International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

STRATEGIC BUSINESS PLAN – ISO/TC 319

Executive summary

Karst covers 22 million km^2, around 15% of the continents. Much of that karst is now suffering from severe environmental degradation. The relative importance of different aspects of karst science and management varies from place to place. For example, it is estimated that karst supplies 25% of the world's population for drinking water. Karst is an important section in the global carbon cycle and has significant implications for scientifically addressing climate change. The study of karst is considered of prime importance in petroleum geology since as much as 50% of the world's hydrocarbon reserves are hosted in karst systems. Other important karst issues can include water pollution, geohazards, soil leakage, and the conservation of biodiversity.

It can be anticipated that the establishment of international standards for karst-related terminology, assessments, technology and products will facilitate sustainable development and international academic exchange on karst. A great social value and potential commercial value will thus be generated. All of the people in karst areas will benefit in varying degrees from the work done by ISO/TC 319, either through commercial interests or for the health and welfare of both people and ecosystems.

ISO/TC 319 was established in 2018. There are currently nine P-members and 20 O-members. It is necessary for ISO/TC 319 to invite more experts to participate in related works.

The ISO member body of Standardization Administration of China (SAC) is appointed to be the Secretariat. The scope of ISO/TC 319 is mainly in the field of karst. The main objectives of ISO/TC 319 are the development of standardized karst terminology, sustainable development of karst resources, environmental protection and management, as well as investigation and assessment (including modeling and mapping of karst systems). The basic terminology, investigation and assessment technologies will be the committee priorities.

Since karst is an inter-disciplinary field of study and management, ISO/TC 319 will address unmet standardization needs and gaps related to geology, water, and biodiversity, etc. The committee will coordinate its work with other technical committees, such as ISO/TC 147, ISO/TC 182, ISO/TC 190, ISO/TC 211, ISO/TC 228 and ISO/TC 265 to avoid conflicts and/or duplication.

It is hoped that readers of this Business Plan will find it informative enough to answer their questions about ISO/TC 319. Questions as well as comments on its contents or the activities of the TC are welcomed. Please contact the Secretariat of ISO/TC 319 at sac@sac.gov.cn or the Committee Manager, Mr. Bai Bing, at baibing@mail.cgs.gov.cn.

Persons interested in participating in the work of ISO/TC 319 should contact their national member bodies (NMBs) for information.

1 Introduction

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 164 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 Business Environment of the ISO/TC

2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The karst is among the most fragile and vulnerable system on the Earth due to its unique structure, hydrology and ecology. The peculiarities of the karst environment makes it highly vulnerable to a number of geohazards that pose direct risks to human health, safety and infrastructure. Important categories of karst geohazards include collapses, landslides, and floods. Anthropogenic hazards associated with karst include land use activities that result in degraded productivity via karst rocky desertification, the destruction of karst landforms, depleted biodiversity, and pollution events that negatively impact water quality and quantity. International standardization of karst technologies would promote geohazards mitigation and environment protection.

Global karst environmental conditions are diverse and extremely complex. Karst is a complicated system with high heterogeneity and anisotropy. Many terms and methods applied to other fields are either not applicable for karst or may require karst-specific adaptations. Since karst investigations and assessments are essential prerequisites for resource development and environment protection, uniform standards should be established for such objectives. It is also necessary to establish unified standards for investigation, evaluation and management.

International standardization of karst would facilitate sustainable development. However, international standardization for karst is very difficult and complex, not only because of the complexity of karst itself as mentioned above, but also because of the great diversity of the global karst environments. Global cooperation among all stakeholders is therefore needed to reach consensus on international standardization. ISO/TC 319 would serve as a platform to attract and integrate related experts engaged in the fields of karst research and standardization. ISO/TC 319 has great potential for strengthening the international exchange and cooperation among related universities, research institutions and enterprises, with more chances for science and technology cooperation and commerce being created.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC:

Karst mainly formed in carbonate rocks are widely distributed in the world, comprising 15% of the earth's continental surface. The proportion of carbonate rocks in Asia, Africa, Europe, South America, North America and Oceania is 9.57%, 10.97%, 19.95%, 1.90%, 15.31% and 6.78%, respectively. Karst occurs in a wide variety of climatic settings, from mainland to islands and from the tropics to frigid zones. Some famous karst areas occur in the Alps-Mediterranean-Balkan Peninsula (e.g. Austria, Switzerland, Slovenia, Serbia), Middle East (e.g. Iran, Türkiye and Saudi Arabia), the Ural Mountains in Russia, the South of Australia, the West of US-Canada, Southeast Asia (e.g. Thailand, Vietnam, Laos, Indonesia), as well as the Southwest of China.

China is one of the country with the most extensive karst in the world, with an area of 3.44 million km^2, which accounts for about 1/3 of the national territorial area. China's diverse karst covers a large area, with very typical development. The exposed karst distribution area is around 1.2 million

km^2, accounting for about 13% of the national territorial area. The following table shows the karst area in 26 countries.

Country	Approximate area (1000 km^2)	Country	Approximate area (1000 km^2)
Argentina	45.2	Mongolia	70
Austria	23.7	Norway	13.1
Australia	391	Pakistan	138
Brazil	312	Poland	46.4
Bulgaria	30.4	Portugal	3.8
Croatia	28.2	Romania	27.3
Greece	53.4	Russia	2513
Hungary	9.2	Slovakia	10.4
India	290	Slovenia	16.2
Indonesia	304	Spain	145.7
Iran	895	Sweden	14.7
Italy	84.4	Switzerland	15.9
Kazakhstan	277	Ukraine	246.7

Carbonate rock data is collected from IAH World Karst Aquifer Map (WOKAM) in 2017 *(Global distribution of carbonate rocks and karst water resources* published by Nico Goldscheider et al. in 2020, and *The World Karst Aquifer Mapping project: concept, mapping procedure and map of Europe* published by Zhao Chen et al. in 2016).

Besides that, the global karst experts jointly conducted the geological survey of 14 countries in these years and estimated the karst area and its ratio to the national territorial area.

Country	Karst area (10^4 km^2)	Ratio to national territorial area
Serbia	1.26	14.19%
Thailand	6.53	12.73%
Indonesia	11.02	5.76%
Iran	24.00	14.59%
Slovenia	1.10	54.19%
Cambodia	0.13	0.72%
Malaysia	6.51	19.89%
Vietnam	6.20	18.79%
Ethiopia	26.41	23.93%
Laos	9.02	38.09%
Romania	7.13	29.91%
Türkiye	24.65	31.46%
Croatia	2.53	44.70%
Saudi Arabia	31.38	13.95%

ISO/TC 319 has not yet published any files of standards, but has received several proposals for standards in various fields such as karst carbon cycle, water resources, and engineering geology. Some of these have been successfully approved. Many engineers and experts from several related international organizations show their great interest in international standardization on karst, which would provide opportunities to make progress in the work.

3 Benefits expected from the work of the ISO/TC

The ultimate benefit of standardization is based on the use of widely recognized and accepted international voluntary standards developed to the highest technical level by an open consensus process that includes all those affected. Considering the extreme special complexity of the global karst, it is necessary to establish uniform standards for the investigation, evaluation, and management of karst resources and environment. ISO/TC 319 Karst will work to develop relevant karst standards. This process may be aided with the grouping of related standards that can fall into three broad categories: 1) basic general standards, including karst morphology, landform terms, as well as the formation, structure and function of karst systems; 2) investigation and evaluation standards, including investigation methods for karst systems, special exploration and experimental methods, evaluation methods and compilation of karst maps, and expression of karst-related research results; and 3) karst resources development, environmental protection and management technical standards, including investigation and evaluation methods on mineral resources, water resources, tourism resources, biological resources, and prevention and control methods for environmental problems like karst rocky desertification, land subsidence, karst leakage, and groundwater pollution, as well as the technical standards for environmental management and protection. With nine P-members as of 2024, the participation is limited, so ISO/TC 319 will initially focus on promoting generally basic standards for karst terms, investigation and evaluation of karst systems, as well as simulation methods in the short term, and then make efforts to establish related standards on sustainable exploitation and utilization of karst resources as well as environmental management and protection.

4 Representation and participation in the ISO/TC

4.1 Membership

https://www.iso.org/committee/7099518.html?view=participation

4.2 Analysis of the participation

At present, as a newly founded TC, there are 29 member bodies in ISO/TC 319, including 9 Participating members and 20 Observing members. The following table provides the regional distribution of these members.

Type	Countries
Participating countries	Austria (ASI), Canada (SCC), China (SAC), Iran, Islamic Republic of (INSO), Portugal (IPQ), Russian Federation (GOSTR), Saudi Arabia (SASO), Serbia (ISS), Switzerland (SNV)
Observing countries	Argentina (IRAM), Bulgaria (BDS), Czech Republic (UNMZ), Finland (SFS), France (AFNOR), Germany (DIN), Hungary (MSZT), India (BIS), Indonesia (BSN), Italy (UNI), Japan (JISC), Latvia (LVS), Lithuania (LST), New Zealand (NZSO), Norway (SN), Poland (PKN), Spain (UNE), Tanzania, United Republic of (TBS), Thailand (TISI), United Kingdom (BSI)
Liaisons	ISO/TC 94 Personal safety -- Personal protective equipment WFEO World Federation of Engineering Organizations

At present, ISO/TC 319 has P-members in the three major karst distribution areas in the world (Alps-Mediterranean, China-Southeast Asia, and North America), which to some extent represents the latest work globally, and the local socio-economic development is closely related to the karst geological environment. However, the overall number of P-members is still relatively small, and the next focus of the committee's work is to attract more countries with higher levels of karst work and better international cooperation foundations to become P-members, such as Slovenia, Thailand, United States, Indonesia, Italy, etc. In addition, ISO/TC 319 has maintained close cooperation with the International Union of Geological Sciences, the International Research Centre on Karst under the auspices of UNESCO, the International Association of Hydrogeologists, and other organizations for a long time. During relevant conference training and cooperation projects, communication was held on karst international standardization, and it is hoped that it will continue to be promoted as a liaison organization to join the committee's work. At the same time, with its international influence, ISO/TC 319 will be further promoted in related activities. In the daily work of the committee, it has attracted the interest of some karst experts or related companies to carry out international standardization work, and guided them to contact the national standardization administration to participate and apply to become P-members.

5 Objectives of the ISO/TC and strategies for their achievement

5.1 Defined objectives of the ISO/TC

Develop international standards, technical specifications, and other ISO deliverables/documents applicable to karst areas worldwide within the scope of the committee. During this process, the committee will continue to liaise with other ISO technical committees and international organizations to avoid duplication and conflicts. The focus of 2025-2030 is to promote proposals closely related to regional sustainable development within the scope of committees on karst carbon cycle, water resources, deep karst, engineering geology, and other related fields. Further strengthen communication and liaison with the national standardization administration of countries with large karst distribution, and assist a broader range of karst experts in participating.

5.2 Identified strategies to achieve the ISO/TC's defined objectives

Drafting Instructions

Provide text that addresses how the ISO committee has used or intends to use specific strategies to achieve its objectives and how these objectives are related to the major market trends (see section 2) and the overall priorities of the work of the committee. Such strategies may include:

- Prioritization of projects (for example, developing terminology standards first, then test methods, etc.);
- Use of available national, regional or other standards (such as CEN standards via the Vienna Agreement) as source documents on which to base International Standards;
- The way in which the ISO committee work will be conducted (for example, correspondence, physical meetings, teleconferences, e-mail, Internet, need for translation in meetings, etc.);
- Necessary co-operation and liaisons with other ISO committees and/or external standards developing organizations;
- Use of the various ISO deliverables (International Standards, Technical Specifications, Publicly Available Specifications, Technical Reports, International Workshop Agreements);
- Specific needs for pre/co-normative research to support the ISO committee's work program should be indicated so that an analysis can be made to detect any timing or funding difficulties;
- The specific structure of the ISO committee (TC, SCs, WGs) and why the ISO committee chose this particular structure should be explained.

提供文本，说明 ISO 委员会如何使用或打算使用具体策略来实现其目标，以及这些目标如何与主要市场趋势（见第 2 节）和委员会工作的总体优先事项相关联。此类策略可能包括：
•项目的优先顺序（例如，首先制定术语标准，然后制定测试方法等）；
•使用现有的国家、地区或其他标准（如通过《维也纳协定》制定的 CEN 标准）作为国际标准的源文件；
•ISO 委员会的工作方式（例如，信函、实体会议、电话会议、电子邮件、互联网、会议翻译需求等）；
•与其他 ISO 委员会和/或外部标准制定组织进行必要的合作和联络；
•使用各种 ISO 交付成果（国际标准、技术规范、公开可用规范、技术报告、国际研讨会协议）；
•应指出支持 ISO 委员会工作计划的预规范/共同规范研究的具体需求，以便进行分析，发现任何时间或资金困难；
•应解释 ISO 委员会（TC、SC、WG）的具体结构以及 ISO 委员会选择这种特殊结构的原因。
ISO/TC 319 will employ the following strategies to satisfy the preceding objectives:

a. Establish Working Groups (WG) or Subcommittees (SC) are assigned responsibility for specific areas and standardization tasks covered by the scope of ISO/TC 319 including the effective organization of available expertise and specialized laboratory facilities for standards development.

b. Begin liaisons with other ISO technical committees and international organizations, such as:
•ISO/TC 113 Hydrometry
•ISO/TC 147 Water quality
•ISO/TC 182 Geotechnics
•ISO/TC 190 Soil quality
•ISO/TC 211 Geographic information/Geomatics
•ISO/TC 265 Carbon dioxide capture, transportation, and geological storage
•IRCK, International Research Centre on Karst, UNESCO
•IUGS, International Union of Geological Sciences,
•IUCN, International Union for Conservation of Nature,
•UIS, Union of International Speleology, and
•IAH, International Association of Hydrogeologists

c. Use a single language for meetings to avoid the problems and expense of organizing interpreters/translation, limiting meetings when possible, and encouraging further use of ISO Portal for electronic distribution of documents.

d. Enhance communication between existing P- and O-members, and encourage each of the P-members to organize plenary meetings of the ISO/TC 319.

e. Identify and engage additional P-members, with the goal of increasing the number of P-members.

6 Factors affecting completion and implementation of the ISO/TC work programme

ISO/TC 319 was established in 2018. Due to the impact of the COVID-19 in 2019-2022, offline international cooperation and communication were not smooth, which means that it will take more time to make progress in international standardization on karst. Since 2023, the committee has actively communicated and contacted P- and O-members and the ISO CS, gradually proposing new proposals.

The chairperson and manager of the committee were re-appointed in 2024, and there is with no vacancies of the committee’s duty.

As the fact that some karst work is fundamental and theoretical research, there is still a certain process of practical transformation before technology and product output can be achieved. The commercial value of relevant standards is difficult to quantify, resulting in insufficient participation and enthusiasm from some stakeholders. However, such standardized karst products will effectively support the development of karst areas worldwide, and it is necessary to further enhance the participation of global karst experts.

7 Structure, current projects and publications of the ISO/TC

Information on ISO online

The link below is to the TC's page on ISO's website:
https://www.iso.org/committee/7099518.html

Click on the tabs and links on this page to find the following information:

- About (Secretariat, Committee Manager, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work programme (published standards and standards under development)

Reference information

Glossary of terms and abbreviations used in ISO

General information on the principles of ISO's technical work