

Proposed 2019 CEOS Chair Initiatives

As 2019 CEOS Chair Agency, the VNSC will first ensure that the priorities and initiatives identified by the current Chair (European Commission) and the current SIT Chair (NOAA) are supported and further developed through 2019, including:

- Land Surface imaging and its applications through LSI-VC activities including Analysis ready data (ARD),
- CEOS support to GFOI and GEOGLAM,
- CEOS open DataCube (CDC) activities,
- Laying the foundation for an international CO₂ and GHG emission monitoring system to make a fundamental contribution to monitoring CO₂ and other GHG emissions globally,
- Following the recommendations on Future Data access and analysis Architectures (FDA).

In the last few years, CEOS agencies have made significant progress in making EO data free, open and sustained, along with the effort to remove complexity and difficulty of handling large and technical datasets through actions such as Analysis Ready Data, Open Data cube and Copernicus Data Information Access Services (DIAS), to support broad uptake of EO satellite data by the user community. Benefiting from the above activities of CEOS agencies, during last 2 years, VNSC has developed and operated the Vietnam Data Cube (VDC), a country scale system of ODC which focus on the SAR data since the fact that Vietnam are expecting its own SAR satellite in next few years. The VDC is currently collecting satellite data from the USGS, ESA, and JAXA for research and monitoring purposes in fields such as forest monitoring, rice monitoring and water quality monitoring in Vietnam. Thank to the valuable supports of international organizations (CSIRO, CESBIO - CNES, JAXA...), in 2018, VDC has successfully developed two applications: forest monitoring and rice monitoring. This success is a very important premise for Vietnam to take the initiative in the 2019 chair.

As 2019 CEOS Chair, **Vietnam initiatives** will seek to integrate many ongoing CEOS activities in regions most affected by climate change, with a focus on the tropical monsoon climates countries in South East Asia (Cambodia, Lao PDR, Thailand and Viet Nam). Those countries are especially vulnerable because they have growing populations facing climate change and anthropogenic impacts. Vietnam and Thailand were found to be among the 10 most affected countries in the world in a study on the Long-term Climate Risk Index (*Global Climate Risk Index 2017*, www.germanwatch.org/en/crri). The VNSC initiatives will focus on the application of satellite data on a regional basis.

The selection of the Mekong basin region is a suggestion, not a binding part of the initiative. However, as a regional member, Vietnam, in particular, VNSC has better understanding of the region that could bring significant advantages in deploying the initiative on this area. On the other hand, to understand the climate vulnerability in the

Mekong Basin region (increase of coastal erosion, increase of sea water intrusion, impacts of forest projects and dam construction on the main stream of Mekong River, impacts of irrigation for high cropping density in rice cultivation...) requires coordinated actions by all the member countries, as recognized by the Mekong River Commission.

By putting the focus on this specific region, CEOS Chair objective is to enhance contribution and cooperation of the CEOS agencies in the region, to identify potential Earth Observation users and to respond effectively to their needs by achieving integration across the full range of Earth Observations, by promoting the sharing of CEOS agency data, and by improving access to and use of such data.

Integration over large regions of existing CEOS thematic acquisition strategies to pool data acquired from space and to make them available to the international community will enable studies and applications in relation to forests, agriculture, disasters, climate, carbon, and water. Satellite mission coordination will be strengthened, particularly through the CEOS Virtual Constellation Activities. CEOS Working Group and VC will support the priorities, and improve the level of complementarity and compatibility of CEOS Agency EO and data management systems.

To support the data sharing, in 2019 and beyond, the CEOS Open DataCube implemented at VNSC in Vietnam with the support of CSIRO will be expanded to users in the Mekong region.

This regional approach can be considered as:

- Demonstration for space climate observatories for key global programs and initiatives as well as demonstration of how to downscale from global to regional to local applications;
- Incorporation of regional datasets (space-based and in situ) from regional observing systems and inclusion of national and regional users downstream who are not directly part of the CEOS community (e.g., AOGEOSS);

Among the thematic areas, VNSC will focus in 2019 on two following areas:

1. **Carbon Observations, including forested regions:** to coordinate EO observations to support the effective monitoring and management of the forests in the region, through its Ad Hoc Space Data Coordination group for GFOI, in support of the development of national forest monitoring and measurement, reporting and verification (MRV) systems. For the countries in the region (Vietnam, Thailand, Lao PDR, Cambodia, Myanmar) which have fast changes in their forests for conversion in agriculture, in industrial tree plantations, and in reforestation programs, there is a need to develop Near Real-Time Monitoring system with dedicated User needs assessment. In particular, the open CEOS DataCube at VNSC (Vietnam DataCube), with the collaboration of FIPI (Vietnam Forest Inventory and Planning Institute), will be used to demonstrate an approach for Carbon Stock assessment of forests to support UNFCC reporting and can be expanded to other tropical regions. This will be done in coordination with the CEOS partners in GFOI.

2. **Observations for Agriculture:** in line with the CEOS Ad Hoc WG on GEOGLAM, and within the GEOGLAM Asia-Rice regional network, a key focus will be addressed on the practical use of CEOS data, especially SAR for rice crop monitoring in Asia. At the Vietnam DataCube (VDC) meeting in March 2018, demonstration of rice monitoring system has been done, in cooperation with CESBIO-CNES. This is in line with the 2018-2020 CEOS Workplan item Agri-8. VNSC will pursue the rice monitoring activities for Vietnam. As a CEOS agency, ESA has extended the GEORICE project to demonstrate monitoring activities to wall-to-wall country-wide for 5 countries in the region (Vietnam, Thailand, Lao PDR, Cambodia, Myanmar). Under this thematic applications, Asia-Rice Technical Demonstration Sites (such as in the Mekong and Red River Deltas) will join the JECAM network.

For the above thematic areas, support of the Working Group for Capacity Building and Data Democracy (WPCapD) will be required for **Training and Capacity Building activities** in the region. Until now, under CEOS framework, such activities have been organized in Africa and Latin America. There is a need for coordination of the existing diverse training and capacity building resources related to satellite observations in the region (e.g. the NASA South/South East Asia Research Initiative (SARI) project, the COSPAR capacity building program). For the initial idea, the training and capacity building will be focused on SAR data processing and land applications since advance application of SAR data in tropical area and it could leverage earlier ESA-NASA land cover training activities. VNSC has proposed a SAR workshop in Hanoi next spring to CSIRO.

The specific focus in the region will be on dedicated user oriented **SAR data training**, because of the following reasons i) the region is largely impacted by cloud cover, limiting the availability of cloud free optical data, ii) many of the remote sensing engineers and researchers in the region have expertise in optical data, from long term use of Landsat, SPOT and regional data (from VNREDSAT-1, THEOS, Formosat..), and iii) many of the existing SAR training courses are leaned towards engineering and not tailored to the user needs for their thematic applications and iv) the user requirements are often specific for the region (e.g. agricultural practices, forest management, etc.). Collaboration will continue to strengthen Asia-Oceania GEOSS (AO GEOSS) to support its training contribution at their annual meeting /workshop in the region.

There is not very specific expecting results at the moment. However, after one year of chair position, Vietnam expect that the base of Regional Observatory can be built with ready application built-in such as forest monitoring and rice monitoring for Mekong river area. The Regional Observatory can be considered as downscaling of Global approach applications and as a regional ODC where concerning people can find they suitable satellite data as well as applications.

In summary, the 2019 Chair Initiative will be on a concept of a Regional Observatory, encompassing many thematic and strategic areas. Such an approach can continue beyond 2019 and extended to other “hotspot” regions in Africa and Latin America.