

SUBCOMMITTEE ON THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS (GEOSS)

1. Introduction/Summary

The Global Earth Observing System of Systems has entered an era of high importance on international political and business agendas due to the twin threats of global climate change and biodiversity reduction, and due to the tremendous shift in cost vs benefit profile of commercial and public-private partnership applications. Dramatic advancements in technologies, business models, and science are providing the opportunity to provide accelerating value to society as threats and impact along with opportunities to provide actionable information for societal and business decisions all increase. Satellite-based earth observations are having more and more impact on applications impacted by environmental conditions, human activity, protection of the environment, and climate change mitigation. The most noteworthy developments in partnerships, applications, GEOSS cooperation from November 2020 through May 2021 are highlighted. GEOSS Subcommittee promotes cooperation between space agencies and Earth focused organizations to address the changing climate, its impact on biota, and applications for sustainable development. The Subcommittee coordinates between the IAF and many of these organizations like the Group on Earth Observations (GEO), and works to highlight the latest advances in Satellite-based Earth science to the IAC by conducting highlight lectures, plenary events and special sessions at the Congresses.

2. Latest Developments

GEO, together with the Belmont Forum, Future Earth and twelve founding partners announced 13 new awards under Transdisciplinary Research for Pathways to Sustainability. The awards support 13 research networks with 136 collaborators from 37 countries over the next two years. On 22 April 2021, GEO invited participants to be among the early adopters of Microsoft's Planetary Computer, which is a multi-

petabyte catalogue of global environmental data with intuitive Application Programming Interfaces to take advantage of open data and analytical tools while helping to shape the development of the platform in its early stages. Applicants will receive up to \$60k US in financial support over 12 months plus up to \$60k Microsoft Azure credits accessible for up to three years. UNESCO and GEO launched the New GEO Urban Heritage Climate Observatory (UHCO) as a community activity in the GEO work program to provide a forum to share practices, needs and expertise to allow matching of user needs with EO data to enrich and coordinate monitoring and management of urban heritage to address risks and impacts of climate change and enable appropriate adaptation measures. In February 2021, GEO and the UN Statistical Commission lauded the Earth Observations Toolkit for Sustainable Cities and Human Settlements to advance Sustainable Development Goals 11. In January 2011 the GEO Human Planet Initiative announced the launch of the Atlas of the Human Planet 2020 providing 100 case studies that use Global Human Settlement Layer data sets in disaster risk management, urbanization, development, environment and sustainability. In November 2021, The GEO Global Water Sustainability (GEOGloWS) Initiative and its global partnership of government, academic, public, private and financial institutions announced the GEOGloWS ECMWF Streamflow Service, a worldwide application of global runoff forecasts transformed into river discharge forecasts for every river of the world. It was led by the US Brigham Young University and Esri, growing out of an effort to build a US national water model by NOAA. Following the successful pilot in the US, the NASA/USAID SERVIR program supported further research and implementation in South Asia in partnership with the international Center for Integrated Mountain Development, and the Americas with AmeriGEO. The World Bank recognized this effort as disruptive technology and supported global expansion and migration to the ECMWF cyberinfrastructure. In April 2021, WMO released a white paper on the

future of weather and climate forecasting, written by 30 leading experts from research, operations, and education fields to analyze the challenges and opportunities, and set directions and recommendations for the future. In November 2020, WMO initiated a review of open data policy (promoted since 1873) to address the lack of data from several regions, address the enormous transformative change in data, science and technology and the rapid growth of the private sector, and the need to exchange data types which have not been shared before like weather radar data. The UN Decade of Ocean Science (2021-2030) started in January. The GEOSS will play a major role because of the unique ability of space-based observations to measure Ocean parameters to support efforts to reverse the decline in Oceans health, mitigate the impact of climate change and other human induced impacts, and support countries in the sustainable development of the Oceans. COVID-19 was a major world event and several notable GEOSS contributions were made including NASA SEDAC (operated by Columbia University) provided a COVID-19 mapper, MIT's Space Enabled research group created Vida decision support system to support COVID 19 response in Brazil, Angola, Indonesia, Chile and Mexico. The Resources for the Future team hosted a series of discussions on using satellite remote sensing to respond to Environmental Justice issues, and NASA SERCIR opened an Air Quality Explorer for Thailand.

3. Breakthroughs

Public-private partnerships both in observations (such as for greenhouse gas monitoring) and in applications (such as machine learning, data access, services) are coming to fruition and are expected to make major contributions that go beyond the traditional Government provided services and commercially offered services.

4. Action plan for the year

GEOSS has several major activities planned for Dubai including a Highlight Lecture celebrating the 20th Anniversary of the Disaster Charter (speakers include the heads of the three founding agencies - ESA, CNES, CSA), a Special Session on monitoring Ocean's health from Space to coincide with the UN Decade of Ocean Science (speakers include heads of earth science in several leading space agencies), a networking forum in conjunction with Young Professionals on Tuesday night at the Congress, and further discussion to support greater integration with GEO, Emerging Countries, and development of a new three-year partnership with YPP.