

# Steps to the Digital Silk Road

**GUO Huadong**

[hdguo@radi.ac.cn](mailto:hdguo@radi.ac.cn)

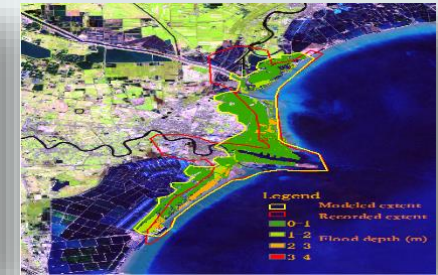
**19 November 2018 Deqing, China**



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

# 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



# 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.

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

## Big Earth Data Services



# DBAR in Numbers

**3** Continents

**8** SDGs

**10** Years

**7** Working Groups

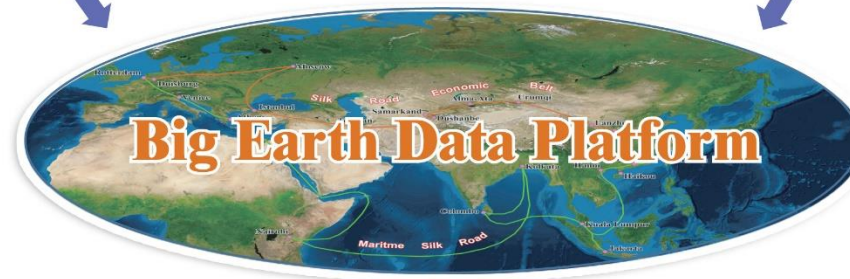
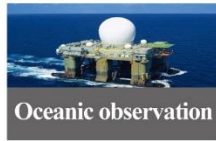
**2** Task Forces

**48** Partners

**8** ICoEs

**1** Big Earth Data Platform

# Research Design



**SDG Highlights Report**

International Programs

International Organizations

**Science and Policy, International to National Programs**

**Data Streams**

**From Data to Information**

**DBAR Foci**

**Synthesis**

**International Conventions**

# DBAR ICoE

**A global network for Big Earth Data knowledge, expertise and researchers**



**Launching of DBAR ICoEs (Dec, 2017)**



**Launching of ICoE-Bangkok (Feb, 2018)**



**Launching of ICoE- El Jadida (Apr, 2018)**



**Launching of ICoE-Lusaka (Jun, 2018)**



**Launching of ICoE-Moscow (Sep, 2018)**



**Launching of ICoE-Helsinki (Oct, 2018)**





# DBAR Big Earth Data Platform



## DBAR Big Earth Data Platform



High Orbit EO Sat.

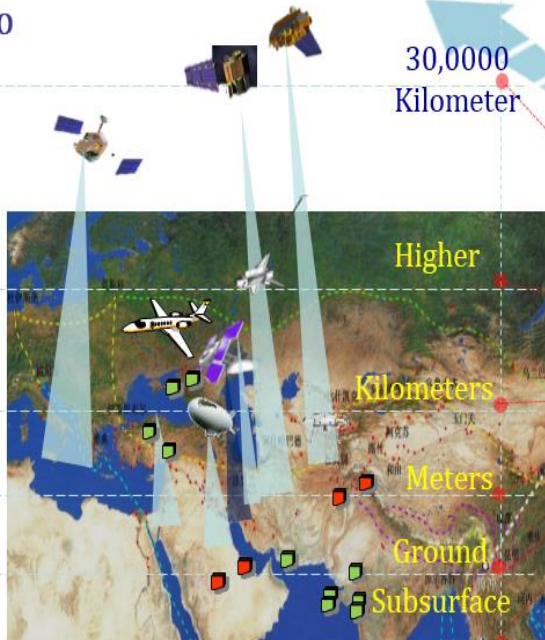
Low Orbit EO Sat.

Airplane

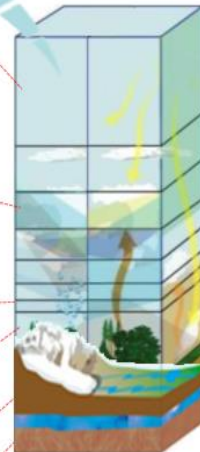
UAV

Surface

Underground



Multiscale Observation

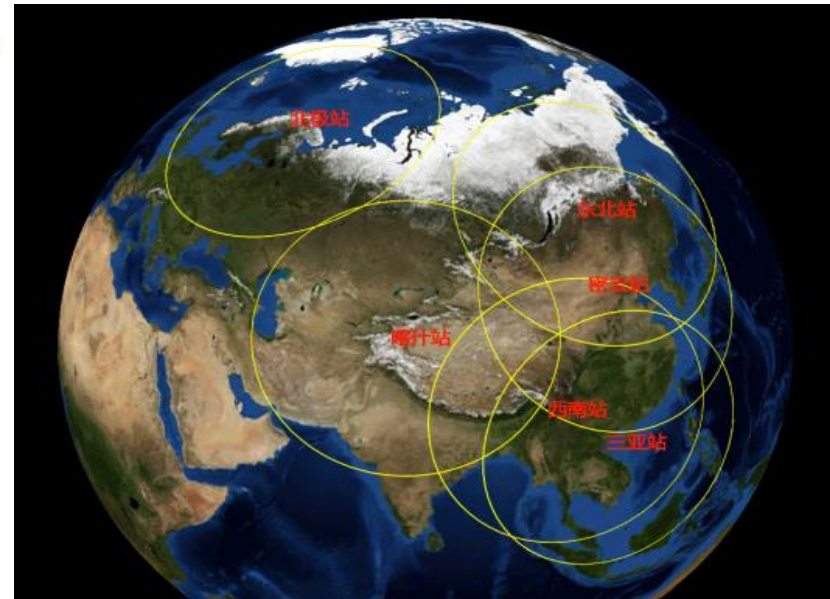


Air

Ice

Water

Land

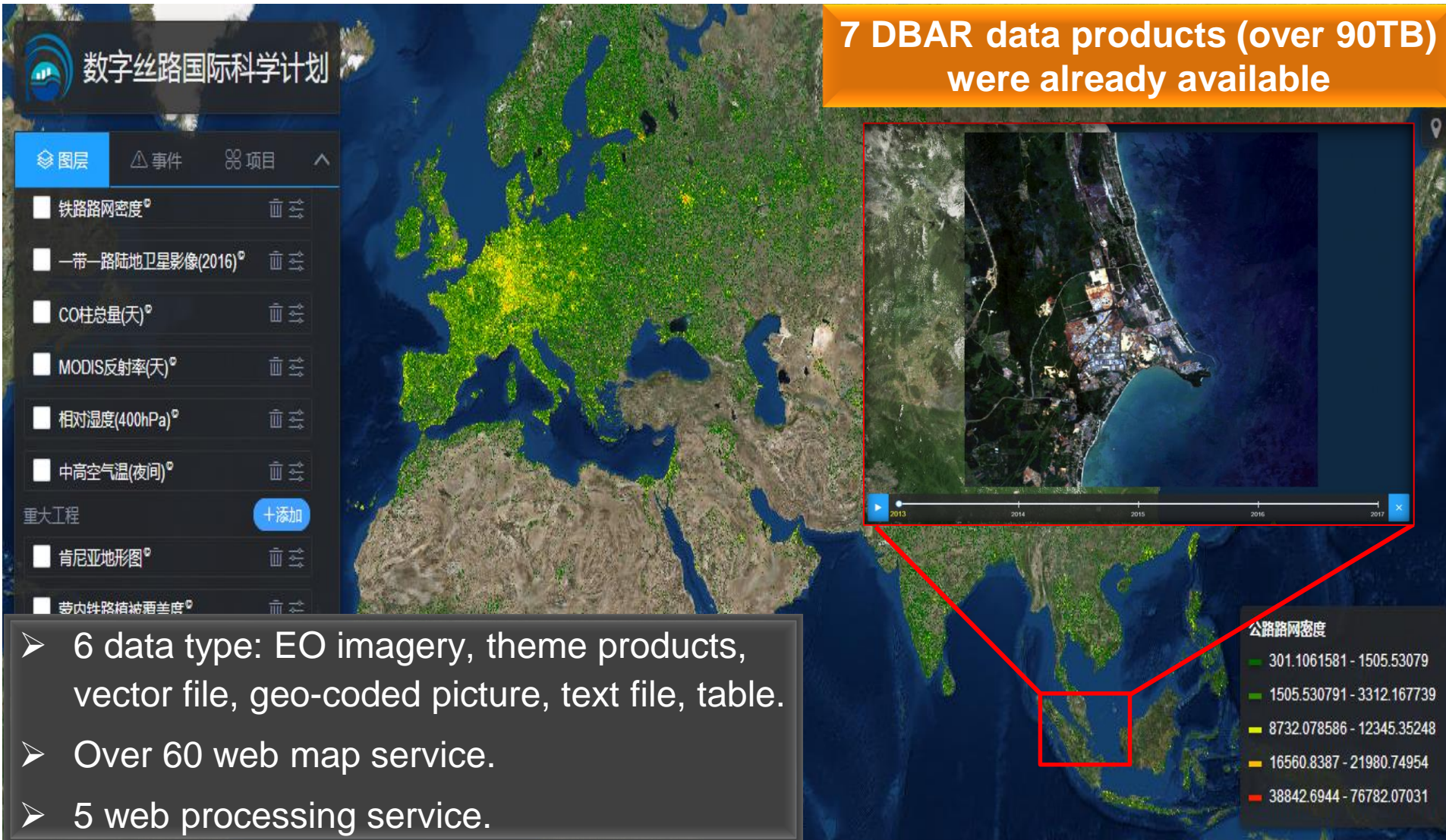


*Data Gateway of the Belt and Road*

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

# DBAR Big Earth Data Platform

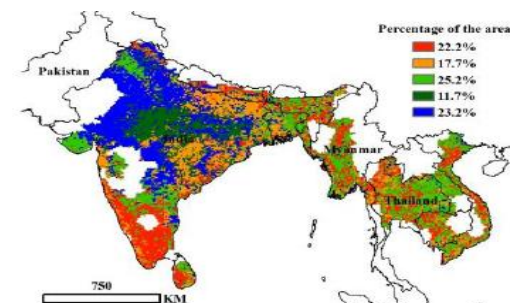
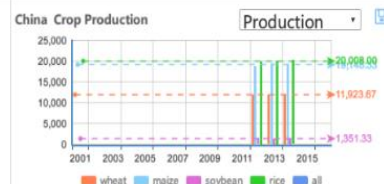
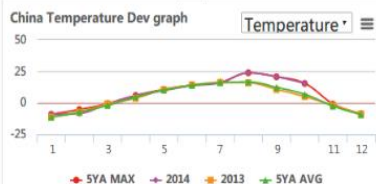
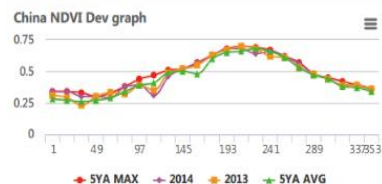
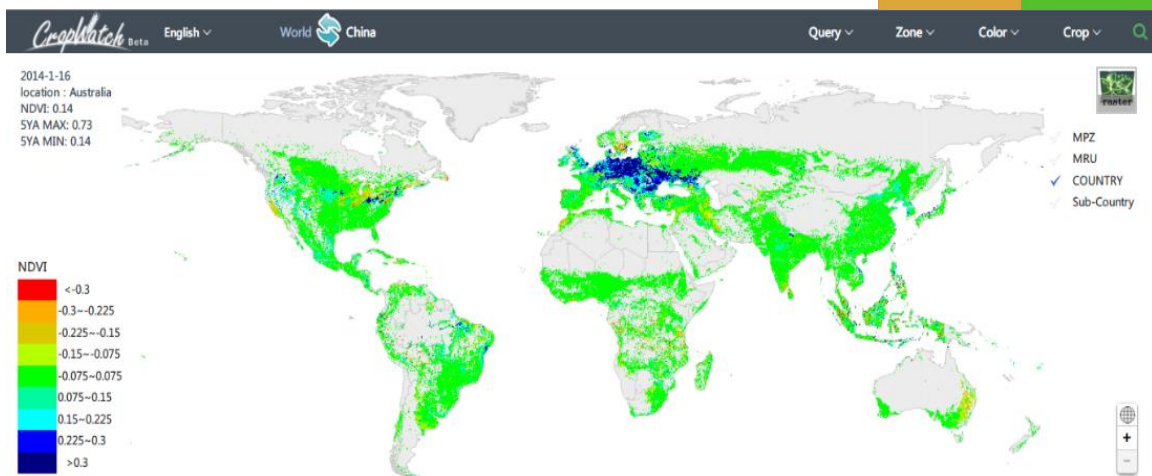
7 DBAR data products (over 90TB)  
were already available



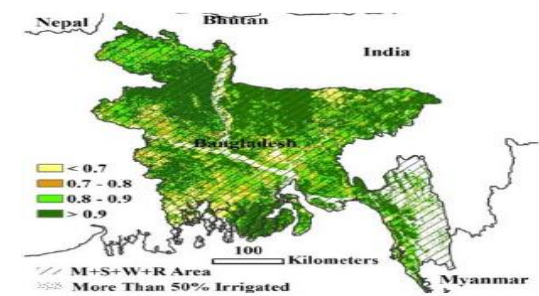
# Agriculture Monitoring

- 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.

## Crop condition monitoring system



South and Southeast Asia  
MPZ: Farming intensity

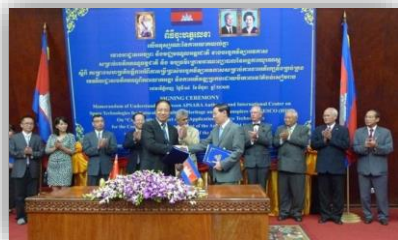
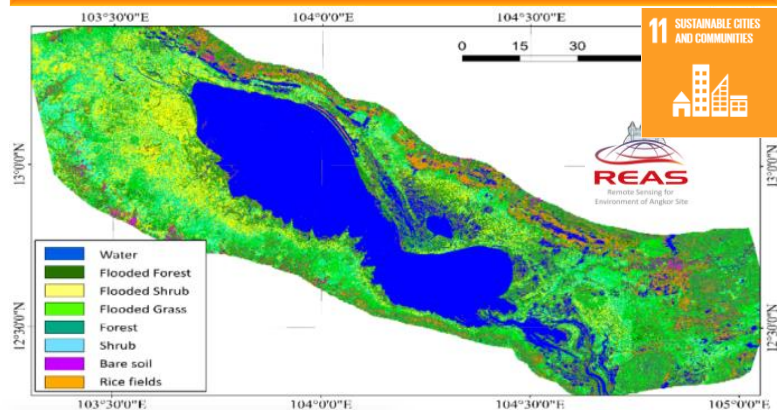


Bangladesh crop condition  
Oct.2013-Jan. 2014

# World Heritages Monitoring

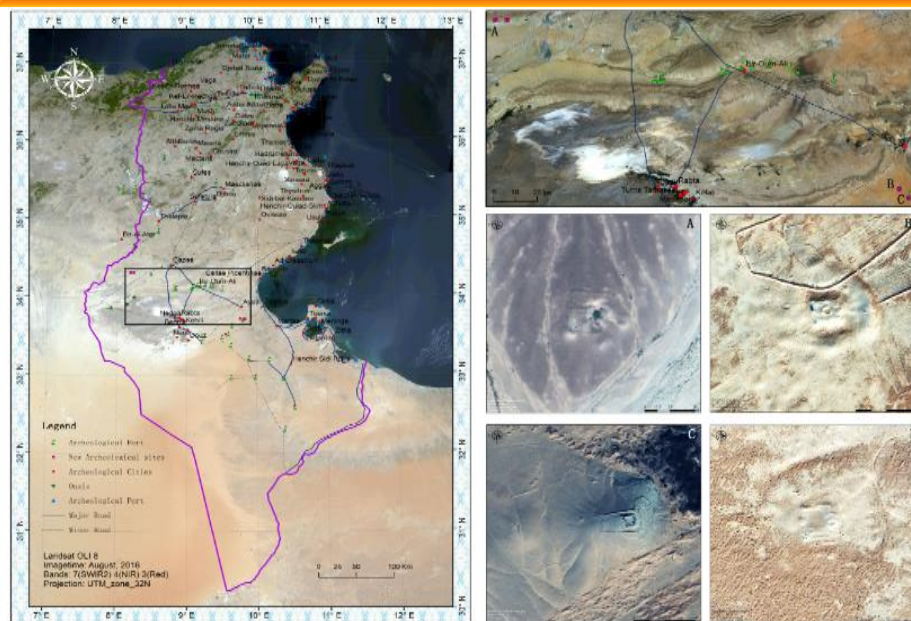
Developed a **World Heritage Remote Sensing Database**, including **40** world heritage sites in China, 40 years' Angkor Site data and dataset of Maritime Silk Road .

## Project of Remote Sensing for Environment of Angkor Site



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

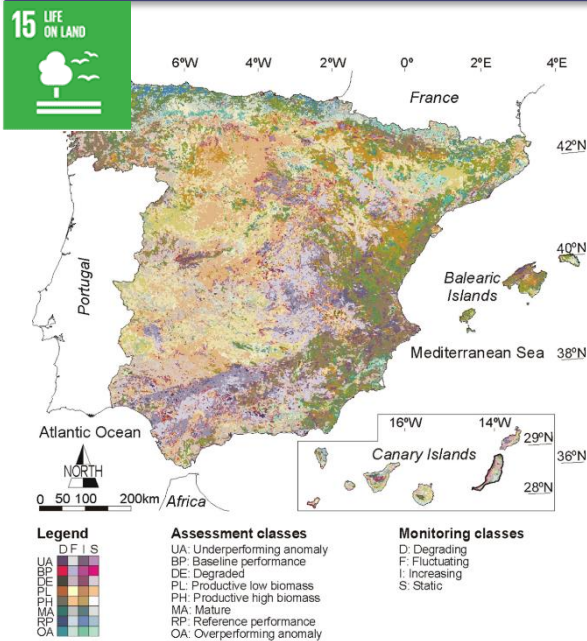
## New archaeological sites discovery



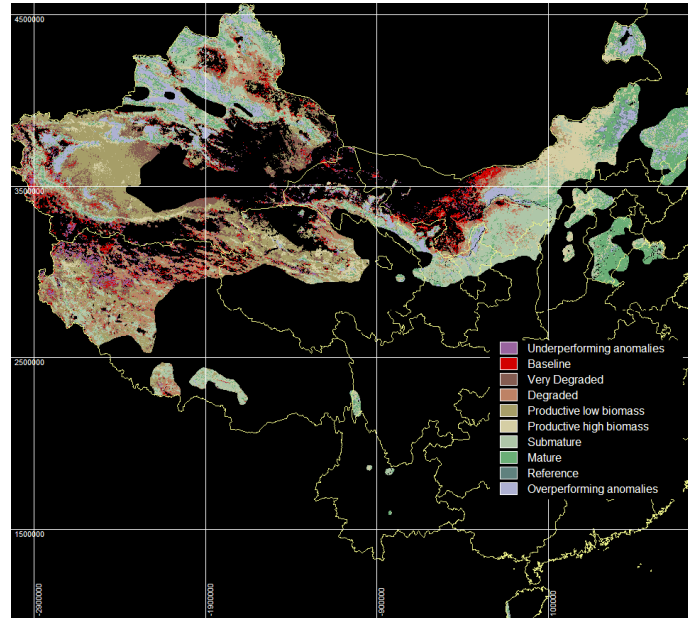
Discovered 10 new archaeological sites in Tunisia dating to ancient Rome using Chinese space-based remote sensing technology.

# Environmental Change

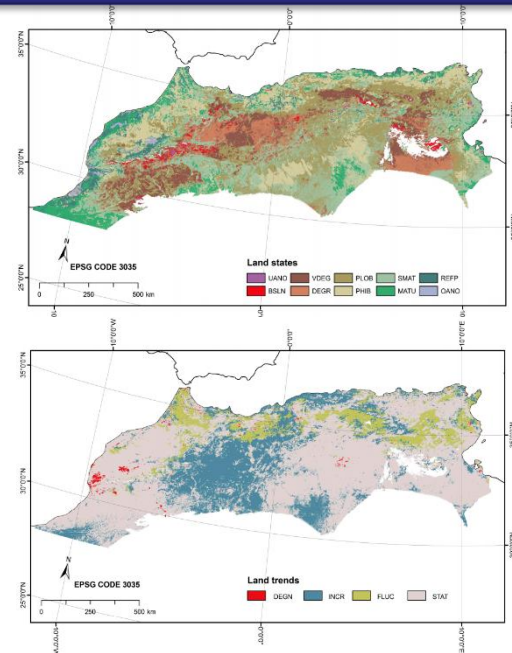
- Combine long-term and short-term rain use efficiency by reflecting biomass and resilience with Big Earth Data for land degradation assessment.
- Reporting to UNCCD for SDG 15.3.1.



**Spain**



**China**



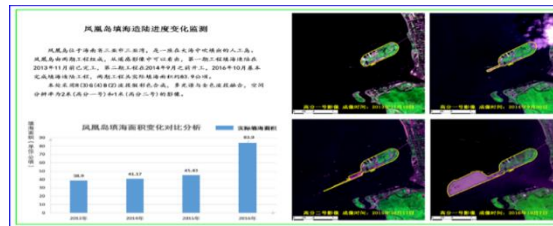
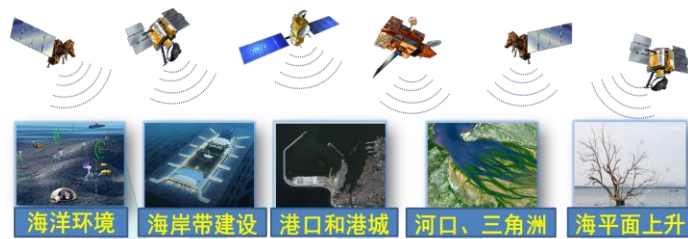
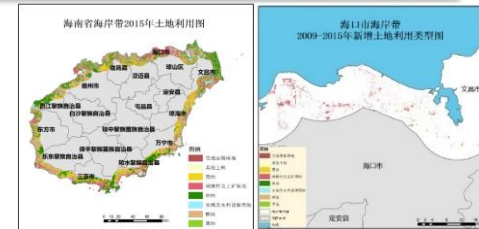
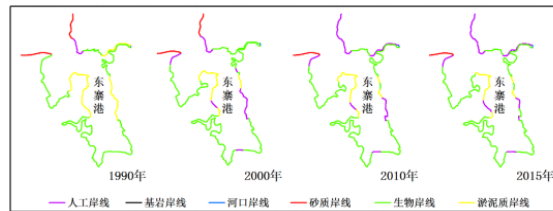
**North Africa**

- **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.

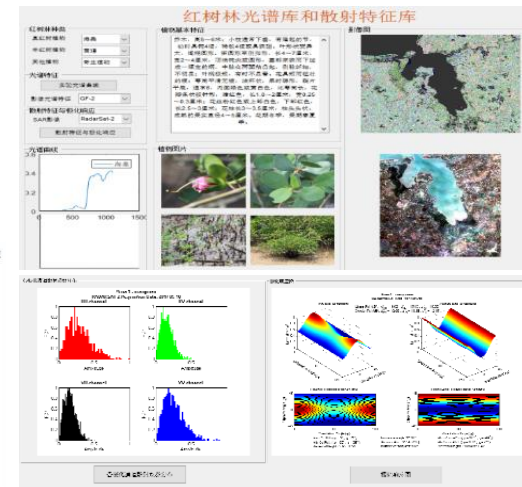
# Environment in Coastal Zone

- 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.

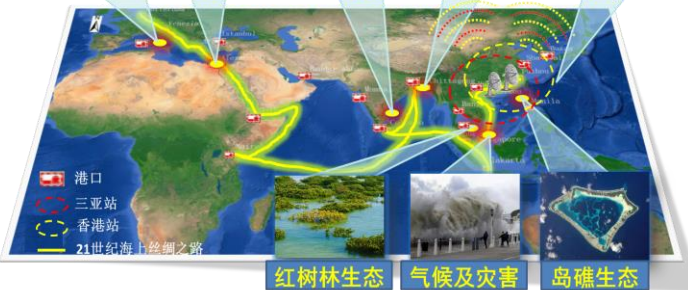
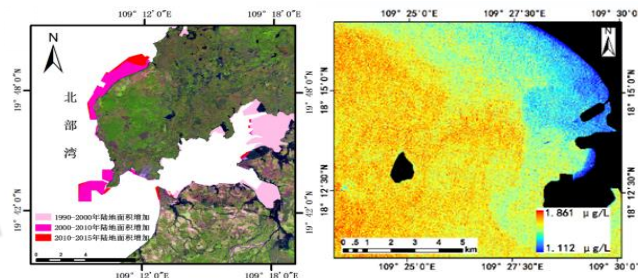
## Coastline resource distribution and type evolution



## Spectrum Knowledge Base of Mangrove



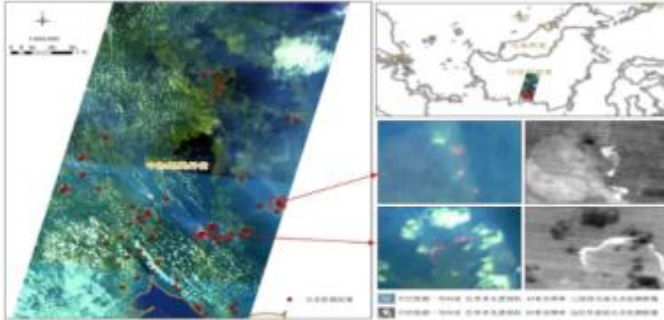
## Artificial island change monitoring



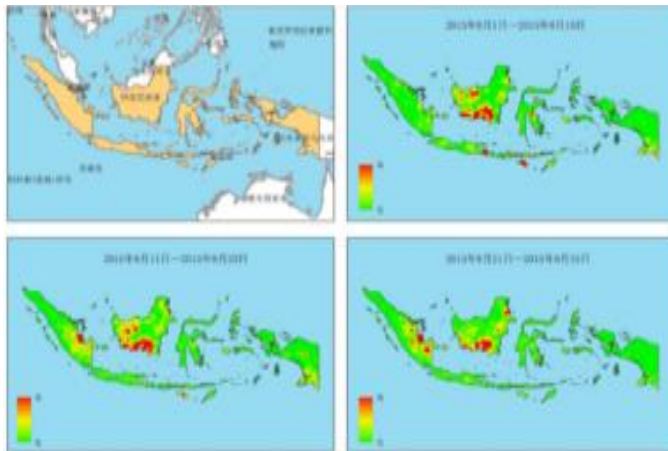
# Disaster Monitoring

## Indonesian Forest Fires Monitoring

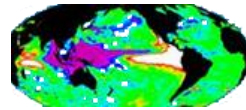
Indonesia suffers from the worst forest fire in history from Aug to Oct 2015.



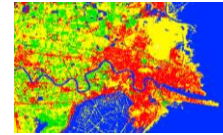
Oct. 10 2015, Forest Fires Monitoring  
-Using CBERS,GF, MODIS data and detected **70** hot spots.



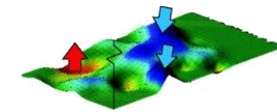
Fire density map (Aug. 2015)



Meteorological data



Land use



Terrain

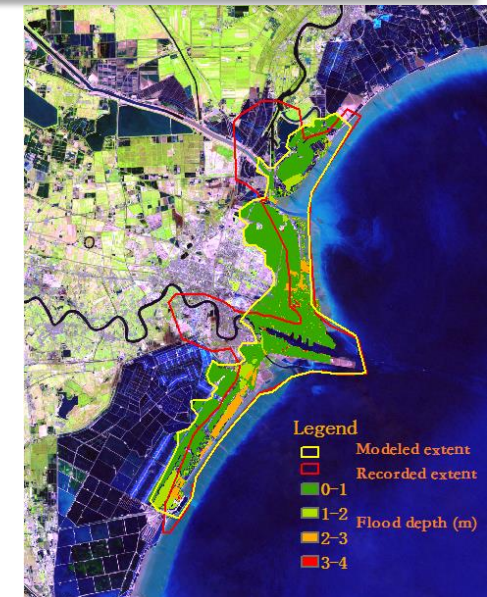


Social economy data

## Coastal flood risk assessment and simulation

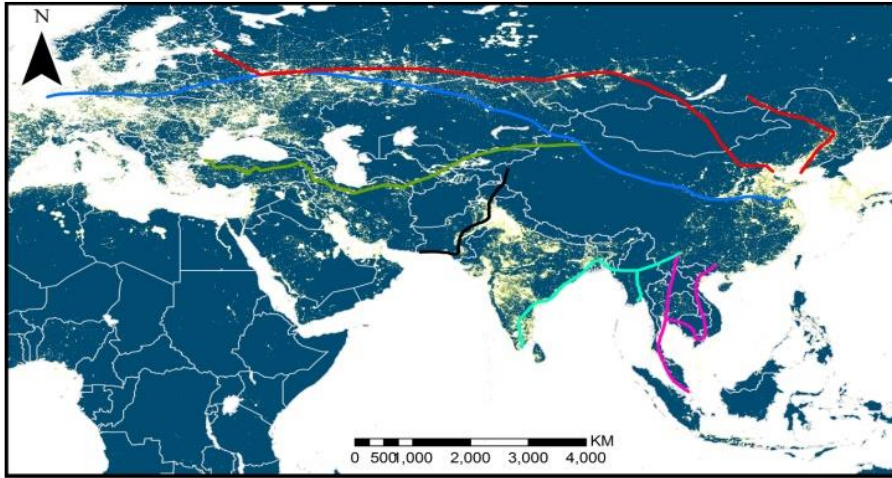


Simulation for 20 hours after Storm surge

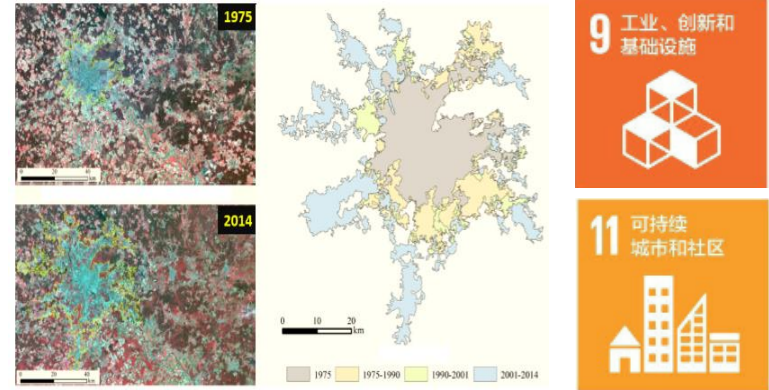


Comparison between simulation results and recorded data

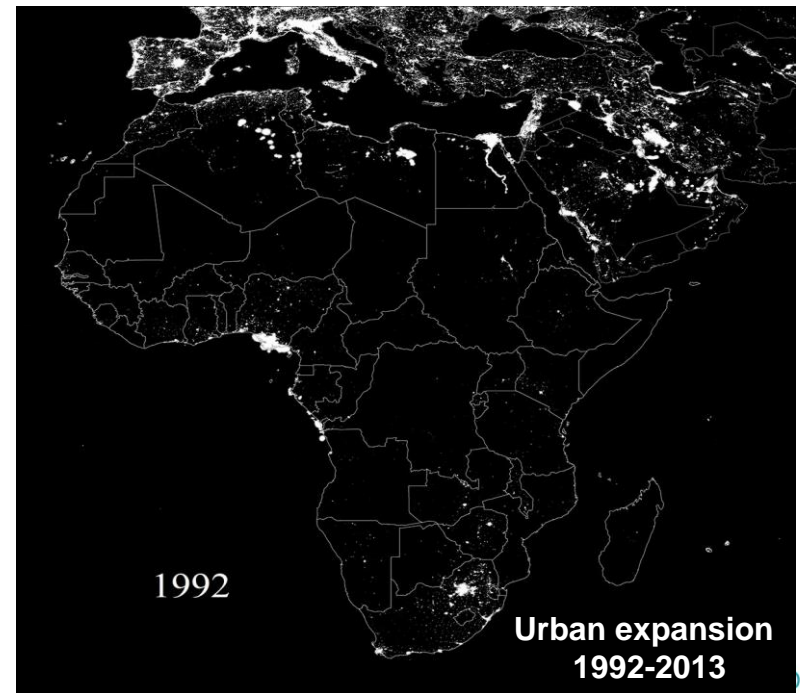
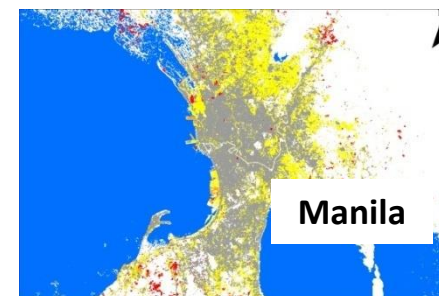
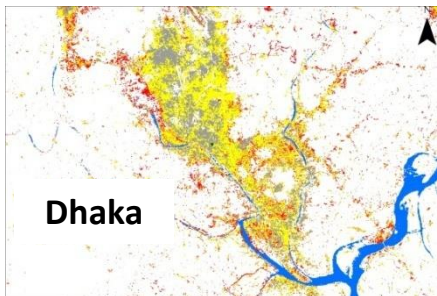
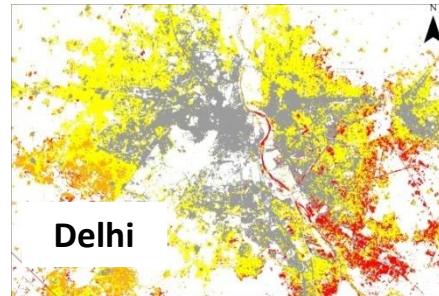
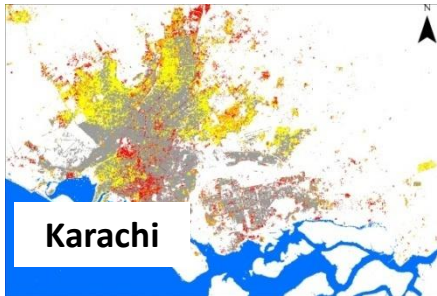
# Urban Expansion Monitoring



## 40 years of urban expansion in Moscow



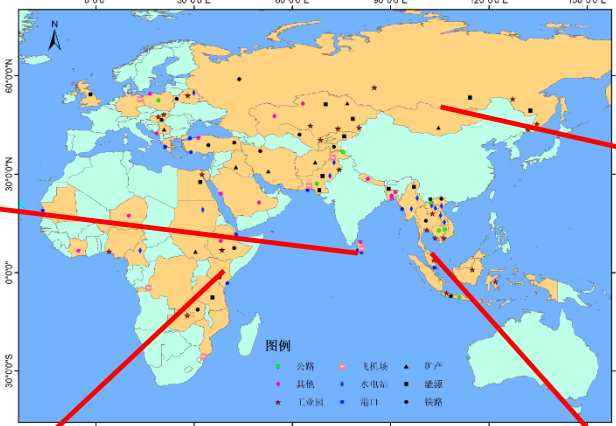
## Urban expansions of key cities in the Belt and Road region



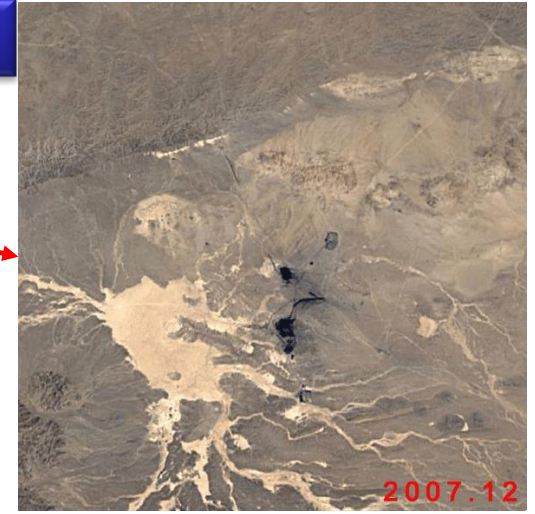


# Major Construction Monitoring

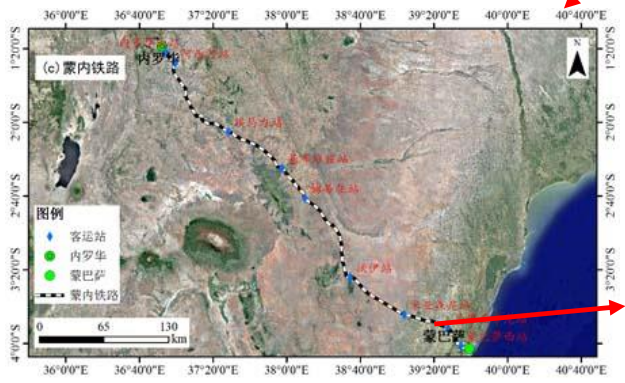
## Distribution of Construction Projects



Hambantota port construction



Mongolian Tavan Tolgoi Coal Mine



a) Location of Railway

Mombasa-Nairobi Railway

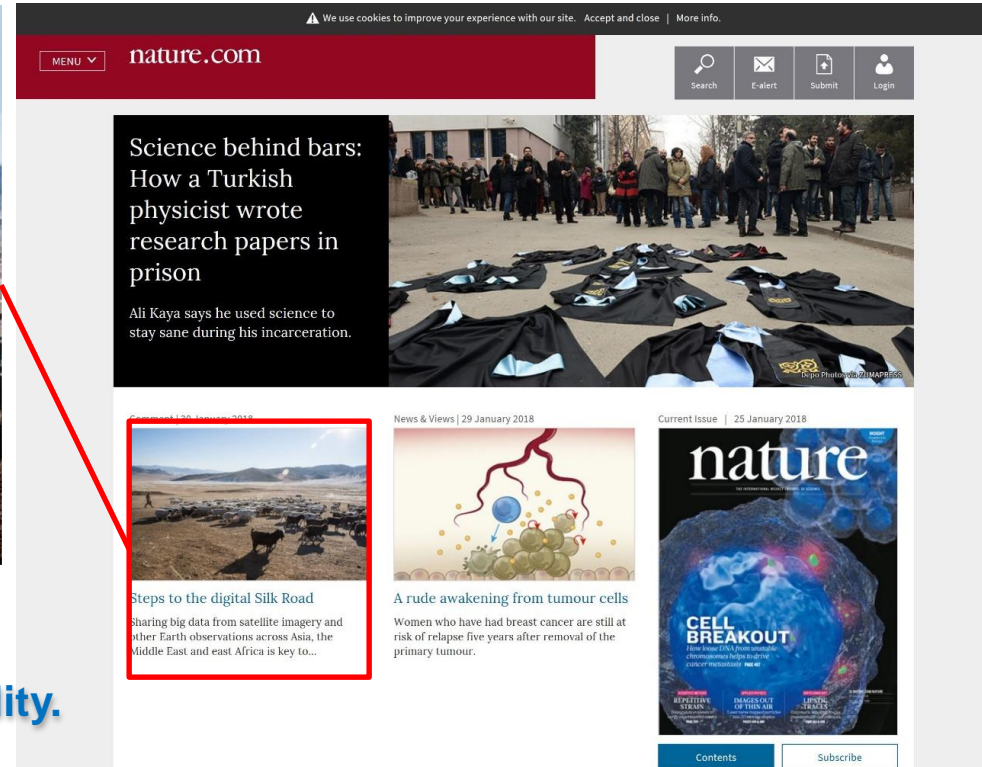


b) Bridge construction



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>



# THE 3<sup>rd</sup> DIGITAL BELT AND ROAD CONFERENCE

5-7 December 2018 Tengchong • China

<http://dbar2018.csp.escience.cn>

DBAR 2018 will be held on **5-7 December, 2018** in **Tengchong, Yunnan, China**.

It aims to

- promote **sustainable development** in the Belt and Road region.
- promote research and discussion on utilizing **Big Earth Data monitoring of UN SDGs indicators** along the Belt and Road region.
- provide a common platform to scientists and decision makers to **facilitate implementation of the Digital Silk Road scientific agenda**.

Hosted by:  **BAR**  
Digital Belt and Road

Co-hosted by: Tengchong Municipal People's Government

Sponsored by:





# Thanks

**DBAR Secretariat**

No.9 Dengzhuang South Road

Haidian District, Beijing 100094, China

Tel: +86 10 82178980

Fax: +86 10 82178959

[www.dbeltroad.org](http://www.dbeltroad.org)

