

Statement Reporting on Progress by the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS) on Coordinated Response to UNFCCC Needs for Global Observations

51st Session of the of the Subsidiary Body for Scientific and Technological Advice (SBSTA)
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The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), on behalf of the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS), is pleased to update the 51st session of the Subsidiary Body for Scientific and Technological Advice (SBSTA) on the coordinated response to the United Nations Framework Convention on Climate Change (UNFCCC) needs for Systematic Observations facilitated by the UN's Global Climate Observing System (GCOS).

CEOS and CGMS, international organizations of 62 Members and Associates and 16 Members, respectively, are honoured to report to the UNFCCC on space agency activities over the past year.

Space agencies continue to advance and evolve their systematic observation of the Earth's climate system, by implementing the Architecture for Climate Monitoring from Space published in 2013.

The web-based Inventory of existing and planned climate data records of GCOS Essential Climate Variables (ECV) observable from space is updated annually and currently contains information for approximately 1300 datasets. The 2019 version fills previously identified gaps. Space agencies have started to address data records for lightning, sea-surface salinity, aboveground biomass, and permafrost, the latter two having significance for the study and analysis of the Earth's carbon cycle. This version of the Inventory will be published by the end of 2019.

The Joint CEOS/CGMS Working Group on Climate continuously analyses the Inventory content to identify measurement gaps in Earth observation that may appear in the future, thus

potentially interrupting the continuity of climate data records. Space agencies use this resource to inform their planning for both mission and product generation to preempt such gaps in the future. The 2019 analysis focused on ECVs for which GCOS has identified issues in their long-term provision, thus providing substantial input to the 4th GCOS status report in 2021.

The 47th session of SBSTA noted the increasing capability of satellite and in situ data to monitor greenhouse gas concentrations and emissions systematically. The recently updated IPCC guidelines on the methodology used by governments to report their greenhouse gas emissions and removals include information on the potential contributions of space-based observations to the atmospheric inversion systems for comparison with greenhouse gas emission estimates, drawing attention to data from observing systems currently operating and upcoming missions.

A whitepaper endorsed by CEOS and CGMS in 2019, describes a constellation architecture for monitoring atmospheric carbon dioxide (CO₂) and methane (CH₄) concentrations, as well as their natural and anthropogenic fluxes from space¹. It provides a reference for individual agencies planning space-based CO₂ and CH₄ missions as well as for the broader coordination on CO₂ and CH₄ measurements through CEOS and CGMS.

CEOS and CGMS have developed a roadmap to implement the monitoring system in several steps to maximize contributions to the Transparency Framework and the achievement of Nationally Determined Contributions and for stocktaking. The first prototype system is based on available space-based assets, and could inform the first global stocktake in 2023. A pre-operational system integrating the satellite data

¹ http://www.ceos.org/document_management/Virtual_Constellations/ACC/Documents/CEOS_AC-VC_GHG_White_Paper_Version_1_20181009.pdf



into an operational atmospheric CO₂ and CH₄ monitoring system should support the second global stocktake in 2028. CEOS and CGMS welcome Parties, and their technical agencies, to start engaging with CEOS/CGMS agencies prior to the first Stocktake to ensure that the products and services provided are fit-for-purpose.

The Joint CEOS/CGMS Working Group on Climate coordinates the activities of the space agencies with relevant stakeholders such as the WMO IG3IS and relevant modelling centres, and maintains the necessary partnerships with the relevant data user communities, both within the emission inventory and policy communities, to address the needs and the overall system implementation goals.

In addition, CEOS and CGMS agencies continue to coordinate annual global coverage of the world's forested areas to ensure the necessary data in support of national reporting processes of the Global Forest Observations Initiative (GFOI), and the Global Observation of Forest Cover and Land

Dynamics (GOFC-GOLD) effort. The CEOS Working Group on Capacity Building and Data Democracy (WGCapD), along with GOFC-GOLD and GFOI are providing regional training in coordination with national agencies on the use of these data. In 2019, CEOS began to coordinate the use of multiple satellite missions with novel capabilities to derive above ground biomass. These data offer new prospects and will enable more direct estimates in support of forest and carbon emission reporting – including for global stocktakes.

Parties are invited to continue supporting the activities of the space agencies.

* This report was delivered by EUMETSAT on behalf of CGMS and the Indian Space Research Organisation (ISRO) being the 2020 CEOS Chair Party.

CEOS and CGMS Agencies

Agence Gabonaise d'Études et d'Observations Spatiales (AGEOS), Gabon	International Ocean Colour Coordinating Group (IOCCG)
Agencia Espacial Mexicana (AEM), Mexico	International Society of Photogrammetry and Remote Sensing (ISPRS)
Agensi Angkasa Negara (ANGKASA), Malaysia	Japan Meteorological Agency (JMA)**
Agenzia Spaziale Italiana (ASI), Italy	Korea Aerospace Research Institute (KARI)
Australian Bureau of Meteorology (BoM)	Korea Meteorological Administration (KMA)*
Belgian Federal Science Policy Office (BELSPO)	Ministry of Education, Culture, Sports, Science and Technology (MEXT)/Japan Aerospace Exploration Agency (JAXA)*
Canada Centre for Mapping and Earth Observation (CCMEO)	National Aeronautics and Space Administration (NASA), USA*
Canadian Space Agency (CSA)	National Institute of Environmental Research (NIER), Korea
Centre National d'Études Spatiales (CNES), France*	National Oceanic and Atmospheric Administration (NOAA), USA*
Centro para Desarrollo Tecnológico Industrial (CDTI), Spain	National Remote Sensing Center of China (NRSCC)
China Center for Resources Satellite Data and Applications (CRESDA)	National Satellite Meteorological Center (NSMC)/China Meteorological Administration (CMA)*
China National Space Administration (CNSA)**	National Space Agency of Ukraine (NSAU)
Chinese Academy of Space Technology (CAST)	National Space Research Agency of Nigeria (NASRDA)
Comisión Nacional de Actividades Espaciales (CONAE), Argentina	Netherlands Space Office (NSO)
Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia	Norwegian Space Centre (NSC)
Council for Scientific and Industrial Research (CSIR) South Africa	Russian Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)*
Crown Research Institute (CRI), New Zealand	Russian Federal Space Agency (ROSCOSMOS)*
Deutsches Zentrum für Luft-und Raumfahrt (DLR), Germany	Scientific and Technological Research Council of Turkey (TÜBITAK-Uzay)
Earth System Science Organisation (ESSO), India	South African National Space Agency (SANSA)
European Commission (EC)	Swedish National Space Agency (SNSA)
European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)*	United Arab Emirates Space Agency (UAESA)
European Space Agency (ESA)*	United Kingdom Space Agency (UKSA)
Geo-Informatics and Space Technology Development Agency (GISTDA), Thailand	United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)
Geoscience Australia (GA)	United Nations Educational, Scientific and Cultural Organization (UNESCO)
Global Climate Observing System (GCOS)	United Nations Environment Programme (UNEP)
Global Geodetic Observing System (GGOS)	United Nations Food and Agriculture Organization (FAO)
Global Ocean Observing System (GOOS)	United Nations Office for Outer Space Affairs (UNOOSA)
Global Terrestrial Observing System (GTOS)	United States Geological Survey (USGS)
International Science Council (ISC)	Vietnam Academy of Science and Technology (VAST)
International Geosphere-Biosphere Programme (IGBP)	World Climate Research Programme (WCRP)
India Meteorological Department (IMD)**	World Meteorological Organization (WMO)*
Indian Space Research Organisation (ISRO)*	
Instituto Nacional de Pesquisas Espaciais (INPE), Brazil	
Intergovernmental Oceanographic Commission (IOC)*	

*Denotes Agencies being Member of both CEOS and CGMS. **Denotes only CGMS Agencies.