The joint environmental geology survey in Thailand during 2019-2020 (work plan)

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October 2019

中国地质调查局
CHINA GEOLOGICAL SURVEY

Outline

1. Marine Karst Study in 2019
2. Marine Karst Study in 2020
3. Joint Environmental Geological Survey in 2019
4. Joint Environmental Geological Survey in 2020
5. Introduction of ISO/TC 319

1. Marine Karst Study in 2019

schedule and route regulations of marine karst geological survey in southern Thailand

10.3, Guilin-Bangkok (CZ6099, 8:40-12:10)， communicate with the Ministry of Mineral Resources of Thailand in the afternoon

10.4, Bangkok-Surat Thani（ **FD3239 11:35--12:55** ） Karst geological survey in Suratthani Province

10.5-10.6，Karst geological survey in Suratthani Province（Mainly carry out Marine karst survey of Ang Thong National Marine Park）

10.7-10.8， karst hydrogeological survey in Krabi Province.

10.9, karst hydrogeological survey in Satun

10.10-10.11, cave survey in Satun.

1. Marine Karst Study in 2019

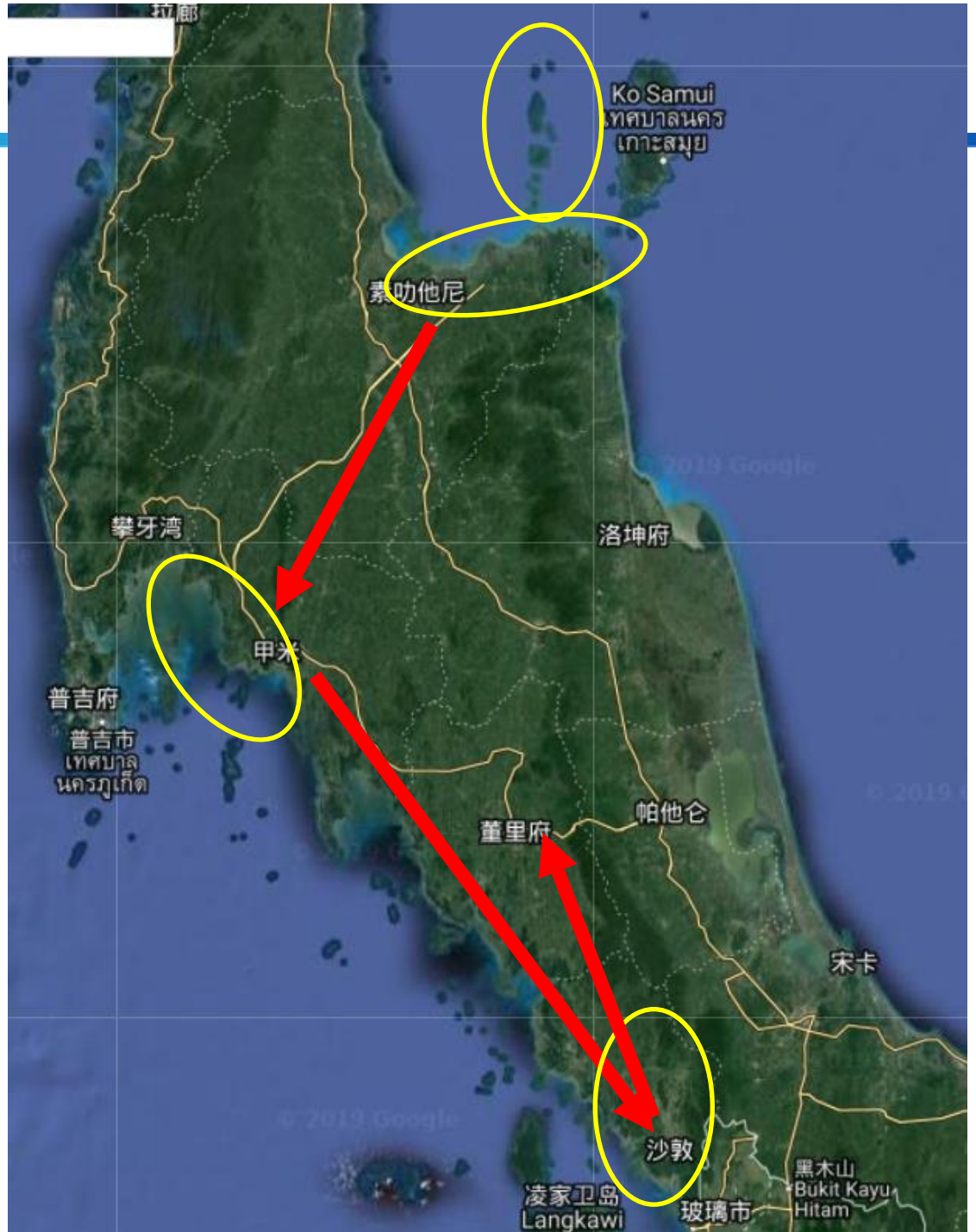
10.12-10.13, investigations at the Tarutao Island and its surrounding islands in the Satun Geopark，focus on the marine karst geomorphology.

10.14-10.15, Investigate the formation of Marine karst and karst hydrogeology in and around Satun Geopark.

10.16, karst hydrogeological survey in the Satun Geopark and its surroundings in the morning, and in the afternoon, Trang-Bangkok (FD3244, 14:55-16:25)

10.17, Bangkok-Guangzhou (CZ3082, 15:40-19:30)

Planned Route



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1. Marine Karst Study in 2019

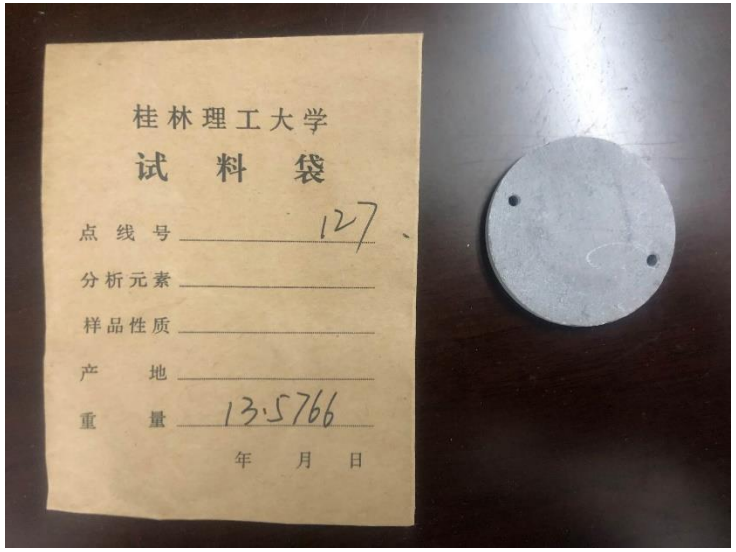
Field work

1）Marine karst investigation

To investigate the characteristics and forms of tropical marine karst, and compare with other types of karst globally. Study the mechanism of karst formation of tropical karst.

e.g. karren; sinkhole; peak forest; stone forest; …

Carry out erosion experiments in the field.



Field work

2） Cave survey

To investigate the characteristics of cave environment in Tropical karst cave, and paleocliamte reconstruction; as one of the long-term critical Zone monitoring sites in ‘global karst’ grand science plan

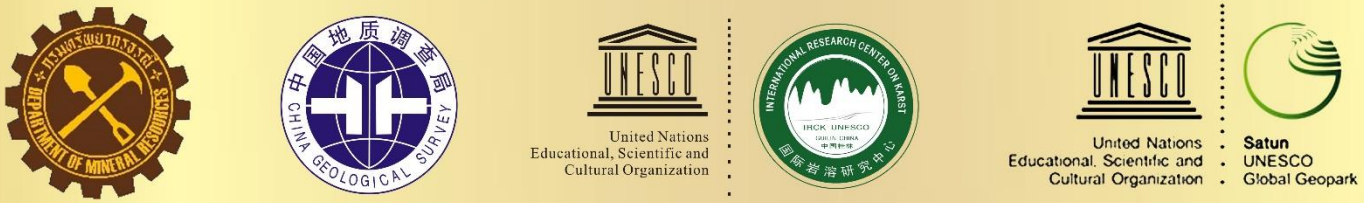
Proxies: air temperature, relative humidity; CO_2 concentration, isotopic and hydrochemical index of drip water and farmed calcite

Stalgmites: paleoclimate reconstruction

1. Marine Karst Study in 2019

probes for cave monitoring, used to in-situ monitor cave temperature and humidity.

1. Marine Karst Study in 2019



Karst Environmental Monitoring Station in Satun UNESCO Global Geopark, Thailand

Belongs to the Global Karst Environmental Monitoring Network constructed by the International Research Center on Karst,UNESCO

1. Marine Karst Study in 2019

Field work

3) Marine karst hydrogeological survey

Choose a karst watershed. Divide karst hydrogeological unit, grasp the surface hydrodynamic change process, the relationship between surface water and groundwater.

Field work

4) investigation of karst carbon cycle at watershed scale and evaluation of carbon sink effect

Investigation on marine karst carbon cycle in south Thailand

e.g. karst dynamic system structure, stratigraphic lithology, hydrogeological structure and land cover type.

1. Marine Karst Study in 2019

Field work

5) Karst soil survey

Aim : The influence of bacteria on carbon cycle in the soil and water system

Background:

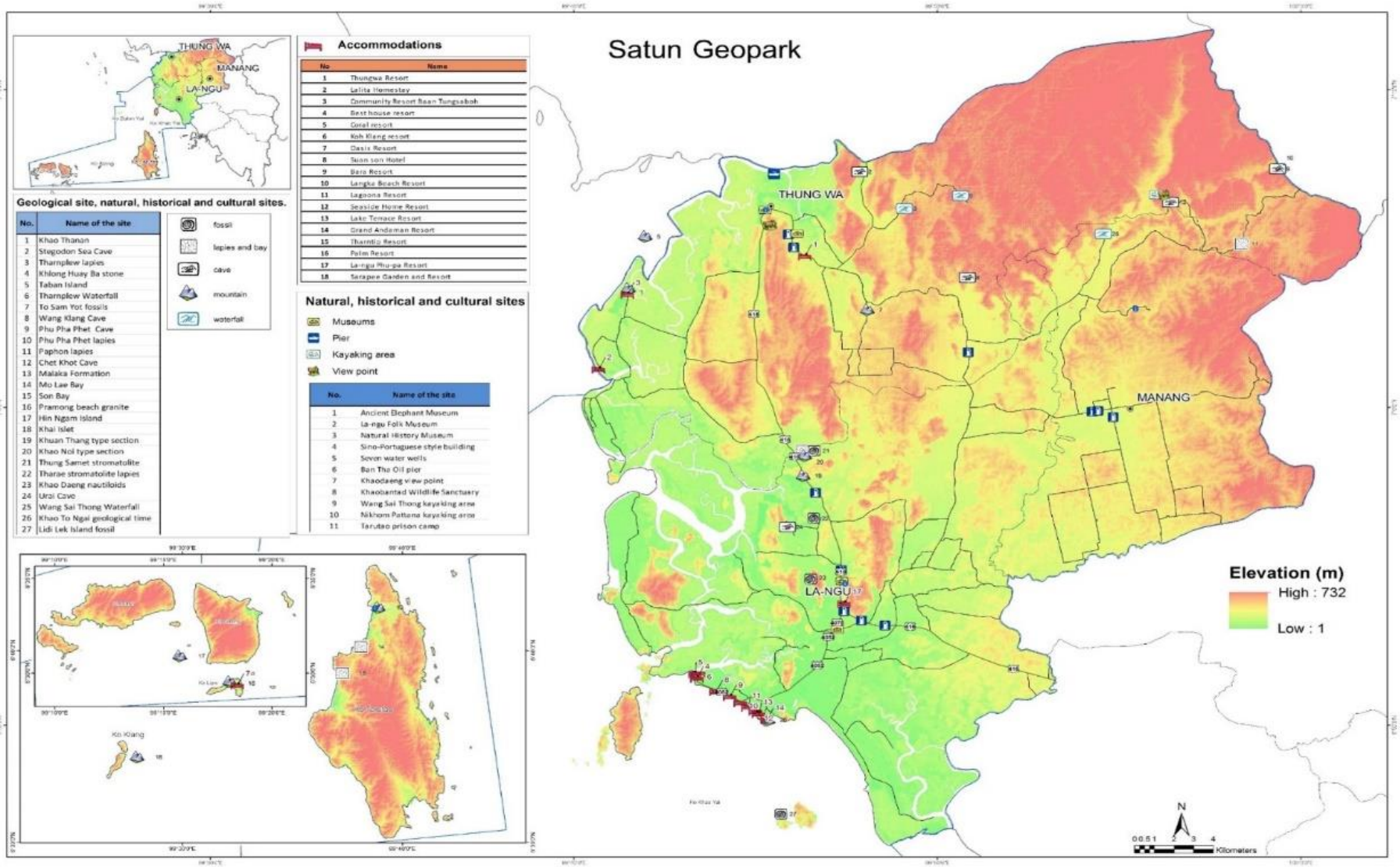
Scientists' warning to humanity: microorganisms and climate change. Nature Reviews Microbiology, 2019.

The Importance of Anabolism in Microbial Control over Soil Carbon Storage. Nature Microbiology,2017

2. Marine Karst Study in 2020

- Sign the Cooperative Project Agreement on Karst geological survey, expand the component of marine karst research, and lay a foundation for the survey and study of karst and caves in southern Thailand;
- Continue to carry out karst morphological survey in southern Thailand;
- Continue to carry out karst hydrogeological survey in Satun Geopark;
- Continue to carry out karst environmental monitoring in Satun Geopark;
- Develop a demonstrative survey plan for cave geological remains in southern Thailand.

2. Marine Karst Study in 2020



3. Joint Environmental Geological Survey in 2019

1) Signed the Cooperative Project Agreement

In March 2019, the two sides signed a Cooperative Project Agreement on Joint Environmental Geological Survey

AGREEMENT ON COOPEATIVE PROJECT OF KARST GEOLOGICAL SURVEY IN IRAN
BETWEEN
CHINA GEOLOGICAL SURVEY, MINISTRY OF LAND AND RESOURCES, THE PEOPLE'S REPUBLIC OF CHINA
AND
THE GEOLOGICAL SURVEY OF IRAN
THE MINISTRY OF INDUSTRY, MINE AND TRADE, THE ISLAMIC REPUBLIC OF IRAN

Under the framework of the Memorandum of Understanding (MOU) on Geoscience Cooperation signed by China Geological Survey, Ministry of Land and Resources of the People's Republic of China and the Geological Survey of Iran, the Ministry of Industry, Mine and Trade of the Islamic Republic of Iran on May 22nd, 2015, the China Geological Survey and the Geological Survey of Iran (hereinafter collectively referred to as "the Parties") firmly believe that the cooperative project of hydrogeological and environmental geological survey in Iran is in the interests of the Parties.

The Parties agree to jointly implement the cooperative project of "Karst Geological Survey in Iran" (hereinafter referred to as the PROJECT), and reach the following agreement.

Article 1 Parties of the Agreement

1.1 China Geological Survey (CGS), Ministry of Land and Resources of the People's Republic of China
Address: 45 Fuwai Street, Xicheng District, Beijing, China
Post code: 100037
Tel.: 86-10-5858 4660
Fax: 86-10-5858 4661
E-mail: ldawen@mail.cgs.gov.cn

1.2 The Geological Survey of Iran, Ministry of Industry, Mine and Trade of the Islamic Republic of Iran (hereinafter referred to as the GSI)
Address: Azadi Sq., Meraj-street, Tehran-Iran
Postcode: 13185-1494
Tel: 98-21-66070500
Fax: 98-21-66070516
Email: info@gsi.ir

Article 2 Purpose and Contents of Cooperation

2.1 Purpose of cooperation
The major purposes of the project are to: 1) conduct comparative study and monitoring technical R&D on karst critical zones between China and Iran through joint mapping on hydrogeology and environmental geology in Iran, and cooperative

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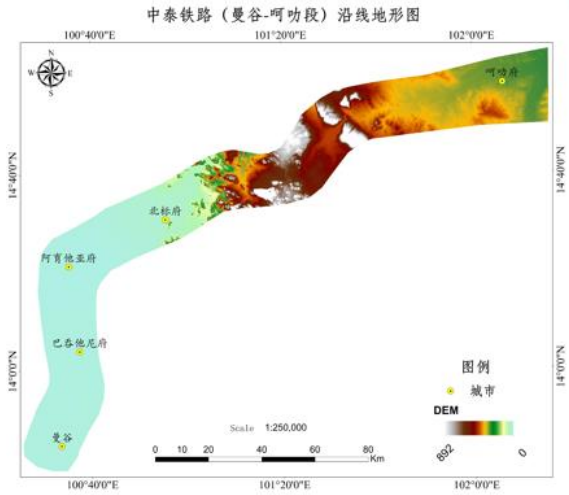
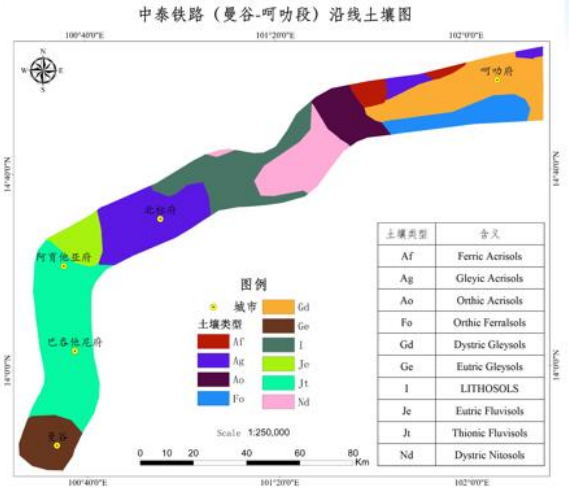
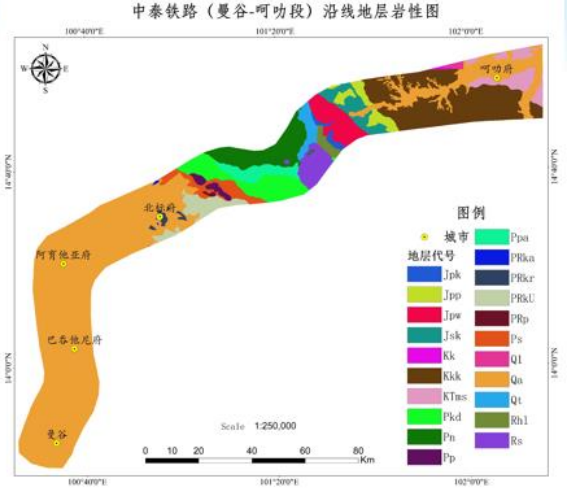
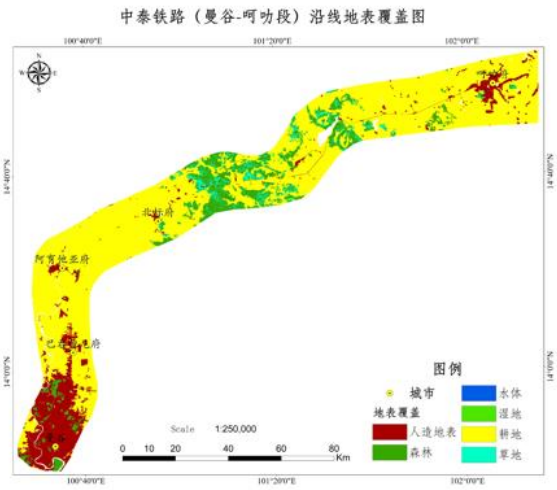
3. Joint Environmental Geological Survey in 2019

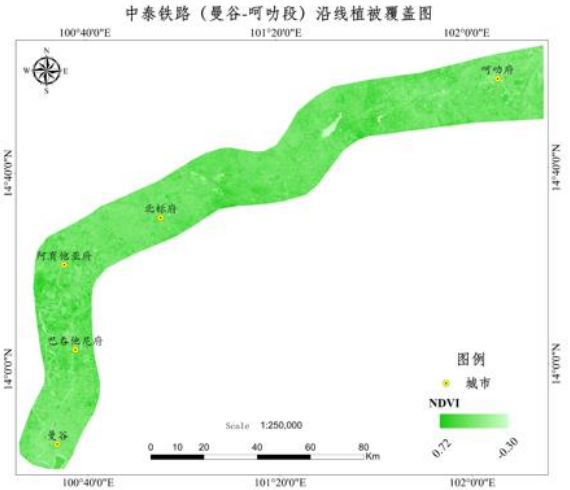
2) Finished the compilation of maps for the distribution of key areas prone to geohazards along Sino-Thai railway (1:250,000)









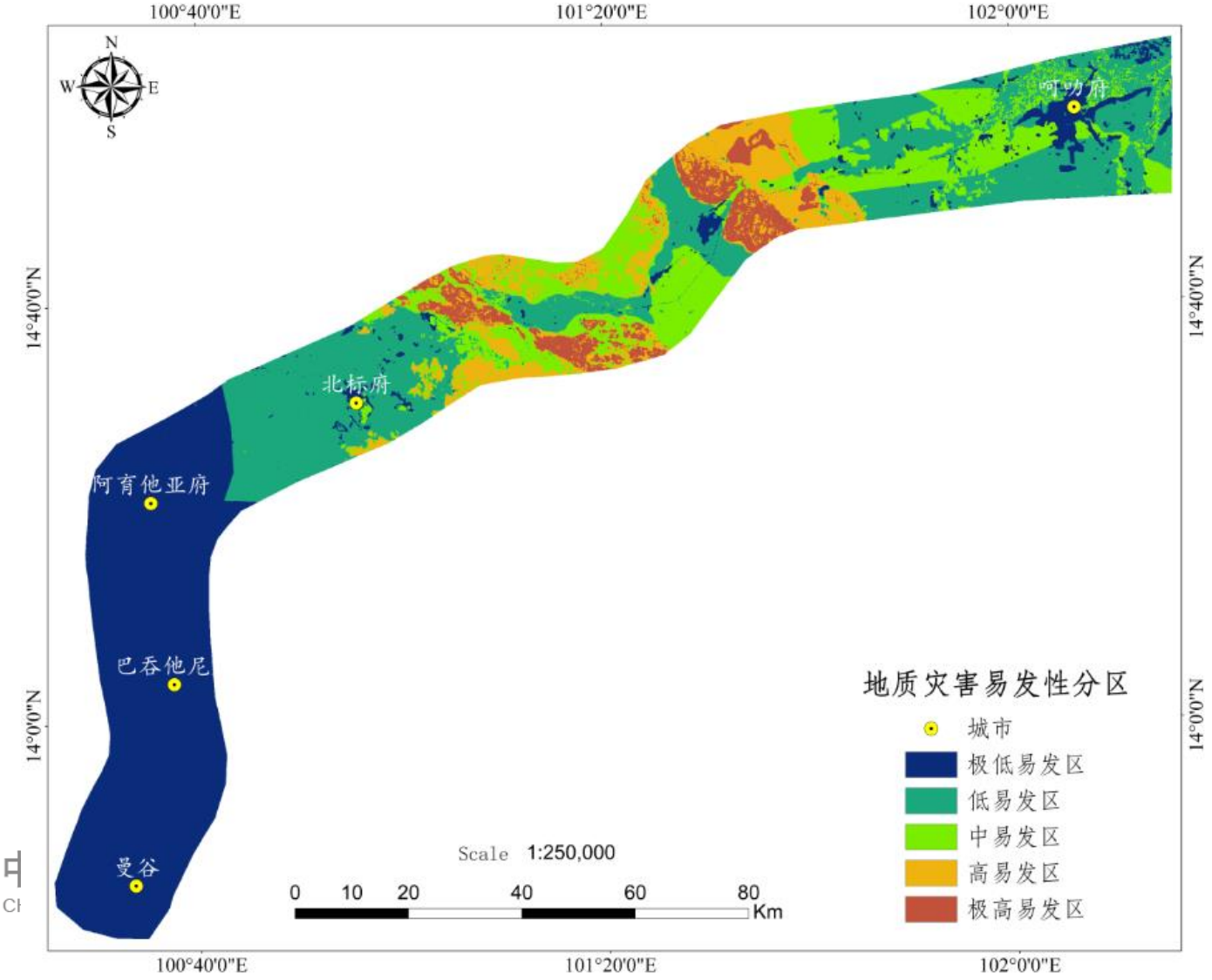


地形 | 土壤 | 地层岩性

地表覆盖 | 植被覆盖

3. Joint Environmental Geological Survey in 2019

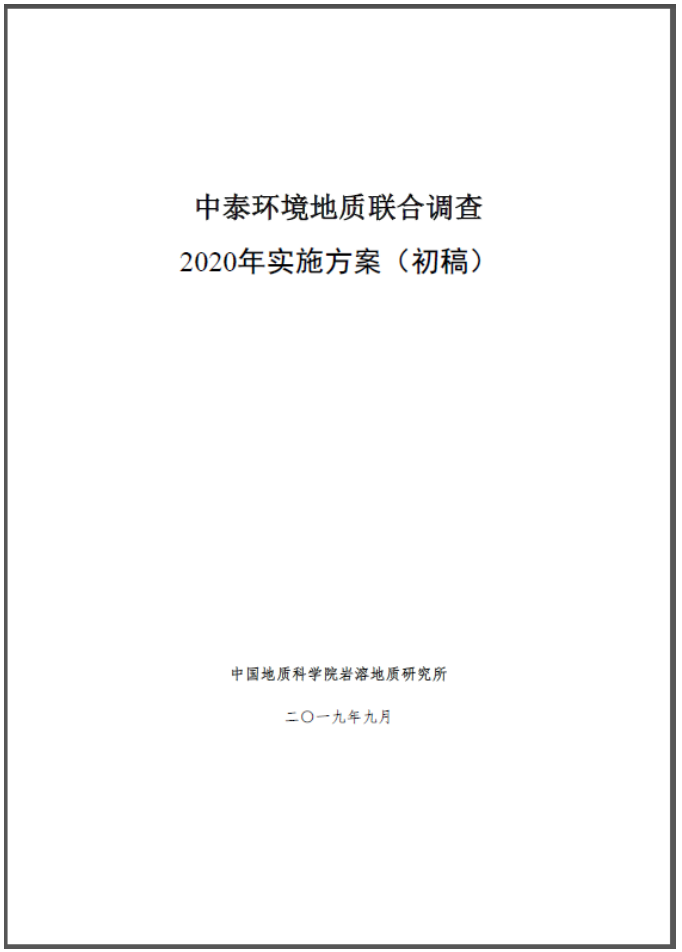
Identified the distribution of prone to geohazards along the Sino-Thai railway



3. Joint Environmental Geological Survey in 2019

3) Developed the 2020 Implementation Plan and Fieldwork Guidebook

- the Implementation Plan (2020) for the China-Thailand Joint Environmental Geological Survey (Draft)


中泰环境地质联合调查

2020年实施方案（初稿）

中国地质科学院岩溶地质研究所

二〇一九年九月

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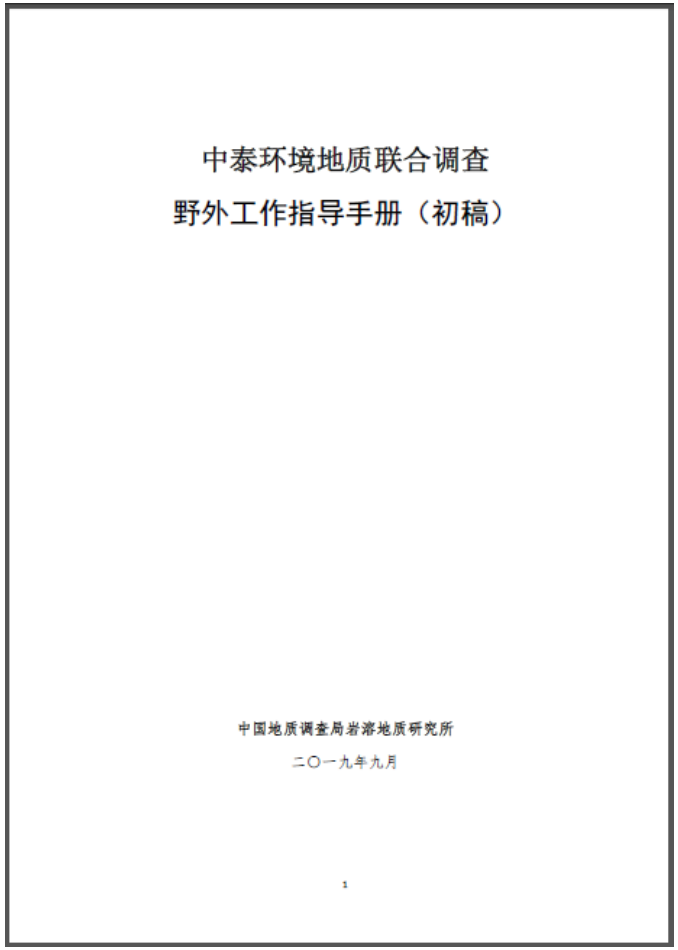
3. Joint Environmental Geological Survey in 2019

3) Developed the 2020 Implementation Plan and Fieldwork Guidebook

- the fieldwork guidebook for the China-Thailand Joint Environmental Geological Survey (Draft)


中泰环境地质联合调查

野外工作指导手册（初稿）

中国地质调查局岩溶地质研究所

二〇一九年九月

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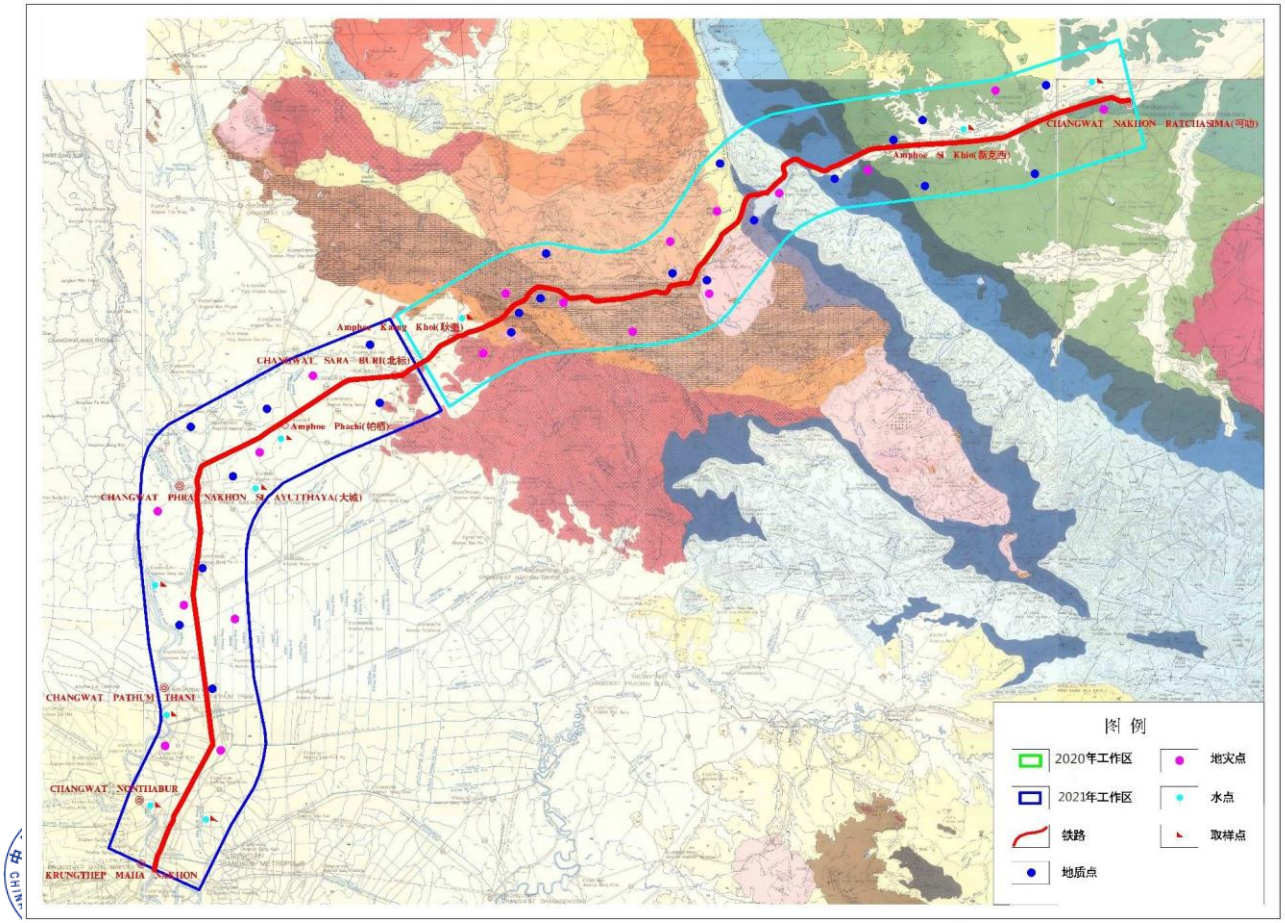
4） Work group has been organized

The Institute of Karst Geology (IKG) of China Geological Survey (CGS) has organized the researchers from IKG and other relevant organizations under CGS to jointly establish a working group on environmental geological survey of the project, defined the members to participate in the work, and discussed the work plan.

4. Joint Environmental Geological Survey in 2020

- 1） Environmental geological survey (1:50000) along the Sino-Thai Railway



Kaeng Khoi-Nakhon Ratchasima section, including field survey, samples analysis, and database construction etc

4. Joint Environmental Geological Survey in 2020

Work plan in 2020

Project \ Month	2020											
	1	2	3	4	5	6	7	8	9	10	11	12
data collection	√	√										
Geological disaster investigation						√	√	√	√			
Terrain measurement						√	√	√	√			
Geophysical exploration						√	√	√	√			
Mountain engineering						√	√	√	√			
Data organization			√	√	√	√	√	√	√	√	√	√
Database construction	√	√	√	√	√	√	√	√	√	√	√	√

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4. Joint Environmental Geological Survey in 2020

Task division ;

Obligations of CGS

1）To organize and coordinate the CGS team to take part in the project work

2）to be responsible for project design and planning, sustainable operation of technology and labor on the basis of mutual agreement of both Parties.

3）To organize the technical trainings of both Parties.

4）To be responsible for indoor interpretation of remote sensing, maps and reports generation

5）To analyze samples which are beyond the ability of DMR.

6）To provide DMR's team with project information as needed

4. Joint Environmental Geological Survey in 2020

Task division ;

Obligations of DMR:

1）To organize and coordinate the DMR's team to take part in the project work.

2）To be responsible for field work of environmental geological survey, verification of remote sensing results in the field and the construction of database.

3）To be responsible for samples (rock, soil, and water) collection and analysis which are under the ability of DMR with guidebook provided by CGS.

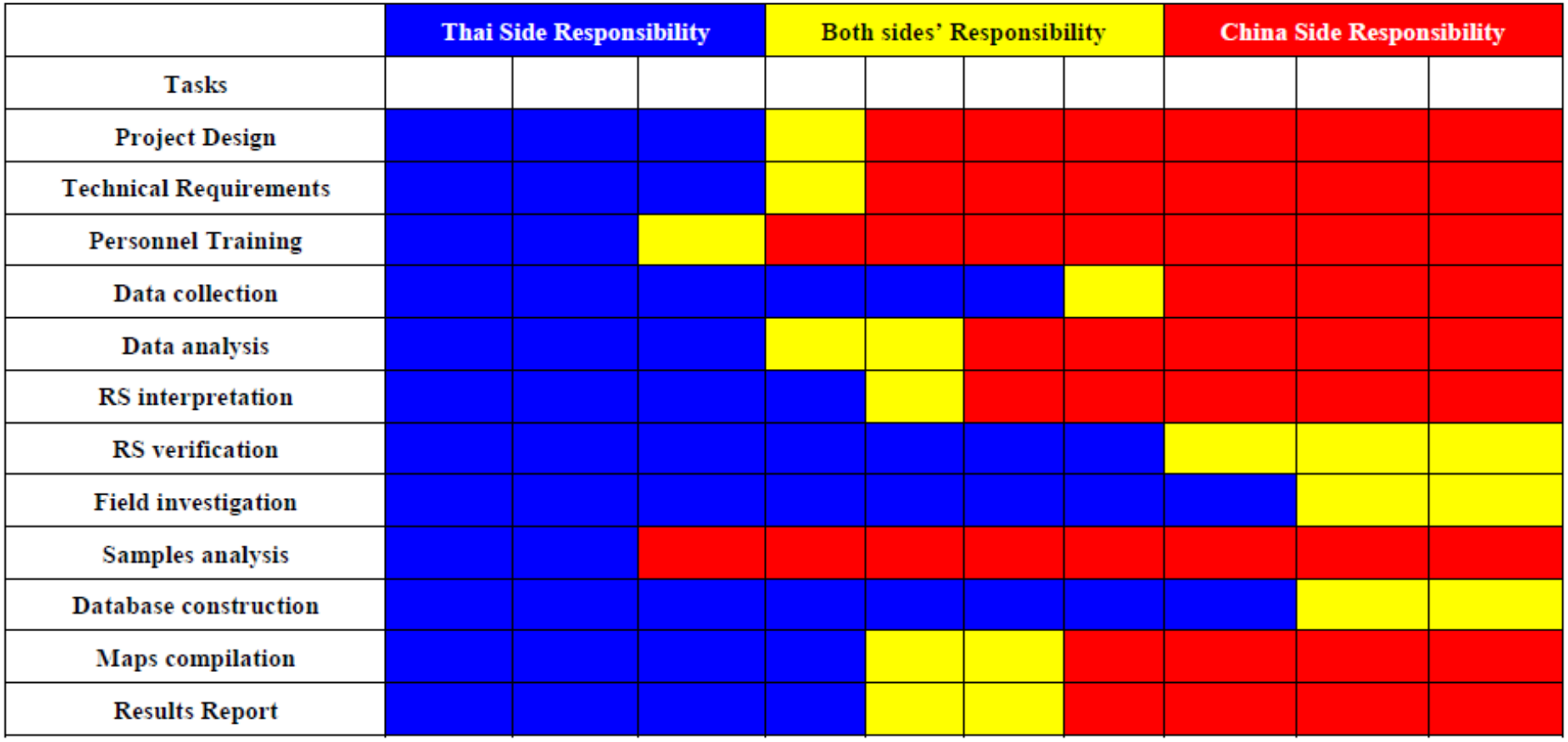
4）To provide available data and information to CGS, including topographical map, geological map, remote sensing data and monitoring data etc.

5）To coordinate with CGS, especially delivering samples and passing the

4. Joint Environmental Geological Survey in 2020

Tasks division and cooperation

The tasks division and cooperation is shown as follows:



4. Joint Environmental Geological Survey in 2020

- Environmental geological survey in the potassic salt mine at Khorat Basin

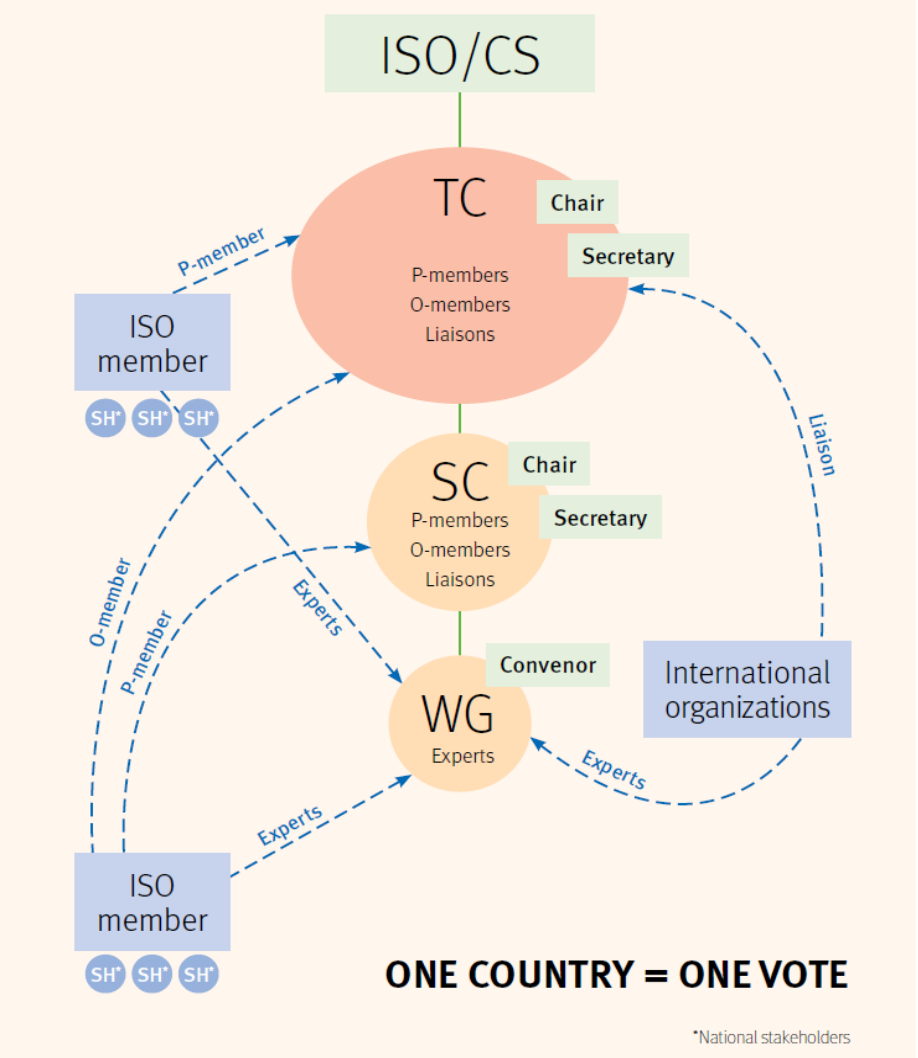
5. Introduction of ISO/TC 319

ISO:International Organization for Standardization

- **TC: Technical Committee**
- **SC: Subcommittee**
- **WG:Working Group**

ISO/TC319: ISO karst Technical committee

https://www.iso.org/committee/7099518.html



ISO committee structure

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Objectives & Tasks

ISO/TC 319 on Karst was authorized to set up in June, 2018.

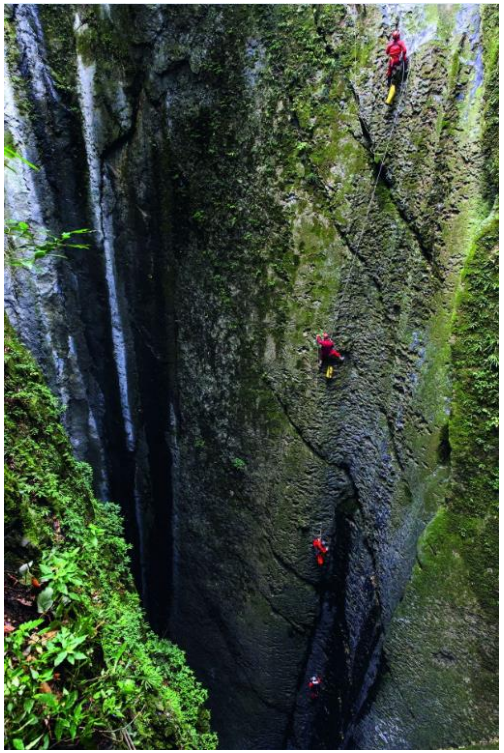
Scope: Standardization in the field of karst terminology, sustainable development of karst resources, environmental protection and management of karst environment, as well as investigation and assessment (including modeling methods and mapping of karst systems).

5. Introduction of ISO/TC 319

The standardization of karst consists of three parts.

- **the first is basic(general) terminology, mainly including the standards of karst features, formation and functions of karst.**

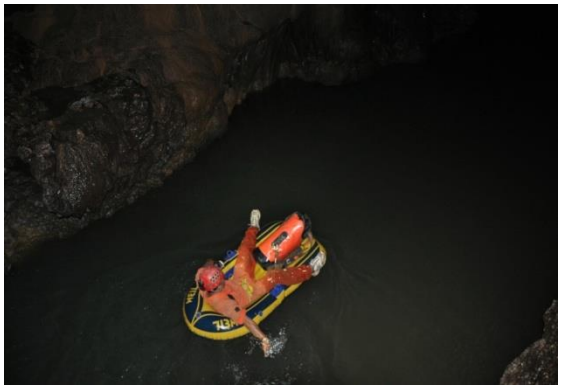
Fengcong karst (Guilin Natural Heritage site)



Shaft in Chongqing

5. Introduction of ISO/TC 319

- the second is the standards of investigation, monitoring and assessment, including the methods on karst characterization, resources calculation and evaluations, ecosystem vulnerability assessment, engineering stability evaluation, etc. .



5. Introduction of ISO/TC 319

- the third is the standards of technologies for the exploitation of karst resources(water, minerals, biological resources, tourism etc.)development, disasters(karst desertification, surface collapse and depression, leakage, water pollution, seawater intrusion, etc.) prevention and mitigation, as well as combined strategies for environment management and protection.

Rocky desertification

Collapse

5. Introduction of ISO/TC 319

Benefits

- Data harmonization and information management are more demanding at an international level due to differences in language, classifications, terminologies, formats, reference systems, etc.
- All stakeholders can benefit from karst standardization.

5. Introduction of ISO/TC 319

Participating members (P-members)

P-members are required to play an active role in the work of a committee, as well as vote on all official committee ballots. They are also expected to base their positions on the consensus of national stakeholders, preferably through national mirror committees.

Observers (O-members)

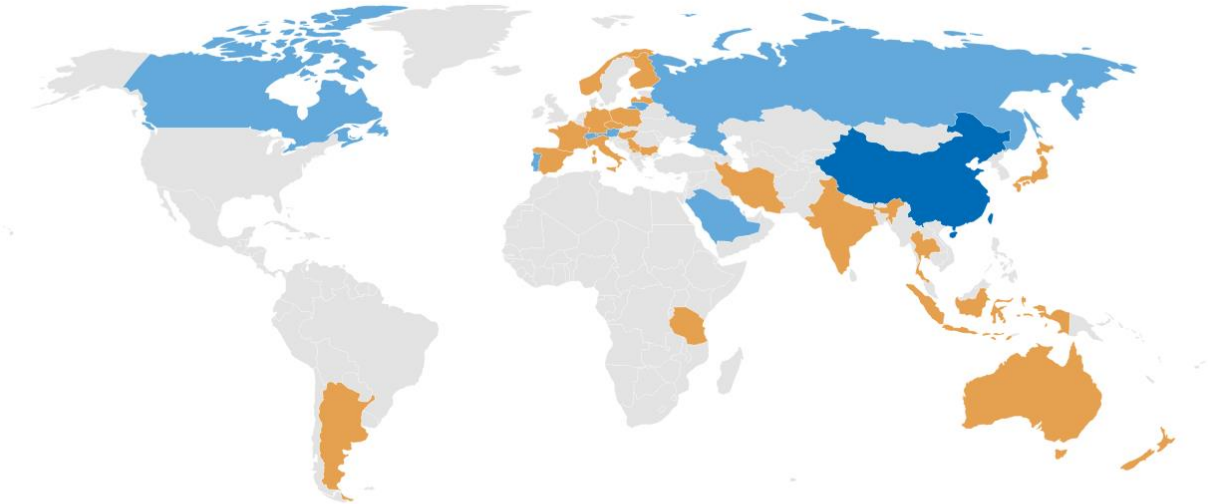
O-members follow the development of a standard, and possibly contribute to the work, without committing themselves to active participation.

5. Introduction of ISO/TC 319

Standards | All about ISO | Taking part | Store | EN | MENU

ISO/TC 319

PARTICIPATION



SECRETARIAT

China - Standardization Administration of China (SAC)

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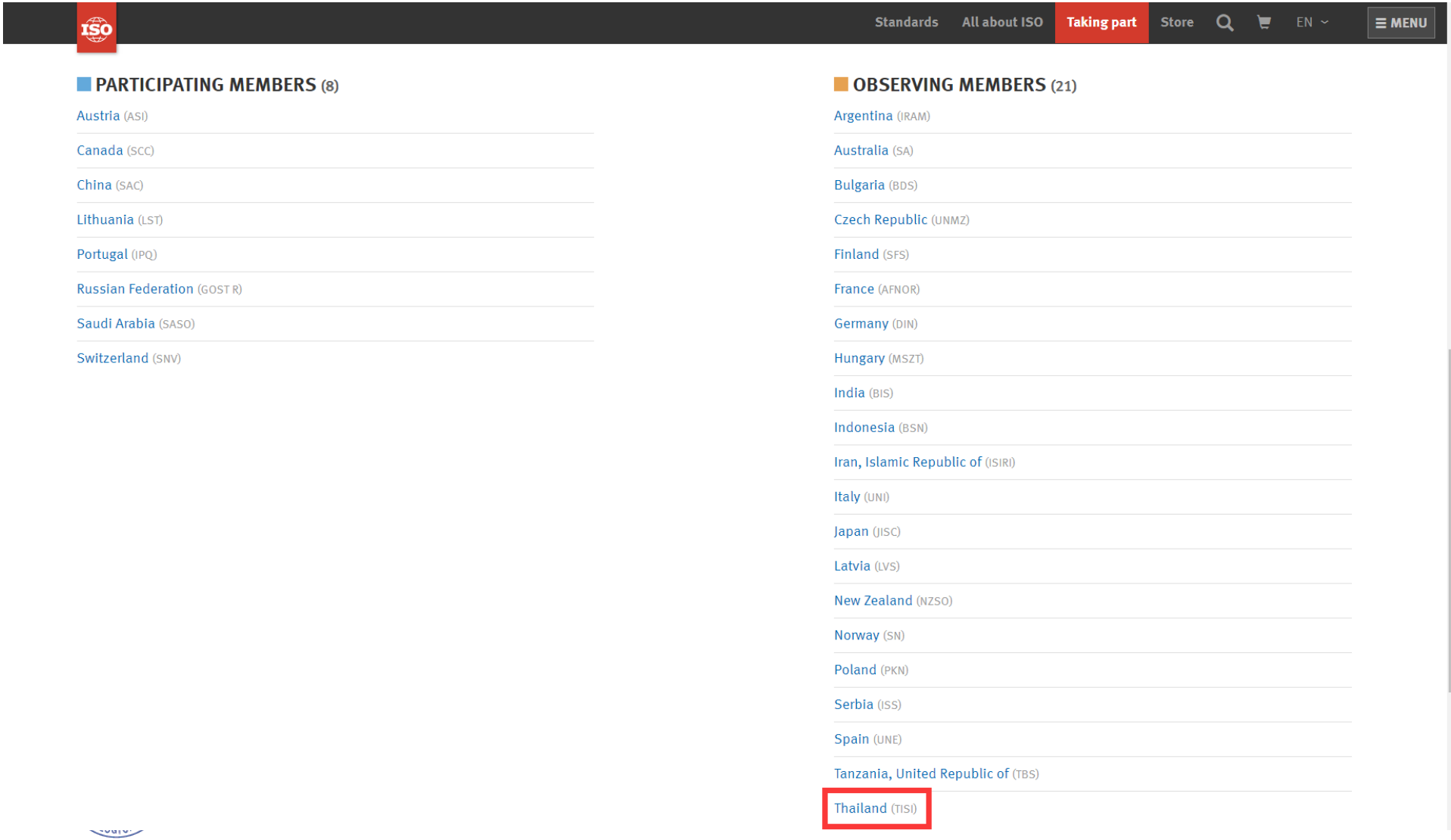
5. Introduction of ISO/TC 319



MOM Suggestions

- Both parties will push forward the revision of the cooperative project agreement on karst geological survey by e-mail.
- Both parties discuss and improve the 2020 Work Plan and Guidebook on Sino-Thai Joint Environmental Geological Survey so as to facilitate the work in 2020.
- Both parties agree to build a karst environment monitoring station in Satun Geopark and carry out long-term monitoring.
- IKG plans to take geological survey along the Sino-Thailand Railway and at Khorat Basin, and the karst geological research in southern Thailand in 2020. DMR provide invitation letters and other assistance for IKG to carry out investigation in Thailand.
- DMR will actively participate in the work of developing international standards on karst. DMR and IKG will associate with Thailand in applying for ISO/TC319 P membership.