but the last five to ten years also the troposphere. The potential to operational monitor the atmosphere, following the meteorological community, came within reach. At the same time, the importance for society of regular operational environmental measurements, related to the ozone layer, air quality and climate change, became apparent, amongst others resulting in the EU initiative Global Monitoring for Environment and Security (GMES)

In order to prepare the operational missions in the context of the GMES, ESA took the initiative to further study the user requirements for the Sentinel 4 and 5 (precursor) missions. The Sentinel 4 and 5 (precursor) missions are dedicated operational missions to monitor the atmospheric composition in the 2013-2020 timeframe and onward. The user requirements for the sentinel missions focus on monitoring the atmosphere from an environmental point of view (ozone layer, air quality and climate). ESA's CAMELOT (Composition of the Atmospheric Mission concEpts and SentineL Observation Techniques) study is the follow-on study to ESA's CAPACITY study finished in 2005. The general objective of the CAMELOT study is to further contribute to the definition of the air quality and climate protocol monitoring parts of the GMES Sentinel 4 and 5 missions. Key issues in the CAMELOT study are:
• trade-offs between different observation strategies (spectral ranges, polarisation, direction etc) for aerosols and several trace gases
• a quantitative assessment of the requirements for spatio-temporal sampling taking into account the contamination of nadir-viewing observations by cloud
• optimising several orbit scenario's (leo, inclined leo, geo or any combination) and a contribution from the user's perspective to the trade-off between different orbits.

In order to address these issues a large European consortium, lead by KNMI, has been formed by 9 European institutes (KNMI, RAL, U.Leicester, SRON, FMI, BIRA-IASB, CNR-IFAC,NOVELTIS and RIU-U.Koeln).

In the presentation an overview will be given of the CAMELOT study, including specific results for combined retrievals, cloud statistics for different orbit geometries and retrievals for several orbit scenarios.