CGMS

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WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

Many of the environmental issues facing society today call for information across multiple domains resulting in an evolving and increasingly complex set of user requirements. The WMO Integrated Global Observing System (WIGOS) is intended to bring into a single framework, the WMO observing systems that are vital to the activities of its Members, and if better integrated can meet these more complex user requirements. Integration of the WMO observing systems through WIGOS will occur across three levels – instrumentation, data management, and product quality assurance – all of which are of importance. CGMS through its role in global contingency planning and technical harmonization, format standardization, intercalibration and product generation efforts, can play a critical role in WIGOS as more comprehensive and diversified space-based capabilities evolve.

Further integration of space-based components of the GOS should result in increased interoperability, enhanced robustness, wider audience and greater benefit to the society.

Recommendation proposed:

Recommendation: CGMS Members are invited to consider integration as a major objective at the instrument, data management, and product quality assurance level, and to support related activities.

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

1 BACKGROUND

Taking into account the evolving and increasingly complex user requirements, as well as the latest technological developments, the fifteenth WMO Congress approved the WMO Integrated Global Observing System (WIGOS) concept as a call for, and an opportunity to work toward greater integration of the WMO observing systems. This enhanced integration would not only improve the capability of Members to effectively provide the widening range of needed services, but would also better serve research programme requirements. Integration of data from diverse surface, airborne, and space-based observing systems, in a fashion which optimizes knowledge of current environmental conditions and exploits this information for predictive weather, climate, and water products and services is greatly needed. It is intended that this integration will lead to efficiencies and cost savings that can be reinvested to overcome known deficiencies and gaps in the current observing systems. Together with the WMO Information System (WIS), WIGOS will also significantly enhance operational components of WMO Programmes in developing and Least Developed Countries.

2 RELEVANCE FOR SPACE-BASED COMPONENTS

As an organizing construct which will bring all WMO systems and programmes together into a single framework, WIGOS will involve three levels of integration – each of which has particular relevance for the space-based component. These three levels of integration include – instrumentation, data management, and product quality assurance – all of which are important.

2.1 Instrument level

At the instrument level, GSICS and the ongoing intercalibration work is an important step that was recognized as a pilot activity for WIGOS (see WMO-WP-02). The harmonization of instrument characteristics should be encouraged to ensure comparable datasets. A contribution to such harmonization could be achieved by updating the satellite component (Chapter 8) of the Commission on Instrumentation and Measurement (CIMO) Guide. This document can be found on line at: http://www.wmo.int/pages/prog/www/IMOP/publications/CIMO-Guide/CIMO%20Guide%207th%20Edition,%202008/Part%20II/Chapter%208.pdf .

2.2 Data Management Level

The second level of integration is the data management. This level, critical for ensuring interoperability within WIGOS, WIS and GEOSS, and greater accessibility to data, includes implementing agreed data and metadata standards, filename conventions, and registering these data in DPCP and GISC interoperable catalogues (see WMO-WP-07).

The work done by the RARS project to define harmonized header and coding structure for RARS products is an example of useful contribution to this harmonization (See WMO-WP-08).

This need for data integration applies for all relevant data including e.g. GSICS products. The EC Working Group Subgroup on WIGOS appreciated the work done by GSICS in developing a NetCdF format implementation, but stressed that GSICS products must be registered in DCPC catalogues and associated with corresponding metadata otherwise they will not be broadly accessible.

2.3 Product quality assurance

The third level of integration is the product quality assurance level. There is a need to evolve from raw data to higher level data and, more specifically, to the development of robust, composite products based on multi-satellite data, as well as surface-based data when appropriate. An example of such need is what is required as precipitation product for operational hydrology (See WMO-WP-23). In this case, user requirements can be met by combining data from different kinds of sources among e.g. IR geostationary imagers (to provide spatial coverage and frequent time sampling), microwave passive imager in LEO (for more quantitative information), space-based precipitation radar (helping to calibrate the latter), surface-based precipitation radars (where they can be implemented) and rain gauges (for ground truth). Users can only rely on such products if full traceability is provided regarding pre-processing, calibration, processing, validation, and quality control.

2.4 Space-surface integration

The linkages between surface- and space-based systems may also require further consideration. It is expected that assimilation into NWP models will be the main way to integrate surface and space-based data, however other aspects need to be considered At the planning stage there is an obligation of optimization that should be conducted jointly for space-based and surface-based plans, as far as practical. The specific requirements of space-based systems for ground-based calibration and validation data should be explicated, as well as the requirements of ground-based systems for space-based auxiliary measurements, if relevant.

2.5 CGMS role and experience

CGMS experience and contributions to the optimization and harmonization of operational space-based observing systems has played a key role heretofore. Defining an agreed reference configuration and sharing plans as far in advance as possible so that gaps can be accounted for is essential. However this integration effort needs to be pursued with even greater energy since we are now evolving towards a more diversified observing system with multiple orbit characteristics and higher number of contributing agencies. New generation instruments require new code forms, higher data rates than lead to new dissemination methods, sophisticated processing that poses a need for traceability.

It may be noted that this need for traceability is also emphasized in current discussions of CEOS and GEO about a Quality Assurance Framework for Earth Observation (QA4EO), which is being developed by CEOS for GEO as a set of recommended guidelines potentially applicable to every observing system contributing to GEOSS.

3 ADDITIONAL INFORMATION

The sixty-first session of the WMO Executive Council (EC-LXI) adopted the updated version of the WIGOS Concept of Operations (CONOPS) which is available online at: http://www.wmo.int/pages/prog/www/wigos/documents/WIGOS_CONOPS_EC-LXI.pdf and also the WIGOS Development and Implementation Plan (WDIP) which is available online at: http://www.wmo.int./pages/prog/www/wigos/documents/WIGOS_WDIP_EC-LXI.pdf. The Council recommended that the current process of implementing the WIGOS concept should focus on the test-of-concept phase, building on development of WIGOS Projects (of which the GSICS Pilot Project is one) and then the later implementation phase would be developed in conjunction with the finalization of, and feedback from the projects.

4 CONCLUSION

CGMS Members are invited to note the ongoing progress with WIGOS, and are invited to consider integration as a major objective at the instrument, data management, and product quality assurance level, and to support related activities.