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Quality Assurance for Essential Climate Variables

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Satellite data are of central interest to the QA4ECV project. Satellites have revolutionized the Earth's observation system of climate change and air quality over the past three decades, providing continuous data for the entire Earth. However, many users of these data are lost in the fog as to the quality of these satellite data. Because of this, the European Union expressed in its 2013 FP7 Space Research Call a need for reliable, traceable, and understandable quality information on satellite data records that could serve as a blueprint contribution to a future Copernicus Climate Change Service.

The potential of satellite data to benefit climate change and air quality services is too great to be ignored. QA4ECV therefore bridges the gap between end-users of satellite data and the satellite data products. We are developing an internationally acceptable Quality Assurance (QA) framework that provides understandable and traceable quality information for satellite data used in climate and air quality services. Such a framework should deliver the historically linked long-term data sets that users need, in a format that they can readily use.

QA4ECV has approached more than 150 users and suppliers of satellite data to collect their needs and expectations. The project will use their response as a guideline for developing user-friendly tools to obtain information on the completeness, accuracy, and fitness-for-purpose of the satellite datasets. QA4ECV collaborates with 4 joint FP7 Space projects in reaching out to scientists, policy makers, and other end-users of satellite data to improve understanding of the special challenges –and also opportunities- of working with satellite data for climate and air quality purposes.

As a demonstration of its capacity, QA4ECV will generate multi-decadal climate data records for 3 atmospheric ECV precursors (nitrogen dioxide, formaldehyde, and carbon monoxide) and 3 land ECVs (albedo, leaf area index and absorbed photosynthetically active radiation), with full uncertainty metrics for every pixel. Multi-use tools and SI/community reference standards will be developed. But QA4ECV is not only about satellites. It is also about exploiting independent reference data obtained from in situ networks, and applying these data with the right, traceable methodologies for quality assurance of the satellite ECVs.

The QA4ECV project started in January 2014, as a partnership between 17 research institutes from 7 different European countries working together for a period of 4 years. All QA4ECV partners are closely involved in projects improving, validating, and using satellite data. We hope that QA4ECV will be a major step forward in providing quality assured long-term climate data records that are relevant for policy and climate change assessments. A detailed description of the project can be found at http://qa4ecv.eu.