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

DBAR：Digital Belt and Road Program

— Big Earth Data for SDGs in the Region

Huadong Guo

7 December 2021 Helsinki, Finland

The Belt and Road region covers a ***vast area*** and involves a ***large population***, facing numerous challenges related to ***sustainable development***.

Sustainable Development Goals (SDGs)

17 Goals

169 Targets

230+ Indicators

Tier I supported by both methods and data — **53%**

Tier II have methods but lack data — **46%**

Tier III have neither standard methods nor data — **1%**

Technology Facilitation Mechanism (TFM)

TECHNOLOGY FACILITATION MECHANISM | SUSTAINABLE DEVELOPMENT GOALS

UNITED NATIONS INTERAGENCY TASK TEAM ON STI FOR THE SDGS (IATT)

10-MEMBER GROUP TO SUPPORT THE TECHNOLOGY FACILITATION MECHANISM

MULTI-STAKEHOLDER FORUM ON SCIENCE, TECHNOLOGY AND INNOVATION FOR THE SDGS (STI FORUM)

ONLINE PLATFORM (2030 Connect) - GATEWAY FOR INFORMATION ON EXISTING STI INITIATIVES, MECHANISMS AND PROGRAMS

10-MEMBER GROUP TO SUPPORT THE TECHNOLOGY FACILITATION MECHANISM

- 10-Member Group 2016-2017

2018-2019

Dr. Paulo Gadelha (Brazil), Coordinator of the FIOCRUZ Strategy for the 2030 Agenda, Oswaldo Cruz Foundation (FIOCRUZ)

Prof. Huadong Guo (China), Chairman of Academic Committee, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (CAS)

Dr. Heide Hackmann (South Africa), Executive Director, International Council for Science (ICSU)

Dr. Agnes Lawrence Kijazi (United Republic of Tanzania), Director General, Tanzania Meteorological Agency (TMA)

Dr. José Ramón López-Portillo Romano (Mexico), Chairman, Q Element Ltd.

Dr. Michiharu Nakamura (Japan), Senior Advisor (Former President), Japan Science and Technology Agency

Dr. Anne-Christine Ritschkoff (Finland), Senior Advisor VTT Technical Research Centre of Finland Ltd.

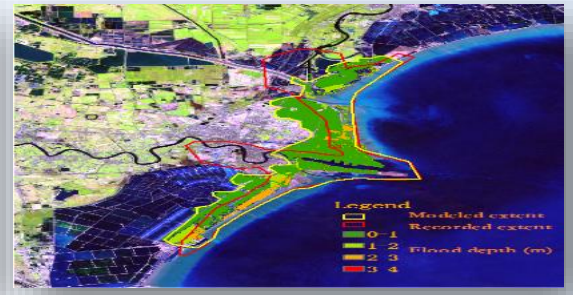
Dr. Špela Stres (Slovenia), Head of Innovation and Technology Transfer Center for Jožef Stefan Institute

Dr. Vaughan Turekian (USA), Senior Director at the National Academies of Sciences, Engineering, and Medicine

Dr. Ada Yonath (Israel), Director and Nobel Laureate, the Helen and Milton A. Kimmelman Center for Biomolecular Structure and Assembly of the Weizmann Institute of Science.

Digital Belt and Road Program (DBAR)

- International Science Program, initiated in 2016
- Promotes Big Earth Data cooperation among the Belt and Road
- Fill gaps in scientific knowledge to support the achievement of SDGs



UN World Conference on Disaster Risk Reduction
2015 Sendai Japan

Sendai Framework for Disaster Risk Reduction 2015 - 2030

THIRD INTERNATIONAL CONFERENCE FINANCING FOR DEVELOPMENT
13-16 JULY 2015 · ADDIS ABABA · ETHIOPIA
TIME FOR GLOBAL ACTION

UNITED NATIONS SUSTAINABLE DEVELOPMENT SUMMIT 2015
25 - 27 SEPTEMBER

SUSTAINABLE DEVELOPMENT GOALS

PARIS 2015

DBAR Work Flow

Data Streams

From Data to Information

Working Groups and Task Forces

DBAR Foci

Synthesis

International Conventions

2 ZERO HUNGER

6 CLEAN WATER AND SANITATION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

17 PARTNERSHIPS FOR THE GOALS

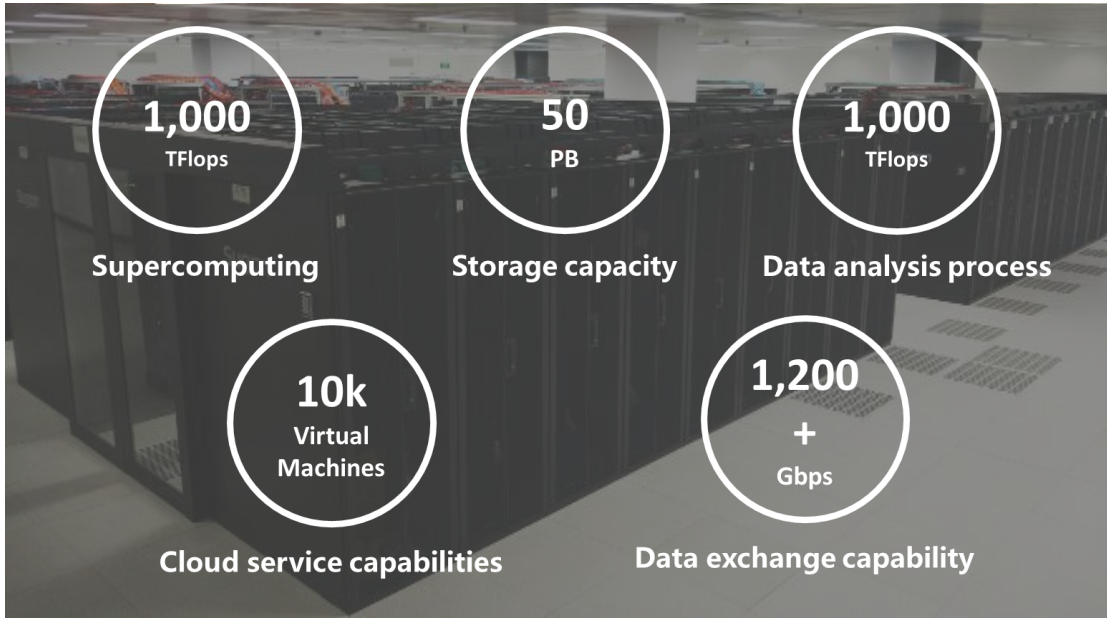
DBAR in Numbers (2021)

Big Earth Data Science Engineering Program(CASEarth)

01 Oriented toward technological problems in resolving major scientific issues.

02 Strategic action plan integrates technical problem-solving with team- and platform-building.

03 New impetus for interdisciplinary, cross-scale, macro-scientific discoveries using Big Earth Data.



CASEarth Data Platform

10PB
Total amount of data

40 years
Satellite Image Data

5.6PB
Biological and ecological data

4.6 million Scenes
Satellite image products

490,000
Items GBDB data record

3.8PB
EO Data

0.6PB
geographic data ground observation data Atmospheric and oceanic data

3.6 million
Items Catalogue of Life China

420,000
Items Microbial Data record

1 billion
pieces Omics data

◎ Each year, about 3PB will be updated on the Platform

◎ Data sharing service system was released on 15,Jan,2019. As of September 2021, more than 280,000 users in 174 countries have accessed the system, and the total online traffic has exceeded 57.97million times.

NATURE COMMENT: Steps to the Digital Silk Road

COMMENT

GEOLOGY Long line of triumph and failure — the hunt for Earth's magnetic heart p.28 | NEUROSCIENCE Antonio Damasio's argument for emotions, appraised p.30 | PUBLIC HEALTH Study the risk of yellow fever in Asia-Pacific p.31 | PSYCHIATRY Pamela Sklar, pioneer of mental-health genomics, remembered p.32

TAYLOR WEDMAN/BLOOMBERG/GETTY

Many developing countries, such as Mongolia, have rural economies, so projects that can provide farmers with up-to-date agricultural information are crucial.

Steps to the digital Silk Road

Sharing big data from satellite imagery and other Earth observations across Asia, the Middle East and east Africa is key to sustainability, urges **Guo Huadong**.

The ancient Silk Road trade routes connecting Asia, Europe and Africa lay behind the development of many great civilizations. Today, solar panels and smartphones have replaced silk, and trains and aeroplanes have superseded camels. But the Silk Road spirit of peace, mutual benefit and learning has been revived in an ambitious plan to bridge East and West, launched in 2013 by Chinese President Xi Jinping.

The 'Belt and Road' initiative promises more than US$1 trillion of Chinese investment in some 60 countries (see 'Belt and Road'). All other nations are welcome to join in. The main aim is socio-economic development through improving the routes for land and sea trade. The initiative will also boost science and technology across the region, for example through research into artificial intelligence, nanotechnology, quantum computing and smart cities (see go.nature.com/2mvfec6).

But protecting the environment while supporting economic growth will be challenging. The Belt and Road region is home to more than 65% of the world's population. It includes 18 cities that have populations of greater than 10 million, such as Beijing, Cairo, Moscow, Manila and Istanbul.

Environments are diverse and fragile. ▶

◎ Enhance infrastructure

An open platform with shared data, codes and algorithms is urgently needed for analyzing the vast amounts of Earth-observation data, which are already daunting and will only increase.

◎ Promote data sharing and interoperability

Data need to be openly exchanged if everyone in the region is to benefit.

◎ Extend applications to more people

Development across the Belt and Road region is uneven. To close these gaps, it is necessary to improve common solutions provided by Big Earth Data.

◎ Identify research opportunities

Knowledge could be discovered within the huge multidisciplinary data sets.

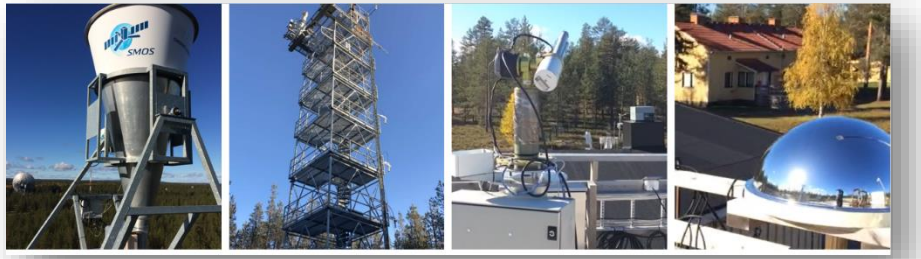
◎ Strengthen international collaboration

Belt and Road nations should set up bilateral or multilateral arrangements and stronger links with international scientific programs and organizations.

DBAR in Eurasia

- DBAR ICoE- Helsinki
- DBAR ICoE-Moscow
- DBAR-HiMAC WG
- DBAR-Disaster WG

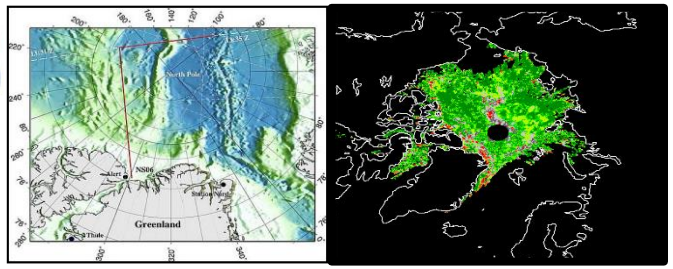
……



Observing infrastructure in Finland

BRICS

BAR
Digital Belt and Road



Joint Research in Russia

Collaboration with PEEX

SDGs of Interests

Support SDGs in three major ways:

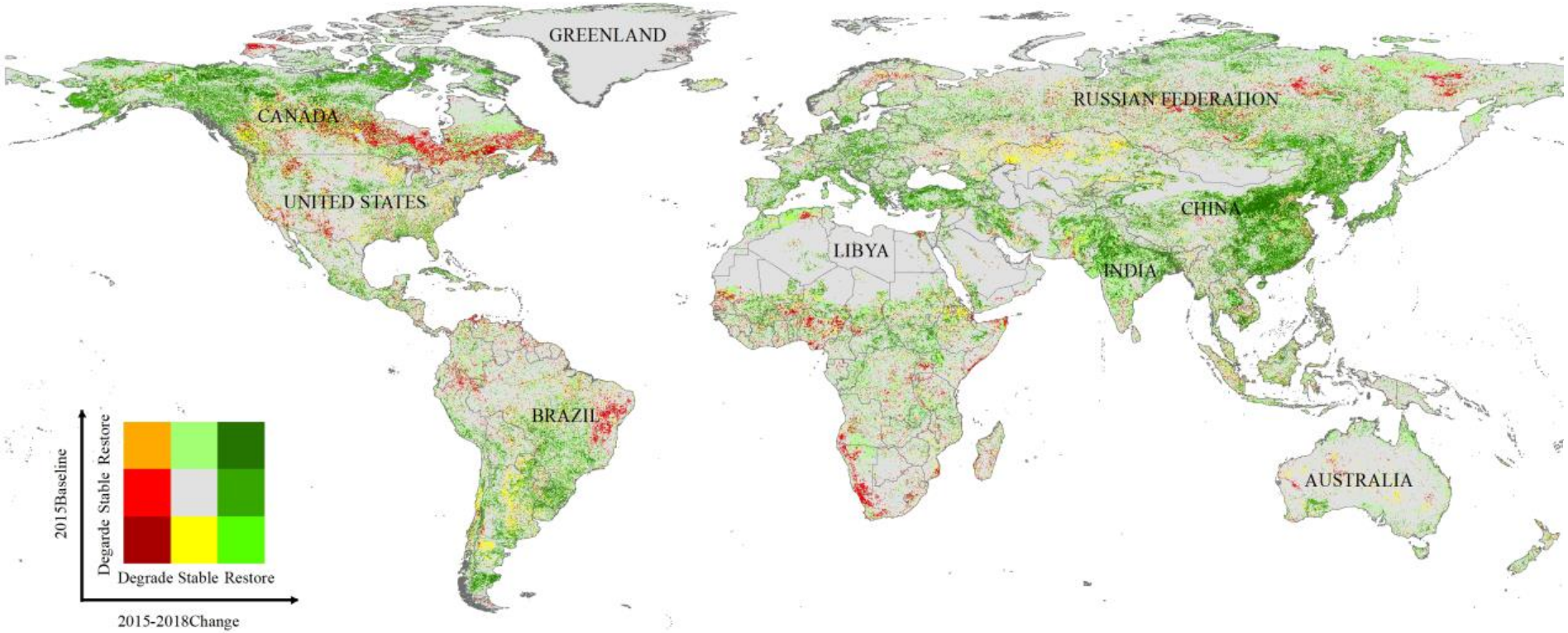
◎Big Earth Data to fill in **missing data** and to provide new sources of data for evaluation.

◎Create **new methodologies** utilizing Big Earth Data technologies and models to evaluate SDGs

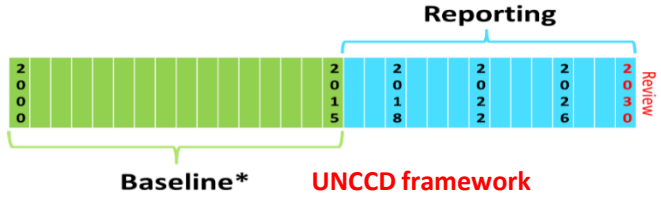
◎Develop **practice cases** of Big Earth Data for SDGs, and aids in monitoring the progress of SDG indicators.

Indicator evaluation for SDG 15

Global land degradation neutrality tracking



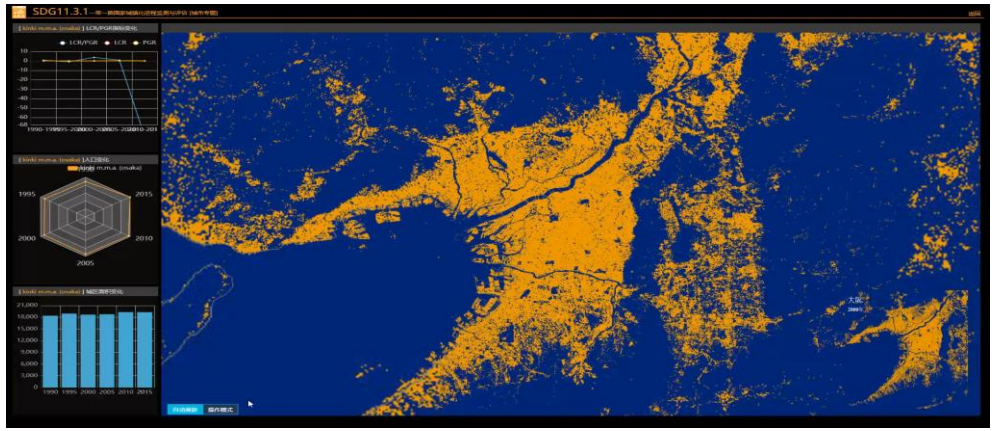
Spatial Distribution of Global Land Degradation Baselines and Dynamics



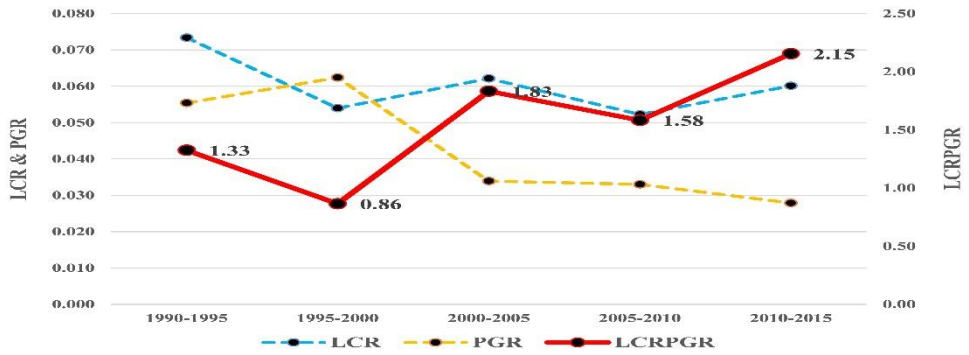
China's LDN status continues to improve. Compared with 2015, the net restored land area in 2018 increased by 60.30%, and the net restored land area accounted for about 1/5 of the world's total, making the largest contribution. From 2015 to 2018, land productivity showed significant decreasing trends in some regions.

Urban Sprawl and Urbanization

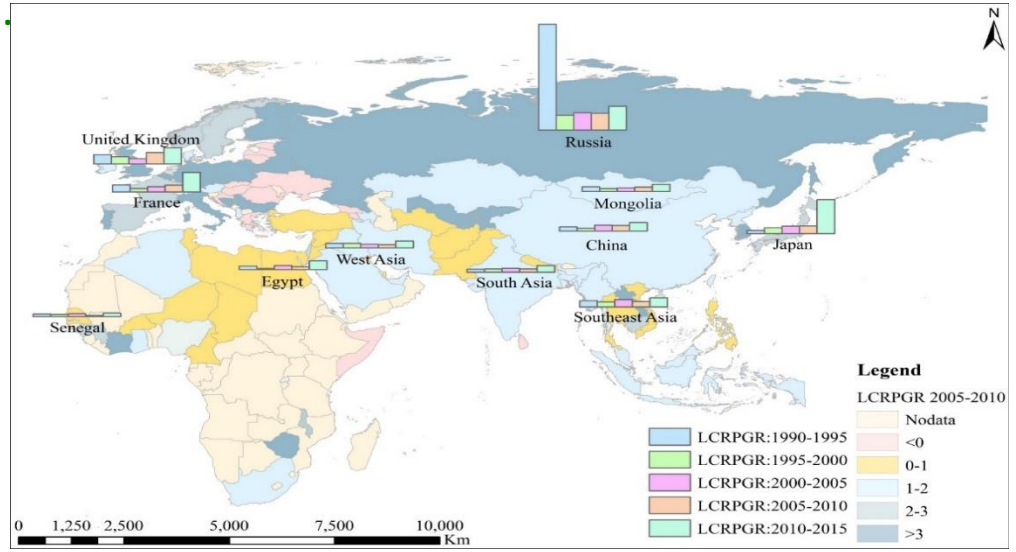
Monitoring and assessing urbanization progress in B&R region



- Monitoring and measuring the SDG 11.3.1 indicator for 1,500 cities with populations greater than 300,000 from 1990 to 2015 at 5-year intervals in the B&R region
- In the B&R region, the results reveal that LCRPGR increased from 1.24 in 1990-1995 to 2.67 in 2010-2015.
- Urban sustainability in B&R still faces major challenges.



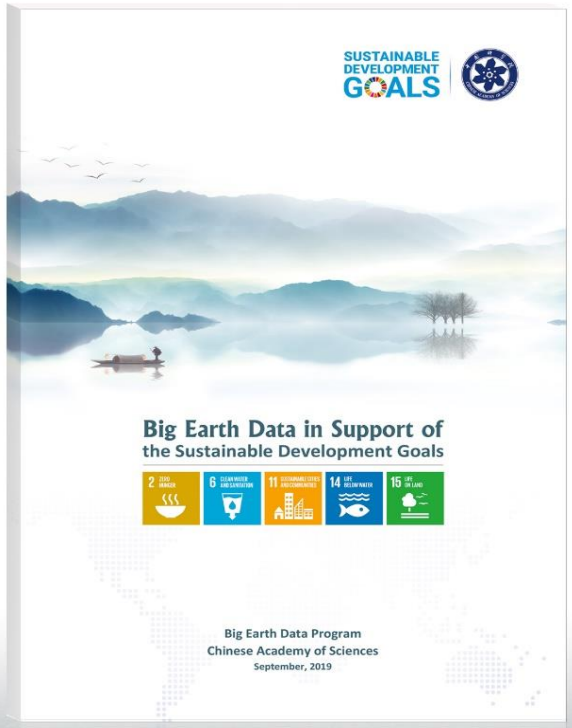
Changes of LCR, PGR and LCRPGR in China

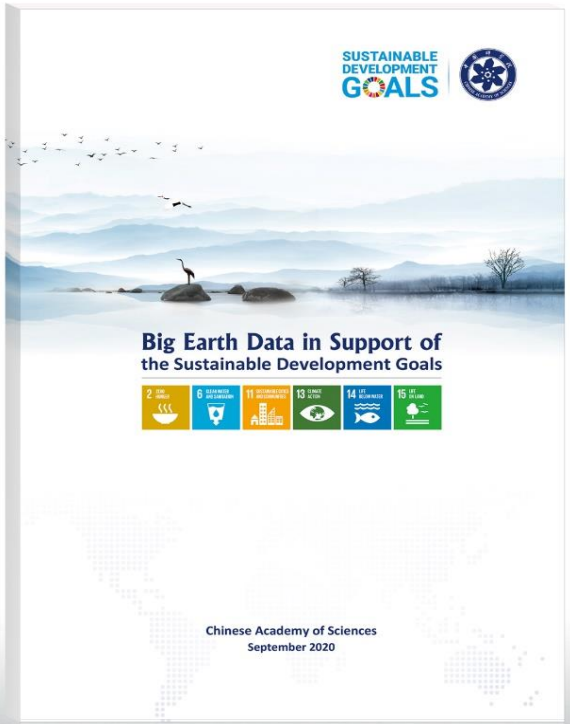


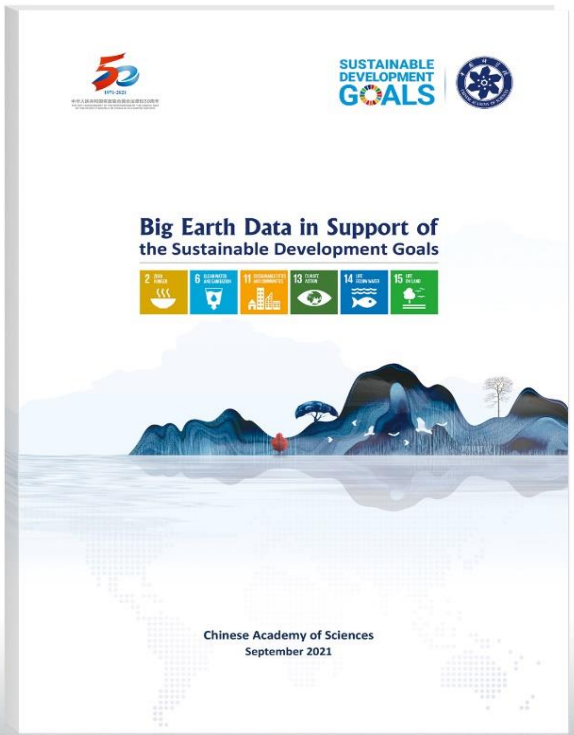
Big Earth Data in Support of SDGs

Chinese government released reports at the 74th and 75th UN GA

2021 report was released by Chinese State Councilor Wang Yi in September 2021



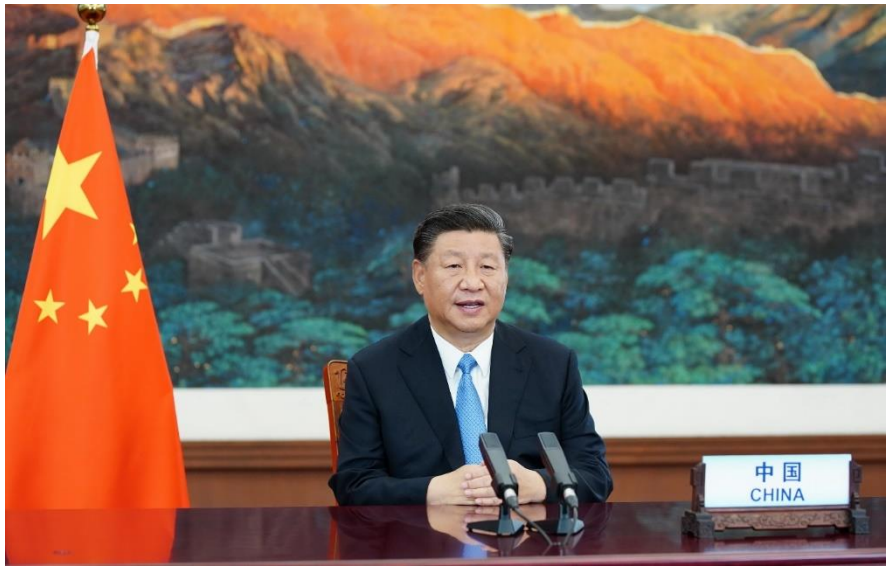




CASEarth: a Partner of UN Online Platform

CASEarth was adopted into 2030 Connect as one of the 24 partners, and one of 6 in the category of Publications and Knowledge Resources.

International Research Center of Big Data for SDGs



The sci-tech innovation and application of big data will help the international community to overcome difficulties and implement the UN 2030 Agenda globally.

-- President Xi's congratulatory letter

This Research Centre will work side-by-side with the Regional Hub for Big Data to support the UN Global Platform. Together, we can do more to end poverty, protect the planet and promote peace.

-- UN Secretary-General António Guterres' video message

Congratulations on International Research Center of Big Data for SDGs

Liu Zhenmin
UN Under-Secretary-General for UN DESA

Inger Andersen
UN Under-Secretary-General and Executive Director of UNEP

Ibrahim Thiaw
UN Under-Secretary-General and Executive Secretary of UNCCD

FBAS

可持续发展大数据国际论坛
International Forum on Big Data for Sustainable Development Goals

International Research Center of Big Data for SDGs(CBAS)

Vision

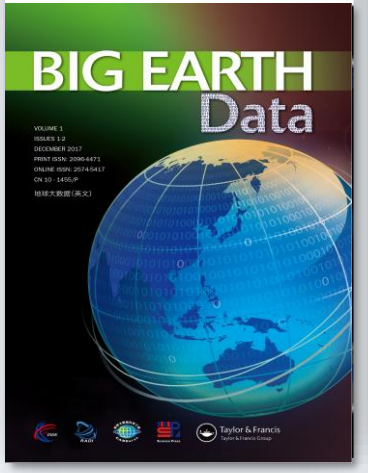
The Center provides a range of services essential for **addressing** the most **challenging problems** such as **lack of data** and **technology barriers** in the implementation of the **SDGs**, including data sharing, technology solutions, decision-making support, as well as capacity building for developing countries.

Objective

We are committed to building the Center into **a public Big Earth Data S&T platform in service of the UN 2030 Agenda**, which will integrate scientific capacity training, with a goal to facilitate the progress of SDGs around the world.

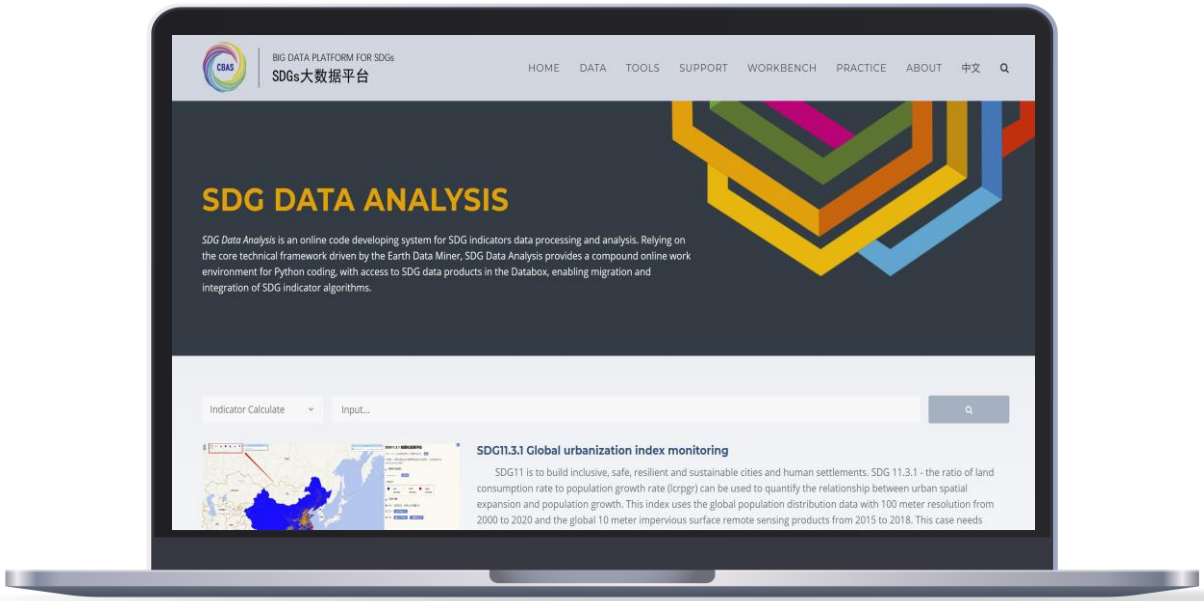
Collectively, CBAS will leverage the **Big Earth Data infrastructure**, **discipline-driving platform**, and **decision support system**, and pool strengths from relevant stakeholders, to build itself into an international research institution capable of all-round services for SDGs progress.

Mission



- Develop SDG **data infrastructure and information products**
- Provide new **knowledges** for SDG monitoring and evaluations
- Develop and launch **a series of SDG Satellites**
- Establish a **think tank** for STI to promote SDGs
- **Capacity development** for SDGs in developing countries

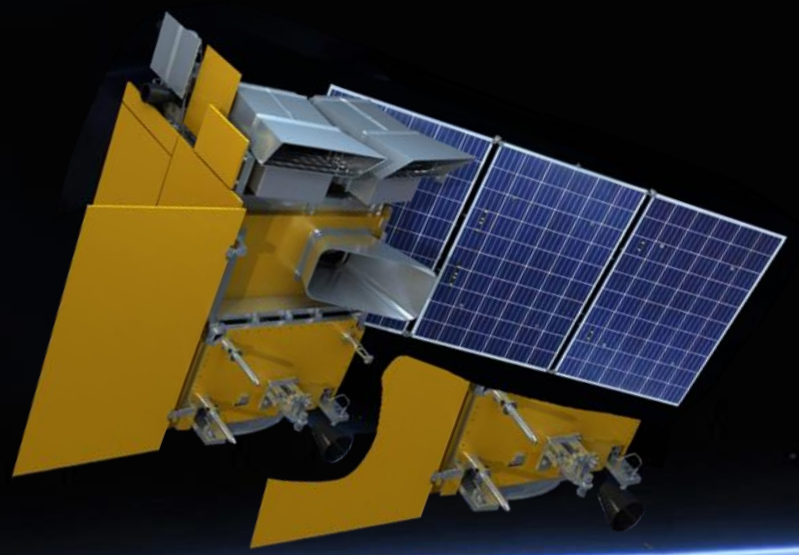
Big Earth Data System for SDGs



Establish SDG website (https://sdg.casearth.cn)

◎ Integrated data sharing
◎SDG indicator processing
◎SDG visualization

SDG Satellite



CBAS SDGSAT-1 可持续发展科学卫星

Explore
methods to sense Earth's
environment

Launched	Nov. 5th 2021

Wide scale	high-resolution	Thermal infrared + nighttime-light + multi-spectral
300 km	**10 m**	

Achieve SDGs with the Key of Big Data Together

BRICS Forum on Big Data for Sustainable Development

Time: May 2022 **Place:** Beijing， China

Subject: Big Data Facilitating Sustainable Development

Proposed Themes:

1. Big Data in Support of End Poverty
2. Big Data in Support of Food Security
3. Big Data in Support of COVID-19 Prevention and Vaccine Accessibility
4. Big Data in Support of Climate Change Response and Disaster Risk Reduction
5. Big Data in Support of Sustainable Urban Development
6. Big Data in Support of Biodiversity Conservation

Expected Outcomes:

1. Establish exchange and liaison mechanism for BRICS and promote consensus on scientific and technological cooperation among BRICS on big data supporting sustainable development
2. Establish a data sharing portal for BRICS
3. Release SDG public data products for BRICS

Thanks

DBAR Secretariat
No.9 Dengzhuang South Road
Haidian District, Beijing 100094, China
Tel: +86 10 82178980
Fax: +86 10 82178959
www.dbeltroad.org