

Submission by Japan

Views on possible themes for the Earth Information Day in 2020 and those in subsequent years

August 2020

1. Introduction

Japan welcomes the opportunity to submit its views on the Earth Information Day in response to the invitation by the Subsidiary Body for Scientific and Technological Advice (SBSTA).

[FCCC/SBSTA2019/L.15, para 16](#)

The SBSTA invited Parties and relevant organizations to submit their views on possible themes for the Earth Information Day in 2020, to be held in conjunction with SBSTA 53 (November 2020), and those in subsequent years via the submission portal by 14 August 2020.

Japan recalls that the Earth Information Day 2019, held on 3rd December 2019 in conjunction with SBSTA51 during the Climate Change Conference, Madrid, focussed on three themes: (a) Updates on the State of the global climate; (b) Updates on implementing Earth observation; and (c) Earth observation for science, policy and practice and provided the latest information on earth and climate change and relevant scientific knowledge.

Japan also recalls that the SBSTA Chair information event with the scientific community, held on 8th June 2020 via the Internet during the June Momentum for Climate Change, provided an opportunity to learn the COVID-19 pandemic impacts on greenhouse gas emissions and the climate system, states of their observations and studies and to discuss possible options and opportunities to enable scientific support for a sustainable recovery and for knowledge sharing.

2. Possible themes for the future Earth Information Day

Japan provides its views on four possible themes for the Earth Information Day 2020 and those in subsequent years as below.

Possible theme 1: COVID-19 Impacts on Climate Change and its Observation

As reported during the SBSTA Chair information event in June 2020, the COVID-19 pandemic is a world changing event with far ranging impacts. Sharing updates since the June event, including greenhouse gas emission/concentration changes since the early

2020, states of the systematic observation, lessons learnt from the COVID-19 related difficulties, outlooks and future plans and relevant studies, may be necessary in such time.

International organizations, such as the Global Climate Observing System (GCOS) and the World Meteorological Organization (WMO), may provide basic information on this theme.

Potential information provided from Japan for this theme

Title: Emissions reduction of greenhouse gases in association with the COVID-19 pandemic and its impact on global environment (with possible implications for multi-model and ensemble experiments for plausible pathways)

Summary

Every human is now suffering from COVID-19 pandemic. A question is that global warming will be affected by the restrictions on economic activity due to the pandemic. Although it is said that the impact is expected to be small from a macroscopic perspective, it could alter climate conditions on several years or a decadal time scales. There is also the possibility of accelerated warming due to the reduction of aerosols. Furthermore, the reduction of aerosols could affect the amount of carbon that can be emitted to meet the 1.5°C and 2°C targets of the Paris Agreement (carbon budget). The Japan Agency for Marine-Earth Science and Technology (JAMSTEC) participates in an international COVID modelling initiative to estimate the possible impact on climate. Multi-model and ensemble experiments for plausible pathways are beneficial to obtain reasonable signals.

Title: Imprints of the COVID-19 pandemic on Earth's environment (specifically on the regional weather and climate)

Summary

Due to changes in human activities that have been triggered by the global pandemic of COVID-19, unprecedented changes on many aspects, relating to weather and climate, have manifested. According to recent studies*, concentrations of particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂) have decreased up to 50% over some cities, while invigorating the ozone (O₃) chemistry. Carbon dioxide emissions have decrease up to 90% for some of the industrial sectors (aviation) and up to 30% for China as a whole in February. These observations raise multiple new questions relating to the role of aerosols on the health of COVID-19 patients and the airborne spread of the virus. Some suggestions are put forward regarding the role of clear sky which has been brought by decline in human activity on intensification of cyclones and anomalous rainfall through radiative forcing change at the bottom of the atmosphere in the Indian subcontinent. Overall, the COVID-19 imprints on the regional weather and climate provide a unique opportunity for testing future climate change mitigation policies.

* e.g., <https://www.nature.com/articles/s41558-020-0797-x>

Possible theme 2: Greenhouse Gas Monitoring by Satellites and Utilization of the Observation Data

It has been more than a decade since Japan's first Greenhouse gases Observing SATellite (GOSAT) was launched successfully in January 2009. The successor, GOSAT-2, was also launched successfully and timely in October 2018. Furthermore, Japan has been monitoring the forest globally with L-band SAR more than 25 years. With these satellites, Japan can monitor the sources and sinks of Greenhouse gases globally. In May 2019, the Intergovernmental Panel on Climate Change (IPCC) adopted and accepted the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* at its 49th Session (IPCC-49) to update, supplement and/or elaborate the *2006 IPCC Guidelines*. Based on the satellite monitoring and its data analysis for the decade, guidance on use of satellite observation in national greenhouse gas inventories had been enhanced in the new methodology report.

To encourage the use of satellite observation in national greenhouse gas inventories and further contribute to successful implementation of the Paris Agreement through quality improved inventories, the latest satellite monitoring results, its characteristics and advantage will be introduced and discussed in this theme.

Potential information provided from Japan for this theme

Title: Monitoring the sources and sinks of Greenhouse Gas by Satellites and Utilization of the Observation Data

Summary

The Japan Aerospace Exploration Agency (JAXA) will present the latest Earth observation activities related to the monitoring of Greenhouse Gas (GHG) emission in global, regional, and local scale. For a local scale, JAXA focuses on the estimation from megacity. In addition to understand the emissions, it is important to improve the understanding of the sinks. JAXA aims to demonstrate satellite-based biomass map which contributes to the removal of GHG. JAXA will also present the recent efforts on monitoring the earth's surface to detect the changes in the global environment and human society related to COVID-19 pandemic.

Possible theme 3: Climate Change in Ocean

According to the *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)*, which was adopted and accepted at IPCC-51 in September 2019, the global ocean has taken up more than 90% of the excess heat in the climate system and the rate of ocean warming has more than doubled since 1993. The report also says that the ocean has undergone increasing surface acidification by absorbing more CO₂. Ocean is an important component to understand climate change and consider climate actions.

A dialogue on the ocean and climate change was planned to be held at SBSTA52 in June 2020 (Decision 1/CP.25, para 31). SBSTA52 was unfortunately postponed due to COVID-19 pandemic and the dialogue has not been held yet. Sharing information on and

discussing climate change in Ocean from earth information aspect at next Earth Information Day will help keeping up the momentum.

FCCC/CP/2019/13/Add.1, Decision 1/CP.25, para 31

Requests *the Chair of the Subsidiary Body for Scientific and Technological Advice to convene at its fifty-second session (June 2020) a dialogue on the ocean and climate change to consider how to strengthen mitigation and adaptation action in this context;*

Potential information provided from Japan for this theme

Title: Research into ocean acidification by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Summary

Research into ocean acidification through activities such as high-quality oceanic observations by R/V *Mirai*, deployment of autonomous observation platforms equipped with multiple sensors, and analysis of calcification. The on-going engagement in such specific activities (for instance, the measurement of CO₂ concentration, pH and alkalinity in seawater; deployment of Biogeochemical Argo, detection of weakened calcification by Microfocus X-ray (MXCT) CT Scan system, etc.) contributes to the Global Ocean Acidification Observing Network (GOA-ON), an international network on ocean acidification.

Possible theme 4: Findings based on Earth Observation — for Deeper Understanding on the Climate Change

Researching and studying long-term (historical) geophysical and/or geochemical changes of the earth is crucial to understand the ongoing climate change. The latest progress and findings based on earth observation will be introduced and discussed in this theme.

Potential information provided from Japan for this theme

Title: Glacial ocean deoxygenation induced by iron fertilization

Summary

The significance of iron fertilization from desert and glaciogenic dust in glacial CO₂ decrease and deep-water deoxygenation is successfully reproduced by an ocean biogeochemical simulation, conducted under the Japan's climate model development project, Integrated Research Program for Advancing Climate Models (TOUGOU). Improved dust data for input and sediment data for model evaluation, both of which are based on recent observations, turn out to be crucial for its success in reproducing the magnitude and large-scale pattern of the observed oxygen changes from the present to the Last Glacial Maximum.

Title: Attribution studies for recent heavy precipitation events in Japan related to global warming.

Summary

Japan experienced unprecedented heavy precipitation in July 2018. In addition, the typhoon *Hagibis* induced extremely heavy precipitation in Eastern Japan in 2019. Using large ensemble global and regional climate experiments with and without human-induced climate change, the Meteorological Research Institute (MRI) evaluates the impacts of global warming on the frequency of heavy precipitation in Japan. MRI also quantitatively evaluates the influence of recent warming on heavy precipitation in 2018.

3. Other

The SBSTA Chair event during the June Momentum for Climate Change was held via the Internet and this format enabled more people (in both number and variety) to join the event more easily. Future Earth Information Days may be held in such or similar format, i.e., not just live streaming from a physical or virtual meeting room but also allowing all the participants interactive communication via the Internet.
