



Steps to the Digital Silk Road

GUO Huadong
hdguo@radi.ac.cn

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Introduction to DBAR




- International Science Program
- Promotes EO cooperation among the Belt and Road countries
- Smart use of Big Earth Data
- Fill gaps in scientific knowledge to support the achievement of sustainable development goals



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Core Objectives



Knowledge Gaps

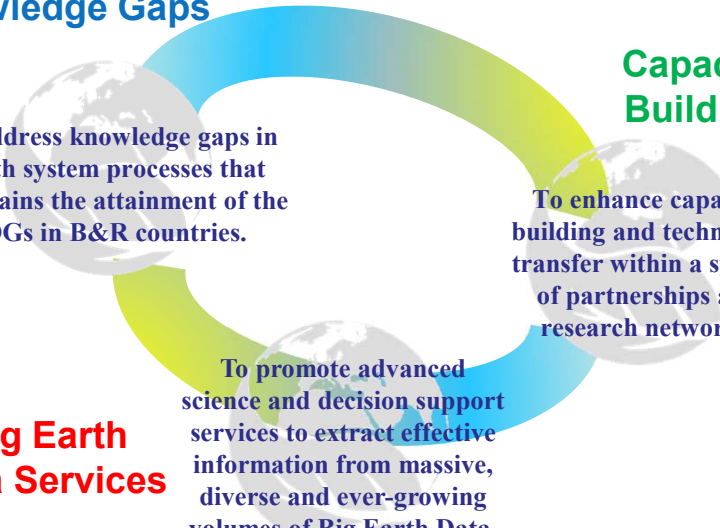
To address knowledge gaps in Earth system processes that constrains the attainment of the SDGs in B&R countries.

Capacity Building

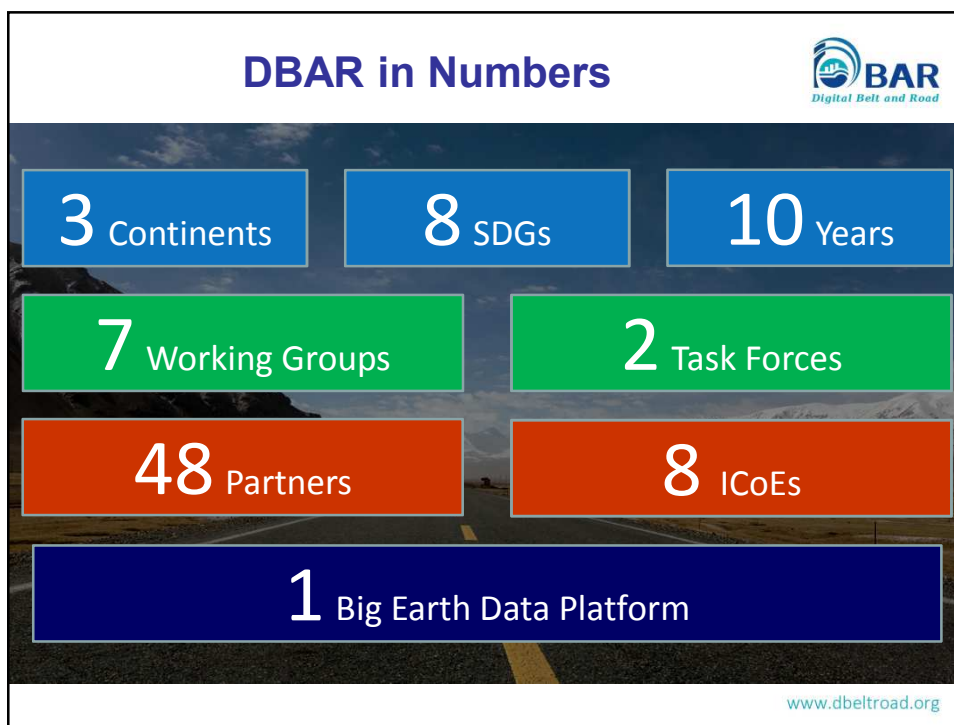
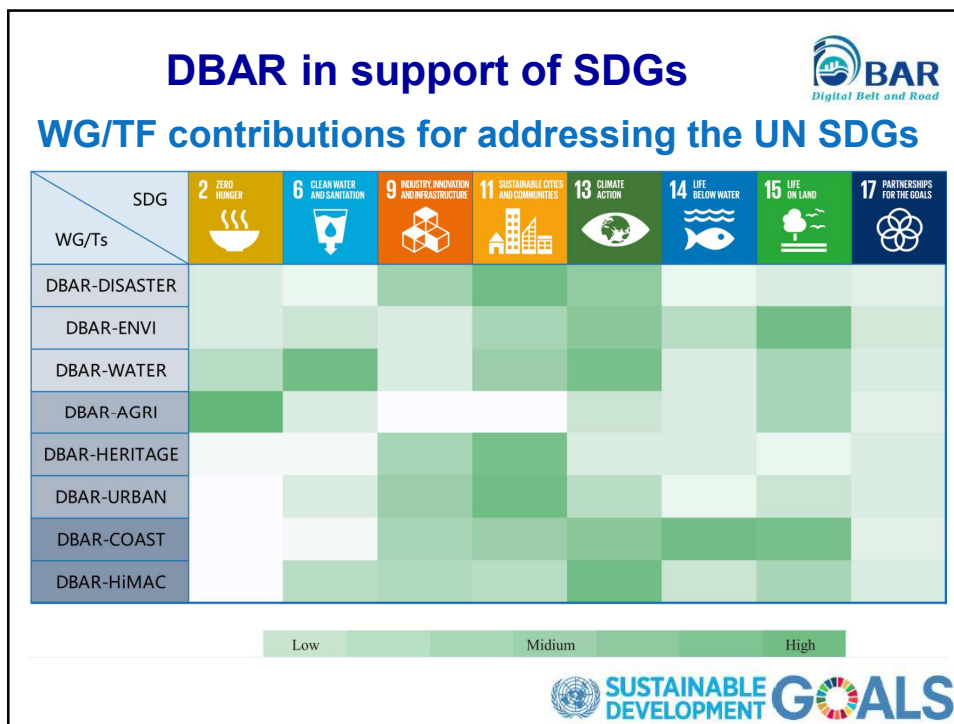
To enhance capacity building and technology transfer within a system of partnerships and research networks.

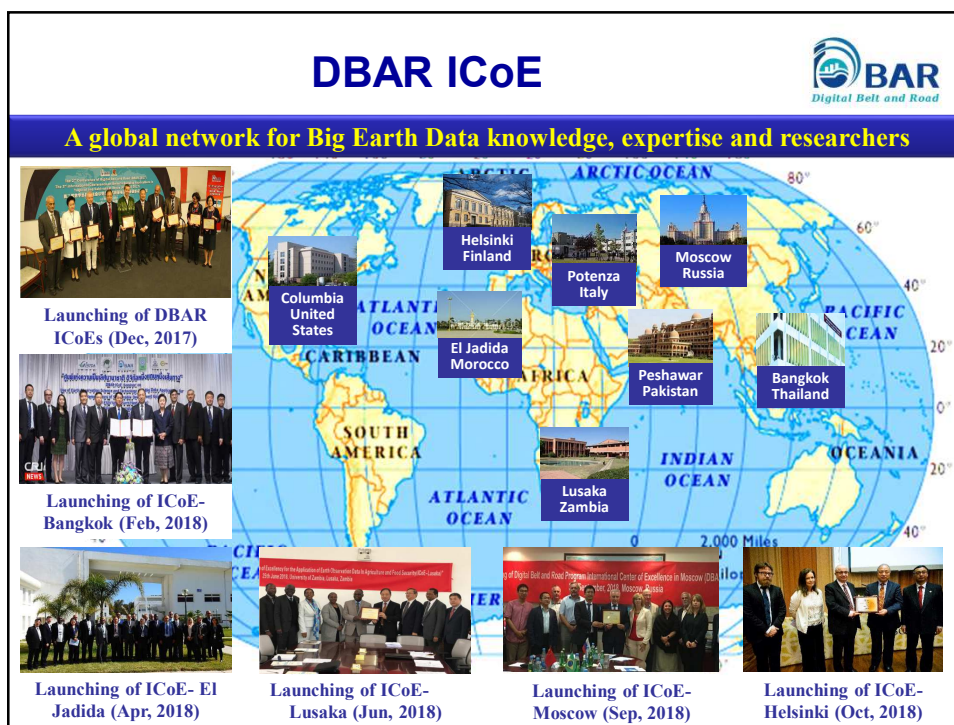
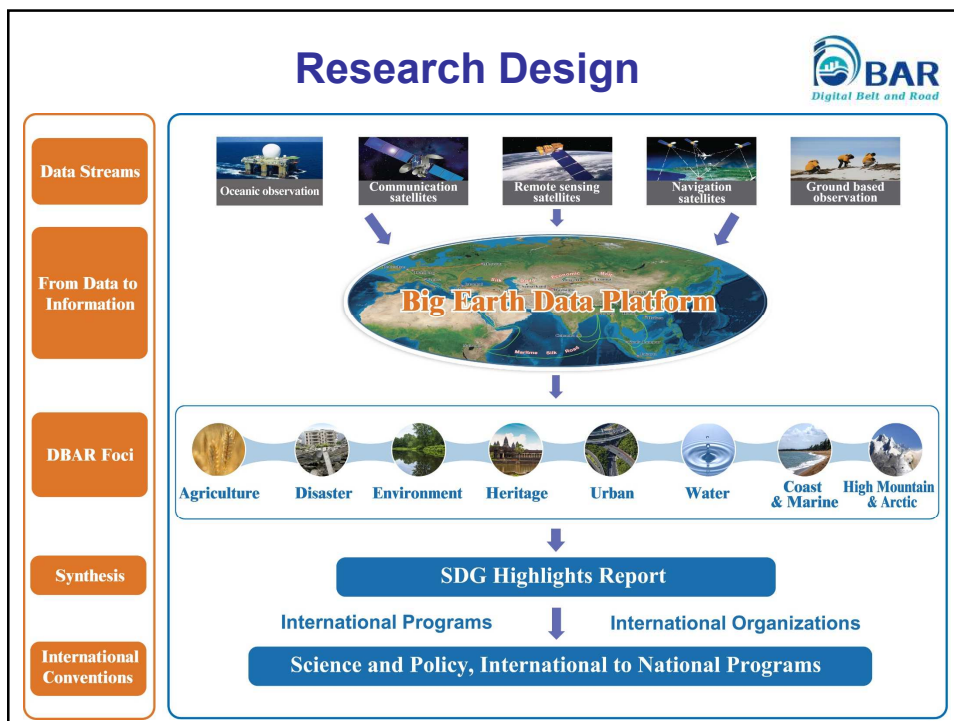
Big Earth Data Services

To promote advanced science and decision support services to extract effective information from massive, diverse and ever-growing volumes of Big Earth Data.




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DBAR Big Earth Data Platform



DBAR Big Earth Data Platform

High Orbit EO Sat.

Low Orbit EO Sat.

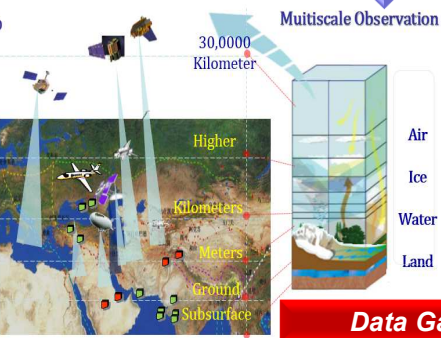
Airplane

UAV

Surface

Underground

Multiscale Observation



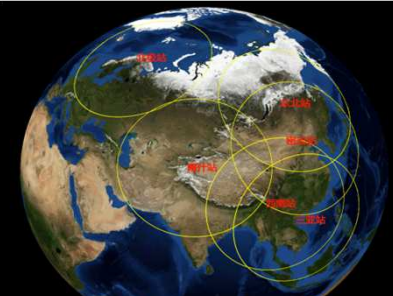
30,000 Kilometers

Higher Kilometers

Meters

Ground

Subsurface



Air

Ice

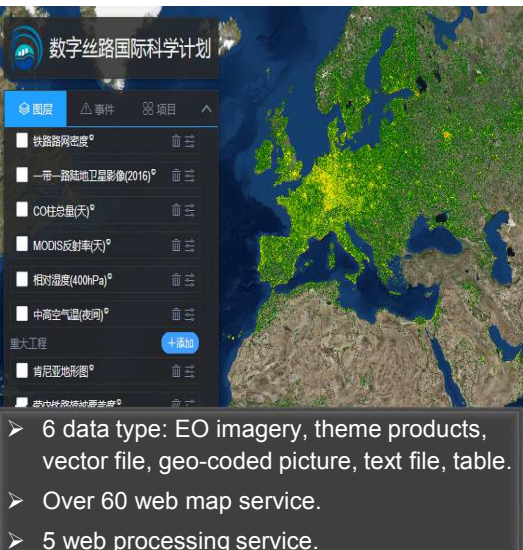
Water

Land

Data Gateway of the Belt and Road

For Scientific Application, For Policy Making, For Open and Sharing....

DBAR Big Earth Data Platform



数字丝路国际科学计划

- 铁路网密度
- 一带一路陆地卫星影像(2016)
- CO₂柱总量(天)
- MODIS反射率(天)
- 相对湿度(400hPa)
- 中高空气温(夜间)
- 重大工程
- 肯尼亚地形图
- 非洲铁路网密度

7 DBAR data products (over 90TB) were already available

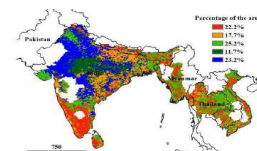
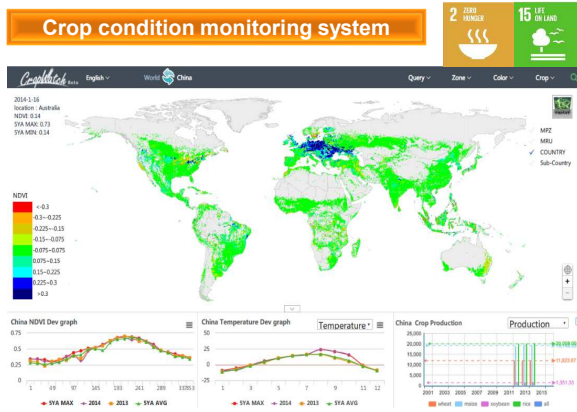
- 6 data type: EO imagery, theme products, vector file, geo-coded picture, text file, table.
- Over 60 web map service.
- 5 web processing service.

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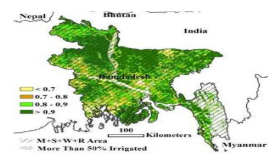
Agriculture Monitoring



- Crop condition monitoring system has **global scale** agricultural monitoring capabilities, covering **31** major producers and exporting countries;
- Downloading of CropWatch Bulletin has exceeded **46,000**;
- **Second** in the world and has surpassed the EU.



South and Southeast Asia MPZ: Farming intensity



Bangladesh crop condition Oct.2013-Jan. 2014

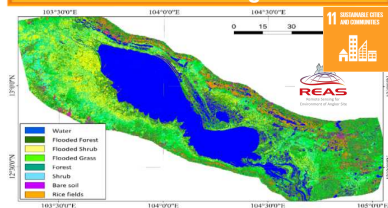
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World Heritages Monitoring



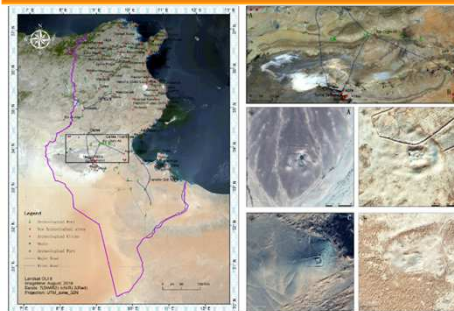
Developed a **World Heritage Remote Sensing Database**, including **40** world heritage sites in China, 40 years' Angkor Site data and dataset of Maritime Silk Road .

Project of Remote Sensing for Environment of Angkor Site



Land classification and change monitoring in the Tonle Sap Lake District, Cambodia


New archaeological sites discovery



Discovered 10 new archaeological sites in Tunisia dating to ancient Rome using Chinese space-based remote sensing technology.

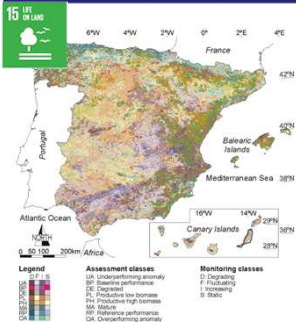
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Environmental Change

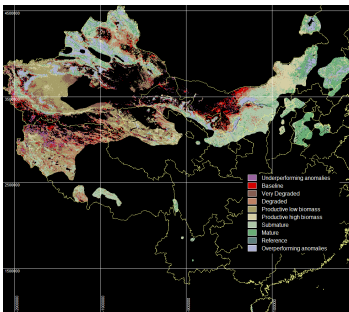


➢ Combine long-term and short-term rain use efficiency by reflecting biomass and resilience with Big Earth Data for land degradation assessment.

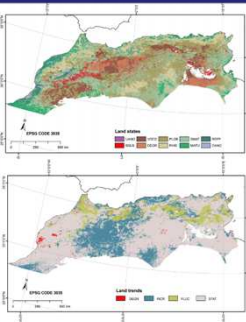
➢ Reporting to UNCCD for SDG 15.3.1.



Spain



China




North Africa

- North Africa: Proportion of degraded land is 21% , 0.7% is actively degrading;
- Spain: Proportion of degraded land is 20% , 1% is actively degrading;
- China: Proportion of degraded land is 35% , 9.12% is actively degrading.


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Environment in Coastal Zone



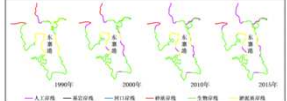
➢ Maritime silk road includes more than 50 countries and regions, crossing 12 major sea areas and 13 typical offshore waters zones.

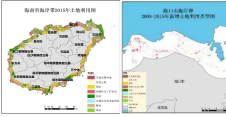
➢ "Port" and "Port City" are key nodes and important hubs of Maritime silk road.



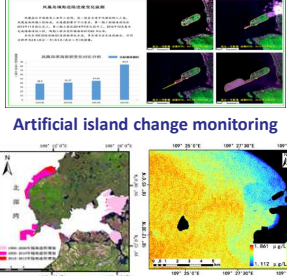
海洋环境 海岸带建设 港口和港城 河口、三角洲 海平面上升

Coastline resource distribution and type evolution

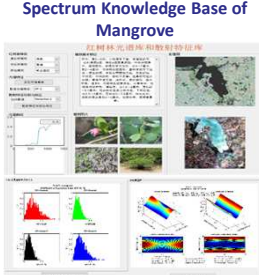




Artificial island change monitoring




Spectrum Knowledge Base of Mangrove



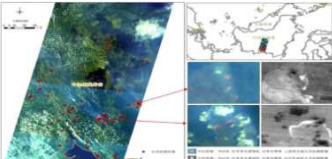
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Disaster Monitoring

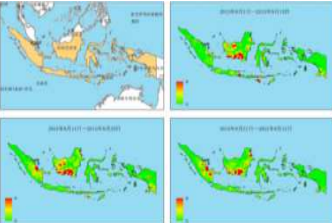


Indonesian Forest Fires Monitoring

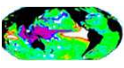
Indonesia suffers from the worst forest fire in history from Aug to Oct 2015.

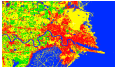


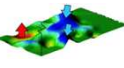
Oct. 10 2015, Forest Fires Monitoring
-Using CBERS,GF, MODIS data and detected **70** hot spots.




Fire density map (Aug. 2015)


Meteorological data



Land use


Terrain

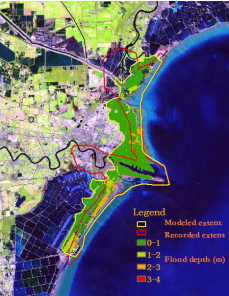

Social economy data

↓

Coastal flood risk assessment and simulation




Simulation for 20 hours after Storm surge



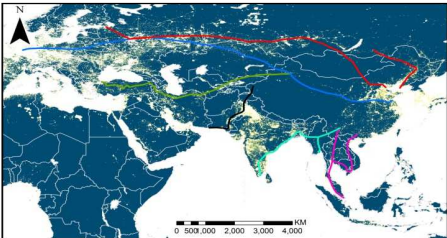
Comparison between simulation results and recorded data


itroad.org

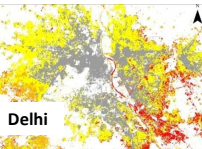
Urban Expansion Monitoring

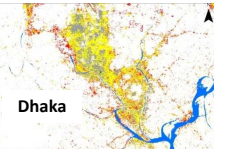



Urban expansions of key cities in the Belt and Road region



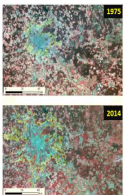

Karachi



Delhi


Dhaka



Manila

40 years of urban expansion in Moscow



1975

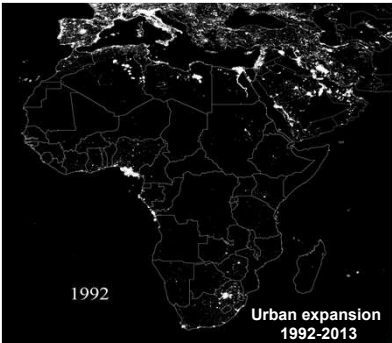

2014

9 工业、创新和基础设施



11 可持续城市和社区






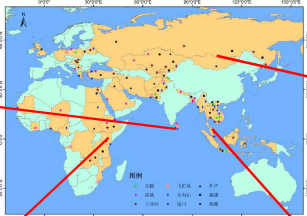
1992 Urban expansion 1992-2013


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Major Construction Monitoring




Distribution of Construction Projects

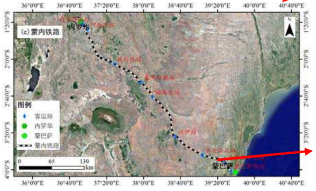




Hambantota port construction




Mongolian Tavan Tolgoi Coal Mine




a) Location of Railway

Mombasa-Nairobi Railway



b) Bridge construction



Malaysia-China Kuantan Industrial Park

DBAR Five Priority Areas







1. **Enhance infrastructure.**
2. **Promote data sharing and interoperability.**
3. **Extend applications to more people.**
4. **Identify research opportunities.**
5. **Strengthen international collaboration.**

Guo Huadong. Steps to the digital Silk Road. *Nature*, 554 (1 February 2018): 25-27.
Available at <https://www.nature.com/articles/d41586-018-01303-y>

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