International Training Courses on Technologies on the Analysis of Carbon Satellite Data

1. Background

Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across every region of the country and many sectors of the economy that are expected to grow in the coming decades. Weather patterns are changing, sea levels are rising, and extreme weather events are becoming more frequently. Carbon dioxide (CO_2), the concentration of which has increased by 40% since pre-industrial times, is the most significant human-emitted greenhouse gas responsible for global warming. The levels of CO_2 and other greenhouse gases in the atmosphere touched record high in 2019. Although greenhouse gas emissions dropped about 6% in 2020 due to travel bans and economic slowdowns resulting from the COVID-19 pandemic, this is only temporary improvement. Once the global economy begun to recover from the pandemic, emissions of greenhouse gases are expected to return to higher levels. Saving lives and livelihoods requires urgent action to address both the pandemic and the climate emergency.

Recent advances in carbon and other GHG satellites, new technologies, and super-computing resources offer the potential to quantify the disturbances in carbon emissions at the regional and local scale. Reducing carbon and GHG emissions is one of the essential steps required to meet the international climate change targets, and thus to start the process toward ultimately limiting the global temperature increase to "well below 2℃", so that society can reach its goals of "Net-Zero Emissions" in a quantitative and verifiable manner. But the fact is that, restricted by the resources' requirement and technology barriers, it is difficult for the developing countries to achieve the goal of "Net-Zero Emissions". The Alliance of International Science Organizations (ANSO) is a non-profit and non-governmental international scientific organization founded in 2018 by 37 international science and education institutions from around the world. ANSO catalyzes and implements collaborative research projects in Science, Technology, Innovation and Capacity Building (STIC) to

tackle with major global environmental challenges and to help advance the UN SDGs under the principles of joint consultation, joint effort and joint sharing. **Technologies on the Analysis of Carbon Satellite Data** is a highly encouraged training program idea by ANSO. It is aligned to the needs of the regional and local science and technology advancement, especially basic and applied sciences to support green and sustainable development. At the same time, it gives high emphasis to collaboration, networking and capacity building and promotes widespread use of carbon satellite data around common S&T challenges and concerns among developing countries, better completing our common goal of "Net-Zero Emissions".

2. What is CASA and its Mission

Cooperation on the Analysis of Carbon Satellites Data (CASA) was originally initiated by the Chinese Academy of Sciences (CAS) and National Earth Observation Data Center (NODA) in 2019. CASA is based on data resources of China's carbon satellites and other atmospheric composition satellites, integrates global carbon satellite data (OCO-2/3, GOSAT-1/2, TanSat, Sentinel-5P, FY-3D, GF-5, etc.) with super-computing resources to form a new integrated storage and infrastructure capacity supporting global change research. CASA aims to promote a new scientific paradigm for scientific research based on carbon observations and then a worldwide acceptance and practice; to reform the research mode of carbon data-based study; to integrate carbon satellite data, models and computing capacity to advance interdisciplinary study; to implement a big earth data e-science platform for global carbon research to solve the technical and policy bottlenecks of scientists in the field of global change in acquiring, collecting and analyzing massive observation data and to build a flagship-level scientific and technological cooperation platform cooperating with relevant global institutions for research and analyses of space-based carbon observation data.

CASA is a global effort to establish a working relationship in the fields related to accelerating the large-scale and interdisciplinary use of carbon satellite data and information based on equality and mutual benefit. The activities consist of the big carbon data-oriented information infrastructure, knowledgeable carbon satellites data and information management. CASA has been gradually

cooperating with 19 international societies, space agencies and research institutes on the promotion of well using carbon satellites data and information. It also operates as an important component of the Access to Climate Data in GEOSS (CLIMDATA-ACCESS), a project of GEO Work Programme 2020-2022.

3. Objectives and Actions of the Training Courses

This training courses on **Technologies on the Analysis of Carbon Satellite Data** are designed and coordinated by ANSO and CASA to promote and foster individual and organizational effectiveness by developing and offering an array of innovative and diverse courses in support of the widespread use of carbon satellite data among international societies, space agencies and research institutes in developing countries. Participants will acquire knowledge and skills in various areas in the international policies to accelerate the “Net-Zero” transition, the major international carbon satellite datasets and services, and the technologies to use these data as part of the multi-component courses. A wide range of participants is from researchers, students, faculties, university staff, and policymakers. The training courses will promote the widespread use of carbon satellite data, advance the basic and applied regional and local carbon studies, and build collaborative networking among developing countries to better complete the common goal of “Net-Zero Emission”. Due to the COVID-19 epidemic, this training will be held online, which will last 1-2 weeks.

4. Science Steering Committee

Academician and Prof. Weihong Cui, Aerospace Information Research Institute, CAS

Prof. Guoqing Li, National Earth Observation Data Center (NODA), China

Dr. Noppadon Khiripet, National Science and Technology Development Agency (NSTDA), Thailand

Prof. Jason Blake Cohen, China University of Mining and Technology, China

Prof. Ailikun, Alliance of International Science Organizations (ANSO) Secretariat

Secretary: Dr. Jing Zhao

5. Date & Time

14-25 February 2022, 8:00-9:00 a.m. UTC

6. Co-Organizers

Alliance of International Science Organizations (ANSO)

Cooperation on the Analysis of Carbon Satellites Data (CASA)

National Earth Observation Data Center (NODA)

AOGEO Regional Centre for Capacity Building

Regional Centre for Capacity Development for Asia-Oceania Group on Earth Observations (AOGEO-RCCD)

National Science and Technology Development Agency (NSTDA), Thailand

Regional Centre for Space Science and Technology Education in Asia and the Pacific (China) (Affiliated to the United Nations)

7. Registration & ZOOM Info

Registration is required. Once done, the ZOOM link shall be sent to your email address. Please register *before 5 February 2022*.

Official website of the training project: https://casa2022.casconf.cn/.

8. Draft Agenda

Up-to-date agenda and detailed introductions of the speakers can be found in the official website.

Date	Lecture	Speaker
14 Feb	The Scientific Agenda and Regional Work of Global Emissions Reduction	**Gensuo Jia** (Institute of Atmospheric Physics, CAS)
14 Feb	China's Carbon-neutral Zone and Realization Path	**Weihong Cui** (Aerospace Information Research Institute, CAS)
15 Feb	The Introduction of the Programme CASA	**Jing Zhao** (Aerospace Information Research Institute, CAS)

15 Feb	Global Carbon Satellites and Development	**Lianchong Zhang** (Aerospace Information Research Institute, CAS)
16 Feb	Sentinel-5P Satellite and Data Service	**Claus Zehner** (European Space Agency)
16 Feb	Major China Carbon Satellites and Data Service	**Di Xian** (National Meteorological Centre, China)
17 Feb	Atmospheric Composition Monitoring Based on Sentinel-5P/TROPOMI Satellite	**Kai Qin** (China University of Mining and Technology, China)
17 Feb	TBD	**Jason Blake Cohen** (China University of Mining and Technology, China)
18 Feb	Scientific Application Based on TanSat Satellite Data	**Dongxu Yang** (Institute of Atmospheric Physics, CAS)
18 Feb	TBD	**Hartmut Boesch** (University of Leicester, UK)
21 Feb	An Overview on the Use of Satellite Greenhouse Gases Observation Data to Evaluate and Improve Greenhouse Gas Emission Inventories	**Shamil Maksyutov** (National Institute for Environmental Studies, Japan)
21 Feb	TBD	**Valery Bondur** (TBD)
22 Feb	Global Real-time Carbon Database Carbon Monitor	**Zhu Liu** (Tsinghua University, China)
22 Feb	An Application Case of Carbon Monitor Data in Hungary	**Philippe Ciais / Steve Davis** (TBD)
23 Feb	Calculation of Carbon Flux Using Assimilation Method	**Qianrong Gu** (Shanghai Advanced Research Institute, CAS)
23 Feb	Agriculture Carbon Footprint Estimation: A Case Study of Sugarcane in Thailand	**Noppadon Khiripet** (National Electronics and Computer Technology Center (NECTEC), National Science and Technology Development Agency, Thailand)
24 Feb	TBD	TBD
24 Feb	TBD	TBD

25 Feb	TBD	TBD
25 Feb	TBD	TBD

9. Contact Persons

Jing Zhao

Secretary of the Organizing Committee

zhao.j@aircas.ac.cn

Bonan Wu

Secretary of the Organizing Committee

wubn@aircas.ac.cn; 8610-82177657