

Small Island Developing States Capacity Building Workshop on Utilizing Big Earth Data for SDGs

WORKSHOP PROGRAMME



INTERNATIONAL RESEARCH CENTER OF BIG DATA
FOR SUSTAINABLE DEVELOPMENT GOALS
可持续发展大数据国际研究中心



**United
Nations**

Department of
Economic and
Social Affairs



SDIM



September 2 - 8, 2024 Beijing, China



Small Island Developing States Capacity Building Workshop on Utilizing Big Earth Data for SDGs

Hosts

International Research Centre of Big Data for Sustainable Development Goals (CBAS)

United Nations Department of Economic and Social Affairs (UN DESA)

United Nations Global Geospatial Knowledge and Innovation Centre (UN-GGKIC)

Aerospace Information Research Institute, Chinese Academy of Sciences (AIR, CAS)

CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM)

International Society for Digital Earth (ISDE)

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< Background and Objective >

Small Island Developing States (SIDS), comprising 37 UN member states and 20 associate members of the regional commissions. SIDS represent 28% of developing countries and 20% of total UN member states. The combined Exclusive Economic Zones (EEZs) of SIDS represents some 30 per cent of all oceans and seas and for most, their EEZs exceed by far their total terrestrial space. SIDS face significant challenges due to global warming and rising sea levels, making them highly vulnerable to environmental changes. To address these issues, the Barbados Programme of Action adopted in 1994, the Mauritius Strategy was adopted in 2005, and the SAMOA Pathway was introduced at the third International Conference on SIDS (SIDS3) in 2014.

Despite efforts, SIDS continue to face substantial challenges in sustainable development. The 2030 Agenda, adopted at the United Nations Sustainable Development Summit in September 2015, prioritizes the sustainable development of SIDS due to their unique challenges such as climate change, sea-level rise, food security, freshwater shortages, biodiversity loss, and land degradation. The SAMOA Pathway calls for urgent action to support the economic, social, and environmental development of SIDS, emphasizing the need for continued investments in education and cultivation to build resilience.

Building on these efforts, the recently adopted Outcome Document of the 4th SIDS Conference, entitled the Antigua and Barbuda Agenda for SIDS (ABAS), has emerged as the latest critical framework that focuses on enhancing climate resilience, securing sustainable financing, and fostering international partnerships, ensuring that SIDS are better equipped to achieve long-term sustainable development.

The International Research Centre of Big Data for Sustainable Development Goals (CBAS) focuses on addressing data gaps and improving SDGs monitoring using Big Earth Data technologies. CBAS develops data platforms, conducts scientific research, operates satellites, promotes technology-driven sustainable development, and provides education and cultivation. In response to the needs of the Alliance of Small Island States (AOSIS) regarding SDGs and climate change, an

international capacity building workshop will feature lectures, seminars, and presentations at relevant conferences. Topics include Big Earth Data processing, global climate change, geographic simulation, and SDGs-related applications.

The workshop will include hands-on technical sessions, social events, and possibly online practice for simulation result analysis and visualization. Highlights include policies and governance for SDGs, knowledge lectures, applications of images from the SDGSAT-1 satellite, data resources and online platforms for SDGs, and interdisciplinary methods for SDGs monitoring and evaluation.

The goal is to strengthen national research capacities for informed decision-making on various aspects of the SDGs, providing AOSIS participants with practical guidance to mitigate threats to the physical and economic security of small islands. By aligning with the priorities outlined in the Antigua and Barbuda Agenda for SIDS (ABAS), this initiative will directly benefit SIDS countries by enhancing their capacity to utilize advanced data technologies for better decision-making. Strengthening national research capacities in these areas will empower SIDS to effectively address their unique challenges, mitigate threats to their physical and economic security, and achieve long-term sustainable development.

The SIDS Capacity Building Workshop on Utilizing Big Earth Data for the SDGs aims to enhance the digital capabilities of SIDS, strengthening their decision-making for sustainable development. It seeks to improve methods for obtaining, analysing, and utilizing big data for SDGs indicator monitoring and evaluation, promote the use of indicator calculation tools and platforms, share public data products and their application methods with SIDS, and present typical case studies of SDGs evaluation using Big Data, among other objectives.

< Contact >

General Contact

Mr. Siming Deng, International Research Centre of Big Data for Sustainable
Development Goals (CBAS)
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Travel and Accommodation

Mr. Yuanxu Ma, International Research Centre of Big Data for Sustainable
Development Goals (CBAS)
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Tel: +86 15001176610

< Notes for Participation >

- a) Please take note that you must have your workshop badge all the time during the workshop.
- b) Please pay prompt attention to workshop notice through your email address and WhatsApp.
- c) Please keep your hotel-room key with you until you check out.
- d) Please take note that the organizers of the workshop will cover only the accommodation and meals during the workshop. Any additional expenses, e.g., phone calls, laundry, drinks, etc. need to be covered by your own.
- e) Please always keep the classroom clean and tidy, and do not forget to take your belongings with you.
- f) Please contact the secretariat staff immediately when you have any concerns or problems.

< House-keeping Guidelines >

Before the Course:

a) **Arrival and Punctuality:** Please arrange your schedule to ensure timely attendance at Room 504 for the workshop. During our capacity building workshop, your attendance will be recorded, which is important for evaluating your overall performance.

During the Course:

a) **Active Participation:** We encourage you to actively engage in discussions, raising questions, and sharing your experiences during the workshop sessions.

b) **Respectful Communication:** Please respect the opinions of others and maintain a courteous and respectful manner during all interactions.

After the Course:

a) **Content Usage:** Please be aware that all lectures and presentation materials will be recorded, shared, and used for knowledge-sharing purposes only, rather than for commercial use.

b) **Feedback Survey:** A survey will be provided to all participants after all courses. This questionnaire aims to gather feedback from attendees, assessing the quality of our courses and measuring the impact of the event.

< Agenda >

Day 1. Monday, September 2, 2024

Opening Ceremony of the Capacity Building Workshop

Venue: Conference Room on the 1st Floor of CBAS Building

09:00-12:00 Opening Ceremony

12:00-13:30 Lunch and Break

13:30-14:00 Change of Venue

- Meeting Place: The entrance of CBAS Building
- Transportation: Taking Shuttle Buses to Olympic Village Campus, Aerospace Information Research Institute, CAS

Session 1: Navigating SDGs with Big Earth Data: A Comprehensive Overview

Venue: Conference Room 504, 5th Floor, Building A, Olympic Village Campus, Aerospace Information Research Institute, CAS

14:00-15:20 Big Earth Data in Facilitating Sustainable Development Goals (Prof. Fang Chen, CBAS)

15:40-17:00 Global SDG Products and Applications Based on Big Earth Data (Prof. Dongmei Yan, CBAS)

Day 2. Tuesday, September 3, 2024

***Session 2: From Satellites to Sustainability: Land-Cover Dynamics
and Disaster Risk Reduction***

***Venue: Conference Room 504, 5th Floor, Building A, Olympic Village
Campus, Aerospace Information Research Institute, CAS***

09:00-10:20 GLC_FCS30D: The First Global 30m Land-Cover
Dynamics Monitoring Product with A Fine Classification System for the
Period from 1985 to 2022 (Prof. Liangyun Liu, CBAS)

10:40-12:00 Land Surface Displacement Monitoring Using Space-borne
InSAR Technique (Dr. Yixian Tang, CBAS)

12:00-14:00 Lunch and Break

14:00-15:20 SDGSAT-1 Satellite Data and Open Science Program (Mr.
Beichen Zhou, CBAS; Mr. Nijun Jiang, CBAS)

15:40-17:00 Mainstreaming DRR for Development Safety: New Global
Research Framework for Actions (Prof. Qunli Han, IRDR International
Program Office)

Day 3. Wednesday, September 4, 2024

Session 3: Big Earth Data: Driving Urban, Marine, and Global Sustainable

Venue: Conference Room 504, 5th Floor, Building A, Olympic Village Campus, Aerospace Information Research Institute, CAS

09:00-10:20 Big Earth Data in Support of the Urban Sustainable Development (Prof. Zhongchang Sun, CBAS)

10:40-12:00 Big Earth Data for Disaster Risk Reduction (Dr. Bo Yu, CBAS; Dr. Lei Wang, CBAS)

12:00-14:00 Lunch and Break

14:00-15:20 Marine Big Data Mining and Digital Twin Supporting Marine SDGs (Prof. Cunjin Xue, CBAS)

15:40-17:00 Big Earth Data Supporting LDN Methods and Tools (Prof. Xiaosong Li, CBAS)

Day 4. Thursday, September 5, 2024

Venue: Conference Room 504, 5th Floor, Building A, Olympic Village

Campus, Aerospace Information Research Institute, CAS

9:00-10:20 AI Powered Big Earth Data Processing and Mining on SDG
Cloud Platform (Dr. Yingchao Piao, CBAS)

10:40-12:00 Big Earth Data Analysis and Decision Support System for
Belt and Road Areas (Dr. Yanjie Lv, CBAS)

12:00-14:00 Lunch and Break

Cultural Exchange & Discussion

14:00-18:00 Cultural Exchange & Discussion

Days 5. Friday, September 6, 2024

*The 4th International Forum on Big Data for Sustainable
Development Goals (FBAS 2024)*

*Venue: Conference Room, 2nd / 3rd Floor, Beijing International
Convention Centre (BICC)*

09:00-10:00 Opening Ceremony of FBAS 2024

10:15-11:45 Plenary Session

12:00-13:00 Lunch and Break

13:00-14:30 Parallel Sessions (Shaping Future Cities through Digital
Innovation and Collaboration)

14:45-16:15 Parallel Sessions (Digital Technology for Disaster Risk
Reduction and SDGs)

16:30-18:00 Parallel Sessions (Big Data and AI solutions for SDG 13
Climate Mitigation and Adaption)

Days 6. Saturday, September 7, 2024

Youth Innovation Session

Venue: Conference Room 305E, 3rd Floor, Beijing International

Convention Centre (BICC)

09:00-10:00 Plenary Session

10:15-11:45 Parallel Session (Youth Innovation: Sharing for the Future)

11:45-13:00 Lunch and Break

13:00-14:30 Parallel Session (Youth Innovation: Sharing for the Future)

14:45-16:15 Parallel Session (Youth Innovation: Sharing for the Future)

Days 7. Sunday, September 8, 2024

FBAS 2024

Venue: Conference Room 305/307, 3rd Floor, Beijing International

Convention Centre (BICC)

09:00-10:00 Plenary Session

10:15-11:45 Parallel Session (Special session for SIDS)

11:45-13:00 Lunch and Break

13:00-14:10 Closing Ceremony of Capacity Building Workshop

15:00-16:00 Closing Ceremony of FBAS 2024

Days 8. Monday, September 9, 2024

9:00-17:00 Free Time & Cooperation Exchange

17:00 Adjourn

< Venue >



Conference Room on the 1st Floor of CBAS Building
No. 9 Dengzhuang South Road, Haidian District, Beijing 100094, China



Conference Room 504 on the 5th Floor, Building A, Olympic Village
Campus, Aerospace Information Research Institute, CAS
North of No. 20, Datun Road, Chaoyang District, Beijing 100101, China



Beijing International Convention Centre (BICC)
Courtyard 8, Beichen East Road, Chaoyang District, Beijing 100101,
China

< Speakers and Summary of Presentations >



Prof. Fang Chen

Course Title: Big Earth Data in Facilitating Sustainable Development Goals

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Course Abstract:

This course offers a comprehensive exploration of how advanced Big Earth Data technologies can be effectively harnessed to drive sustainable development. Participants will gain an in-depth understanding of the pivotal role that Big Earth Data plays in monitoring and evaluating SDGs. The course covers a broad range of topics, including the utilization of satellite imagery, geographic simulation, and specialized data platforms to enhance decision-making processes. Emphasizing a practical, data-driven approach, the workshop is designed to build participants' capacity for effective SDG evaluation and implementation. Specifically, the course will equip participants with valuable skills in using data-driven methods to address the unique challenges faced by SIDS. It will focus on applying Big Earth Data to monitor and evaluate SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). Ultimately, this training aims to foster resilience and promote sustainable development in these vulnerable regions.

Simple CV:

Fang Chen is the Deputy Director General of the International Research Centre of Big Data for Sustainable Development Goals (CBAS), and a Professor of the Chinese Academy of Sciences (CAS) Aerospace Information Research Institute. His work focuses on adapting Big Earth Data technologies to meet the SDGs assessment needs (mainly for SDG 11 and SDG 13) of developing countries, including Nepal, Thailand, and Small Island Developing States (SIDS). Dr. Chen also conducts interdisciplinary work combining remote sensing, geology, and other fields of study to assess spatial and temporal patterns of disaster risk, including glacial lake outburst floods, landslides, wildfires, drought, and earthquakes, especially in the Himalayas and other parts of High Mountain Asia. Dr. Chen has published over 100 academic papers and book chapters.



Prof. Qunli Han

**Course Title: Mainstreaming DRR for Development Safety:
New Global Research Framework for Actions**

E-mail: qunli.han@irdrinternational.org

Course Abstract:

The world has been witnessing in recent years the rapid increase of complex, interconnected and cascading as well as transboundary hazards and disaster risks. Such a dynamic and changing risk landscape has clearly highlighted the underlying vulnerabilities ingrained in our social, economic, and environmental development systems, requiring global attentions and new STI effort for solutions. The IRDR programme, an international DRR community, consisting of researchers, practitioners and policy makers, has been engaged over a decade to mobilize global, regional and national science and technology for DRR, and to enhance the science-policy-society interactions for development safety. The Global Framework of Science in Support of Risk Informed Sustainable Development and Planetary Health launched by IRDR, ISC and UNDRR in November 2021 provides a new, comprehensive and systemic agenda for international cooperation and action. Based on the nine research priority areas outlined in this Framework, IRDR has repositioned itself with new mission, functions and research actions to lead the global implementation of the Framework, aiming to usher in an inclusive, safe and sustainable world.

Simple CV:

Qunli Han is the former Executive Director of International Programme Office of Integrated Research on Disaster Risk (IRDR) cosponsored by ISC and UNDRR (September 2017- June 2024). He has been working with IRDR scientific community to complete the first phase of IRDR (2010-2021) and contributing to the formulation of “A Framework of Global Science in Support of Risk-informed Sustainable Development and Planetary Health” toward 2030 and beyond, as well as to establish IRDR’s new decennium phase. He is also a Professor at CBAS. During 1989-2017, Qunli worked for UNESCO, and took positions including of Senior Programme Specialist on Environmental Sciences in Asia-Pacific Region, Director of Tehran Cluster Office and Director of the Executive Office of Natural Science Sector. He actively participated in UN-led post-disaster actions responding to 2004 Indian Ocean Earthquake and Tsunami, 2005 Central Java Earthquake and 2010 Pakistan floods. During 2013-2017, Qunli was the Director of Division of Ecological and Earth Sciences and Secretary of UNESCO’s Man and the Biosphere Programme.



Prof. Dongmei Yan

Course Title: Global SDG products and applications based on Big Earth Data

E-mail: yandm@aircas.ac.cn

Course Abstract:

The course will centre on the following key aspects: firstly, we will introduce the CASEarth Programme. Next, we will deliver into various data types under this program, including basic data, public data, and thematic data products tailored for SDGs. Then, we will explore the advanced classification system designed for both big earth data and SDGs. Also, we will guide you through our data sharing system and the release of our data products. Lastly, we will present the results of the CASEarth review, conducted by CODATA, a renowned international scientific data organization.

Simple CV:

Prof. Dongmei Yan is a Professor of the Aerospace Information Research Institute, CAS, and Director of the Administrative Office for Big Earth Data Science Engineering (CASEarth) since 2018. She served as Assistant of the Institute of Remote Sensing and Digital Earth Research and Director of the Division of Information Technology Sciences, CAS, from 2013 to 2018. She was also the Deputy Director and Director of the Technical Division of Centre for Earth Observation and Digital Earth from 2009 to 2012. Prior to that, she worked as Associate Professor of China Remote Sensing Satellite Ground Station, CAS, from 2005 to 2009. With her extensive experience in digital earth, sustainable development, and scientific innovation, she has led the Data Sharing Working Group of the Strategic Priority Research Program - Big Earth Data Science Engineering (CASEarth) since its establishment in 2018. In addition, Prof. Yan has been involved in a variety of projects. She was responsible for the key R&D project for Hainan Province from 2018 to 2019. She was also in charge of the project “High-Precision Extraction and Verification of City Clusters Using Big Data for Medium and High-resolution Remote Sensing Satellites.” She won the Third Prize of the Ministerial Science and Technology Progress Award in 2005 and ranked first personally. Then, she won the First Prize of the Ministerial Science and Technology Progress Award in 2015. Her current research focuses on remote sensing and image processing, information extraction and application of optical remote sensing images, image understanding, and computer vision.



Prof. Liangyun Liu

**Course Title: GLC_FCS30D: The First Global 30m
Land-Cover Dynamics Monitoring Product with A Fine
Classification System for the Period from 1985 to 2022**

E-mail: liuly@radi.ac.cn

Course Abstract:

Land cover change information plays an indispensable role in environmental monitoring, climate change research, agricultural planning, urban development, biodiversity conservation, and natural disaster risk assessment. Here, we used the stratified land-cover monitoring strategy and time-series Landsat imagery to develop a novel global 30 m land-cover dynamic product with fine classification system from 1985 to 2022 (GLC_FCS30D). Firstly, we used the multitemporal classification to generate the time-series impervious surfaces, wetlands and tidal flat products. Then, we proposed to combine the continuous change detection algorithm and local adaptive updating model to capture the land-cover changes, and to generate a new global 30 m land-cover dynamic product (impervious surfaces, wetlands and tidal flat types were excluded in this step). Next, after overlapping the three multitemporal classification products and the time-series dynamical land-cover dataset, the novel GLC_FCS30D was developed, which contained 35 fine land-cover types. Lastly, using the global 84526 validation points in 2020, the GLC_FCS30D was validated to show the great performance with an overall accuracy of 80.88%, and had obvious advantages over other global land-cover products in diversity of land-cover types and mapping accuracy.

Simple CV: Liangyun Liu is a Professor of CBAS. He received his Ph.D. degree in optics from Xi'an Institute of Optics and Precision Mechanics, Chinese Academy Sciences, in 2000. He is the winner of the first National Science Fund for Excellent Young Scholars in 2012, and the National Science Fund for Distinguished Young Scholars in 2018, and selected as one of the "Leading Talents" in the "Ten Thousand Talents Program". He has published more than 200 journal papers, and his papers have been cited more than 10000 times. He has written one book "Vegetation Quantitative Remote Sensing Principles and Applications", and his book and lecture were awarded by excellent textbook and best course by University of Chinese Academy of Sciences. He was Executive Editor-in-Chief of Journal of Remote Sensing, Associate Editor of Geographical Sciences. His research experience and interests are in vegetation quantitatively remote sensing and spatiotemporal analysis of remotely sensed data.



Prof. Cunjin Xue

Course Title: Marine Big Data Mining and Digital Twin Supporting Marine SDGs

E-mail: xuecj@aircas.ac.cn

Course Abstract:

Our ocean has been under threats, e.g., ocean pollutions, ocean acidification, deoxygenation, sea level rise, etc, which results in the decline of structure, function and benefit of marine ecosystems, environments and resources. Conserve and sustainably use the oceans, seas and marine resources for sustainable development (SDG14) and United Nations Decade of the Ocean Science (UNDOS) have set clear and specific goals for building the ocean we want. This lecture focuses on how to leverage the technological dividends of marine big data mining and digital twin of the ocean to carry out monitoring and evaluation of marine sustainable development goals, mainly including:

- 1) Challenges from SDG14 and UNDOS, as well as the demands for marine big data mining technology
- 2) Marine spatiotemporal modelling and digital twin of the ocean supports digital presentation of the ocean
- 3) Marine spatiotemporal information system supports for delivering data, knowledge and technology to all
- 4) Case Studies of monitoring and assessment of SDG14.

Simple CV:

Prof. Cunjin Xue is a specially engaged Prof. of Chinese Academy of Sciences (Backbone), a member of Young Innovation Promotion Association of Chinese Academy of Sciences (2013), and a member of Academic Construction Committee of International Research Centre of Big Data for Sustainable Development Goals, and a director of Digital Ocean and Air Research Division. He completed his MS studies at Wuhan University, and his PhD studies at the Institute of Geographic Sciences and Resources, Chinese Academy of Sciences, and holds 11 national invention patents, and more than 90 articles. His research topics mainly include: Marine Data Mining, Digital twin and marine sustainable development, e.g., process-oriented marine spatiotemporal representing and graph storing model, process-oriented marine abnormal variation extracting technology, and process-oriented marine spatiotemporal clustering and associating methods, digital twin system and applications.



Prof. Xiaosong Li

Course Title: Big Earth Data Supporting LDN Methods and Tools

E-mail: lixs@aircas.ac.cn

Course Abstract:

In 2015, the United Nations adopted the Transforming Our World: The 2030 Agenda for Sustainable Development, in which land degradation neutrality (LDN) is one of the important targets of the Sustainable Development Goal (SDG 15.3). However, due to various indicative symptoms of land degradation in different climatic/geographical zones and land use types, the complexity of factors affecting land degradation or improvement, and the limits of spatial and temporal scope to define land degradation, for a long time, there was lack of common accepted methodology to identify land degradation, and short of key data set to establish reference baselines, and measure progress of SDG 15.3, which hinders the realization of SDG 15.3 by 2030. As a typical representative of a data-intensive scientific paradigm, Big Earth Data provides the possibility to solve this data gap. Focusing on two important aspects of SDG 15.3 reporting, namely baseline determination and progress monitoring, this article introduces the key challenges we faced, the potential of Big Earth Data and the practices we have taken. Finally, the prospects for harnessing Big Earth Data to facilitate SDG 15.3 in the future are outlined.

Simple CV:

Xiaosong Li, Ph.D., Aerospace Information Research Institute, Chinese Academy of Sciences, member of Expert Group on UNEP Sustainable Development Goals progress measuring report, SDG 15 coordinator of "Big Earth Data Supporting the Sustainable Development Goals", member of the Working Group of the International Earth Observation Organization-Land Degradation Neutrality Initiative, and member of the Expert Group on China's voluntary LDN targets setting. He has been mainly engaged in research work in the direction of big earth data to promote the realization of sustainable development goals, remote sensing big data analysis and land degradation monitoring, and hosted over more than 20 major national science and technology projects. He has published 4 books, published more than 70 research articles, and won 3 National and Ministerial and Provincial-Level Science and Technology Award.



Prof. Zhongchang Sun

Course Title: Big Earth Data in support of the Urban Sustainable Development

E-mail: sunzc@aircas.ac.cn

Course Abstract:

Sustainable cities and communities (SDG 11) are central to achieving all 17 SDGs. The transformative process that shapes sustainable urbanization need to be understood. As an important aspect of technological innovation and big data, Big Earth Data can offer a new key to generate knowledge about the Earth, playing a major role in promoting sustainable development. To shape science-based policies and data-driven decision mechanism in service of the SDGs, CBAS has conducted many practice cases to monitor the progress of SDG indicators cantered on urban sustainable development. In this presentation, I will focus on 8 main themes about urban development, including urban shantytowns, urban public transportation, urbanization, heritage protection, disaster prevention & mitigation, pollution, open public space, and comprehensive assessment. Especially for SDG 11.3.1, I will introduce our systematic and full-chain research works, including remote sensing monitoring methodologies, data products, single indicator monitoring and projection, as well as interaction and comprehensive assessment of SDG11 indicators. Our research results prove that Big Earth Data can fill in much of the data gap for urban sustainable development evaluation. Big Earth Data, as a new approach to sustainability science, can bring great value and potential for achieving the SDG 11 for China and countries around the world.

Simple CV:

Dr. Zhongchang Sun is a professor in Aerospace Information Research Institute (AIR), Chinese Academy of Sciences (CAS). He also serves as deputy director of the Key Laboratory of Digital Earth Science, CAS, as well as head of Cooperation & Development Office at the International Research Centre of Big Data for Sustainable Development Goals (CBAS). He received his Ph.D. from the Centre for Earth Observation and Digital Earth (CEODE), CAS in 2011. He was honoured as Nanhai Young Talent in 2020 and CAS Distinguished Core Researcher in 2022. His research interests focus on urban remote sensing and urban sustainability. He has published nearly 100 papers, and 6 books as an associate editor. He is the awardee of 3 international and domestic prizes. He also presided nearly 20 projects funded by agencies.



Dr. Lei Wang

Course Title: Big Earth Data for Disaster Risk Reduction

E-mail: wanglei@radi.ac.cn

Course Abstract:

Our world has witnessed a rise in the frequency and magnitude of natural hazards over the past decade. High population densities, poor infrastructure, unstable landforms, and exposure to severe weather events make developing countries particularly vulnerable. The Sendai Framework for Disaster Risk Reduction, as well as the 2030 Agenda for Sustainable Development, have clear expectations on the roles of science, technology, and innovation in disaster risk reduction.

This course will increase the knowledge and capacity to use Big Earth Data for disaster risk reduction. It will provide an overview of Big Earth Data for disaster risk management, introduce the new online platform development, and give some case studies using Big Earth Data for different disasters. It will also introduce training and research chances to early- and mid-career scientists in developing countries.

Simple CV:

Dr. Lei Wang is an associate professor at the International Research Centre of Big Data for Sustainable Development Goals. He received his bachelor's degree in 2004 and a doctorate degree in 2009. He is currently a member of the World Federation of Engineering Organizations (WFEO) Committee on Disaster Risk Management (CDRM) and the office director of the CAS-TWAS Space Disaster Reduction Centre of Excellence (SDIM). His research interests include disaster risk reduction and forest disturbance monitoring with Big Earth Data. He has published over 50 research papers in the Lancet, Science Advances, Remote Sensing of Environment, and other journals.



Dr. Yixian Tang

**Course Title: Land Surface Displacement Monitoring
Using Space-borne InSAR Technique**

E-mail: tangyx@aircas.ac.cn

Course Abstract:

Considering the global climate change, the dual threats of land subsidence and sea level rise make island countries face more serious disasters such as flooding. In order to monitor the ground subsidence efficiently, the technique of space-borne interferometric SAR is presented in this course, such as differential InSAR and the multi-temporal InSAR (Persistent Scatterers InSAR and Small Baseline Subset InSAR). And the applications of such techniques are also introduced in this course.

Simple CV:

Dr. Yixian Tang is an Associate Professor in International Research Centre of Big Data for Sustainable Development Goals. He got his B.S. degree in geography from Beijing Normal and Ph.D. degree in Cartography and geography information system from Institute of Remote Sensing Applications, Chinese Academy of Sciences, in 2006. His research interests include the differential SAR interferometry/time series InSAR method and its applications to the monitoring of surface displacements, especially high-performance computing for InSAR data processing at large scale recently.



Dr. Bo Yu

Course Title: Big Earth Data for Disaster Risk Reduction

E-mail: yubo@radi.ac.cn

Course Abstract:

Our world has witnessed a rise in the frequency and magnitude of natural hazards over the past decade. High population densities, poor infrastructure, unstable landforms, and exposure to severe weather events make developing countries particularly vulnerable. The Sendai Framework for Disaster Risk Reduction, as well as the 2030 Agenda for Sustainable Development, have clear expectations on the roles of science, technology, and innovation in disaster risk reduction.

This course will increase the knowledge and capacity to use Big Earth Data for disaster risk reduction. It will provide an overview of Big Earth Data for disaster risk management, introduce the new online platform development, and give some case studies using Big Earth Data for different disasters. It will also introduce training and research chances to early- and mid-career scientists in developing countries.

Simple CV:

Bo Yu is an associate professor of the International Research Centre of Big Data for Sustainable Development Goals (CBAS). Her research interests include landslide monitoring and analysis with large-scale remotely sensed data. She has proposed a dynamic super pixel image augmentation strategy to address the technical challenge of data imbalance between landslides and background objects. A multi-scale matrix-deconvolution model was proposed to break the technical bottleneck of incomplete landslide detection in remote sensing images of varying spatial resolutions. Additionally, a biomimetic feature joint learning model was established, optimizing the model's transferability across different remote sensing sensors and research areas. She has published over 40 academic papers as first/corresponding authors.



Dr. Yingchao Piao

Course Title: AI Powered Big Earth Data Processing and Mining on SDG Cloud Platform

E-mail: pyc@cnic.cn

Course Abstract:

SDG Big Data Platform aims to integrate Big Earth Data for SDGs monitoring and prediction and provide decision support for SDGs implementation. Based on a hyper-converged framework, this SDGs platform integrates modules of supercomputing, big data cloud, data storage, and high-speed network, with capacities of 1000 trillion double-precision floating-point supercomputing per second, 75PB data storage, and 10,000 CPU core cloud computing. Combing multiple sources of data in geography, remote sensing, ground monitoring, and social statistics, this platform provides tailored services for SDGs research by integrating over a hundred popular algorithms and tools on the unified platform. The bilingual portal features SDGs data products and cloud services, such as the SDGs data analysis, SDGs Data Engine, Earth Data Miner, Decision Support, SDGs data repository.

In this course, we will introduce the innovative technologies and many data processing and mining tools in SDG Big Data Platform, including the unified scheduling and aggregation services of ultra-large-scale distributed computing resources, the management and computation of PB-level gridded data, and the interactive online analysis of Big Earth Data. All these will guarantee the effectiveness and efficiency of SDGs implementation progress monitoring, thus contributing to the United Nations 2030 Agenda.

Simple CV:

Yingchao Piao, Senior Engineer, Computer Network Information Centre of the Chinese Academy of Sciences, focuses primarily on research areas such as big data analysis methods, information system development, and cloud service application integration. She has participated in the system development of the Cloud Service Platform and SDG Big Data Platform in the CAS Earth Big Data Science Project.



Dr. Yanjie Lv

Course Title: Big Earth Data Analysis and Decision Support System for Belt and Road Areas

E-mail: lvyj@aircas.ac.cn

Course Abstract:

The Belt and Road (BR) initiative is proposed to promote connectivity and cooperation among countries along the ancient Silk Road routes. This course focuses on leveraging big data technologies to address the unique challenges and opportunities within the Belt and Road regions. It provides an in-depth understanding of the theoretical foundations and practical applications of big earth data analysis, emphasizing its role in supporting decision-making processes. With the exception of promoting the application of big data technologies for the Digital Belt and Road, a Big Earth Data Analysis and Decision Support System is introduced to be a powerful tool to support the application of big earth data in the Belt and Road region. The system is built upon a cloud computing and storage infrastructure. Supported by virtualization and distributed storage technologies, it achieves scalable services for the integration, management, sharing and access of big earth data related to the Belt and Road Initiative. Case studies will be used to illustrate the application of this system in real-world scenarios. By the end of the course, users from the BR region will be equipped with the knowledge and skills needed to effectively utilize this system, enabling them to access various resources and tools to support decision-making, implementation, and assessment of projects related to the Belt and Road Initiative.

Simple CV:

Yanjie Lv received the B.S. degree in mechanical engineering from the Huazhong University of Science and Technology, Wuhan, China, in 2004 and the Ph.D. degree in aeronautical and astronautical manufacturing from Beihang University, Beijing, China, in 2016. He is currently a Research Scientist with International Research Centre of Big Data for Sustainable Development Goals, Beijing, China. His research interests include overall architecture and cutting-edge technologies of big data infrastructure, intelligent processing and mining of spatial big data, and the application of big data analysis techniques in sustainability science.



Mr. Beichen Zhou

Course Title: SDGSAT-1 Satellite Data and Open Science Program

E-mail: bczhou@cbas.ac.cn

Course Abstract:

This course will be based on the context of using and sharing data from The Sustainable Development Science Satellite 1 (SDGSAT-1). The SDGSAT-1 satellite is the world's first scientific satellite dedicated to serving the 2030 Agenda for Sustainable Development. It has three Earth observing sensors and provides global data coverage. The Open Science Program allows SDGs researchers and Practitioners to access and customize the data for scientific research. The program aims to promote multi-disciplinary research on SDGs and fill data gaps. Researchers are invited to contribute to SDG research outcomes.

The course will explain the characteristics of SDGSAT-1, its operation, data coverage, principles of service, and related results, etc., to help participants understand the general overview of SDGSAT-1, and provide the rights to use the SDGSAT-1 Open Science Program to the delegates from various countries for use.

Simple CV:

Beichen Zhou has been a member of the CBAS SDGSAT-1 operation and control team since February 2023, following his graduation from University of Sheffield with a Master's degree in Applied Geographic Information Science.

He is mainly responsible for SDGSAT-1 data processing and international cooperation in the SDGSAT-1 Open Science Program. He has participated as a lecturer in the training of Kenyan nations in Africa on data application. Currently, he is focusing on satellite international cooperation activities.



Mr. Nijun Jiang

Course Title: SDGSAT-1 Satellite Data and Open Science Program

E-mail: njjiang@cbas.ac.cn

Course Abstract:

The SDGSAT-1 satellite, designed to monitor sustainable development goals (SDGs), offers a suite of advanced sensors including Multispectral Imager (MSI), Glimmer Imager (GIL), and Thermal Infrared Spectrometer (TIS). These instruments enable detailed observation and analysis of the Earth's natural environments, human activities, and their intricate interactions. SDGSAT-1 has been successfully applied in a variety of cases, including environmental monitoring, urbanization studies, and vessels tracking.

For island nations, which often face unique environmental challenges, SDGSAT-1 offers critical insights. The satellite's capabilities can be leveraged to monitor marine resources, fishing activities, and water quality, all of which are essential for maintaining the delicate balance between island ecosystems and socio-economic development.

Simple CV:

Nijun Jiang has been a member of the CBAS SDGSAT-1 operation and control team since April 2023, following his graduation from University College London with both a Master's and a Bachelor's degree. He is experienced in processing and applying SDGSAT-1 data. He is familiar with application cases involving SDGSAT-1 MSI data, GIL data, and TIS data.

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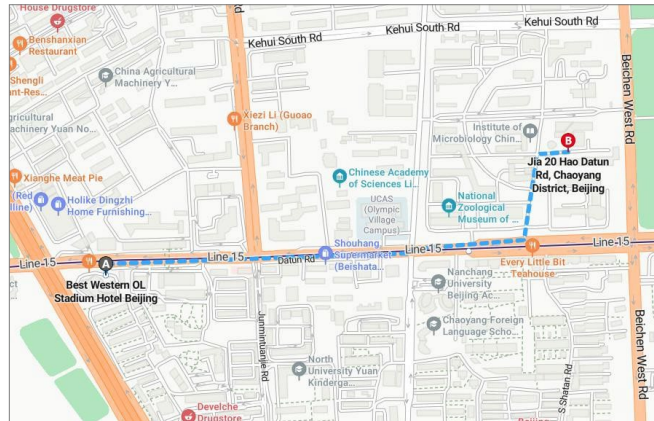


Figure 1. Route Map from Best Western OL Stadium Hotel Beijing (A) to Olympic Village Campus, Aerospace Information Research Institute, CAS (B).

[Valid for the Workshop from September 2 to September 5; Walking Distance: 1.4 kilometres; Estimated Time: 15 minutes]

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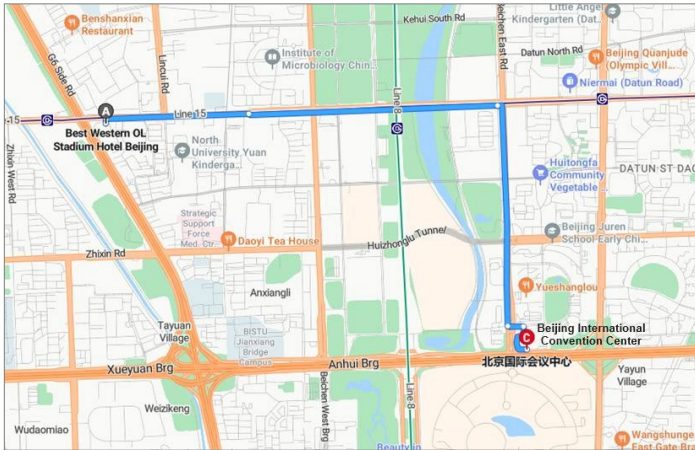


Figure 2. Route Map from Best Western OL Stadium Hotel Beijing (A) to Beijing International Convention Centre (BICC) (C).
[Valid for FBAS2024 from September 6 to September 8; **Distance**: 3.9 kilometres; **Transportation**: Shuttle Bus Arranged by the forum organizers]