

G7 INITIATIVE ON EARTH OBSERVATION AND INTEGRATED COASTAL ZONE MANAGEMENT

Promoting healthy oceans and coastlines and ensuring the resilience of island and coastal communities to natural hazards and to the impacts of climate change is critical to human and environmental well-being and economic prosperity. Ocean warming, acidification and sea-level rise, together with other slow-onset and extreme weather events, are affecting coastal and island communities globally, with the Arctic and low-lying coastal communities, particularly Small Island Developing States (SIDS), among the most vulnerable. This point is driven home when considering 80% of the world's population will be concentrated in coastal areas by 2030 and that environmental factors can exacerbate natural hazards in these areas. Using Earth Observation data and services, as part of a suite of information and decision support tools and other services, is critical to better understanding the current state of our oceans and coasts and to monitoring the climatic and other environmental factors that may affect these areas. This depth of understanding is a critical part of undertaking sound integrated coastal zone planning and management. However, gaps in our understanding exist, compounded by minimal data availability and accessibility that pose a barrier to enhancing adaptive capacity and strengthening resilience. This is most acute for coastal communities and small island developing states who are among the most vulnerable to the impacts of extreme weather events.

As discussed within the Sendai Framework for Disaster Risk Reduction 2015-2030, the accessibility and availability of non-sensitive disaster risk information when appropriate can support preparedness, response and recovery efforts to enhance overall community resilience. Earth Observation data is one of the largest sources of such information.

Earth Observation technologies and their applications are developing rapidly – both in amount and complexity of information – in advanced economies and within a larger global Earth Observation community. Industry plays a leadership role in finding innovative solutions to data collection and sharing challenges, and in developing applications that use Earth Observation data to provide services for decision makers at all levels. Also, many multilateral organizations dedicate significant effort to the collection, sharing and use of Earth Observation data including: the World Meteorological Organization (including the Global Observing System, and the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology), the Committee on Earth Observation Satellites (CEOS), the Group on Earth Observation (Global Earth Observation System of Systems including Ocean and Society: Blue Planet Initiative), the Marine Biodiversity Ocean Network (MBON), Open Geospatial Consortium, the United Nations Educational, Scientific and Cultural Organization's Intergovernmental Oceanographic Commission (IOC; including the Ocean Biogeographic Information System), and the International Science Council (ICS) World Data Systems.

This G7 Initiative on Earth Observation and Integrated Coastal Zone Management provides an opportunity to scale up capacities in Earth Observation collection and sharing, which includes the opportunity to identify new actions to enhance coastal resilience particularly in the poorest and most vulnerable regions of the world.

Leveraging innovation in the field of Earth Observation technologies and related applications, and making them broadly and freely available through increased accessibility and capacity building in the poorest and most vulnerable regions of the world supports, *inter alia*, disaster risk reduction, emergency response and contingency planning, urban and spatial planning, resilient infrastructure and building design, early warning systems and risk transfer mechanisms. These tools and resources will enable oceans and coastal communities to respond and recover from challenges and impacts, and to build back better.

The G7 members generate highly valuable Earth Observation data, technologies and expertise; as such, on voluntary and mutually agreed upon terms, we commit to:

1. Carry out new and build upon existing G7 member actions list in Annex A in the areas of: access to data and information; capacity building; research and innovation; sharing of relevant tools and products; and, coordination of efforts.
2. Expand collection, sharing and capacity building to apply and use Earth Observation data. This will be done through close collaboration with vulnerable communities, scientists, decision-makers, and leading Earth Observation organizations to develop responsive and useful tools and resources.
3. Work through leading Earth Observation organizations, or under the auspices of multilateral fora, to:
 - a. identify, coordinate, harmonize and prioritize Earth observation data and services needs;
 - b. develop, distribute and make available at no cost tools that can assist in coastal management and disaster risk reduction and build coastal resiliency and infrastructure to facilitate information sharing and dissemination, including those that can be adapted and tailored to local needs;
 - c. share Earth Observation technology, services, and approaches with vulnerable coastal communities to acquire, manage, and integrate space-based to in-situ coastal sensitivity information in support of coastal management, including disaster planning and enabling the provision of on-demand data to emergency operators;
 - d. strengthen and enhance the global partnerships on Earth Observation by developing direct linkages between the coastal and small island developing states and the ocean observation community and users to building capacity in integrating science and technology with cultural and social knowledge, and implement pilot and prototype services that address key priorities and issues; and,
 - e. encourage partnerships and broader participation in efforts to lower technological and jurisdictional barriers to sharing data and climate services.
4. Work with industry and other non-governmental stakeholders to encourage and foster science-driven innovative solutions to remove data complexity and volume-related barriers and enable information sharing in a user-friendly, user-responsive and cost-effective way with vulnerable coastal communities through applications such as data cubes, and developing or leveraging Big Data technologies and infrastructures.
5. Build upon the ongoing work of the existing G7 Future of the Seas and Oceans Working Group including monitoring and reporting back, as appropriate.

Annex A -Non-comprehensive list of self-identified G7 actions to deploy Earth observation technologies to empower coastal communities in developing countries to build resilience

Member	Area of action	Action	New or On-going
EU and its Member States	Access to data and information	The <u>Copernicus programme</u> , through its space component, grants full, free and open access to high-resolution data from the Sentinel constellation of Earth Observation satellites.	On-going
EU and its Member States	Access to data and information	The <u>Copernicus programme</u> , through its service component, processes and analyses satellite and in-situ data together with modelling information to generate value-added information, including maps, statistical series, historical climate data records, seasonal and long term forecasts, near-real time observation and identification of anomalies. These 6 Copernicus services are: Atmosphere, Marine Environment, Land, Climate Change, Emergency Management and Security.	On-going
EU and its Member States	Access to data and information	The <u>Copernicus Data Information and Access Services (DIAS)</u> provide the infrastructure for third parties (companies, governments, research institutes) to deploy Earth Observation applications for their users. Each of the DIAS provides a catalogue for discovering, viewing and downloading data and information. Data can then be used in the cloud infrastructure on a pay-per-use basis, allowing third parties to generate and deploy advanced information services. The initial cloud-based DIAS offer is publicly available since June 2018 and will ramp up until December 2018. The 5 DIAS are: <u>Creodias</u> from Creotech (Poland) with cloud provider CloudFerro (Poland); <u>ONDA</u> from Serco (Italy) with cloud provider OVH (France); <u>SOBLOO</u> from Airbus (France) with cloud provider Orange (France); <u>Mundiwebservices</u> from ATOS	New

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All	Access to data and information	<p>(France) with cloud provider T-Systems (Germany) and <u>WeKEO</u> from EUMETSAT (Germany) with Mercator Ocean (France) and ECMWF (UK).</p> <p>Access to :</p> <ul style="list-style-type: none"> • All near real-time Meteosat, Metop, Jason-2, Copernicus Sentinel-3 marine and atmosphere data and products delivered via EUMETCast, Direct Dissemination, FTP over the internet and the Copernicus Online Data Access (CODA). • Historical (archived) Meteosat, Metop, Jason-2 and Copernicus Sentinel-3 marine and atmosphere data and products. • All third-party data delivered via EUMETCast to Meteorological and Oceanography satellite information (Meteosat, Metop, Jason, sentinel 3,...) through Eumetsat Earth Observation Portal 	On-going
Germany	Access to data and information	The <u>GeoSeaPortal</u> is the central entrance to all spatial data of the Federal Maritime and Hydrographic Agency of Germany. The Portal covers data on nautical hydrography, oceanography, marine geology and marine environment surveillance.	–
Germany	Access to data and information	The Copernicus Data and Exploitation Platform – <u>Deutschland (CODE-DE)</u> is the German entry point to the Sentinel Satellite Systems, their data products and the products of the Copernicus Services. Next to that CODE-DE offers predefined maritime information products (such as	–

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		water quality) and processing facilities on the platform.	
Germany	Access to data and information	The German Remote Sensing Data Center (DFD), an institute of the German Aerospace Center (DLR) as part of the Earth Observation Center (EOC), is a center of competence for Earth observation in Germany. DFD supports science and industry as well as the general public. With its national and international receiving stations DFD offers direct access to data from earth observation missions over European, Arctic and Antarctic water and coastal areas. DFD derives information products from the raw data, disseminates these products to users, and safeguards all data in the National Remote Sensing Data Library (D-SDA) for long term use. Its geoscience research related to the atmosphere, global change and civil security facilitates access to products and approaches based on remote sensing and consolidates their utilization in scientific and commercial domains. DFD operates thematic user services such as the Center for Satellite-based Crisis Information (ZKI) and the Maritime Safety and Security Lab, developing and providing near real time satellite information products for maritime monitoring and coastal protection.	–
Germany	Access to data and information	The German Geoportal.de grants public access mainly to geospatial in-situ-data provided on local, regional and national level. It is part of the national spatial data infrastructure.	–
Germany	Research and Innovation	The German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR) analyses and quantifies change and dynamics	–

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European Union	Capacity building	<p>in coastal areas, such as coastal urbanization expansion, land subsidence, coastline change, sea level rise and expected impacts, coastal vulnerability and exposure, salinity intrusion into soils and aquifers, the threat to coastal protective ecosystems, such as wetlands and mangroves, as well as the economic, social and cultural potential of global coasts; e.g. in the context of trade and tourism. Moreover, research and development activities on multi-risk assessment, early warning systems and Earth observation based emergency response for natural disasters are being performed in close cooperation with international partners.</p> <p>The European Development Fund is initiating a new EUR 85 million '<i>Climate Services</i>' Programme with the African, Caribbean and Pacific Group of States (ACP) to strengthen the capacities of regional hydro-meteorological organisations and to take advantage of the Copernicus climate data store to provide access to relevant tools and products in partner countries. The programme will reach local application developers and final users, such as civil protection agencies, decision-makers, vulnerable communities, SMEs, farmers and other local stakeholders in order to help them make informed decisions based on knowledge of climate risks.</p>	New
European Union	Capacity building	<p>The EU is contributing EUR 26.5 million to the '<u><i>GMES & Africa</i></u>' programme of the African Union starting in 2018 and aiming to improve African policy-makers' and planners' capacities to design, implement, and monitor national, regional and continental policies and to promote sustainable management of natural resources through the use of Earth Observation data and derived information. The main areas of investment</p>	New

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		are (i) receiving stations and software to access Copernicus and other Earth observation data, (ii) water and natural resources services, including new applications, (iii) marine services, (iv) capacity building and training through universities, (v) awareness raising.	
European Union	Research and Innovation	As part of the African Union/European Union Research and Innovation Partnership on Climate Change and Sustainable Energy that was launched at the Abidjan Summit in November 2017, the EU Research and Innovation programme ‘Horizon 2020’ is funding new research for up to EUR 40 million. The ‘ <i>Human dynamics of climate change</i> ’ topic of this call for proposals will support research on the use of Copernicus and GEOSS data to create dedicated climate services in Africa for the water, energy, land use, health and infrastructure sectors.	New
All	Coordination of efforts	The Group on Earth Observation (GEO) is a partnership of over 100 governments (including all G7 members) and over 100 organisations that promotes the full and open access to Earth observation data, information and knowledge and creates portal platform to integrate systems and share data (GEOSS). GEO develops and implements initiatives that deliver user-driven services tailored to the needs of specific user communities. The GEO Blue Planet, AquaWatch and Marine Biodiversity Observation Network Initiatives are among those efforts that specifically address the needs of the coastal communities, particularly in the small island developing states.	On-going
All	Coordination of efforts	The Committee on Earth Observation Satellites (CEOS) was established	On-

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		<p>in 1984 at the request of the Economic Summit of Industrialised Nations Working Group (G7), as the international forum for Earth observing space agencies. CEOS operates through best efforts of its 32 Members (Space Agencies) and 28 Associates via voluntary contributions to coordinate civil space-borne observations of Earth including observations for sea surface temperature, ocean colour, ocean surface winds, and ocean surface topography.</p>	going
All	Coordination of efforts	<p>The “Future of the Seas and Oceans” initiative established by G7 Science and Technology Ministers in 2016 and 2017 includes an ocean observation component and relates to the efforts of the Intergovernmental Oceanographic Commission (GOOS-Global Ocean Observing System).</p>	On-going
All	Coordination of efforts	<p>The UNESCO Intergovernmental Oceanographic Commission (IOC) also leads some cooperative efforts on coastal risks, such as Tsunami, harmful algae</p>	On-going
Canada	Access to data and information	<p>The Marine Spatial Data Infrastructure (MSDI) initiative aims to improve public access to Fisheries and Oceans Canada’s marine geospatial data and provide easy-to-use visualization and analysis tools for users. This effort is being coordinated with the Department of Fisheries and Oceans, Natural Resources Canada, the Arctic Spatial Data Infrastructure, the Open Geospatial Consortium and the Federal Geospatial Platform. It leverages governance and standards of the International Hydrographic Organization’s MSDI Working Group (all</p>	New

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Canada	Access to data and information	<p>G7 nations are members of this WG).</p> <p>The Federal Geospatial Platform (FGP) is an online platform for federal geospatial data. The Federal Committee on Geomatics and Earth Observations (FCGEO) provides proactive, whole-of-government leadership in geomatics and Earth observations to better support government priorities, and improve access, sharing, and integration of geospatial data at all levels.</p>	On-going
Canada	Coordination of efforts	<p>Canadian Integrated Ocean Observing System (CIOOS) will bring together and leverage existing Canadian and international ocean observation data, including Earth Observation, into a federated data system which will generate value for users. CIOOS will improve coordination and collaboration among diverse data producers, improve access to information for decision making, and enable discovery and access to data to support a wide variety of applied and theoretical research efforts to better understand, monitor, and manage activities in Canada's oceans. The development of CIOOS will also facilitate collaboration with existing observing systems, such as the US Integrated Ocean Observing System and the Global Ocean Observing System.</p>	New
Canada	Research and Innovation	<p>On November 7, 2016, the Prime Minister launched a \$1.5 billion national Oceans Protection Plan (OPP) that improves marine safety and responsible shipping, protects Canada's marine environment, and offers new possibilities for Indigenous and coastal communities. This initiative includes high resolution mapping of Canada coasts, development of</p>	On-going

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		innovative approaches to coastal protection and spill response which could be shared with developing states to help build coastal resilience.	
Canada	Coordination of efforts	Ocean Research in Canada Alliance (ORCA) brings together Canada's ocean science and technology community to increase collaborative knowledge, align efforts, and forge collaborative ties, with the goal to improve the coordination of ocean science and technology in Canada. The ORCA community of practice is the forum to share information, discuss priority issues, connect with the wider science community, and collaborate on ocean science and technology initiatives in Canada. International partners are invited to attend the forum, to share best practice and develop opportunities for international collaboration.	On-going
Canada, European Union, United States	Coordination of efforts	The <u>Atlantic Ocean Research Alliance (AORA)</u> 's overarching goal is to advance the shared vision of an Atlantic Ocean that is healthy, resilient, safe, productive, understood and treasured so as to promote the well-being, prosperity and security of the present and future generations.	On-going
Canada	Research and Innovation	The Ocean Tracking Network is a global aquatic animal tracking, technology development, and partnership platform headquartered at Dalhousie University in Canada. OTN and its partners are using electronic tags to track more than 140 keystone, commercially important, and endangered species in 29 countries.	On-going
Canada	Research and Innovation	In anticipation of the Canadian RADARSAT Constellation Mission (RCM), a three satellite mission scheduled to launch in 2018, Canadian	New

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		<p>Federal User Departments have been supported by the Canadian Space Agency (CSA) to ensure RCM is operationally used for key application areas including marine and coastal monitoring. Specifically, the Department of Fisheries and Oceans (DFO) – Canadian Hydrographic Service (CHS), will use RCM to improve navigation safety in Canadian Waters. Environment and Climate Change Canada are ready to use RCM data for coastal erosion monitoring in Canada's North, improving marine forecasts in coastal areas, as well as continued sea ice and oil pollution monitoring.</p> <p>Access to RCM data, will be made available to support marine and coastal zone monitoring, with the intent of developing new user capacity to better integrate Earth observation data in support of sustainable development of coastal regions.</p>	
Canada, United States	Research and Innovation / Capacity Building / Access to data and information	<p>The <u>World Meteorological Organization's (WMO) Regional Association IV</u> (North America, Central America and the Caribbean) to which Canada and the United States are permanent members oversees a program on Tropical Cyclones which aims at reducing the loss of life and damage caused by tropical cyclones to a minimum. Canada and the United States participate actively in the Hurricane Committee providing leadership and expertise to ensure standards, practices and training are coordinated and shared, thus fostering coastal resilience through the use of timely alerting, numerical weather prediction and earth observation data.</p> <p>The United States operates two WMO RA Regional Specialized Meteorological Centers (RSMC) for Tropical Cyclone Forecasting, One</p>	On-going

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		<p>is in Miami covering the North Atlantic Ocean, North, Central and part of South America and one is at Honolulu covering the Eastern Pacific Ocean. These RSMCs provide guidance products and alerts for their areas and coordinate with the nations in these areas to reduce loss of life and damage and build capacity of the other nations.</p> <p>Canada also contributes to coastal resilience through its weather alerts for extreme weather events, such as tsunamis.</p>	
Canada, Japan	Research and Innovation / Capacity Building	<p>The <u>Regional Climate Centres</u> (RCCs) initiative of the World Meteorological Organization (WMO) for user-relevant climate outlook products of significance for the region of concern. Products are developed collaboratively to foster adaptation and climate resilience of local communities by scientists, decision-makers, data users, and local populations. Canada leads the North American node of the Arctic Regional Climate Centre (ArcRCC) network, whose members collaborate on developing climate products using models and earth observations for the circumpolar Arctic. Japan operates a RCC, the Tokyo Climate Center (TCC), which assists the climate information services of National Meteorological and Hydrological Services (NMHSs) in the Asia-Pacific region, with the aim of mitigating climate-related disasters and contributing to sustainable development. Other nodes are led by <u>WMO members list</u>.</p>	New
Germany, France, Canada as	Capacity building / Accessibility of data	<p>The <u>Climate Risk & Early Warning Systems (CREWS)</u> initiative supports Least Developed Countries (LDCs) and Small Island Developing States (SIDS) in significantly increasing the provision of weather and</p>	On-going

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member of WMO		<p>climate services and the capacity to generate and communicate effective, impacted multi-hazard, gender-informed, early warnings systems to protect lives, livelihoods, and assets. CREWS is an international partnership that seeks to strengthen risk information and early warning systems in vulnerable countries, and to leverage financing to protect populations exposed to extreme climate events, including in coastal areas. Increased access and better use of Earth observations are one component in developing early warning information. Key partners include implementing partners (WMO, World Bank, UN, Canada's financial contribution to CREWS is provided to WMO as an implementing partner) and CREWS members (Australia, France-chair, Germany, Luxemburg, Netherlands).</p>	
Canada, France, Japan, United Kingdom	Capacity building	<p>The Severe Weather Forecasting Demonstration Project (SWFDP) under the auspices of the World Meteorological Organization: The SWFDP successfully strengthens capacity of National Meteorological and Hydrological Services in developing countries including least developed countries and Small Island Developing States to deliver improved forecasts and warnings of severe weather to save lives and livelihoods, and protect property and infrastructure. The SWFDP provides information for short-term planning and early warning information. Increased access and better use of global and regional Earth observation data are one component in developing impact-based and risk-informed products and services.</p>	On-going
Canada	Capacity building	<p>Canada participates in the Lake Victoria now-casting project under the auspices of the World Meteorological Organization, in which both radars</p>	On-

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		and satellites are being set up to decrease deaths and danger of navigation on the Lake (fishing in particular) and all the cities around it; this addresses coastal issues in Africa around an inner body of water.	going
Canada, Japan	Capacity building	Canada and Japan provide scientific and leadership expertise in the WMO Coastal Inundation and Forecasting Demonstration Project (CIFDP) that contributes to improving storm surge and inundation information for a number of high risk project areas around the globe; better usage of and access to Earth observation technology are relevant elements of this project.	On-going
Canada, Japan WMO	Research and Innovation	A Marine Environmental Emergency Response Expert Team under the WMO framework, allows Canadian and Japanese experts to provide scientific expertise on oil spill modelling which would have coastal implications; increased Earth Observation data access and usage underpins these initiatives.	On-going
Canada	Research and Innovation	Provision of scientific expertise and leadership via an Expert Team on Sea Ice and the committee on the World Wide Met-Ocean Information Warning Service have experts contributing to standards, best practices and training to deliver and enhance maritime safety including the coastal zone contributing to coastal resilience.	–
Canada, France	Accessibility of data / Research and Innovation	The Canadian Operational Network for Coupled Environmental Prediction Systems (CONCEPTS) is a collaborative initiative of the Canadian government (ECCC, DFO, DND) together with partners from	On-going

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		<p>Mercator Océan (France) and Canadian academia for the development of an operational coupled atmosphere-ice-ocean-wave assimilation and prediction capability for Canada. This collaboration has already reached a major achievement with the first coupled weather/ocean forecasting system being run by ECCC for weather and ocean forecasts across the globe. Its results are available and refreshed every day through dissemination systems operated by ECCC and accessible via web services.</p>	
Canada	Access to data and information	<p>Development of a collaboration between Canada and Copernicus Services through contribution to the generation of seasonal predictions (4 months in advance) under Copernicus Climate Change Services. This collaboration aims to reduce uncertainties in forecasts through the combination of predictions from multiple centres and provides for the entire globe outlooks of upcoming weather conditions. It is used in particular by organizations responsible for emergency response for anticipation and preparedness.</p> <p>(See 2nd entry from EU above)</p>	New
Japan	Research and Innovation	<p>The Earth Observation Satellite series is operated continuously by Japan Aerospace Exploration Agency(JAXA) and the data obtained from these satellites are utilized for the Disaster Risk Prevention, contingency planning, and coastal zones monitoring in global scale such as “<u>Sentinel Asia</u>” and “<u>Global Satellite Mapping of Precipitation(GSMaP)</u>”. Leveraging these cutting-edge Earth Observation technologies and innovative activities using data, these satellites are contributing to</p>	On-going

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Japan	Access to data and information	<p>address the challenges of developing countries and Small Island Developing States(SIDS). (Further information is available at http://www.eorc.jaxa.jp/en/index.html)</p>	
Japan	Research and Innovation	<p>The <u>Data Integration and Analysis System (DIAS)</u> archives large-scale earth observation data to be analyzed in combination with socio-economic data. The data is converted into practical information for various needs, such as global-scale environmental disasters and other threats. DIAS makes this information available both domestically and overseas through its software and services of DIAS applications.</p>	On-going
Japan	Access to data and information	<p>The <u>Social Implementation Program on Climate Change Adaptation Technology (SI-CAT)</u> is a research program that develops reliable technologies for near-term climate change projections and realizes reliable social implementation of adaptation technology through development with the needs of local governments in Japan. One of the R&D themes is downscaling-projected information of ocean around Japan by using dynamical downscaling ocean model with ocean data assimilation.</p>	On-going

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Japan	Access to data and information	<p>Sentinel Asia is a space-based disaster management support initiative in the Asia-Pacific region, launched in 2006 aimed at contributing to disaster risk management activities in this region, through international cooperation, by using satellites: Sentinel Asia is currently composed of over 100 member organizations. When a natural disaster occurs, space agencies including the Japan Aerospace Exploration Agency (JAXA), conduct emergency observation with their satellites and provide satellite data. Emergency maps based on space data are provided for local agencies of the affected country or region and are provided to them through its dedicated website.</p> <p>In this emergency observation flow, the Asia Disaster Reduction Center (ADRC) has been serving as the reception desk of emergency observation requests and JAXA has been serving as the secretariat to coordinate the entire process.</p> <p>For more detailed information on Sentinel Asia.</p>	On-going
Japan	Access to data and information	<p>It is important to understand the tsunami-affected areas immediately in order to coordinate emergency response appropriately. Tsunami Inundation Damage Estimation System aims to support the coordination of emergency response by the national government through estimation of Tsunami damages within 30 minutes.</p>	–
Japan	Access to data and information	<p>Japan has been operating geostationary meteorological satellites named Himawari observing cloud images over the East Asia and Western Pacific regions. The imagery data capturing severe weather phenomena such as tropical storms are disseminated to the regions via the Internet</p>	On-going

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		and a communication satellite, and contribute to the disaster risk reduction and mitigation in the regions.	
France	Access to data and information	<p>Theia platform : The purpose of the Theia continental data and services hub is to increase the use by the scientific community of spatial data in complementarity with other types of data, particularly in situ and airborne data. It provides scientists (national and international), and private actors, data and value-added products from satellite remote sensing including coastal areas. It also aims at structuring the scientific community, pooling image data, treatments and scientific expertise, and making national achievements visible on an international scale.</p> <p>PEPS platform: PEPS is the french hub to access the Sentinel Satellite Systems and their data products. PEPS makes possible to search, view, select and download data, access to online librairy programs and online treatments closer to the data. PEPS contributes to the implementation and monitoring of environmental and safety policies and promotes the emergence of downstream services and related industrial development in particular the marine and coastal applications.</p>	–
France	Access to data and information	The Ocean Data and Services ODATIS cluster, aims to be the single point of entry for access to ocean observation data. Its general objective is to promote and facilitate the use of ocean observations and observations at its interface with other environments, including in situ measurements and remote sensing. ODATIS contributes to describe, quantify and understand the ocean as a whole, offshore and coastal, the dynamics and thermodynamics of the ocean, the evolution of its physico-	–

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		<p>chemical properties, biogeochemical cycles, the functioning of marine ecosystems, the evolution of the ocean and the ocean-climate link in the past.</p> <p>The in situ Marine Coastal Data data set, are already available through the Ifremer coastal portal envlit.</p>	
United Kingdom	Coordination of efforts	<p>The UK works proactively in CEOS and GEO to ensure the EO satellites are fit for purpose, the data is free and open as far as possible and that the data can be validated and checked for accuracy.</p>	–
United Kingdom	Research and Innovation	<p>Natural Environment Research Council supported Research Centers are working on the development of Earth Observation techniques for the coastal environment and supporting projects to build capacity internationally. There are many projects for example, The Plymouth Marine Laboratory, including its National Centre for Earth Observation team, and the National Oceanography Centre are supporting coastal monitoring and modelling. Scientists are working internationally with GEO groups to establish better and shorter pathways for decision making and policy. CPOM Centre for Polar Ice Monitoring are using satellites to track monitor the Polar regions.</p>	–
United Kingdom	Capacity building / Accessibility of data	<p>The UK Space Agency's International Partnership Programme is funding a project called "Coastal Risk Information Service (C-RISe)": C-RISe will be carried out by an international partnership between the UK, Mozambique, Madagascar and South Africa to provide satellite-</p>	–

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		<p>based information on sea level rise, storm surges, extreme wind speeds and wave heights. Information will be provided via a dashboard that meets local priorities. Local users will be trained to use the satellite data so they can provide scientific support for strategy development, governance and management of coastal areas to help increase their resilience. The goal is to enable local stakeholders to use this information to reduce the social and economic impact of coastal hazards and increasingly variable weather patterns. C-RISe will enable stakeholders to obtain information about coastal vulnerability that is not currently available; this increased capacity will enable them to evaluate and plan for future risks.</p> <p>Satellite altimeters have been providing continuous global measurements of sea level, ocean wind speeds and wave heights for over 25 years, and provide a key contribution for monitoring climate change. However, there is a difficulty in retrieving accurate measurements close to the coast. An innovative processing technique has been developed in the UK to retrieve this data, and is applied, in this project, to data from the Jason1 series of altimeter satellites for the Mozambique, Madagascar and South Africa coastal regions. The coastal altimeter data generated will be delivered through a web-based portal, and the project team will support local partners in using the data, working with them to develop a range of case studies to demonstrate how the data may be used in different application areas.</p> <p>The UK Space Agency Space for Smarter Government programme has projects looking at coastal stability and erosion control.</p>	

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United Kingdom	Capacity building / Accessibility of data	<p>The UK Space Agency's International Partnership Programme is funding a project called "Recovery And Protection In Disaster (RAPID) for Vietnam":</p> <p>Project objectives are to:</p> <ul style="list-style-type: none"> • Increase technological and operational prediction of typhoon land fall – location, severity and timing for all of Vietnam. • For five key municipalities, provide mapping of key 'at-risk' critical infrastructure with updated live space and ground data feeds into the system. • Enhance flood extent mapping timeliness and effectiveness by providing updated flood maps no more than 12 hours after a typhoon strikes; • Using space-based capability, provide integrated asset tracking for live Humanitarian Assistance and Disaster Relief (HADR) ground resources for four deployments; • Demonstrate through field trials with a shadow team a live disaster scenario to prove RAPID increases operational first responder response. <p>RAPID utilises SAR Earth observation data from satellites such as COSMO SkyMed to provide low latency images of flood extent, and when complimented by real-time feeds and data gathered from unmanned aerial systems it enables effective decision making when it is needed most. Landsat and Sentinel images produced an archive base map of Vietnam and when modelled alongside weather forecast data we can predict how vital infrastructure and areas are affected at critical times.</p>	-

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United Kingdom	Capacity building / Accessibility of data	<p>High Availability Disaster Recovery (HADR) resources are equipped with Global Positioning Systems and front line satellite communications to allow for efficient command and control of assets via the RAPID system during disaster events.</p> <p>The UK Space Agency's International Partnership Programme is funding a project called "Earth and Sea Observation System (EASOS)":</p> <p>EASOS will provide a dashboard to the Malaysian government integrating information about marine pollution incidents (amongst other things). The marine pollution element will reduce the degradation to the mangrove coastline in Malaysia by reducing marine pollution in the Malacca Straits and supporting prosecution of offenders: Information from the dashboard will enable authorities to identify and locate discharges, forecast the pollution dispersal and identify the vessels that are likely to be responsible.</p> <p>The project will utilise ESA's Sentinel 1 and 2 EO data for this purpose and provide access to high-resolution imagery through a data hub. Satellite aspects include the acquisition and analysis of Synthetic Aperture Radar (SAR) data for oil spill detection as well as Automatic Identification System (AIS) data for attributing spills to particular vessels.</p>	–
United Kingdom	Capacity building / Accessibility of data	<p>The UK Space Agency's International Partnership Programme is funding a project called "CommonSensing":</p> <p>The overall aim of CommonSensing is to use satellite remote sensing for</p>	–

Member	Area of action	Action	New or On-going
		<p>applications that support three Commonwealth countries: Fiji, the Solomon Islands and Vanuatu to improve national resilience towards climate change. The project's main output is to provide the evidence and data needed for these island states to be able to apply to the Commonwealth Climate Finance Access hub with a much higher degree of success than present. This will allow these island states to obtain the funding they need to protect critical infrastructure and build resilience into their economy to combat the growing effect of climate change. A key aspect of the project is its integration with the Commonwealth's Climate Finance Access Hub to use the established channels for increasing success in accessing climate funds.</p> <p>CommonSensing will deliver impact in two main areas:</p> <p>In terms of Earth Observation (EO) derived services, CommonSensing will use EO data to provide partners with access to vital information regarding disaster and climate risks to inform planning, food security needs and impact on the environment. This information will be readily available to users through easily accessible services.</p> <p>In terms of sustainability and capacity development, partners aim to contribute to national and regional technical capabilities to inform policy and secure funding for climate change resilience programmes beyond the three-year project. In addition, CommonSensing consortium partners are committed to supporting the long-term sustainability of the information services they develop with the three country partners.</p> <p>EO data used in the project includes satellite images from optical satellites, including Sentinel-2, SPOT and Landsat, radar imagery from Sentinel-1 and elevation data from PALSAR.</p>	

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United States	Capacity Building / Access to data and information	<p>Under the auspices of the World Meteorological Organization (WMO), the United States operates a World Meteorological Center (WMC) whose functions include a Global Producing Center for Numerical Models and a WMO Global Information System Center (GISC). Through these facilities the United States collects and makes available global observations, meteorological analyses and forecast products needed to provide efficient services in all countries in support of the World Weather Watch (WWW), Disaster Risk Reduction, Global Framework for Climate Services and similar programs that support disaster risk reduction, emergency response, early warning systems, societal resilience and capacity building.</p>	–
United States	Capacity Building / Access to data and information	<p>The United States is a tsunami service provider through NOAA's Tsunami Warning Centers and International Tsunami Information Center, The Pacific Tsunami Warning Center and National Warning Center, provide tsunami forecasts in two basins – the Caribbean and the Pacific. These guidance products are used by National Tsunami Warning Centers (NTWC) to make warnings for their citizens. NOAA's International Tsunami Information Center has been providing capacity building workshops on SOPs for NTWCs and also has been key to helping communities become prepared and recognized by IOC under the Tsunami Ready International pilot. Over 15 communities have sought this recognition.</p>	–
United States	Research and Innovation / Capacity Building / Access	<p>The United States Regional Climate Center (RCC) is being developed to provide the WMO Regional Association IV (RA-IV)(North America, Central America, and the Caribbean) with climate services, supporting</p>	–

Member	Area of action	Action	New or On-going
	to data and information	countries and sub-regions that do not currently have their own capabilities, as well as serving as a backup to the existing RCCs in the region. Coordination with other countries will support capacity building and resilience.	
United States	Capacity Building / Access to data and information	The United States Hurricane Center in conjunction with the WMO, manages a project that has greatly improved storm surge modeling. It has been implemented in the Dominican Republic and related projects are beginning in Belize and Eastern Mexico.	–
United States	Access to data and information	<u>US IOOS</u> , <u>IOOS data portal</u> , <u>Marine Biodiversity Observation Network (MBON) Data Portal</u> , <u>Animal Telemetry Network (ATN) Data Assembly Center</u> .	–
United States	Access to tools and information	<p>NOAA's Digital Coast was developed to meet the unique needs of the US coastal management community. The platform provides critical coastal data as well as the tools, training, and information needed to make these data truly useful for coastal resiliency. The Digital Coast provides a centralized repository for this information via a platform that is cost effective and easy to use. Data sets range from economic data to satellite imagery. The site contains visualization tools, predictive tools, and tools that make data easier to find and use. Information is also organized by focus area or topic.</p> <p>Content on the site comes from many sources, but being relevant to the coastal management community is the requirement. The Digital Coast Partnership helps ensure this relevance, as this group provides user</p>	On-going

Member	Area of action	Action	New or On-going
		<p>insight and feedback.</p> <p>The Digital Coast is managed by NOAA's Office for Coastal Management and was first released in 2007. While the data is only applicable to the US, the tools and products on the site are relevant for coastal managers world-wide.</p>	
United States	Access to data information/Capacity Building	<p>Through the Group on Earth Observations (GEO) the United States operates GEONETCast Americas (GNC-A), the Western Hemisphere component of GEONETCast, a near real time, global network of satellite-based data dissemination systems designed to distribute space-based, air-borne and in situ data, metadata and products to diverse communities. The system is especially useful and efficient in providing access to environmental data in areas where the internet coverage is limited or nonexistent. The system can be portable, and products can be disseminated on demand and with low latency, making it a valuable tool in the decision making process on severe environmental events.</p> <p>In addition the United States hosts training workshops for users to facilitate their effective use of GNC-A data, information and services.</p>	On-going
United States	Access to data and information	<p>The United States National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) hosts and provides public access to one of the most significant archives for environmental data on Earth. Through the Center for Weather and Climate and the Center for Coasts, Oceans, and Geophysics, NCEI provides over 25 petabytes of comprehensive atmospheric, coastal, oceanic, and geophysical data. By preserving, stewarding, and</p>	On-going

Member	Area of action	Action	New or On-going
		<p>maximizing the utility of the United States' billion-dollar investment in high-quality environmental data, NCEI remains committed to providing products and services to industry and businesses, local to international governments, academia, international partners as well as the general public. From the depths of the ocean to the surface of the sun and from million-year-old ice core records to near-real-time satellite images, NCEI is a leading global authority for environmental information.</p>	
United States	Access to data and information	<p>The United States National Oceanic and Atmospheric Administration National Environmental Satellite, Data and Information Service (NESDIS) provides secure and timely access to global environmental data and information. NESDIS operates a fleet of environmental satellites that provide critical observations of the Earth and space. GOES-17, GOES-16/GOES-East, Suomi NPP and NOAA 20 deliver data daily, powering forecast models, watches and warnings for all types of weather and environmental conditions.</p> <p>NOAA's next generation Geostationary Operational Satellites (GOES) provide advanced imagery and atmospheric measurements of Earth's Western Hemisphere, real-time mapping of lighting activity and improved monitoring of solar activity. Together GOES-16 and GOES-17 watch over the Western Hemisphere from the west coast of Africa all the way to New Zealand.</p> <p>NOAA's Joint Polar Satellite System (JPSS) provides global observations that serve as the backbone of both short- and long-term forecasts, including those that help us predict and prepare for severe weather events. Each satellite carries five state-of-the-art instruments,</p>	On-going

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		<p>including the Advanced Technology Microwave Sounder (ATMS), the Cross-Track Infrared Sounder (CrIS), the Visible Infrared Imaging Radiometer Suite (VIIRS), the Ozone Mapping and Profiler Suite (OMPS) and an instrument to measure the Earth's energy budget.</p> <p>JPSS satellites circle the Earth from pole-to-pole and cross the equator about 14 times daily in the afternoon orbit to provide full global coverage twice a day. In doing so, they provide the majority of data that informs numerical weather forecasting in the U.S. and deliver critical observations during severe weather events like hurricanes, tornadoes and blizzards.</p> <p>Beyond forecasting, JPSS satellites also play a critical role in detecting and monitoring environmental hazards, such as droughts, forest fires, poor air quality and harmful coastal waters—observations they will provide on a continuous basis through 2038. The versatile ground system controls the spacecraft, ingests and processes data, and provides information to users like NOAA's National Weather Service and other U.S. and international partners.</p>	
United States, France, and Europe	Access to data and information	<p>Jason3, and its predecessor Jason-2, will provide NOAA and the world with redundant ocean altimetry satellite data, including vital ocean temperature information, used to predict if — and when — a storm will strengthen. Jason-3 is an international mission in which NOAA collaborates with NASA, the Centre National d'Etudes Spatiales (CNES, the French Space Agency) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).</p> <p>Beyond monitoring ocean height, data from Jason-3 are being used for</p>	On-going

Member	Area of action	Action	New or On-going
		<p>other scientific, commercial, and operational applications, including: ocean wave height modeling for commercial vessel operators; forecasting currents for commercial shipping and ship routing; coastal forecasting for response to environmental challenges, including oil spills and harmful algal blooms; coastal modeling, which is crucial for marine mammal and coral reef research; and El Niño and La Niña forecasting.</p>	

Source: <https://g7.gc.ca/en/g7-presidency/themes/working-together-climate-change-oceans-clean-energy/g7-ministerial-meeting/joint-chairs-summary/g7-initiative-on-earth-observation-and-integrated-coastal-zone-management/>