

## Statement by the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS) on Progress in Supporting UNFCCC Needs for Global Observations

63<sup>rd</sup> Session of the Subsidiary Body for Scientific and Technological Advice (SBSTA)

10 November 2025

The Commonwealth of Australia, on behalf of the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS), is pleased to provide this annual update to the 63<sup>rd</sup> session of the Subsidiary Body for Scientific and Technological Advice (SBSTA). This Statement highlights the critical role of satellite observations in supporting the United Nations Framework Convention on Climate Change (UNFCCC).

CEOS and CGMS coordinate civilian satellite observations that advance knowledge of Earth's environment. They comprise 67 Member Agencies and Associates (CEOS) and 16 Member Agencies (CGMS). CEOS acknowledges the Global Climate Observing System (GCOS) assessment of the state of global observations of the atmosphere, land and ocean. In 2025, the joint CEOS-CGMS working group on climate delivered the "Space Agencies' Response to the 2022 GCOS Implementation Plan"<sup>1</sup> and concluded that plans are already in place to address most of the needs identified by GCOS.

**Sustained and systematic satellite observations** have been transformative in our ability to monitor and understand Earth system change and inform science-based policy. CEOS and CGMS works across the international community to ensure that their satellite observations are trustworthy, that algorithms and processing are transparent, and that measurement uncertainties are communicated. Below are six thematic areas in

which satellite observations continue to significantly advance our knowledge.

**1. Earth's Energy Imbalance (EEI):** the difference between absorbed solar radiation and outgoing thermal radiation—is the fundamental driver of Earth climate. A persistent positive imbalance means the Earth system is accumulating energy, with over 90% stored in the ocean. Satellite observations are crucial for quantifying this imbalance, and measurements are validated by global in-situ ocean measurements.

**2. Land Cover, Forest Structure, Agriculture and Ecosystems:** Long-term satellite records enable consistent global monitoring of forests, agricultural lands, and ecosystems. These observations support Reducing Emissions from Deforestation and Forest Degradation (REDD+) programs and are a unified approach to globally measuring carbon stocks. Space agencies have invested in research satellite missions which will quantify tropical stocks with unprecedented accuracy.

**3. Quantifying Ice Loss and Glacier Retreat:** Satellite observations show accelerating ice mass loss from Greenland, Antarctica, polar oceans, and mountain glaciers. As we mark the International Year of Glaciers' Preservation (2025), sustained in-situ and satellite observations reveal that glaciers have lost more than 9,000 Gt of water globally since 1976 – nearly half of it in the past decade. These continued observations will be critical for the upcoming Fifth International Polar Year (2032–2033), while also informing scientific assessments and adaptation

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<sup>1</sup>[https://ceos.org/document\\_management/Working\\_Groups/WGClimate/Documents/Space\\_Agency\\_Response\\_GCOS-IP\\_2024\\_v1.0.pdf](https://ceos.org/document_management/Working_Groups/WGClimate/Documents/Space_Agency_Response_GCOS-IP_2024_v1.0.pdf)

planning in remote and inaccessible areas, such as high-mountain and polar regions.

#### 4. Measuring and Projecting Sea Level Rise:

For over 30 years, satellite altimetry missions have provided uninterrupted, precise sea level measurements, revealing a total global mean sea level rise of approximately 10 cm since 1993. These data have been used to provide open, accurate, and up-to-date information on global and regional sea level rise, including contributions of local land subsidence. They are also being used in data-driven model projections that inform scientific assessments, national adaptation plans, environmental risk analysis, and coastal resilience planning.

#### 5. Measurements of Atmospheric Composition:

Advancements in satellite technology have enabled high-resolution measurements of carbon dioxide, methane, and other trace gases over the past two decades, significantly enhancing our understanding of their sources and sinks. These observations have been used to estimate surface-level carbon dioxide and methane emissions and, in some cases, to verify national carbon inventories.<sup>2,3</sup> CEOS and CGMS agencies have collaborated with public and commercial Earth observation providers to establish a common practice for methane products<sup>4</sup>, enhancing data quality verification and strengthening confidence in consistent, transparent, and actionable monitoring.

#### 6. Enhancing Early Warning and Response:

Earth observation satellites enable monitoring of extreme events, including in real time —of floods, droughts, wildfires, thunderstorms, heatwaves, coldwaves, and tropical cyclones. These data power early warning systems, strengthen disaster

response, and reduce loss of life and infrastructure damage.

**Future Advances:** The remarkable pace of innovation in satellite observation—driven by miniaturisation of space hardware, cloud-based processing and data access, artificial intelligence, and a growing commercial space sector—has expanded our ability to track changes within the Earth system. CEOS and CGMS agencies are actively and responsibly leveraging these advances to improve data quality, delivery, and interoperability. Through initiatives such as the CEOS Analysis Ready Data Strategy, we are also working to further lower the barriers to the use of satellite data, including in relation to adaptation where tailored local information is crucial.

Recognizing the importance of fit-for-purpose information for decision-making, CEOS and CGMS have compiled lessons-learned from the first Global Stocktake<sup>5</sup> and are refining strategies to deliver more accessible, tailored Earth system information for policymakers to assess the progress of global climate agreement. Space agencies remain committed to further partnering with their governments to help integrate satellite data into national monitoring systems and policy-making frameworks—improving the information quality.

The past decade has seen unprecedented advancements in satellite remote sensing capabilities, enabling scientific breakthroughs and informing global decision-makers about Earth system processes. As challenges facing our planet grow more complex, international collaboration and sustained investment in satellite Earth observation systems are essential to expanding knowledge, guiding adaptation, and enabling effective responses.

### Roster of CEOS and CGMS Participating Agencies

Agence Gabonaise d'Études et d'Observations

Spatiales (AGEOS), Gabon

<sup>2</sup>[https://unfccc.int/sites/default/files/resource/20231112\\_BUR\\_II\\_MGL\\_Final.pdf](https://unfccc.int/sites/default/files/resource/20231112_BUR_II_MGL_Final.pdf)

<sup>3</sup><https://unfccc.int/sites/default/files/resource/INDIA%20ECOND%20BUR%20High%20Res.pdf>

<sup>4</sup> <https://zenodo.org/records/17047789>

<sup>5</sup>[https://ceos.org/document\\_management/Working\\_Groups/WGClimate/Documents/LessonsLearned\\_v1.0.pdf](https://ceos.org/document_management/Working_Groups/WGClimate/Documents/LessonsLearned_v1.0.pdf)

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

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