Geological data for the Sustainable Development Data Ecosystem

Towards nationally integrated geospatial information management

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中国地质调查局
CHINA GEOLOGICAL SURVEY

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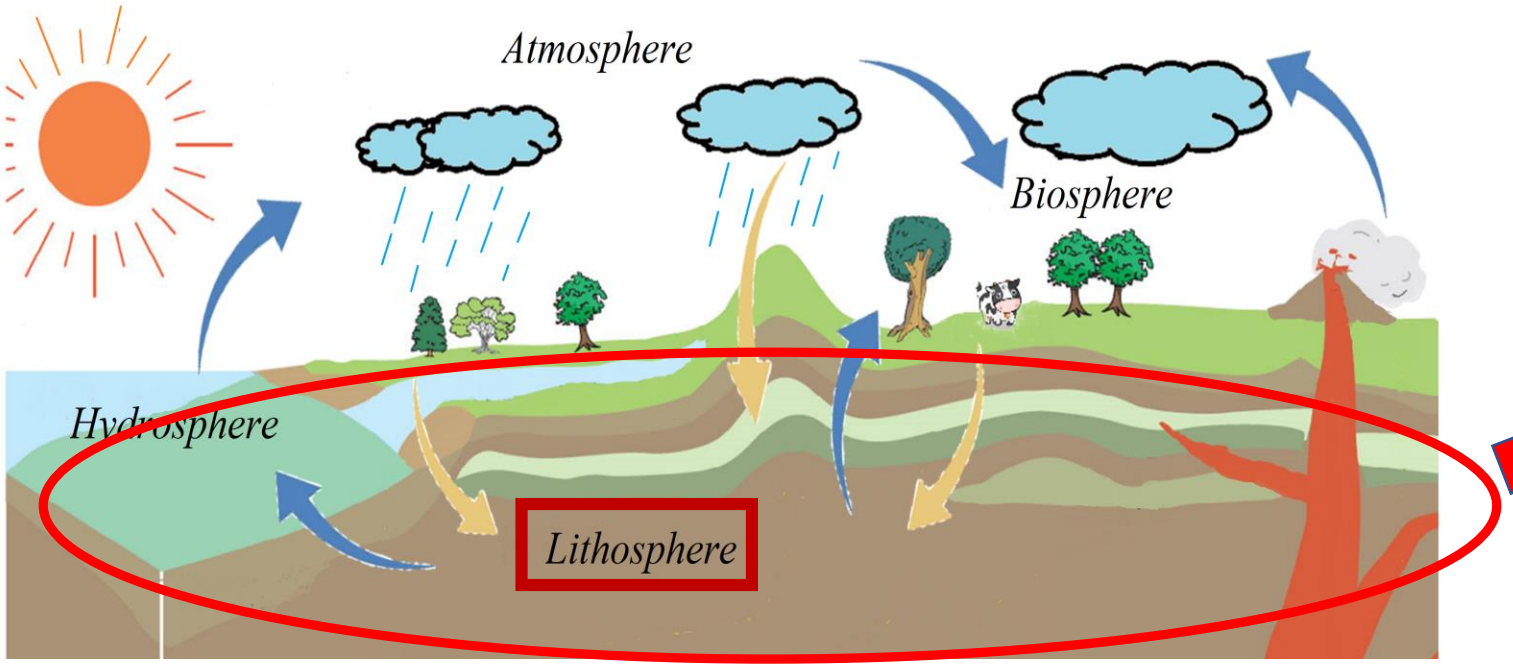
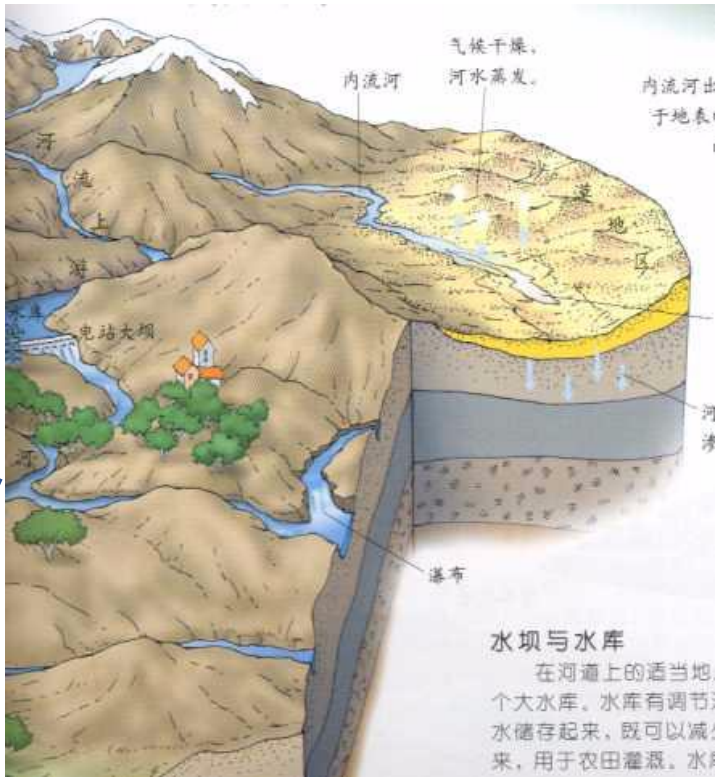
Geological Works and Data

Object: Crust, Earth (lithosphere)

Mission: Determine the composition, structure and evolution of Earth. To obtain the information about resources and environments for our living

The geological work is a complete process of the data ecosystem.





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Geological Works and Data

Field Route Data Collection

Sample analysis test

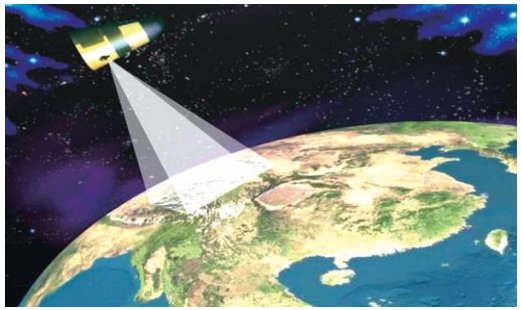
Remote sensing

Geophysical Exploration

Geochemical Exploration

Geological disaster monitoring

Comprehensive analysis and results report



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Geological Works and Data

Spatial

Describes the spatial structure and attributes below the surface

Reusable

minerals, geophysics, geochemistry, mathematical geology, geomechanics, environment, paleontology

全国地质资料馆
NATIONAL GEOLOGICAL ARCHIVES OF CHINA

Historical

Long time formation and impact

Complex

Various methods and multi-level acquisition platform

description as reports, videos, images, etc.

Cost highly, and requires long term field working

Precious

Sustainable development practices from Geology

12

Sustainable resources and energies providing

- Mineral resources: lithium battery (using lithium mine), shale gas, oil, natural gas and clean energy— geothermal
- Groundwater and shallow geothermal energy



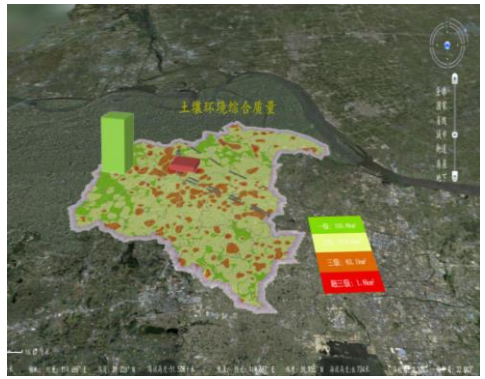


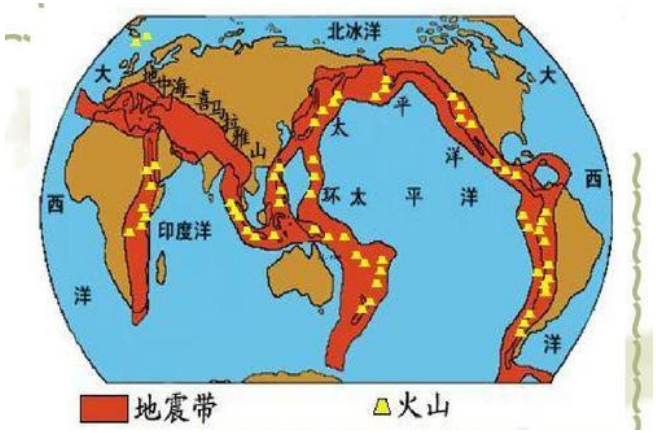


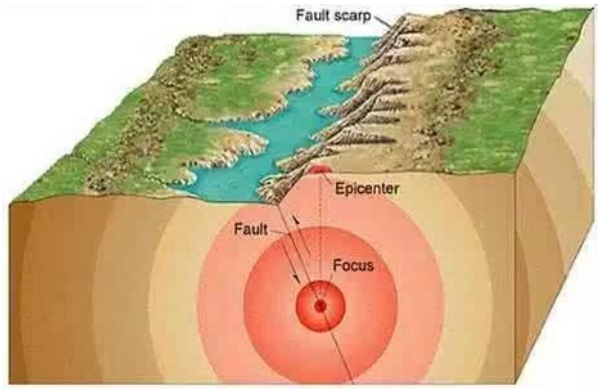
Sustainable development practices from Geology

12 Evidence of resource exploitation、disaster and diseases prevention providing

- Resource and disaster predication: the space - time distribution and the mechanism of forming of material and disaster
- Relationship between subsidence and lung disease caused by resource exploitation and
- Endemic diseases, which is mainly caused by certain soil elements



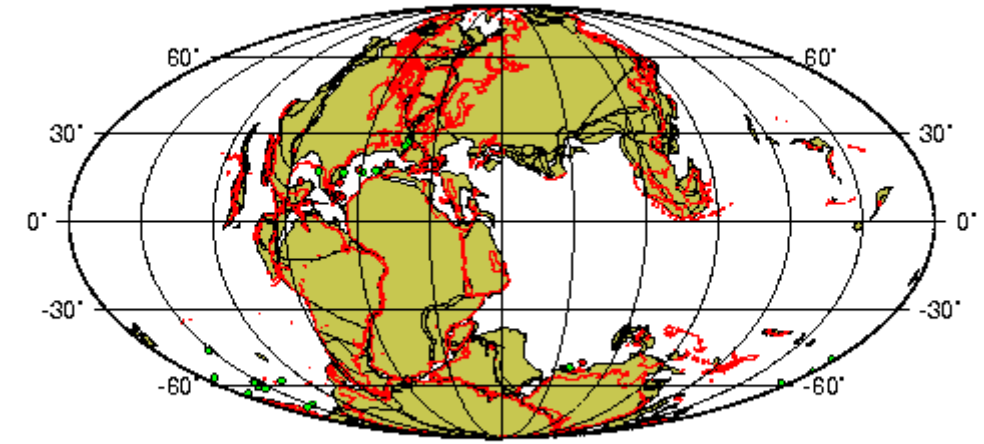




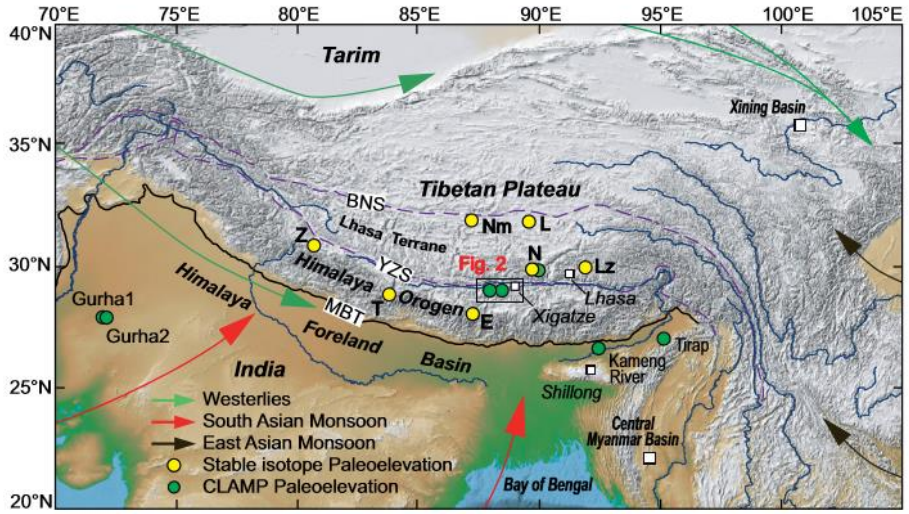
Sustainable development practices from Geology

13 Evidence of earth condition and global climate prediction providing

- The occurrence of geological events based on the time of geological bodies formation
- Paleogeography, paleoclimate, paleontology, and geochemistry
- Quantifying the rise of the Himalaya orogen and implications for the South Asian monsoon



150 My Reconstruction

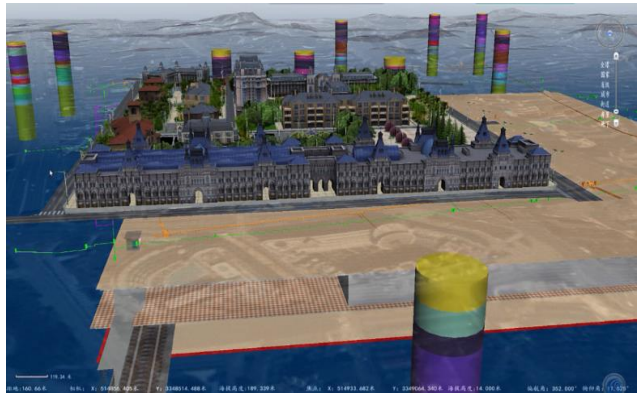


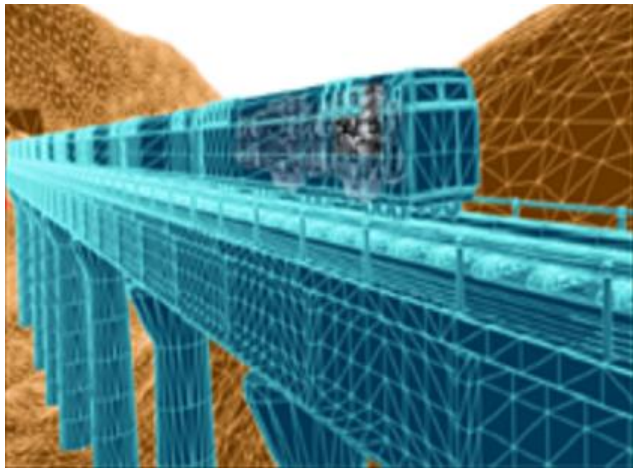
13 CLIMATE ACTION

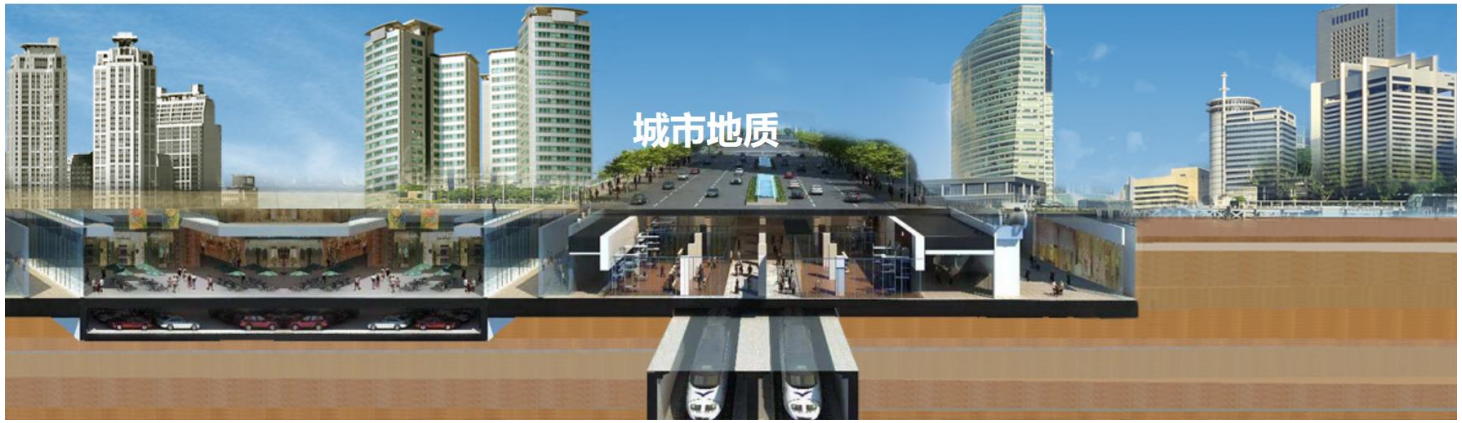
Sustainable development practices from Geology

9 Evidence of urban and national critical infrastructure build providing

- Provides data from the underground
- Underground space planning
- 3D modeling with digital Twins







Sustainable development practices from Geology

1 Geopark, Geological Relics and Characteristic Agriculture

National Geopark

Geological Relics

Characteristic Agriculture

Case studies for integrated geospatial information management

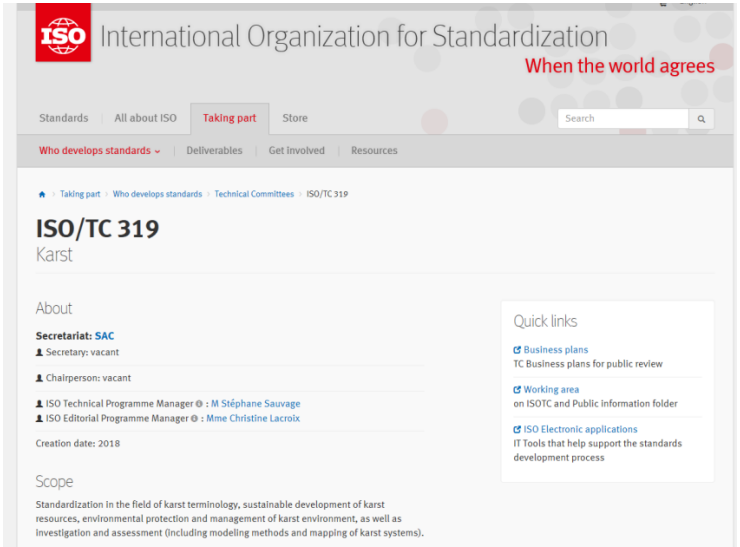
International Karst Data Hub

United Nations
Educational, Scientific and
Cultural Organization

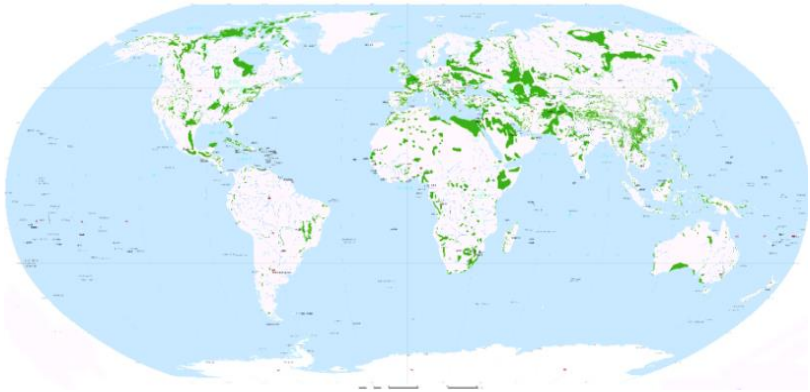
2008-International Research Center on Karst

Resources and Environmental Effects of Global Karst Dynamics Systems

6 major fields
1. carbon cycle
2. karst water
3. karst landscape
4. ecology
5. karst geological disaster



2018-ISO/TC 319 - Karst



World Karst Map (2018)

Karst landscapes

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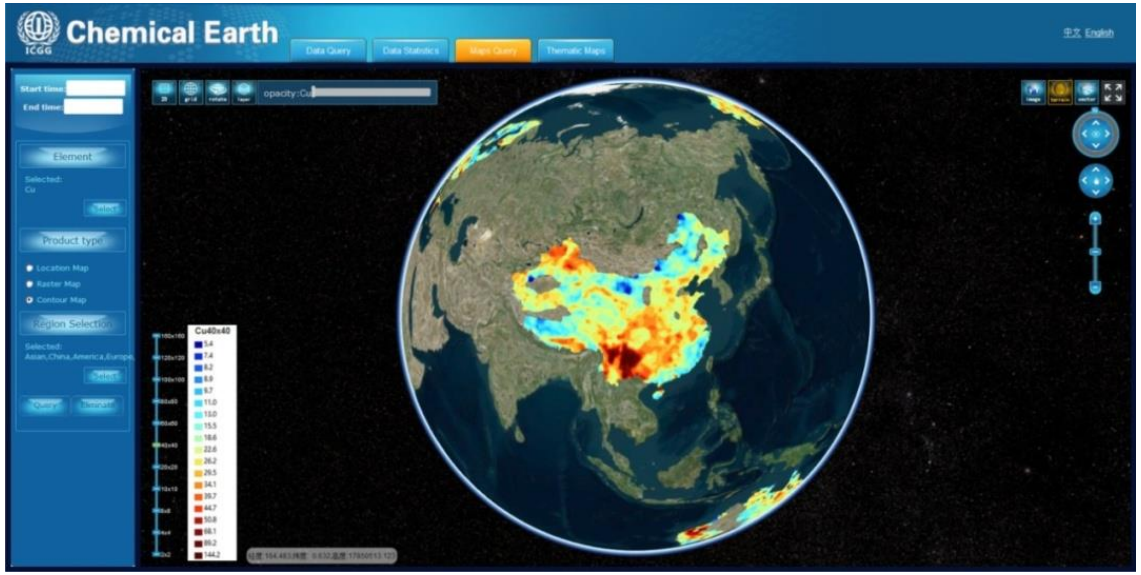
International Geochemistry Hub

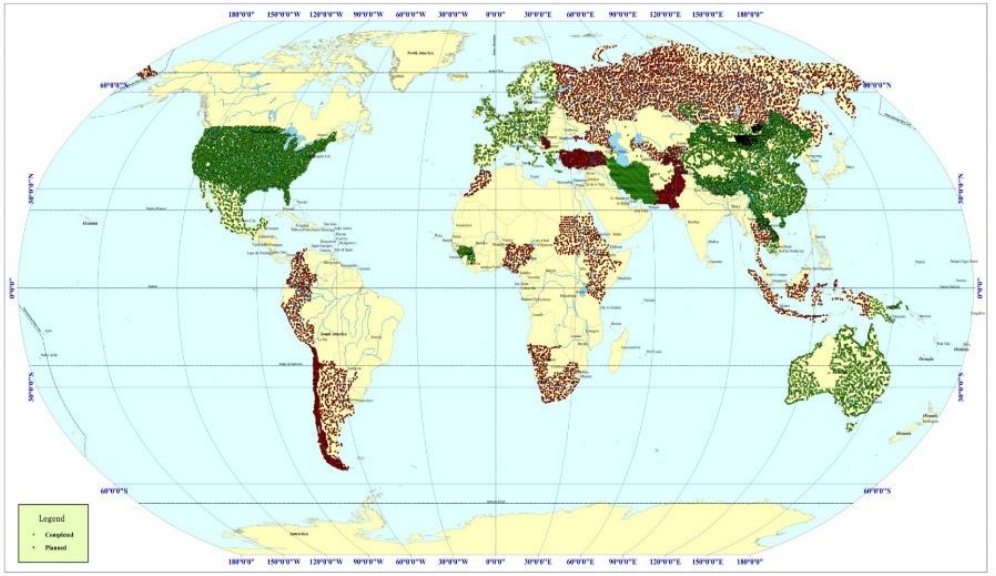
United Nations Educational, Scientific and Cultural Organization

UNESCO International Centre on Global-Scale Geochemistry

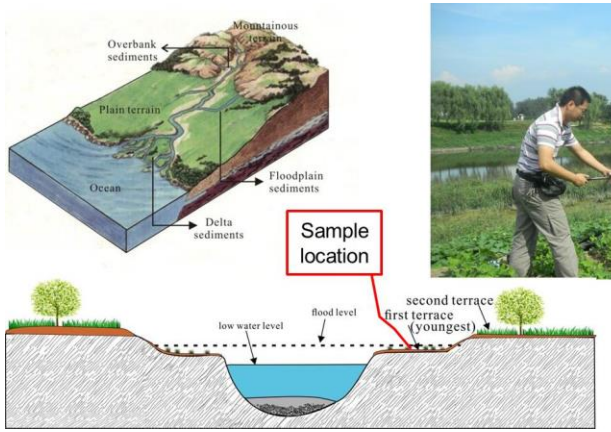
2016-International Centre on Global-Scale Geochemistry



Chemical Earth Platform on the website



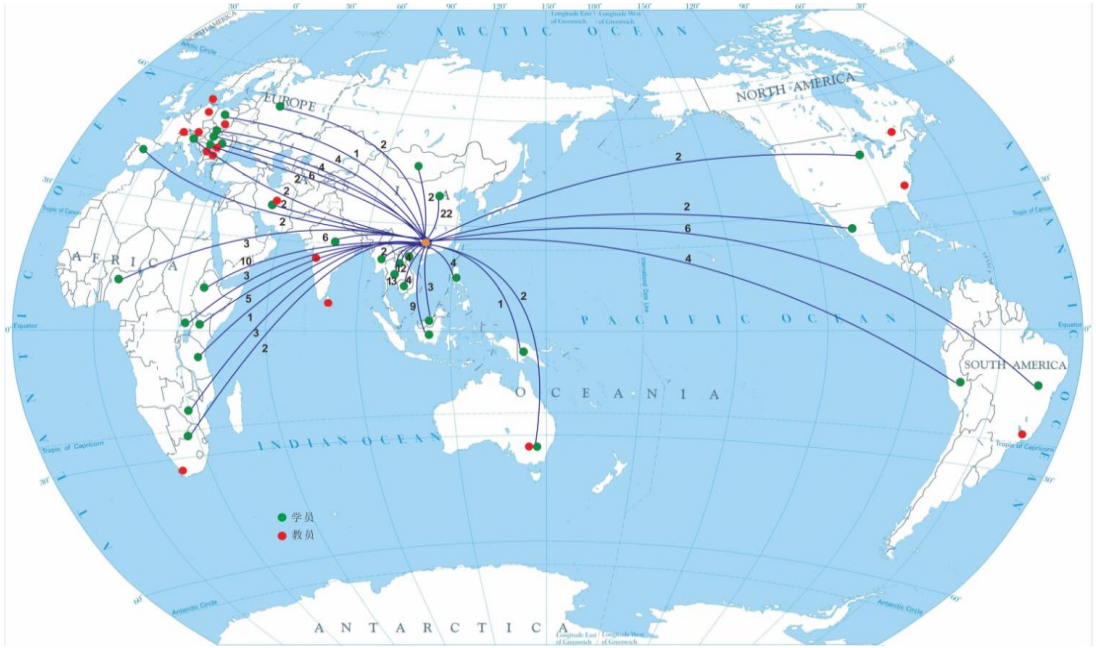
Baseline of World Geochemistry



Develop and standardize methods

Case studies for integrated geospatial information management

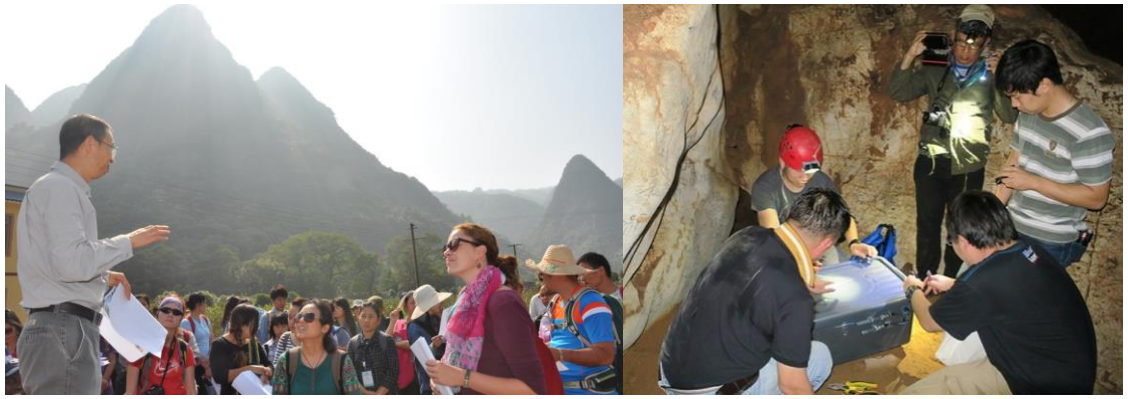
Training and international geological survey



More than **1,000 trainees** from the world participated in the training course host by CGS. The training topic covers water resources, basic geology, karst, geochemistry, map compilation, and other fields of geology. **Much data was got during this communication**

International Geological Survey in 27 countries, including 11 in Asia, 10 in Africa, 2 in Oceania and 4 in South America. Many fields were involved in the international geological survey

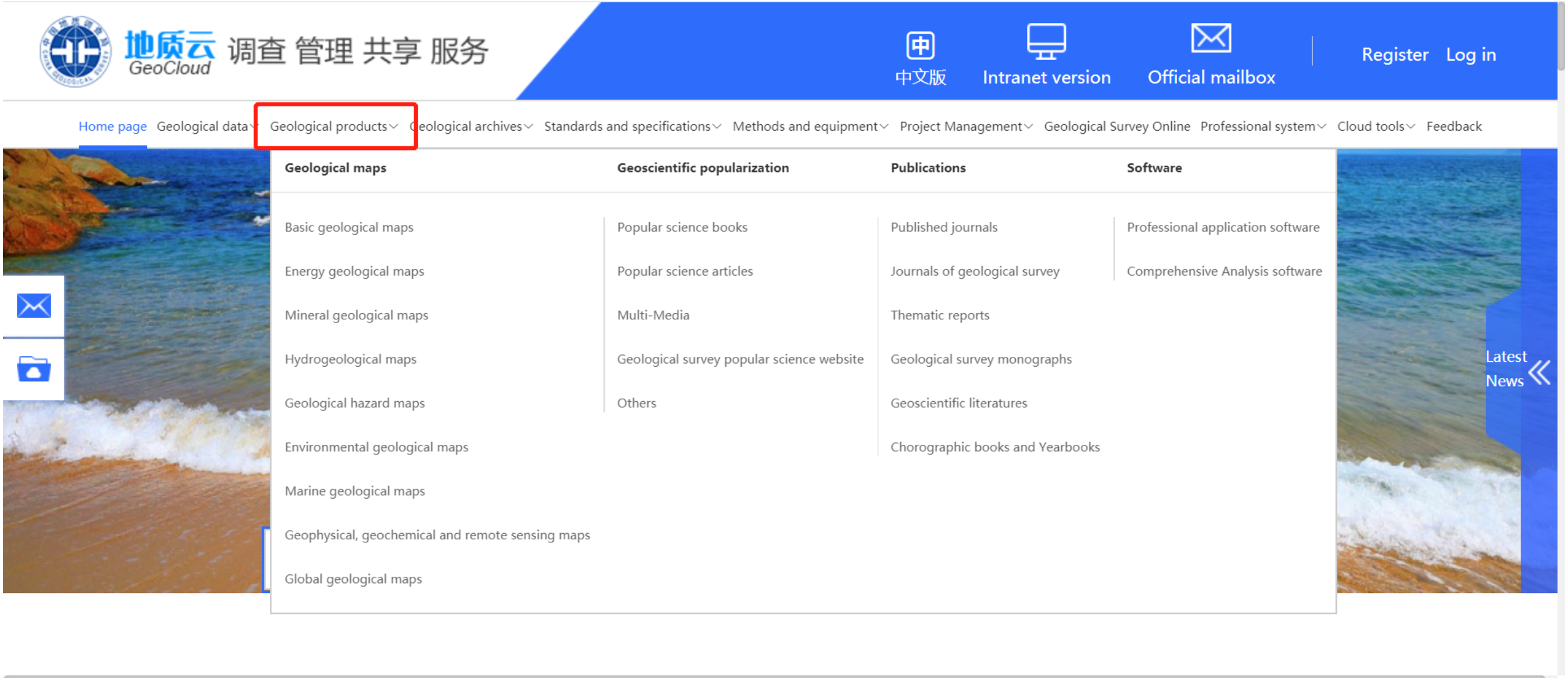
- Minerals
- Geochemistry
- Ocean
- Water
- Soil
- Digital Geology
- Other Fields



Training and international geological survey

Case studies for integrated geospatial information management

A National Geological Big Data Hub



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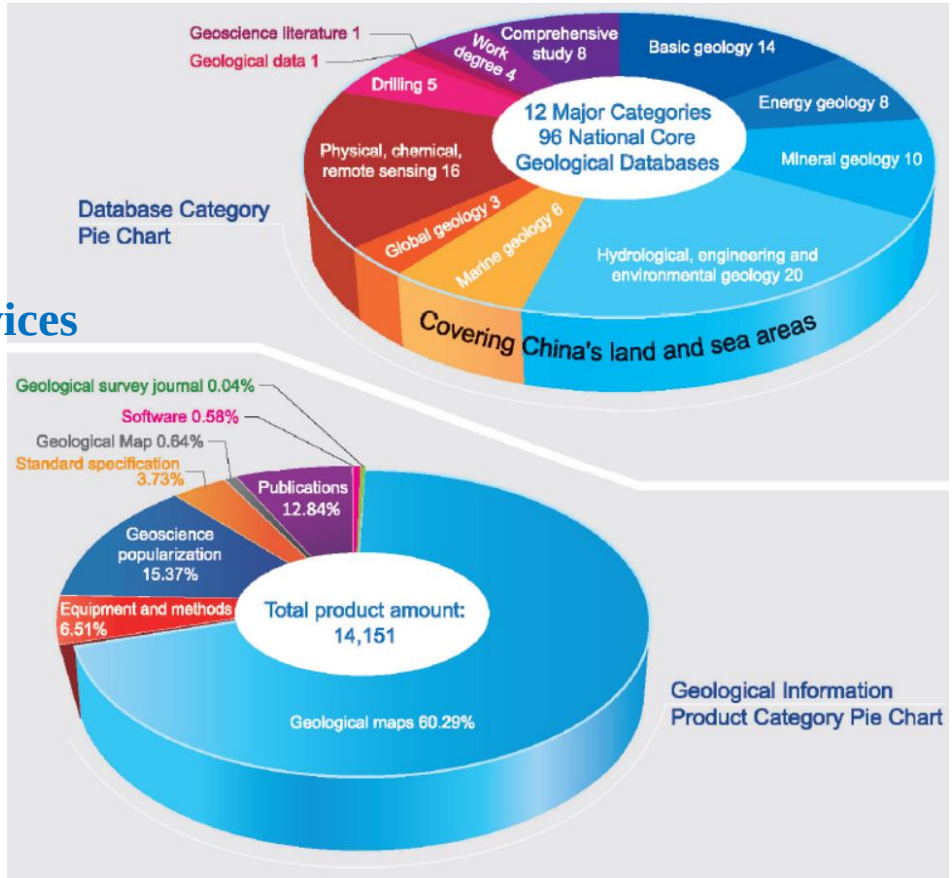
International Sharing and Service

Application services

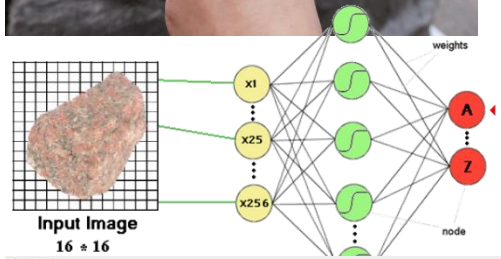


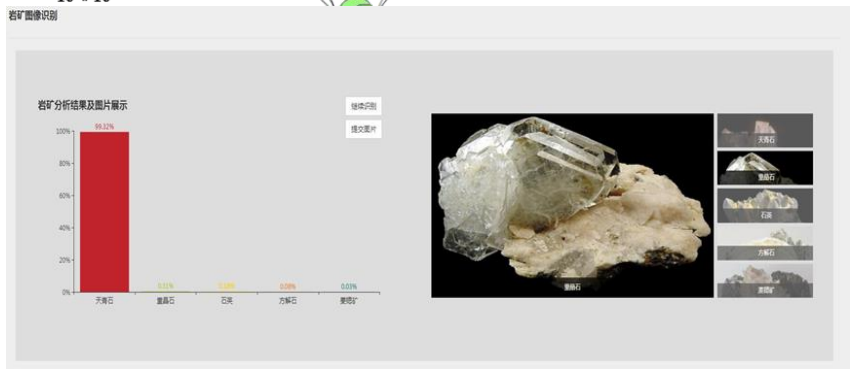
Data services

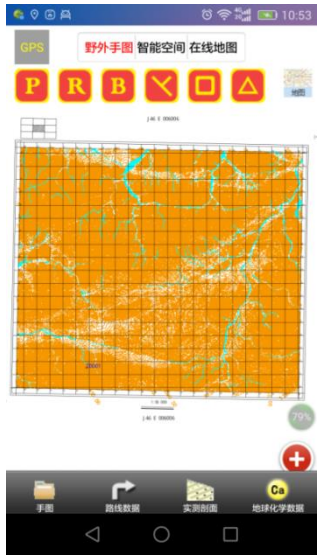
Internal information sharing by GeoCloud(http://geocloud.cgs.gov.cn/)

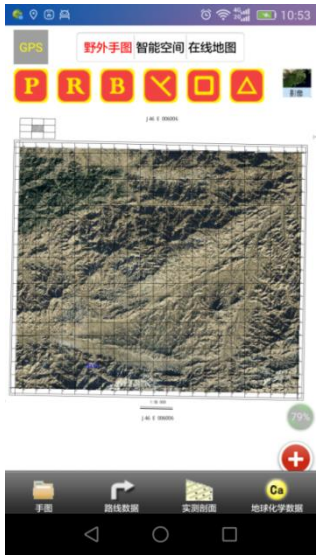
Sustainable development practices from CGS

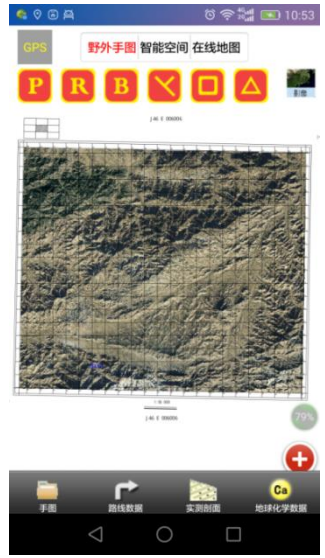
Intelligent application services

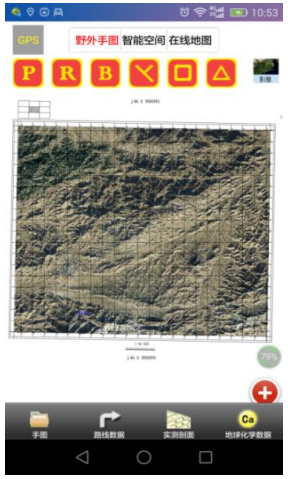


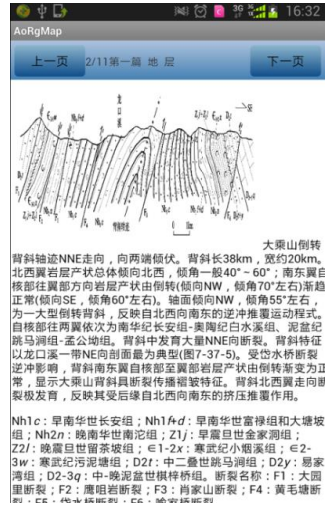






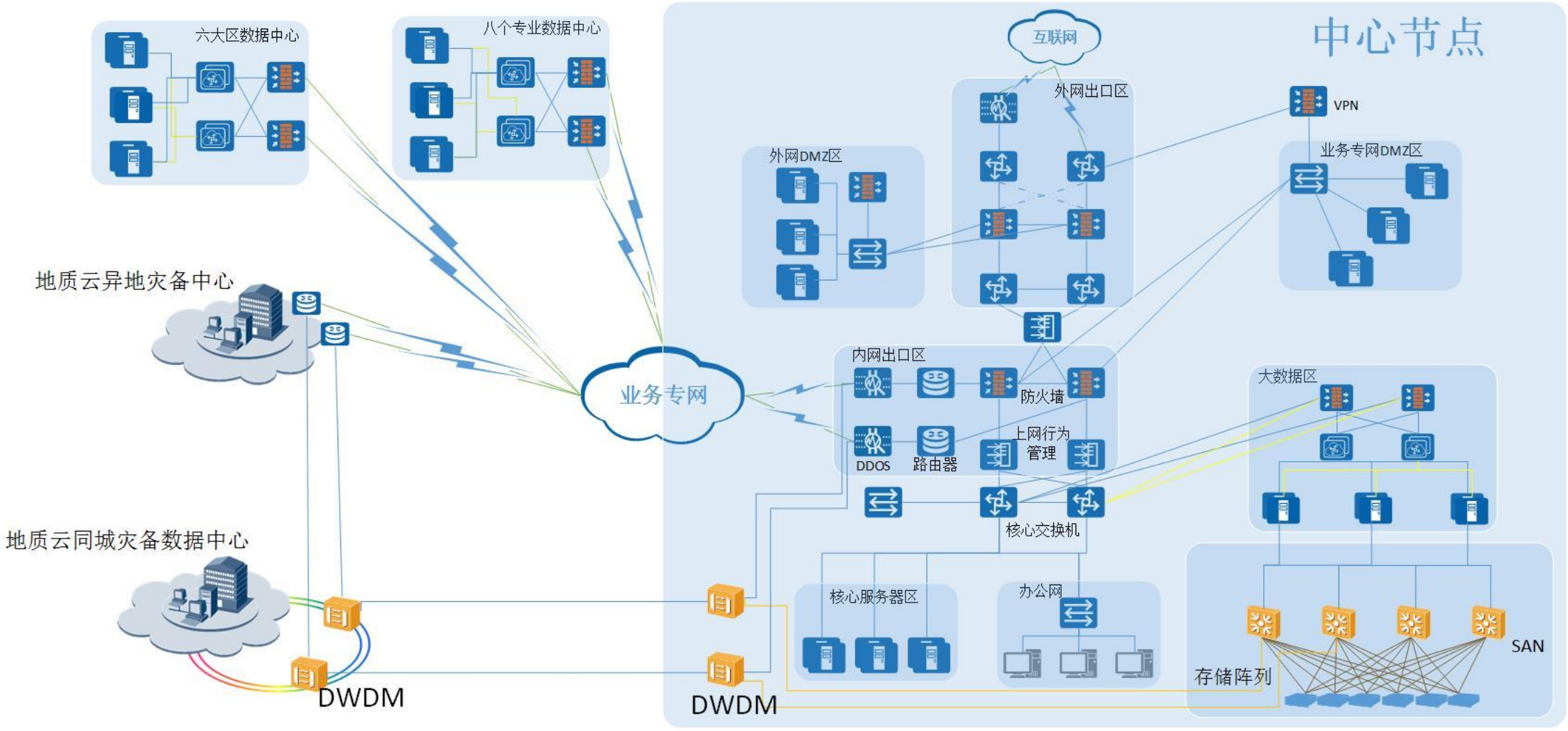






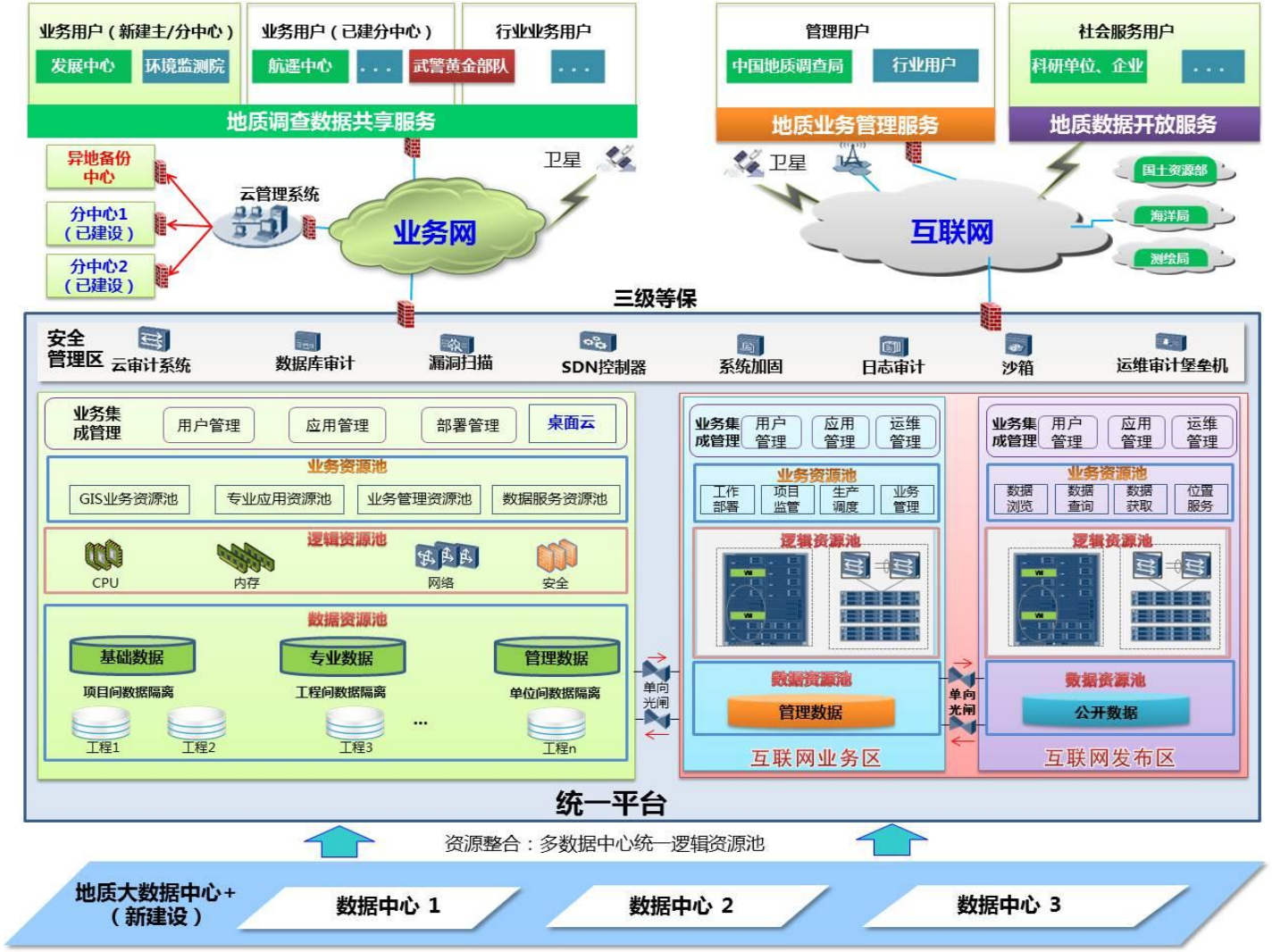
Case studies for integrated geospatial information management

Distributed Structure

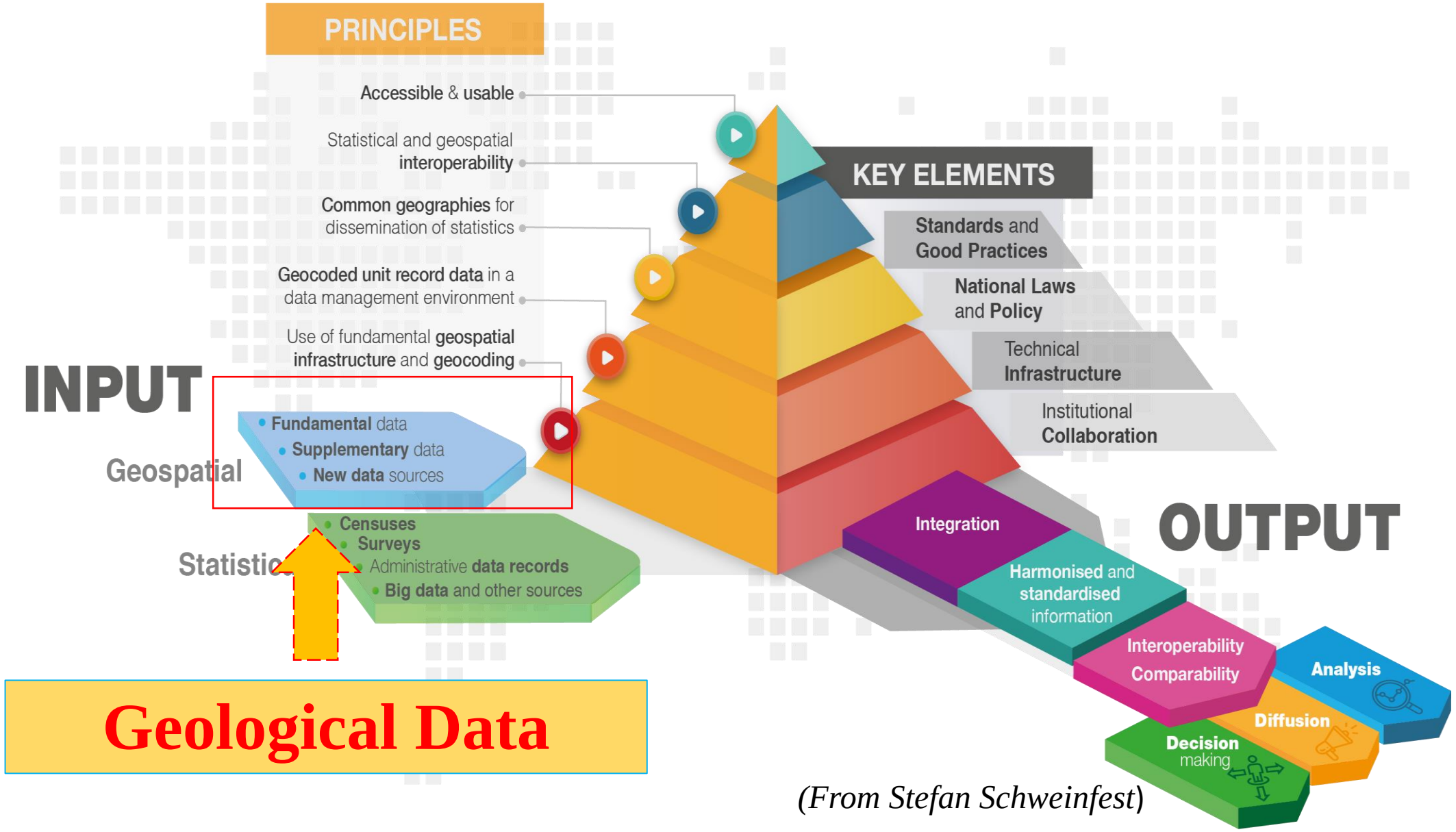


Case studies for integrated geospatial information management

Framework and Achievements



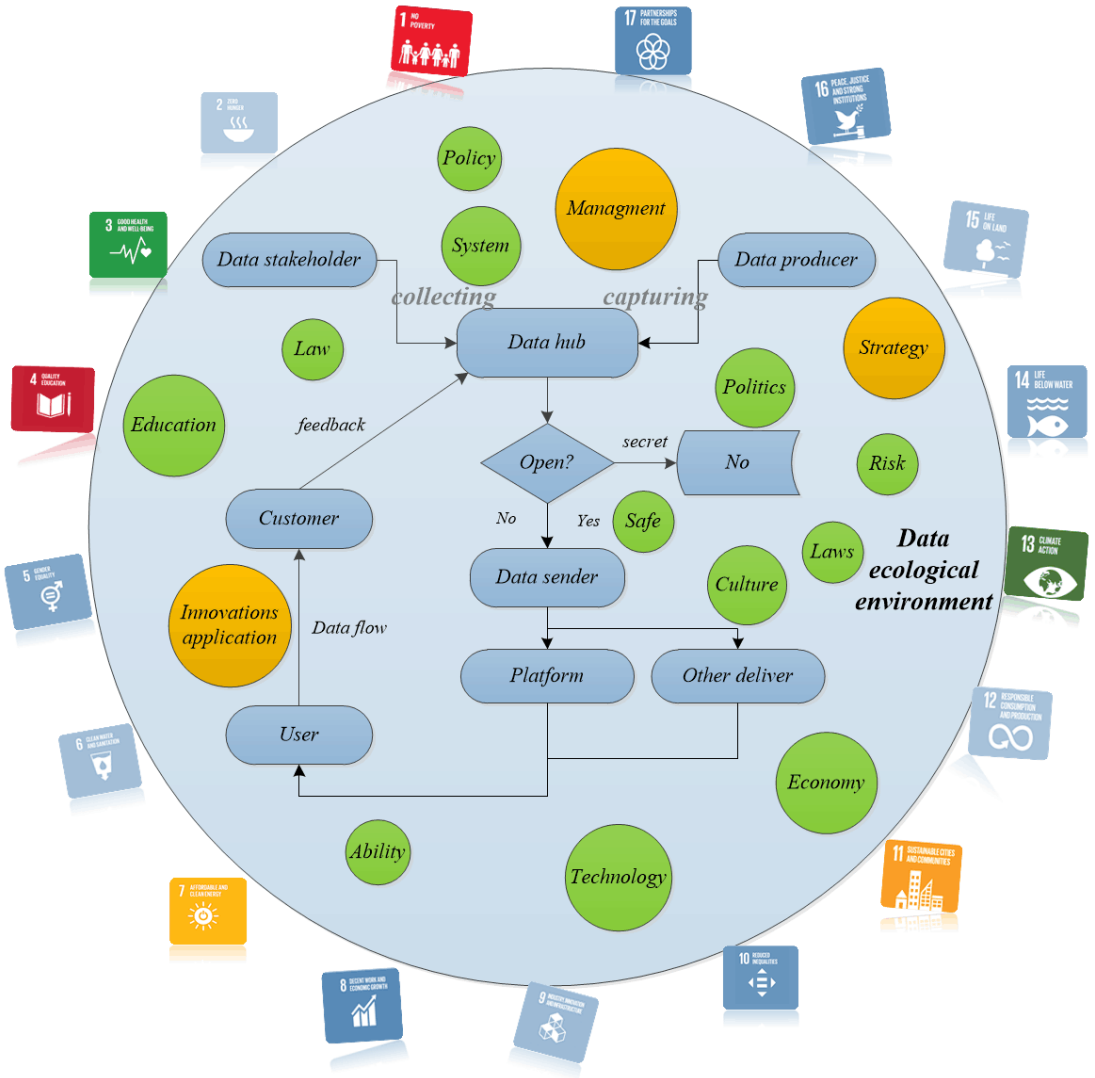
Conclusion and Suggestions



Geological Data

(From Stefan Schweinfest)

Conclusion and Suggestions



Technology :

Management processing, and description, as well as data integration, expression, simulation, dissemination, interpretation, reuse, and long-term preservation

AI, Distributed cloud architecture, Blockchain

Policy :

Data Sharing：Incentive and enforcement policies

Intellectual Property：Data publishing

Data Interoperability：Global data model and describe model

Mechanism: Working Group

Conclusion and Suggestions

A Geological Big Data Working Group:

- To provide a general geological information framework and platform
- To play a leading role at the national level by raising political awareness and highlighting the importance of geological big data with the features including reliable, timely and fit-for-purpose, to play an important role for geological big data in decision making processes, to improve the integration of geological data and the global fundamental geospatial data.

Conclusion and Suggestions

- To strengthen national capacity for geological survey and geodata processing to stimulate green development and digital economy.
- To share or exchange the experience among all member states for some crucial global problems, which may have potential solutions from geological big data to support 2030 SDG.

Conclusion and Suggestions

Surface and underground

Integration of the Geography geospatial data and Geological data

Geography

Geographic spatial data

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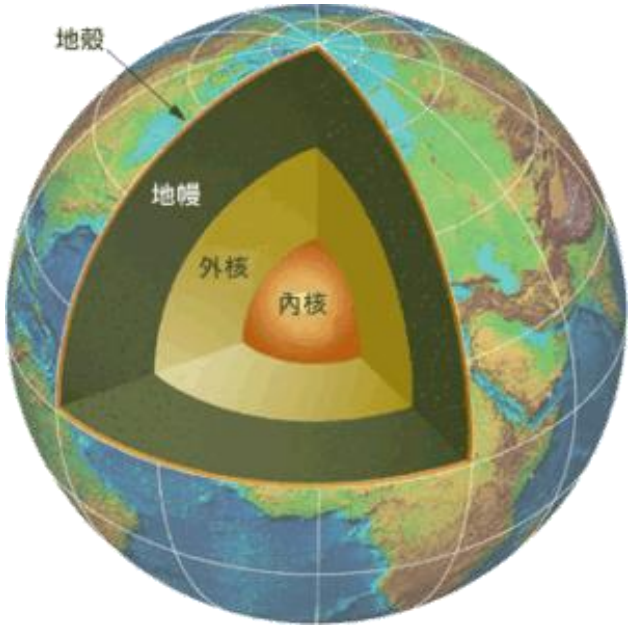

Geology

Geological spatial data

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Digital of our world

Geospatial data of earth

Conclusion and Suggestions

Geological Data is of importance and Cannot be Separate from the process of sustainable development, and it requires participation from everyone that lives on the same planet earth.

Thanks for your listening

谢 谢 !