

QA4EO: MEETING THE NEEDS OF THE GEO BENEFITS THROUGH INTEROPERABILITY AND HARMONISATION

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Abstract

The Group on Earth Observations' (GEO) Global Earth Observation System of Systems (GEOSS) aims to deliver comprehensive "knowledge information products" in a timely manner to meet the needs of its nine "Societal Benefit Areas" (SBA), of which the most demanding, in terms of accuracy, is climate. To accomplish this vision, starting from a system of disparate systems that were built for a multitude of applications, requires the establishment of an internationally coordinated operational framework to facilitate interoperability and harmonisation of methodologies used in data collection, particularly with respect to the calibration and validation of data. The Committee on Earth Observation Satellites (CEOS), the space arm of Group on Earth Observations (GEO), has led the development of a data quality assurance strategy based on the adoption of a set of key guidelines. These key guidelines have been derived from "best practices" for implementation by the community under the auspices of GEO. These key guidelines define the generic processes and activities needed to establish an operational Quality Assurance Framework for Earth Observation (QA4EO).

It can be argued that the most crucial aspect of monitoring activities using Earth Observing Satellites are the continuity and consistency of Earth's surface measurements through time. The objectives of such monitoring activities are almost always to make quantitative measurements of small changes. In the case of climatic behaviour, many of the changes will only become apparent after decades or more of observations. Such changes, of course, have massive impacts on most of the GEO themes and on the associated SBA.

In recent years, the advancement in technology of satellite instrumentation has demonstrated in several cases to be well capable of making the type of accurate quantitative measurements that are required. However, in order to acquire a long time-series of data it may be necessary to use records from a series of sensors which, although they measure the same parameters, may produce differing products and measurements because of different procedures for calibration of the sensors. For climate applications, especially, this can be a major obstacle to acceptance by the user communities of satellite data-records.

The QA4EO Initiative has led to a set of guidelines which set out realistic and practical procedures which can be followed in the calibration and validation of earth-observing

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satellite sensors. These key guidelines have been structured into an operational framework based on interoperability requirements. As a result of agreement at two workshops (“Guiding principles”, held in Geneva in October 2007, and its subsequent partner, “Establishing an operational framework”, held in Gaithersburg in May 2008) held with calibration and validation (Cal/Val) experts from around the world, the guidelines have been collated into three theme areas – Data Quality, Data Policy and Communication & Education.

The QA4EO framework, and its ten associated key guidelines, have recently been published and can be found on the CEOS Cal/Val portal at <http://calvalportal.ceos.org/CalValPortal/qa4eoInfo.do>. The QA4EO was endorsed by the Working Group for Calibration and Validation (WGCV) at their 29th plenary in September 2008 and endorsed by the CEOS plenary in November 2008 and is recommended for implementation and use throughout the GEO community. If guidelines such as these are adopted, many difficult issues of traceability and inter-operability will be effectively addressed.

In this paper, the QA4EO initiative will be described and the proposed guidelines will be outlined and some implementation issues will be briefly discussed.