

CCOP

ANNUAL REPORT

2022



CCOP Technical Secretariat

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ABBREVIATIONS

AG – ADVISORY GROUP	MATERIALS TRAINING CENTRES
AIST – NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY, JAPAN	IOC – INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
APGN – ASIA PACIFIC GEOPARKS NETWORK	IOMAC – INDIAN OCEAN MARINE AFFAIRS COOPERATION
ASCOPE – ASEAN COUNCIL ON PETROLEUM	ISGEO – INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES, REPUBLIC OF KOREA
ASEAN – ASSOCIATION OF SOUTHEAST ASIAN NATIONS	IUGS – INTERNATIONAL UNION OF GEOLOGICAL SCIENCES
ASOMM– THE ASEAN SENIOR OFFICIALS MEETING ON MINERALS	JMG – DEPARTMENT OF MINERAL AND GEOSCIENCE MALAYSIA
BGR – FEDERAL INSTITUTE FOR GEOSCIENCES AND NATURAL RESOURCES, GERMANY	KIGAM – REPUBLIC OF KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES
BGS – BRITISH GEOLOGICAL SURVEY	KNOC – KOREAN NATIONAL OIL COMPANY
CC – COOPERATING COUNTRY	MC – MEMBER COUNTRY
CCOPTS – CCOP TECHNICAL SECRETARIAT	MGB – MINES AND GEOSCIENCE BUREAU, PHILIPPINES
CCS – CARBON CAPTURE AND STORAGE	MEMR – MINISTRY OF ENERGY AND MINERAL RESOURCES, INDONESIA
CCUS – CARBON CAPTURE, UTILISATION AND STORAGE	MNR – MINISTRY OF NATURAL RESOURCES, CHINA
CGS – CHINA GEOLOGICAL SURVEY	MME – MINISTRY OF MINES AND ENERGY, CAMBODIA
CO – COOPERATING ORGANISATION	MONRE – MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT OF THAILAND, VIETNAM
CPC – CIRCUM PACIFIC COUNCIL	PETRAD – PETROLEUM MANAGEMENT AND ADMINISTRATION, NORWAY
DENR – DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, PHILIPPINES	SC – STEERING COMMITTEE
DGM – DEPARTMENT OF GEOLOGY AND MINERALS, LAO PDR	SEADPRI – SOUTHEAST ASIA DISASTER PREVENTION RESEARCH INITIATIVE, MALAYSIA
DGSE – DEPARTMENT OF GEOLOGICAL SURVEY AND MINERAL EXPLORATION, MYANMAR	SPC – PACIFIC COMMUNITY IN THE PACIFIC ISLANDS AND TERRITORIES
DMR – DEPARTMENT OF MINERAL RESOURCES, THAILAND	UKM – UNIVERSITI KEBANGSAAN MALAYSIA
DOE – DEPARTMENT OF ENERGY, PHILIPPINES	UN – UNITED NATIONS
EAGER – EAST ASIA GEOSCIENCE AND ENVIRONMENTAL RESEARCH	UNECE - UNITED NATIONS ECONOMIC COMMISSION OF EUROPE
EGS – EUROGEOSURVEYS	UNEP – UNITED NATIONS ENVIRONMENT PROGRAMME
EOS – EARTH OBSERVATORY OF SINGAPORE	UNESCO – UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
ESCAP – ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC	UNFC – UNITED NATIONS FRAMEWORK CLASSIFICATION
EU – EUROPEAN UNION	
GAI – GEOLOGICAL AGENCY OF INDONESIA	
GDMR – GENERAL DEPARTMENT OF MINERAL RESOURCES, CAMBODIA	
GETECH – GEOPHYSICAL EXPLORATION TECHNOLOGY	
GEUS – GEOLOGICAL SURVEY OF DENMARK AND GREENLAND	
GIS – GEOGRAPHIC INFORMATION SYSTEM	
GSC – GEOLOGICAL SURVEY OF CANADA	
GSI – GEOINFORMATION SHARING INFRASTRUCTURE	
GSJ – GEOLOGICAL SURVEY OF JAPAN	
GTK – GEOLOGICAL SURVEY OF FINLAND	
IGDP – INTEGRATED GEOPHYSICAL AND GEOCHEMICAL DATA PROCESSING	
INTERMIN – INTERNATIONAL NETWORK OF RAW	

MESSAGE FROM THE CHAIRPERSON

Dear friends,

First and foremost, as the Chairperson of the CCOP Steering Committee, I'd like to express my sincere gratitude to the CCOP Steering Committee, Advisory Group, Technical Secretariat, and all friends from the CCOP Member Countries, Cooperating Countries and Cooperating Organizations. I am delighted and proud to present the CCOP Annual Report 2022, and to show the extraordinary progress we have made in the past year in promoting the sustainable development of Earth science in the East and Southeast Asia region.



In line with the UN's 2030 Agenda for Sustainable Development and the Paris Agreement on climate change, CCOP has continued to put its efforts towards promoting the application of geoscience for sustainable development and better life on future Earth. Under the guidance of the CCOP 2021-2025 Strategic Plan, we have fulfilled its responsibilities and worked tirelessly to build bridges of communication and collaboration. We are also committed to strengthening the beneficial cooperation among all CCOP family members.

In 2022, we have worked through the pandemic and restarted cooperation and communication in East and Southeast Asia. Most impressively, we successfully held the 78th CCOP Steering Committee in Ulaanbaatar, Mongolia, which was our first face-to-face Steering Committee meeting since the outbreak of the COVID-19 pandemic. Additionally, we organized 32 physical/virtual workshops, training courses, and meetings with themes covering a variety of disciplines, such as urban geology, geohazard, CCUS, groundwater, marine geology, geopark, mineral resources and other related fields. Over 870 participants from the Member Countries and Cooperating Countries joined those activities, which promoted collaboration and knowledge sharing among the CCOP Member Countries.

Dear colleagues, these achievements in our cooperation have not come easily, and we have much more to look forward to in the future. As an ancient Chinese saying goes, "The wise are free from doubts, the benevolent from anxiety, and the brave from fear." Confronted with the new situation and common challenges of regional development, we need to forge a consensus on building a CCOP community with a shared future, deepen communication and exchanges, and take regional multilateral cooperation to a new height. I believe that a series of fruitful cooperation will inject fresh impetus into regional development, bring broader development prospects to the CCOP family and our common home, and create more development opportunities for the people in the East and Southeast Asia region.

Finally, I wish all of you happy and healthy in 2023!

Thank you!

A handwritten signature in black ink, consisting of three stylized Chinese characters: 李金发 (Li Jinfa).

Dr. Li Jinfa

Chairperson of CCOP Steering Committee
Permanent Representative of China to CCOP
Vice Minister for Geological Survey
Ministry of Natural Resources, P.R. China
President of China Geological Survey

■ CCOP: Vision, Mission and Strategy

Vision:

To be the Leading Intergovernmental Geoscience Organization for Sustainable Development in East and Southeast Asia

Mission:

To work together on advancing geoscience for better lives on a future earth, in-line with the goals of international conventions including the 2030 Agenda for Sustainable Development, the Sendai Framework, and the Paris Agreement, through:

- The application of geoscience knowledge and provision of technical solutions, provision of advice and geoinformation for economic development and sustainable management of the national resources and environment;
- Adapting to digital transformation in geoscience for future earth;
- The promotion of education, capacity building and outreach.

STRATEGIC FOCUS:

CCOP should play a leading role regionally in supporting national geoscience organizations contribution to the individual country achievements in meeting the goals of the international conventions, including, the 2030 Agenda for Sustainable Development (UN SDGs), the Sendai Framework for Disaster reduction 2015-2030, and the Paris Agreement, as guided by its Member Countries. The strategic aims for this strategy are identified as:

1. Provision of Geoscience Solutions, Advice and Reliable Information through Cooperation and Partnership
2. Adapting to Digital Transformation in Geoscience for Future Earth
3. Promotion of Geoscience Education, Capacity Building and Outreach.

“TO BE THE LEADING INTERGOVERNMENTAL GEOSCIENCE ORGANIZATION FOR SUSTAINABLE DEVELOPMENT IN EAST AND SOUTHEAST ASIA ”



Member Countries:

CCOP currently has a total of 16 Member Countries (MCs): Brunei Darussalam, Cambodia, China, Indonesia, Japan, the Republic of Korea, Lao PDR, Malaysia, Mongolia, Myanmar, Papua New Guinea, the Philippines, Singapore, Thailand, Timor-Leste and Vietnam.

Cooperating Countries:

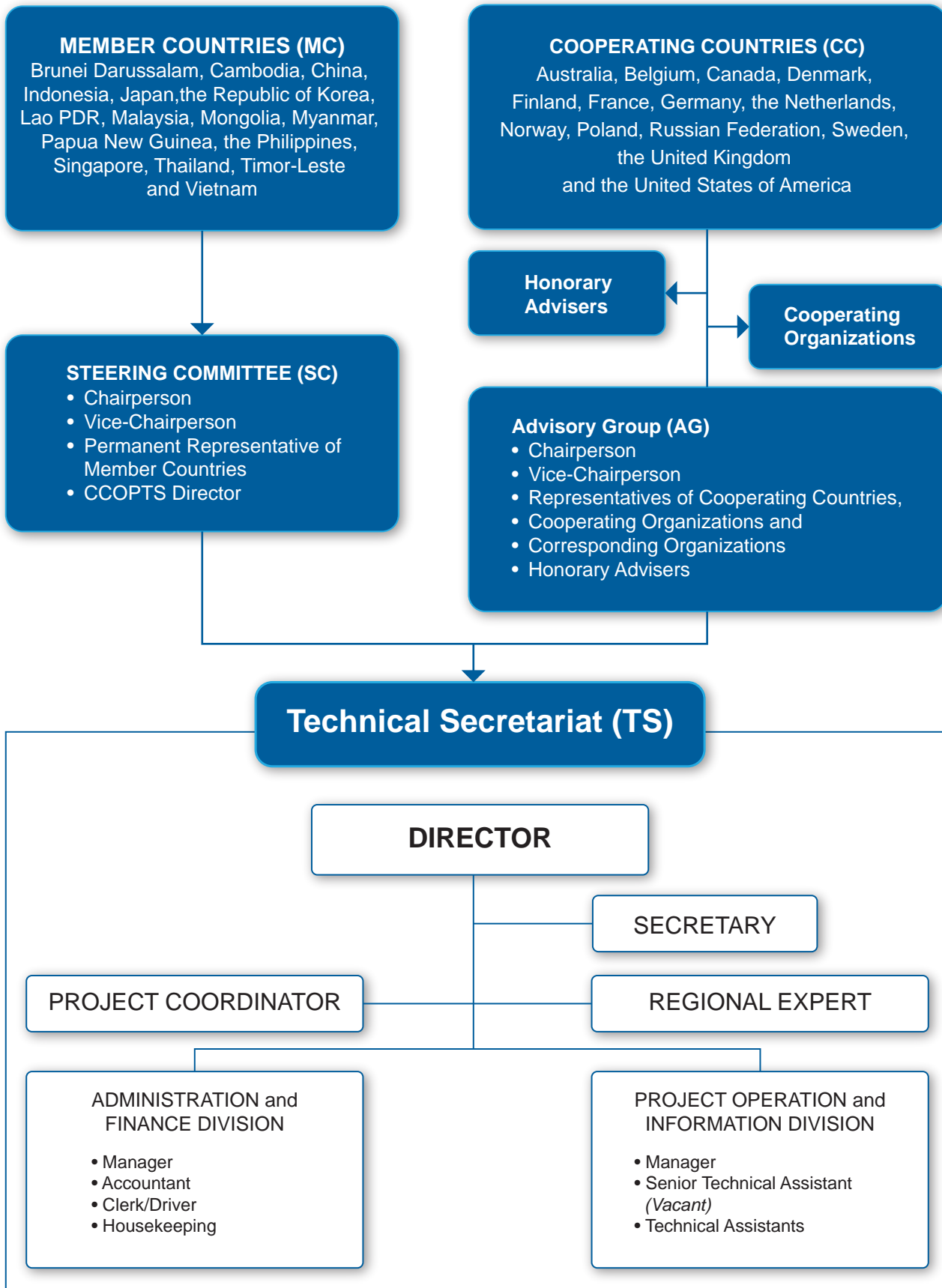
CCOP also works closely with 14 Cooperating Countries (CCs): Australia, Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Poland, Russian Federation, Sweden, the United Kingdom and the United States of America.

Cooperating Organizations:

There are 17 Cooperating Organizations (COs) throughout the world:

ASCOPE, CIFEG, CPC, EUROGEOSURVEYS, GETECH, IERI/GIST, IOC, IOMAC, IUGS, PETRAD, SPC, UNESCAP, UNEP, UNESCO, UKM, THE WORLD BANK and YES NETWORK.

MANAGEMENT AND ORGANIZATION



As of 31 December 2022, the CCOP Technical Secretariat (TS) has 10 personnel, comprising three professionals, six supporting staff and one out-sourced staff. The operational organization chart of the Technical Secretariat is shown in Figure 1.

Dr. Songyang Wu from China succeeded **Dr. Dhiti Tulyatid** from Thailand as CCOPTS Regional Expert. For the term of 2 years, he assumed office at the CCOPTS from 1 May 2022. CCOP appreciates the contribution of **Dr. Dhiti Tulyatid** during his 4 years of service as CCOPTS Regional Expert.



Dr. Songyang Wu

The 79th CCOP Steering Committee (SC) Hybrid Meeting held on 13 October 2022 in Bandung Indonesia elected Dr. Shinsuke Nakao, Permanent Representative of Japan to CCOP, as the Vice-Chairperson of the CCOP Steering Committee to succeed **Dr. Eko Budi Lelono** who will be retiring from office as Permanent Representative of Indonesia to CCOP, and Head of Indonesia's Geological Agency. **Dr. Shinsuke Nakao's** term as CCOP SC Vice-Chairperson is from 1 November 2022 to 31 December 2023. CCOP appreciates the contribution of **Dr. Eko Budi Lelono** to CCOP during his term as the Permanent Representative of Indonesia to CCOP as well as the Vice-Chairperson of the CCOP Steering Committee.



Dr. Eko Budi Lelono



Dr. Shinsuke Nakao

Appointments of new Permanent Representatives of Member Countries (MCs) to CCOP in year 2022.

On 17 May 2022, **Dr. Yondon Gelen**, Minister, Ministry of Mining and Heavy Industry of Mongolia (MMHI) appointed **Dr. Uyanga Bold**, Director-General of the Geological Policy Department of the Ministry of Mining and Heavy Industry (MMHI) as Permanent Representative of Mongolia to CCOP succeeding **Mr. Kherlen Khishigjargal**.

On 1 October 2022, **Dr. Oranuj Lorphenstri** has been appointed as the Director-General of Department of Mineral Resources (DMR), Ministry of Natural Resources and Environment succeeding **Mr. Pongboon Pongtong** as Permanent Representative of Thailand to CCOP.

CCOP would like to record its thanks and appreciation for the contribution of **Mr. Kherlen Khishigjargal**, and **Mr. Pongboon Pongtong** during their term as Permanent Representative of Mongolia and Thailand to CCOP respectively.

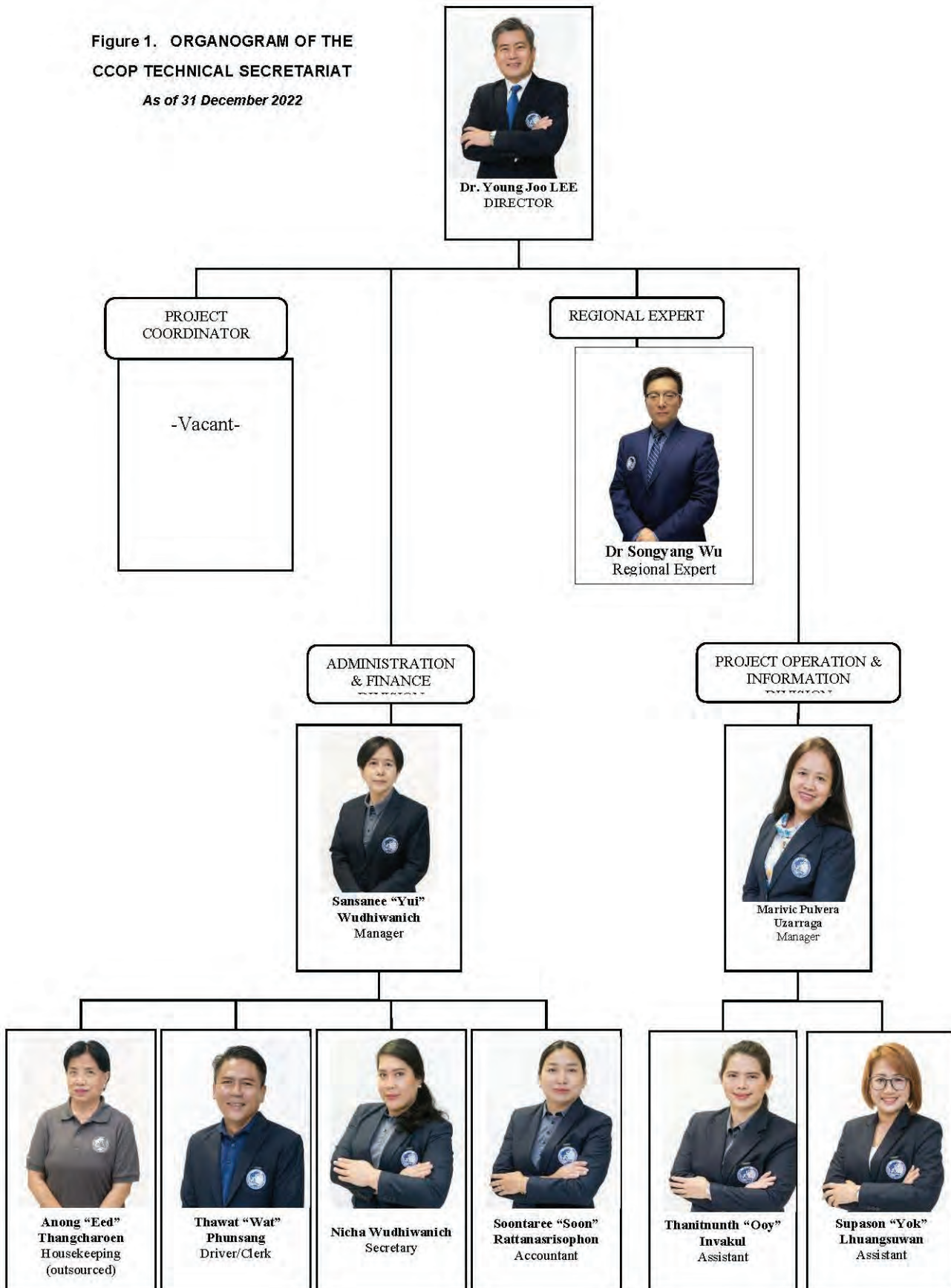


Dr. Uyanga Bold



Dr. Oranuj Lorphenstri

**Figure 1. ORGANOGRAM OF THE
CCOP TECHNICAL SECRETARIAT**
As of 31 December 2022



HIGHLIGHTS FOR THE YEAR 2022

The 78th CCOP Steering Committee Hybrid Meeting

The 78th CCOP Steering Committee (SC) Hybrid Meeting was held in person at IBIS Styles Ulaanbaatar Polaris Hotel, Ulaanbaatar, Mongolia and virtually by using the Zoom application on 31 May – 1 June 2022. The Meeting was totally 73 attended by 42 online and 31 onsite delegates from the following Member Countries (MC): **BRUNEI DARUSSALAM, CAMBODIA, CHINA, INDONESIA, JAPAN, REPUBLIC OF KOREA, LAO PDR, MALAYSIA, MONGOLIA, MYANMAR, PAPUA NEW GUINEA (PNG), PHILIPPINES, SINGAPORE, THAILAND, and VIETNAM.** Also, **Ioannis Abatzis** and **Dato' Yunus Abdul Razak**, Chairperson and Vice-Chairperson of the CCOP Advisory Group (AG) respectively, as well as the Director and staff of the CCOP Technical Secretariat (CCOPTS) were present.

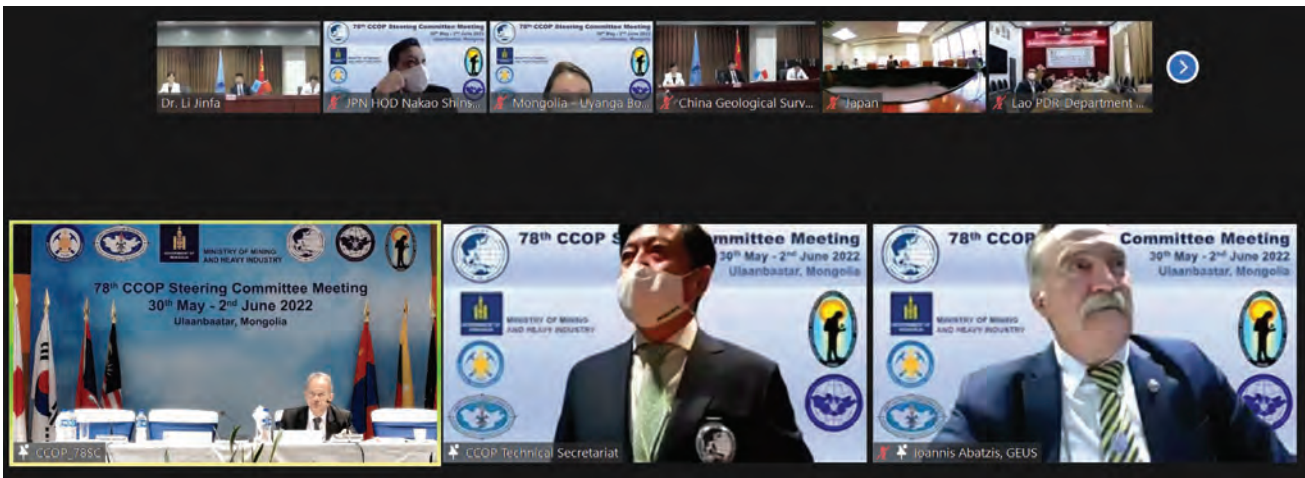


Dr. Uyanga Bold, Permanent Representative of Mongolia to CCOP and Director General of Geological Policy Department of the Ministry of Mining and Heavy Industry, Mongolia delivered welcoming remarks onsite. **Dr. Li Jinfa**, Chairperson of the CCOP Steering Committee, Permanent Representative of China to CCOP and then Vice President of China Geological Survey, delivered the opening address online and officially opened the 78th CCOP Steering Committee Meeting. **Dr. Eko Budi Lelono**, Vice-Chairperson of the CCOP Steering Committee, Permanent Representative of Indonesia to CCOP and the Head of Geological Agency of Indonesia expressed greetings to all delegates from Member Countries.





Dr. Young Joo LEE, the CCOPTS Director presented the CCOP Progress Report covering the period 1 January to 31 December 2021 and 1 January to 31 March 2022. The report included the administration and personnel, finance, technical activities, publications and upcoming activities.



Dr. Songyang Wu, Regional Expert, CCOPTS, gave a report on the implementation of the CCOP Strategic Plan 2021-2025. New activities include the following projects: CCUS, CCOP-RCUG and CCOP-Urban Geology Project. The Meeting gave the following recommendations: Expand the expert group to cover other aspects; Encourage MCs for new input or comments on needs and offers; and cooperate with CCs/COs and seek funding for projects in response to current issues towards sustainable development goals.



Focus / Objectives	Projects/Activities	Responsible Offices / Persons	Duration	Resources / Source of Fund
AL2.1	UNESCO Global Geopark Network International Conference on UNESCO Global Geopark	CCOPTS	2021–2025 (expected in 2023)	CCOP
AL2.2	China–ASEAN Mining Cooperation Forum & Exhibition	CCOPTS	2021–2025 (On-going)	CAMCF / CCOPTS
AL2.3	Energy China Forum (ECF)	CCOPTS	2021–2025 (On-going)	ECF & CCOP
AL2.4	CCOP-KIGAM GW Project in Mekong River Basin	CCOPTS, Lao PDR, Cambodia, Thailand, Vietnam	2021-2022 (On-going)	KIGAM
AL2.5	CCOP-GSJ Groundwater Phase IV	CCOPTS	2019-2023 (On-going)	GSJ
AL2.6	Groundwater / georesources for agriculture	CCOPTS	2022–2025 (N/A)	CGS





The Meeting endorsed the recommendations of the Select Finance Committee (SFC) as presented by **Mr. Ioannis Abatzis**, Chairperson of the CCOP Advisory Group. On SFC membership, the Meeting tasked the CCOPTS to review the terms of reference and propose revisions if any at the next meeting.



The Meeting endorsed the following New Initiatives & Revised CCOP Workplan 2022 as presented by the **Dr. Young Joo LEE**, CCOPTS Director, including 1) Group on Earth Observations (GEO); 2) Global Geopark; 3) Global Energy Technology Project; 4) Groundwater resources in the Greater Mekong Subregion; 5) CCOP Expert Group Network or Regional Expert Pool (REP); 6) Collaboration with Cooperating Countries (CCs) and Cooperating Organizations (COs)

Republic of Korea Delegation confirmed the hosting of the 80th CCOP Steering Committee Meeting (80SC) in April 2023 at Jeju Island, Republic of Korea.



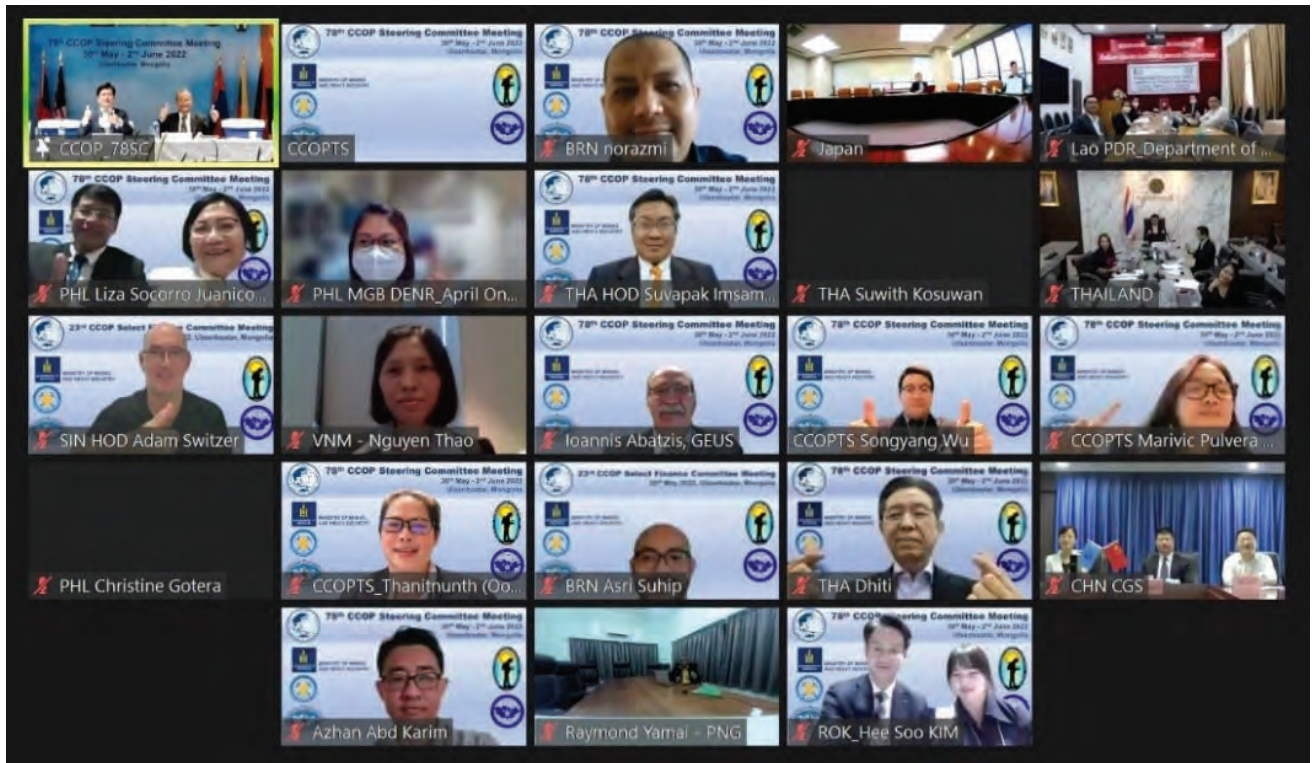
Indonesia Delegation confirmed the hosting of the 58th CCOP Annual Session (58AS) and 79th CCOP Steering Committee Meeting (79SC) and planned to hold physically on 9-13 October 2022 at Bandung, Indonesia. Thematic Session will restart during the 58th CCOP Annual Session with the topic of “Geoscience for Energy Transition in East and South East Asia”. The Indonesia Delegation informed the proposed meeting schedule, venue and field excursion.



Dr. Young Joo LEE, the Director of CCOPTS updated the meeting on the results of the recruitment of CCOPTS Regional Expert with the term 1 May 2022 - 30 April 2024. The CCOP Technical Secretariat submitted CV of nominees for Recruitment of Regional Expert and Selection Form nomination of candidates together with selection form to CCOP Member Countries. CCOPTS received the indicated preferred candidate from 6 CCOP Member Countries, the largest supporting number, a total of 6 Permanent Representatives of CCOP Member Countries, selected **Dr. Songyang Wu** from China as the Regional Expert for the period of 1 May 2022 - 30 April 2024.



The Chairperson of the 78th CCOP Steering Committee Meeting, **Dr. Eko Budi Lelono** delivered the closing remarks. He noted that Covid-19 outbreaks have changed social lives and have added to the existing challenges. However, he was particularly pleased that CCOP had started to organize offline meetings. He wished this meeting will be an indicator that recovery time has come. He highlighted that the meeting discussed many items efficiently. The Technical Secretariat presented progress of activities during the period from 1 January to 31 December 2021. The Meeting was particularly glad that the CCOP Strategic Plan 2021 – 2025 has been implemented and has progressed well according to the plan. **Dr. Eko Budi Lelono** conveyed thanks to all the delegates from Member Countries and the Advisory Group for their presence and deliberation on the various issues and matters raised during the hybrid meeting, and again expressed thanks to **Dr. Uyanga Bold**, Director-General of the Geological Policy Department of the Ministry of Mining and Heavy Industry, Mongolia in cooperation with CCOP Technical Secretariat under **Dr. Young Joo LEE** for their excellent preparation in hosting this 78th CCOP SC Hybrid Meeting.



58th CCOP Annual Session and the 79th CCOP Steering Committee Meeting

As the first physical Annual Session after the COVID-19 pandemic, there were over 160 participants from 21 countries attended in person and virtually on 9-12 October 2022 in Bandung, Indonesia. During the opening ceremony, the Representative of the Governor of West Java and **Dr. Eko Budi Lelono**, Vice-Chairperson, CCOP Steering Committee gave the Welcome Address. The Special Message was given by **Mr. Ioannis Abatzis**, Chairperson of the CCOP Advisory Group. **H.E. Kwon Hee-Seog**, Ambassador of the Republic of Korea to ASEAN expressed his greetings at the ceremony. **H.E. Arifin Tasrif**, Minister of Energy and Mineral Resources, Indonesia, delivered the opening address and officially opened the 58th CCOP Annual Session.



Country/Organization reports were presented by CCOP Member Countries, Cooperating Countries and Cooperating Organizations, introducing the progress and plans/intentions in collaboration with CCOP and bilateral/multilateral cooperation among CCOP regions. **Dr. Young Joo LEE**, Director of CCOP Technical Secretariat, presented the CCOP Progress Report and Proposed Workplan for 2023.





The CCOP Thematic Session, which was held on 11 October 2022, with a theme of “Geoscience for Energy Transition in East and Southeast Asia”. Three sub-themes were as follows:

- Renewable and Mixed Energy: Sustainable Development;
- Critical Minerals: Exploration and Discovery;
- Geohazard and Urban Geology: Management and Planning.

Over 100 geologists from CCOP member countries and cooperating countries actively participated in the three parallel sessions, of which 37 speakers gave presentations on the latest research achievements in the region.

CCOP 58th Annual Session 2022 Field excursion to Kamojang Area



Dr. Young Joo Lee was interviewed during the CCOP 58th Annual Session field excursion in Kamojang Area or (the Kamojang crater), Pertamina Geothermal field about Collaboration of CCOP Member Countries on green energy.

Scan the QR Code to see the video clip of the interview.





CCOPTS COURTESY VISITS



TECHNICAL PROGRAMMES AND ACTIVITIES



Provision of Geoscience Solutions



Transformation for Future Earth



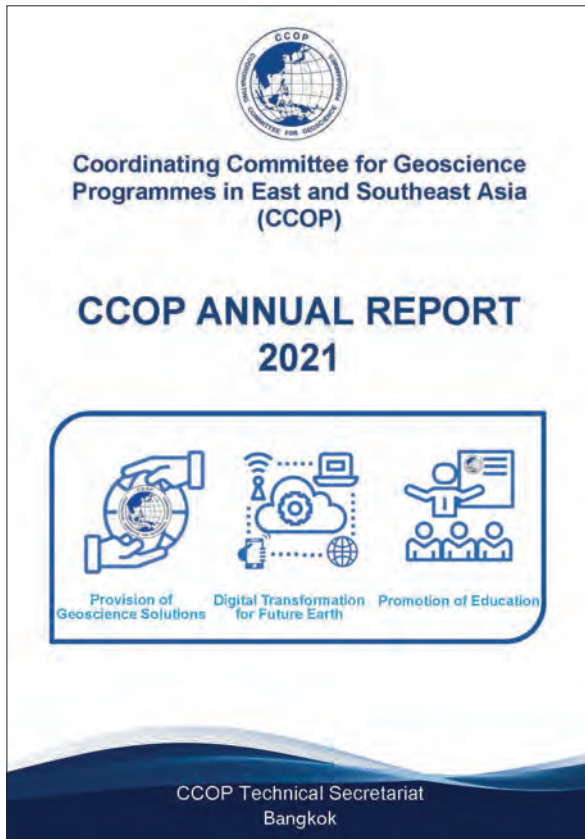
Promotion of Education

DATE/VENUE	ACTIVITY
13 Jan 2022	The 3 rd working and task group leaders meeting online (DDE)
21 Jan 2022	WCOGS Activities Meeting
11-12 Feb 2022	The Online International Conference on Geology, Geotechnology and Mineral Resources of Indochina (GEOINDO 2022)
24-25 Feb 2022	The 6 th International Workshop on CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project
22 Feb 2022	The 11 th Virtual Liaison Officials Meeting
26 Feb 2022	Critical Minerals Forum (Asia and Oceania) - Geoscience to support critical mineral discovery
27 Feb to 2 Mar 2022 <i>Nakhon Phanom and Nong Khai, Thailand</i>	CCOP's Transboundary Aquifer (TBA) Monitoring Wells Operation Site Visit
1 Mar 2022	Workshop of Technology Innovation Challenge (GSHP)
9 Mar 2022	The 7 th ASOMM Joint Working Group (JWG) and Associated Meetings The 20 th Meeting of the Working Group on Mineral Information and Database (WGMID)
9-10 Mar 2022	GSJ-GW Workshop
14 Mar 2022	4 th Meeting of the Governing Council of the Deep-time Digital Earth (DDE)
16 Mar 2022	Online 2 nd Meeting: CCOP - CGS Book Project on Coastal Erosion and Mitigation
19 Apr 2022	Online Meeting on CCOP-KIGAM-MME GW Project TBA well installation in Cambodia
6 May 2022 <i>Bangkok, Thailand</i>	Past, Current and Outlook of Thailand's Critical Minerals
8-9 May 2022 <i>Bangkok, Thailand</i>	CCOP-KIGAM Groundwater Project Meeting
11-12 May 2022 <i>Nong Khai, Thailand</i>	CCOP-KIGAM GW Project: TBA Monitoring Well Installation Sites
23-27 May 2022	78 th Session of the United Nations Conference Centre in Bangkok and online
30 May-2 Jun 2022 <i>Ulaanbaatar, Mongolia</i>	The 78 th CCOP Steering Committee Meeting
20 Jun 2022 <i>Jakarta, Indonesia</i>	Visit and meeting with ASEAN-KOREA Programme Management Team (AKPMT)
21 Jun 2022 <i>Jakarta, Indonesia</i>	Courtesy Visit the Ambassador, Mission of the Republic of the Republic of Korea to ASEAN
22 Jun 2022 <i>Jakarta, Indonesia</i>	Meeting with the ASEAN Secretariat
23 Jun 2022 <i>Bandung, Indonesia</i>	Meeting with the Geological Agency of Indonesia
28 Jun 2022	Building better public geoscience for a better world: Introduction to the World Community of Geological Surveys (Online)

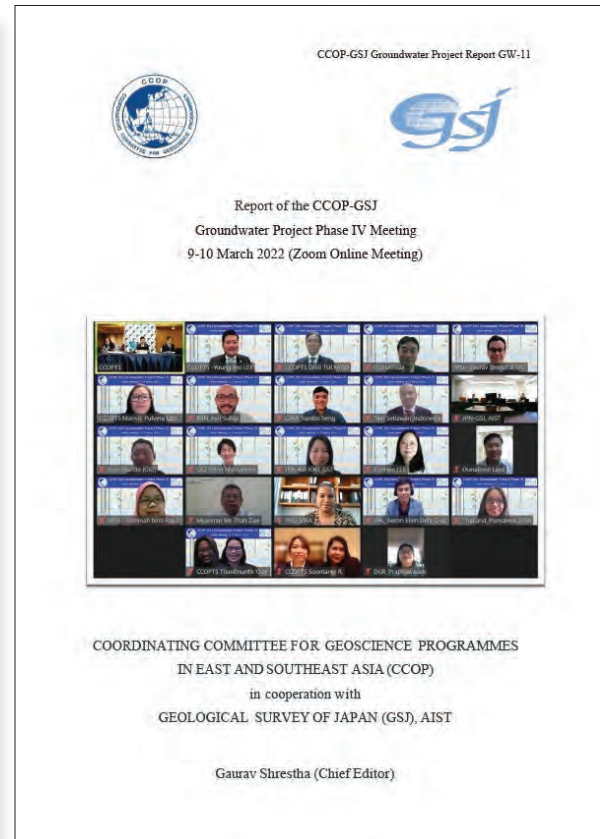
DATE/VENUE	ACTIVITY
3-9 Jul 2022 <i>Bangkok, Thailand</i>	CCOP-KIGAM GDR Project Meeting
5-7 Jul 2022 12-14 Jul 2022 19-21 Jul 2022	GSJ Webinar 2022 on Practical Geological Survey Techniques - Application to Geological Disaster Mitigation – Course 1: Lectures on Geological Disaster Mitigation Course 2: Practical Training on Geographic Information System (GIS) Course 3: Practical Training on Remote Sensing
21 Jul 2022 <i>Bangkok, Thailand</i>	CCOP-Global CCS Institute Meeting on Cooperation
26-27 Jul 2022 <i>Ho Chi Minh, Vietnam</i>	CCOP-KIGAM Groundwater Project Transboundary Aquifer (TBA) Monitoring Well Site Visiting in Mekong Delta
3 Aug 2022	CCOP-KIGAM-DGR Groundwater Online Meeting on monitoring well site for the installation and operation plan of the groundwater monitoring system in Thailand
9 Aug 2022	8 th Joint Working Groups Meeting of the ASEAN Minerals Cooperation
11 Aug 2022 <i>Bangkok, Thailand</i>	Signing Ceremony between K-CCUS Association & CCOP
16 Aug 2022 <i>Bangkok, Thailand</i>	CCOP-KIGAM-SCGP on CCUS technology
22-24 Aug 2022 <i>Bangkok, Thailand</i>	The 1 st Thailand Groundwater Symposium Key to water Security and Sustainability
22-28 Aug 2022 <i>Manila, Philippines</i>	GDR Web System Training for MGB, Philippines
29 Aug to 1 Sep 2022 <i>Jeju, Korea</i>	The 19 th International Conference of the Pacific Basin Consortium for Environment and Health in 2022: 'Environmental exposures in a changing climate'
19-22 Sept 2022	VACI 2022
19-23 Sept 2022 <i>Singapore</i>	CCOP-KIGAM Urban Geology Workshop "Urban Geology Technology Sharing for Sustainable Cities in E & SE Asia"
26-30 Sept 2022 <i>Phuket, Thailand</i>	CCOP-KIGAM Geoscience Data Repository (GDR) Project Third Working Group Meeting/Workshop
9-13 Oct 2022 <i>Bandung, Indonesia</i>	The 58 th CCOP Annual Session The 79 th CCOP Steering Committee Meeting
25-28 Oct 2022 <i>Zumaja Basques Coast UGGP, Spain</i>	IUGS 60 th Anniversary Event: The First 100 IUGS Geological Heritage Sites
26-27 Oct 2022 <i>Brussel, Belgium</i>	50 th Anniversary to mark the first meeting of the Western European Geological Surveys and its development into EuroGeoSurveys
7-9 Nov 2022 <i>UNESCO, Paris</i>	The 2022 DDE update meeting & DDE Open Science Forum
21 Nov to 2 Dec 2022	Online International Training Course on Security and Development of Karst Areas: Water, Geohazards, and Big Data
22-23 Nov 2022	Online Workshop of CCOP-ASEAN-IGDP project on Geoscience Information
22-25 Nov 2022	22 nd ASOMM and Its Associated Meeting/Event
25 Nov 2022	CGS-CCOP Online Seminar on Geological hazard Prevention and Risk Control Supported by Sciences and Technology
28 Nov 2022 <i>Bangkok, Thailand</i>	CCOP- KHAN - KIGAM Meeting
29-30 Nov 2022	The 5 th Training Courses on Capacity Building on Marine Geosciences and Geohazards Reduction & Prevention for ASEAN Member States
27 Nov to 3 Dec 2022 <i>Daejeon and Jeju, Korea</i>	IS-Geo Regular Training Course on "3D Geological Modelling – SKUA GOCAD"
4-10 Dec 2022 <i>Daejeon and Jeju, Korea</i>	IS-Geo Regular Training Course on 'Geopark: preparation and management'
Dec 2022	IERI Recruitment of Internships from CCOP Member Countries

PUBLICATIONS

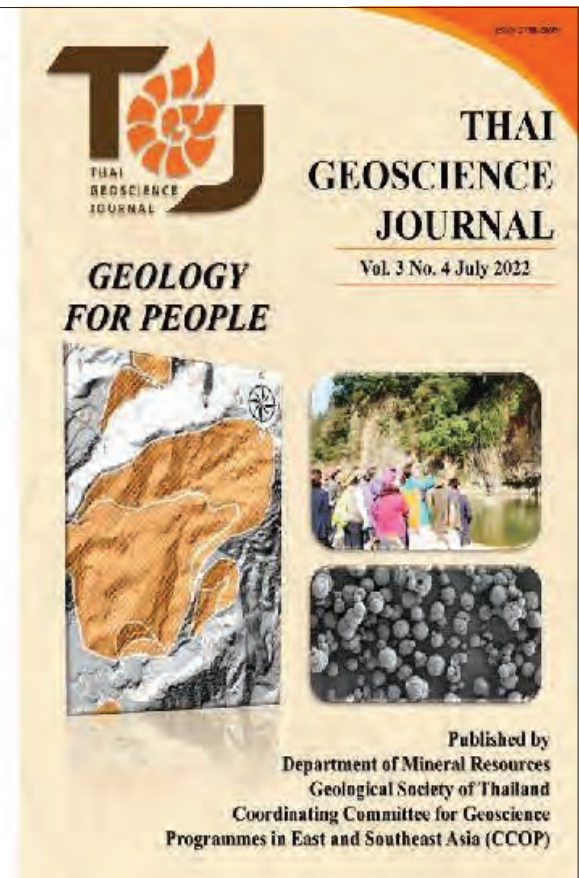
CCOP Annual Report 2021



Report of the CCOP-GSJ Groundwater Project Phase IV Meeting, 9-10 March 2022



Thai Geoscience Journal



COOPERATION AND PARTNERSHIP

COUNTRY	CCOP TECHNICAL ACTIVITIES
1) Member Countries	
China	<p>CGS support the following:</p> <ul style="list-style-type: none"> • Secretariat of the CCOP Research Centre on Urban Geology (CCOP – RCUG) • Technical Workshop of CCOP – RCUG • Integrated Geoscience Data Processing project (IGDP)
Japan	<p>GSJ continues to financially and technical support the following projects:</p> <ul style="list-style-type: none"> • Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project • CCOP-GSJ Groundwater Project Phase IV • GSJ Webinar on Practical Geological Survey Techniques - Application to Geological Disaster Mitigation -
Republic of Korea	<p>KIGAM support financially and technically the following projects:</p> <ul style="list-style-type: none"> • Vulnerability assessment to climate change of groundwater system in Greater Mekong Subregion and comparative study of groundwater dependent ecosystem • CCOP Geoscience Data Repository (GDR) Project • GeoSample and Analysis Data Repository System (CCOP-GADR) Technology Transfer to Member Countries • Urban Geology Technology Transfer for Sustainable Cities in East and Southeast Asia (March 2021-2024) • KIGAM IS-Geo Training Programmes
Thailand	<p>DMR continues to support the Permanent Office Building for CCOPTS in DMR Complex, Bangkok, Thailand.</p>
2) Cooperating Countries	
United States of America	<p>The Geological Society of America (GSA) manages the 'Terman Fund' for the EAGER Award Project for CCOP Member Countries, which has been resumed in 2019 per the decision of the 72nd CCOP Steering Committee Meeting in March 2019, Samui Island, Thailand.</p> <p>One grant was awarded at the 58th CCOP Annual Session held on 9-12 October 2022.</p>
3) Cooperating Organizations	
IERI	CCOP-IERI Internship at GIST
IUGS	Deep-time Digital Earth (DDE)

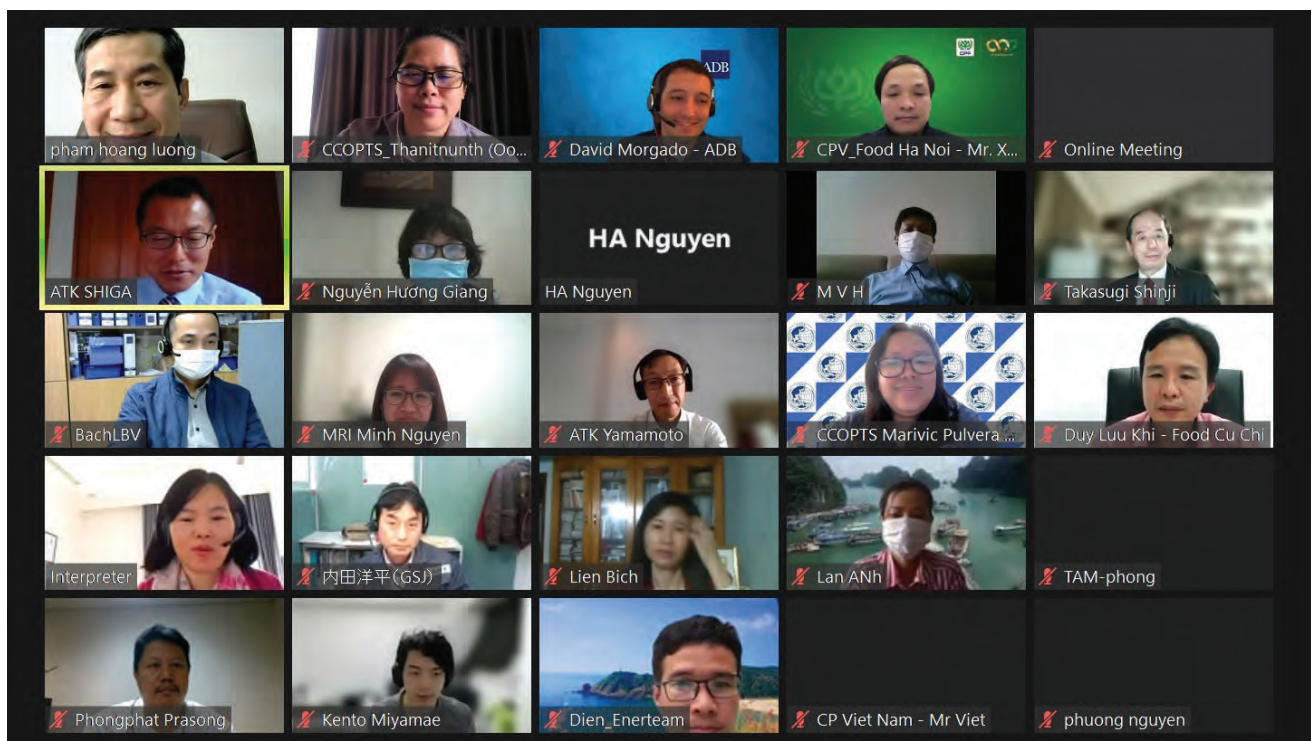
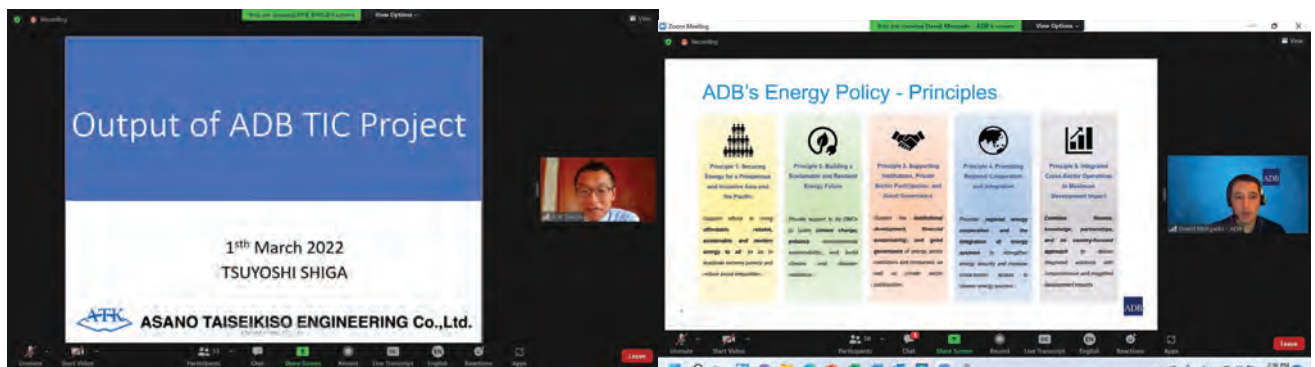
STRATEGIC AIM I: PROVISION OF GEOSCIENCE SOLUTIONS, ADVICE AND RELIABLE INFORMATION THROUGH COOPERATION AND PARTNERSHIP

OBJECTIVE 1: To promote work on geohazards, disaster, environment & climate change adaptation

Workshop of Technology Innovation Challenge (GSHP)

On 1 March 2022, 10:00-12:00 (Bangkok Time), the workshop of the Technology Innovation Challenge (GSHP) was held online and about 50 participants attended from MOIT, ADB, ATK, GSJ, VIGMR, MONRE, CP Vietnam and CCOPTS. The aim of this workshop is to be an opportunity to understand the output of the project and discuss the applicability and challenges for successful dissemination of the core technology in Vietnam and ASEAN region.

Asian Development Bank (hereafter ADB) has selected Asano Taiseikiso Engineering Co., Ltd. (hereafter ATK) to receive grant funding for implementing a pilot test and demonstration site of its proposed technology solution (energy saving) in a premise of a private company (C.P. Vietnam) in Vietnam.



CCOP-CGS (QIMG) Book Project on Coastal Erosion and Mitigation of E & SE Asia

There were 36 experts from 10 Member Countries participated in the meeting on 16 March 2022: Brunei Darussalam (4); China (10); Indonesia (3); Japan (2); Republic of Korea (3); Malaysia (2); Myanmar (1); PNG (2); Philippines (2); and Thailand (7); and 5 from CCOPTS. The project has received 8 chapter manuscripts from MCs including Brunei Darussalam, China, Indonesia, the Republic of Korea, Malaysia, Myanmar, the Philippines and Thailand.

Dr. Dhiti Tulyatid, Regional Expert cooperation among CCOP's Member Countries on Coastal Erosion; achieve a comprehensive review on the region's coastal erosion; and achieve data in support of the monitoring work on Climate Change of the region. There were 34 experts from 9 Member Countries participated in our first meeting on 22 July 2021. The CCOP expert group has a total of 19 experts nominated from 9 Member Countries: Brunei Darussalam, Cambodia, China, Indonesia, the Republic of Korea, Malaysia, Myanmar, the Philippines and Thailand. The project has received 8-chapter manuscripts from MCs including Brunei Darussalam, China, Indonesia, the Republic of Korea, Malaysia, Myanmar, the Philippines and Thailand.



COUNTRY REPORTS:

China: **Dr. Chen Xiaoying**, Qingdao Institute of Marine Geology (QIMG), CGS;
 Indonesia: **Mr. Undang Hernawan**, National Coordinator, Center for Geological Survey, GA;
 Japan: **Dr. Toru Tamura**, Chief Senior Researcher, GSJ;
 Republic of Korea: **Dr. Seong-Pil KIM**, Principal Researcher, KIGAM;
 Malaysia: **Mr. Mohd Rais bin Ramli**, Principal Geologist, JMG;
 Myanmar: **Mr. Zaw Htet**, Deputy Director, DGSE;
 Philippines: **Dr. Karlo L. Queano**, Supervising Geologist, MGB
 Brunei Darussalam: **Mr. Uditha Ratnayake**, Senior Assistant



DISCUSSION:

Dr. Yin Ping, Deputy Director General of Qingdao Institute of Marine Geology (QIMG) reported the progress on book publication to the meeting. She has worked with the printing house and showed the book cover to the meeting.

The following items are the summary of suggestion and findings:

The submitted manuscripts have been reviewed by QIMG and need final English editing. **Dr. Dhiti Tulyatid** informed the meeting that he was in a process of contacting **Dr. Martin Smith**, CCOP Editor-in-chief to handle the case and will communicate with QIMG for further action.

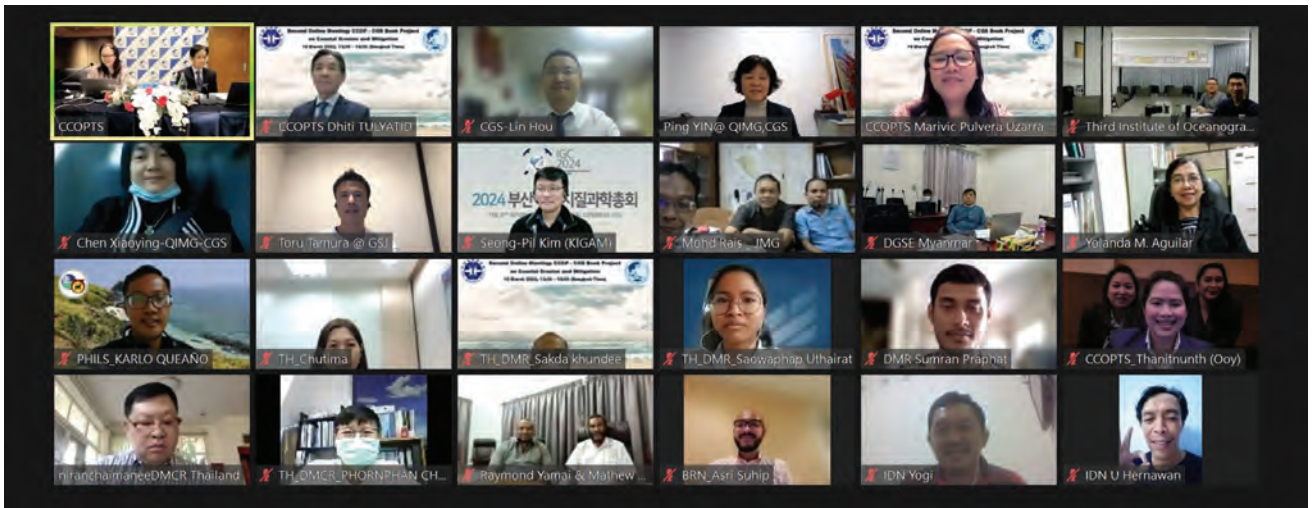
In addition, there are several chapter manuscripts that need some editing or more input:

Indonesia: the chapter focused on one small area. The chapter has to cover work of a national level;

Malaysia: the chapter needs to expand on the 'Coastal Management and Protection';

Myanmar: the chapter still lacks a national scale and need a conclusion chapter.

Japan is also encouraged to submit the chapter manuscript, possibly in April, the latest.



STRATEGIC AIM I: PROVISION OF GEOSCIENCE SOLUTIONS, ADVICE AND RELIABLE INFORMATION THROUGH COOPERATION AND PARTNERSHIP

OBJECTIVE 2 : To promote work on sustainable geo-resources management.

CCOP's Transboundary Aquifer (TBA) Monitoring Wells Operation Site Visit

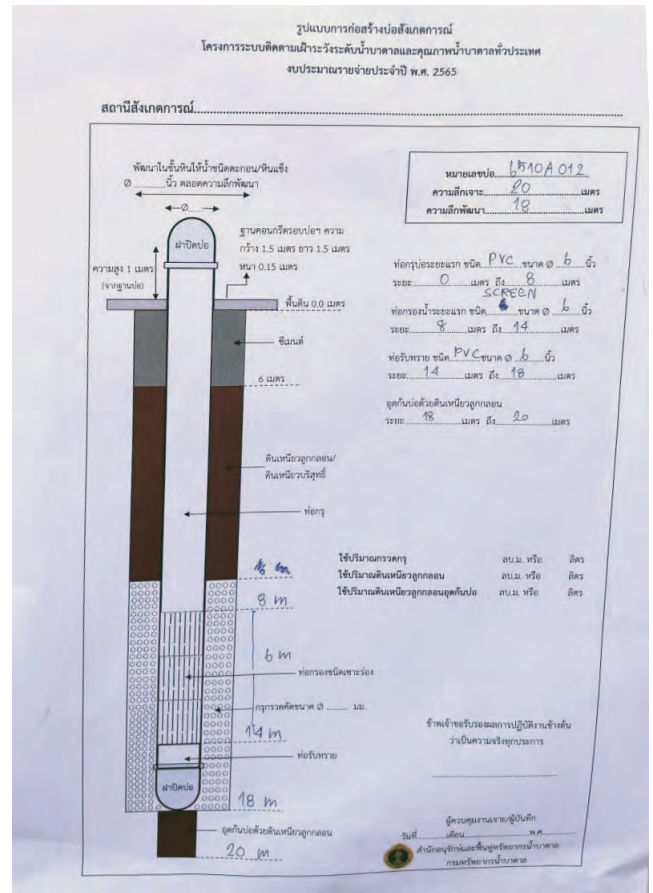
During 27 February – 3 March 2022, **Dr. Young Joo LEE**, Director of CCOPTS, and **Dr. Dhiti Tulyatid**, Regional Expert, CCOPTS, went to visit the Groundwater Dependent Ecosystem (GDE) Monitoring Well Network Drilling and Installation Sites in Nakhon Phanom and Nong Khai, NE Thailand.

The groundwater monitoring network well site drilling and installation in the Greater Mekong Subregion in Thailand was carried out by the Department of Groundwater Resources (DGR). DGR team members participated in the site visit include Central Office (Bangkok) and Regional Office. There are two sites: Wat Trai Ratana Wanaram, Nakhon Phanom; & Wat Tha Sai Sa-ard Temple, Nong Khai.

1. Wat Trai Ratana Wanaram. Zone48Q UTM: 474689 E/1927300 N, Ban Kok Tong, Tambon Art Samart, Muang District, Nakhon Phanom Province.



The entrance of the Temple and the well location within the temple.



It is expected to drill down to approximately 20 m below the ground surface. Saline water is expected at the depth beneath 18 m below the ground surface. The Six-inch PVC casing will be installed from the surface down to 8 m below ground.



ความลึก (ม.)	ชนิดดิน	สี	ลักษณะ	ความชื้น (%)	ค่า pH	ค่า EC	ค่า TDS
0	ดินเหนียว	สีน้ำตาล	ดินเหนียว	15.00	7.50	150.00	150.00
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2	ดินเหนียว	สีน้ำตาล	ดินเหนียว	15.00	7.50	150.00	150.00
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20	ดินเหนียว	สีน้ำตาล	ดินเหนียว	15.00	7.50	150.00	150.00

Well logging operation.



Sediments from well sampling at various depths (metre).



Group Photo with DGR Team at Wat Tri Ratana Wanaram, Nakhon Phanom, NE Thailand.

2. Wat Tha Sai Sa-ard, Zone 48Q UTM 246650E/1984012N. Ban Hua Sai, Mu 12, Tambon Phan Phrao, Sri Chiang Mai District, Nong Khai Province.

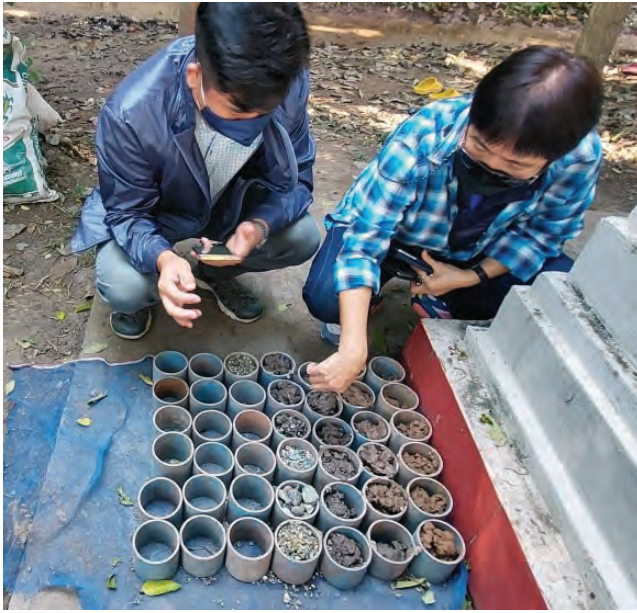


The Temple's main entrance.



Drilling site, Wat Tha Sai Sa-ard,





Dr. Young Joo LEE and Dr. Tussanee Nettasana examined the sediments at different levels (m) from the drilling well.

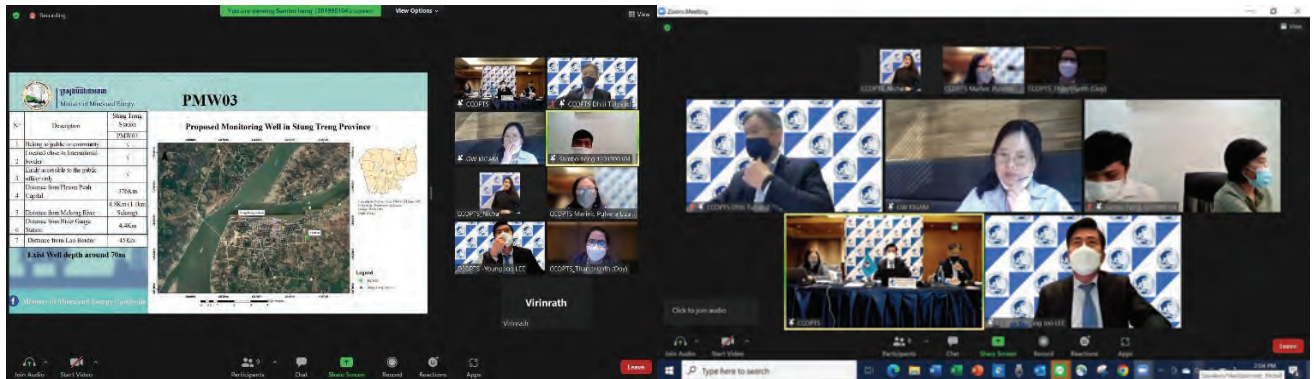


Group Photo with DGR Central Office at Wat Tha Nam Sai Sa-ard, Nong Khai Province, NE Thailand

At Wat Tha Sai Sa-ard, it is also expected to drill down to the level of 20 m below the surface. Saline water is also expected at that depth. There are groundwater wells nearby; one is still in use by the temple and the community. Several monitoring wells were also present nearby, i.e., within 100 m vicinity.

CCOPTS informed DGR staff that once the final report of the monitoring well drilling and construction of these two sites are completed, CCOPTS will organize a workshop for DGR experts to give a summary report to expert participants from KIGAM and other relevant MCs, possibly by the end of April 2022.

Online Meeting on CCOP-KIGAM-MME GW Project TBA well installation in Cambodia



On 19 April 2022, 14:00-15:20 (Bangkok Time), the Meeting on CCOP-KIGAM-MME GW Project TBA well installation in Cambodia was organized online with attendees from KIGAM, Ministry of Mines, Cambodia and CCOPTS. **Dr. Young Joo LEE**, Director of CCOPTS, delivered a welcome and opening address. **Ms. Yang Virinrath** and **Mr. Sambo Heng** gave a summary of the progress of the TBA well installation in Cambodia. **Dr. Eunhee LEE** led the discussion on the selection of well installation sites in Cambodia. Based on the report on groundwater detection survey carried out by Groundwater and Sanitation (GWS) Co., Ltd., the meeting agreed that Cambodia will start working on the well installation site in Kampong Cham province is now suitable for drilling.

Cambodia will seek for the second well installation site (in replacement for the Stung Treng Province where the groundwater level is too deep, according to the GWS); will re-estimate the cost and propose the new estimates for two well installation sites (with the depth under 100 m) and will consult the company to have an on-line meeting with CCOPTS and KIGAM, possibly over the next two weeks. The meeting agreed that TS will send an official letter and be approved by the Government of Cambodia for the drilling.

CCOP-KIGAM Groundwater Project Meeting on

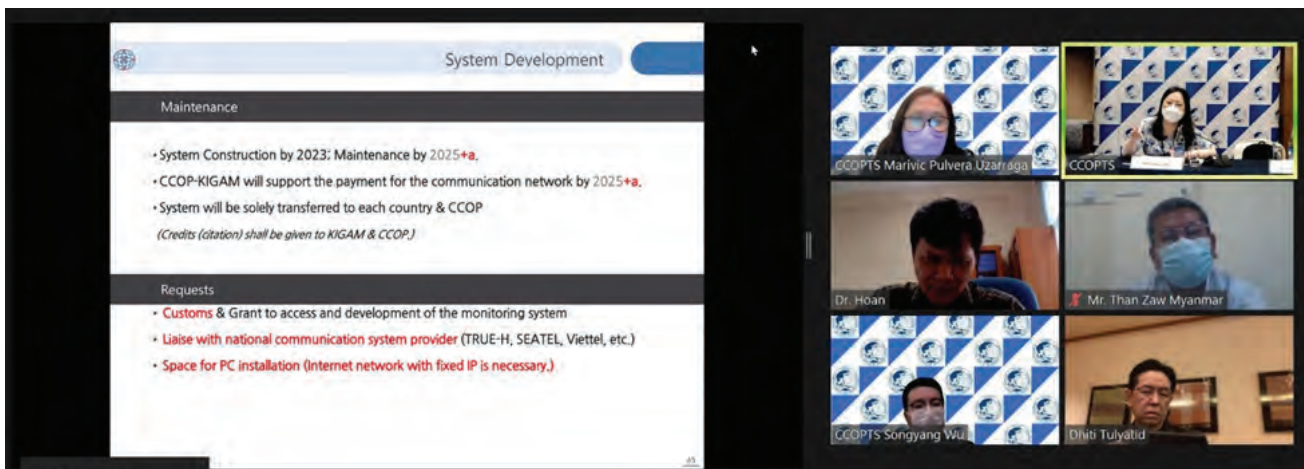
“Final review, selected monitoring well site for the drilling, installation, and operation plan of the groundwater monitoring system during 9 – 12 May 2022, Thailand”

On 9-10 May 2022, CCOP-KIGAM Groundwater Project Meeting on “Final review, selected monitoring well site for the drilling, installation and operation plan of the groundwater monitoring system was organized online with total of 18 participants from KIGAM, engineers from Soda System Inc., Republic of Korea, representatives from Cambodia, Myanmar, Thailand, Vietnam and CCOPTS. **Dr. Young Joo LEE**, Director of CCOPTS, delivered a welcome and opening address.

Dr. Eunhee LEE gave a presentation on CCOP-KIGAM Groundwater Project, Realization of GW Monitoring Network in GMS. Well installation sites as following

- Thailand: 2 wells drilled during February 2022
- Cambodia: 2 wells to be drilled
- Lao PDR: 1 well to be drilled
- Vietnam: 3 existing wells to be utilized
- Myanmar: to be negotiated

Representatives from Department of Groundwater Resources gave presentation of introduction, overview of the progress, details of collected data, such as pumping test results and water quality from Representatives from Department of Groundwater resources gave presentation of introduction, overview of the progress, details of collected data, such as pumping test results and water quality from 1) Trairat Wanaram Temple site in Nong Khai Province and 2) Tha Sai Sa-at Temple site in Nakhon Phanom Province. Thailand’s groundwater monitoring system was also presented.



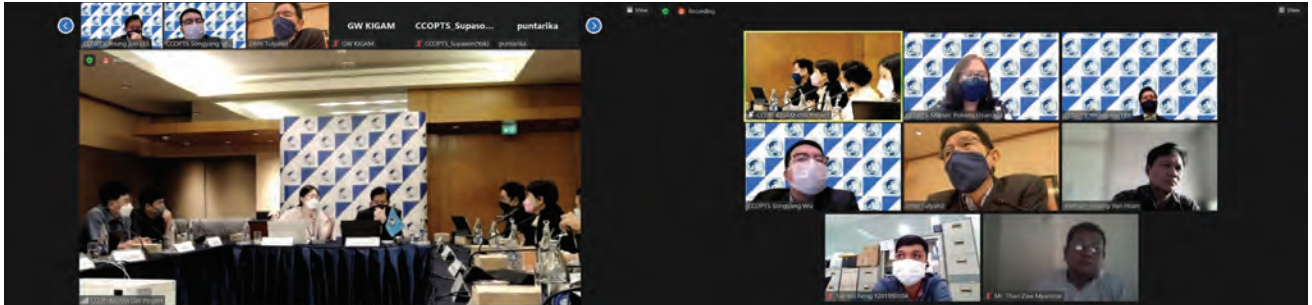
Discussion on the general timeline and action points

- **Cambodia** - Selection of two wells sites completed (Kampong Cham and Stung Treng) and drilling to be completed (August 2022)
- **Vietnam** – needs more investigation on existing sites, to be utilized the existing monitoring wells (3 wells), well selection to be completed (May 2022) and installation of automatic data system (November 2022)
- **Myanmar** - **Dr. Eunhee** expected to visit site selection by June or July 2022. Recommended well site in Tachileit District of Eastern Shan State where is near Lao PDR border.
- **Lao PDR**- to be utilized one existing well for system installation (May 2022) and one well to be drilled (without automatic data monitoring system)
- **Thailand** – CCOP will facilitate the official letter to DGR about the local custom to shipment of the monitoring system equipment will be itemized later from Soda. Inc., Korea to DGR.

Regarding to the Groundwater Monitoring System, discussion as following

- Internet Network type need to be confirmed from DGR that had done on drilling two wells and ready for monitoring system development. The path of transferring data ► DGR ► CCOP Server ► System.
- The duration of application through custom and shipment in Thailand and other GMS countries. Shipment process will take about one or two months in Thailand.
- CCOP-KIGAM Project will provide one computer for each GMS countries for monitoring data to the real time

On 10 May 2022, review, selected monitoring well site for drilling and installation in Myanmar and Vietnam.



On 11-12 May 2022, field Trips; field inspection site at Trairat Wanaram Temple in Nong Khai Province.



CCOP-KIGAM Groundwater Project Transboundary Aquifer (TBA) Monitoring Well Site Visiting in Mekong Delta, Vietnam

Groundwater resources sustainable management in Mekong Delta is one of the concerns that have a great impact on society and the economy. Given the critical role of groundwater resources in the Mekong Delta for human use and socio-economic development, groundwater sustainability issues should be solved. CCOP-KIGAM Groundwater Project aims to realize sustainable groundwater management by establishing a TBA monitoring network in the GMS with new groundwater monitoring wells and an automatic monitoring system.

Southern Vietnam is the most significant component of the Mekong Delta which covers 36,000 km². This area plays a critical role in protecting diversity. It is also vulnerable to climate change and related disasters and almost all residents in southern Vietnam live at an altitude near 10m. To advance the monitoring network in Vietnam and regional cooperation, CCOP-KIGAM-NAWAPI organized monitoring well site visit in Mekong Delta, Vietnam, on 25-28 July 2022. The visit was attended by:

Dr. Songyang Wu, Regional Expert, CCOP Technical Secretariat

Dr. Eunhee Lee, Senior Research Scientist, Groundwater Department, Korea Institute of Geoscience and Mineral Resources (KIGAM)

Dr. Hoang Van Hoan, Senior Hydrogeologist, Department of Groundwater Resources Fundamental Investigation, National Center for Water Resources Planning and Investigation (NAWAPI)

On 26 Jul 2022, CCOP, together with KIGAM, had a meeting with NAWAPI in Ho Chi Minh City.

Dr. Phan Chu Nam, General Director, NAWAPI Southern Division and **Dr. Pham Van Hung**, Deputy General Director, NAWAPI Southern Division expressed welcome. **Dr. Songyang Wu**, Regional Expert, CCOPTS, delivered appreciation and introduced general information about the project. **Dr. Eunhee Lee**, Senior Research Scientist, KIGAM, updated the project progress and five existing nominated wells for monitoring system along the Mekong Delta, Southern Vietnam. **Dr. Hoang Van Hoan**, Senior Hydrogeologist, NAWAPI, introduced the current status and information of existing monitoring wells and systems for the groundwater in the Mekong Delta.



On 26-28 Jul 2022, 5 existing monitoring wells were visited (Q606-Cao Lanh, Q204-Chau Thanh, Q219-Chau Phu, Q408-Long Xuyen, Q209-Can Tho). Details of each well including site surroundings, electric supply based on the solar panel, water level, aquifer(s), etc., were comprehensively surveyed. Based on the survey, Q606 and Q209 were consented as the best wells to install the monitoring system, and the installation roadmap will be finalized accordingly.

CCOP-KIGAM Groundwater Online Meeting with DGR on Preparation of Automatic Monitoring System Installation

On 3 August 2022, 13:00 – 15:30, Bangkok Time, CCOP Technical Secretariat, KIGAM and the Department of Groundwater Resources, Thailand (DGR) had an online meeting via Zoom Application. The purpose of this meeting is to discuss the detailed work plan for groundwater automatic monitoring system installation in Nong Khai Province and Nakhon Phanom Province, Thailand.

Details include network system, data server, shipment for equipment with tax exemption, system operating and training, system maintenance, etc. All sides satisfied the consensus after the discussion. The groundwater automatic system in Thailand will be fully finalized in November 2022.



CCOP-KIGAM Groundwater Project Meeting with Soda System

On 28 October 2022, 13:00 – 14:00, Bangkok Time, CCOP Technical Secretariat, KIGAM and the Soda System had an online meeting via Zoom Application. The purpose of this meeting is to discuss the detailed work plan for groundwater automatic monitoring system installation in Thailand, Cambodia, Vietnam and Lao PDR.

The groundwater automatic system in Thailand will be installed by the end of 2022, with training courses provided by Soda System. The date of the CCOP-KIGAM-SODA site visits in Cambodia, Vietnam and Lao PDR will be decided after coordinating with each side. Other matters that have been discussed during the meeting include network system, data server, shipment for equipment, system maintenance, etc. The meeting was adjourned at 14:00, Bangkok Time.



Past, Current and Outlook of Thailand's Critical Minerals

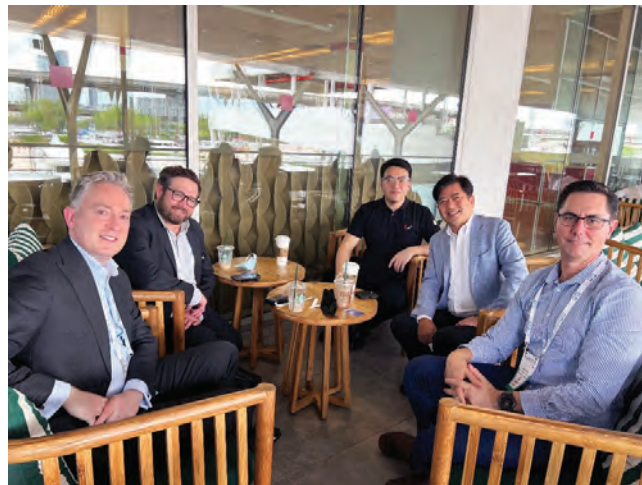


On 6 May 2022, 10:30, Bangkok Time, the seminar of Critical Minerals was organized onsite at the meeting room, CCOPTS office, Bangkok, Thailand. Critical minerals have become important raw materials for high technology products and the renewable energy sector toward SDGs and zero-emission over the next 2-3 decades. CCOPTS invited **Dr. Thawatchai Chualaowanich** from the Mineral Resources Division, Department of Mineral Resources, Thailand (DMR) to give presentation on topic of 'Past, Current and Outlook of Thailand's Critical Minerals' that he has done some valuable research on rare earth minerals in Thailand for many years. CCOPTS

valued his expertise and would like to have more discussion and cooperation in critical minerals.

CCOP-Global CCS Institute Meeting on Cooperation

On 21 July 2022, 15:00 – 16:00 pm, Bangkok Time, **Dr. Young Joo LEE**, Director of CCOPTS and **Dr. Songyang Wu**, Regional Expert of CCOPTS, had a meeting with Global CCS Institute at BITEC, Bangkok, Thailand, for the international cooperation on carbon capture and storage (CCS) in East and Southeast Asia.



CCOP-Korea CCUS Association Memorandum of Understanding Signing Ceremony

On 11 August 2022, 17:00 – 18:00 pm, Bangkok Time, a Memorandum of Understanding has been signed between CCOP and the Korean CCUS Association (K-CCUS). Cooperative research projects, international collaboration through regular dialogue on knowledge and innovations sharing, capacity building will be implemented based on the MoU.

K-CCUS, which originated from the Ministry of Trade, Industry and Energy (MOTIE), private sectors and academic stakeholders, is the leading organization for the technological development and commercialization of CCUS in Korea. K-CCUS commits to bringing together government agencies, private businesses, and academic experts from across the Korean CCUS value chain, and provides expert analysis, policy advice, technical support, workforce education and cooperates internationally.



Dr. Young Joo LEE, the Director of CCOP Technical Secretariat, addressed that although Southeast Asia is in the early stage of the clean energy transition, ASEAN Member States already recognize that carbon capture, utilization, and storage (CCUS) technologies are set to play an important role in supporting clean energy transitions in this region.

Dr. Yi Kyun Kwon, Director General of K-CCUS Association, expressed that the collaboration between K-CCUS and CCOP will not only allow ASEAN Member States to further develop research and technologies for CCUS, but also support AMS to reach the carbon neutrality mission by 2050.

SCGP-KIGAM-CCOP MEETING ON CCUS TECHNOLOGY: CEMENT AND PACKAGING INDUSTRY



On 16th August 2022, SCGP-KIGAM-CCOP Meeting on CCUS Technology: Cement and Packaging Industry meeting was held at SCG 100th Year Building, SCG Headquarters at Bangsue, Bangkok. Participated by **Mr. Wichan Jitpukdee**, Chief Executive Officer, SCG Packing Public Company Limited (SCGP), **Mr. Danaidej Ketsuwan**, Chief Financial Officer, SCGP, **Mr. Wichan Charoenkitsupat**, Chief Operating Officer, Fibour Business, **Dr. JiWhan Ahn**, Director of Carbon Mineralization Flagship Center, KIGAM, **Dr. Jeong Yun Kim**, Principal Researcher, KIGAM, **Dr. Jun Hyun Choi**, Senior Researcher, KIGAM, and **Dr. Young Joo LEE**, Director CCOPTS

The aim of this meeting is to share technology for CCUS from KIGAM and experience from SCG on Packaging Business. **Dr. JiWhan Ahn**, Director of Carbon Mineralization Flagship Center, KIGAM gave introduction about the technology for CCUS from KIGAM on Packaging Business. Follow by discussion for future collaboration on CCUS.

THE 1ST THAILAND GROUNDWATER SYMPOSIUM KEY TO WATER SECURITY AND SUSTAINABILITY



The Department of Groundwater Resources (DGR), Ministry of Natural Resources and Environment and Groundwater Development Fund hosted the 1st Thailand Groundwater Symposium: Key to Water Security and Sustainability, was held at Amari Watergate Hotel, Bangkok, Thailand on 22-26 August 2022. It aims to provide participants with opportunities to share their experiences, research findings, innovation, and technology regarding groundwater-related issues, and to serve as an international platform for leading researchers, policy makers, practitioners, and private executives to identify common and emerging issues, hotspots, and opportunities in groundwater management, as well as to discuss how to further build the coalition.

This is the first international academic symposium on groundwater which is organized in Thailand. More than 350 participants from more than 23 countries attended the symposium. **Dr. Young Joo LEE**, the Director of CCOP Technical Secretariat, attended the opening ceremony as an honored guest and gave a presentation titled “CCOP’s Role to Promote Groundwater Activities in the Region” as a keynote speaker during the symposium.

Dr. Young Joo LEE, the Director of CCOP Technical Secretariat, addressed that groundwater in CCOP region is now facing issues and challenges including groundwater stress, storage, salinity, arsenic distribution, and management, etc. CCOP is always seeking to promote groundwater sustainable development through knowledge and technology sharing, capacity building, and technical activities, with various sources from member countries as follows:

1. Database & GIS compilation (CCOP-GSJ);
2. Trans Boundary Aquifer (TBA) effort in the Mekong River Region (CCOP-KIGAM-UNESCO);
3. Capacity Building & Knowledge Sharing (IS-GEO, etc.);
4. Young Generation Education & Outreach (YES, IERI, etc.).

Dr. Songyang Wu, Regional Expert, and **Ms. Thanitnunth Invakul**, Assistance, Project Operation & Information of CCOP Technical Secretariat also attend the symposium.

The 19th International Conference of the Pacific Basin Consortium for Environment and Health in 2022: 'Environmental exposures in a changing climate'

The International Environmental Research Institute (IERI) in Gwangju Institute of Science and Technology (GIST) was organized

This International conference hosted by the International Environmental Research Institute (IERI) in Gwangju Institute of Science and Technology (GIST) and the Pacific Basin Consortium (PBC) is themed 'Environmental exposures in a changing climate' from 29 Aug to 1 Sept 2022 in Jeju Island, South Korea. The meeting will consist of 3 training workshops (designed for students, junior faculty, and early career researchers), 5 plenary sessions, 6 symposia, a poster presentation session, and a dedicated session for student oral presentations. Director of CCOP Technical Secretariat, **Dr. Young Joo LEE** was invited as the keynote speaker for this conference.



The Pacific Basin Consortium for Environment and Health (PBC) conference themes are traditionally advancing environmental health sciences, promoting the translation of scientific knowledge to action, and enhancing environmental health sciences through stewardship and support. In addition, this 2022 PBC provides a forum for individuals and organizations with diverse professional expertise and geographic backgrounds to come together and discuss the most pressing environment and health issues of our time, engage in cooperative research, and develop and disseminate innovative strategies for addressing these issues.

CCOP-KIGAM Urban Geology Workshop

The CCOP-KIGAM Urban Geology Workshop was held hybrid on 20-22 September 2022 in Singapore, with the theme: Urban Geology Technology Sharing for Sustainable Cities in East and Southeast Asia.



There were 27 participants from 12 Member Countries [Cambodia (2), China (2), Indonesia (1), Japan (1), Korea (5), Lao PDR (1), Malaysia (1), Mongolia (1), Myanmar (1), Philippines (1), Thailand (1), Vietnam (3)], 1 Cooperating Country [British Geological Survey (1)], 2 Universities [University of Malaya (1) and Singapore University of Social Sciences (1)] and CCOP Technical Secretariat (4). **Dr. Songyang Wu**, Regional Expert, CCOP Technical Secretariat hosted the workshop.



During the Opening Ceremony, **Dr. Dong Woo Ryu**, Project Manager of KIGAM Urban Geology and **Dr. Young Joo Lee**, Director of CCOP Technical Secretariat delivered the Welcoming and Opening Address.

There are four keynote presentations given by **Dr. Dong Woo Ryu**, Project Manager of KIGAM Urban Geology, **Dr. Ara Cho**, Senior Researcher from KIGAM, **Mr. Marcus R. Dobbs**, Head of Engineering Geology from BGS and **Dr. Elanni Affandi**, Graduate Researcher from the Department of Geology, University of Malaya.



In the Session of Country Reports, representatives from Member Countries gave presentations sharing the status and updates of urban geology in each country.



During the last agenda items, group discussions were led by **Dr. Wook Hyun Nahm**, Principal Researcher, KIGAM and **Mr. Marcus R. Dobbs**, Head of Engineering Geology, BGS, focusing on the following three topics and future collaborations:

- **Topic 1:** Specific cases of the complex geological disasters that occurred in your country
- **Topic 2:** Government efforts
- **Topic 3:** Cases related to climate change in which the frequency and extent of damage have increased in the urban area and countermeasures at the government level.

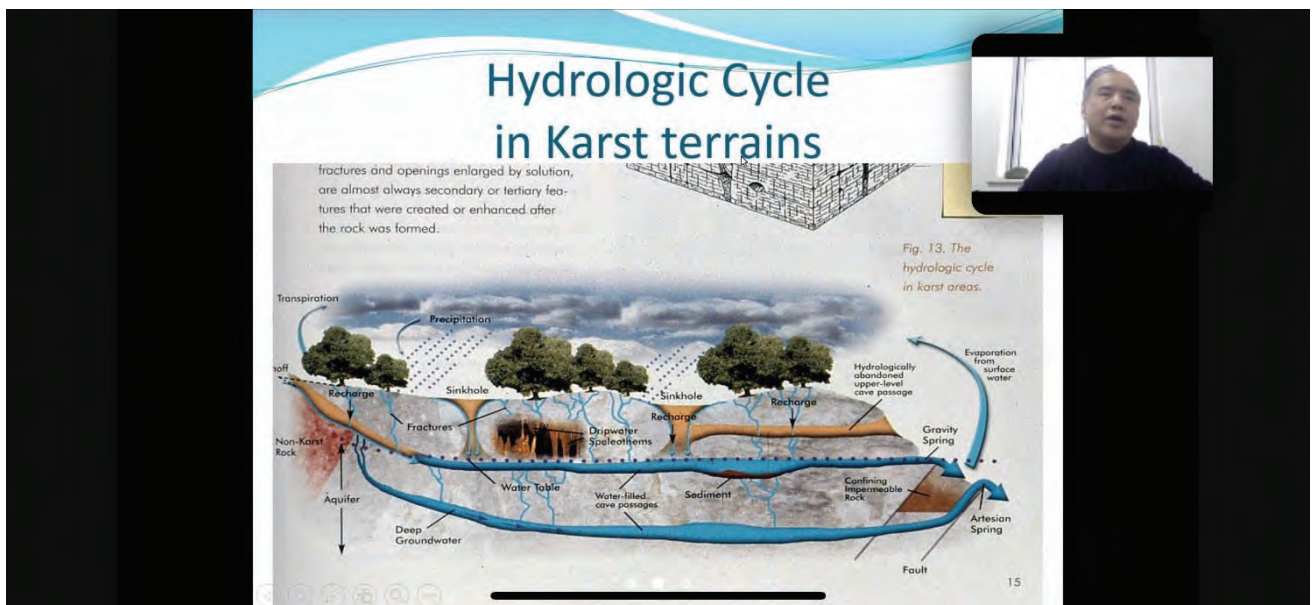
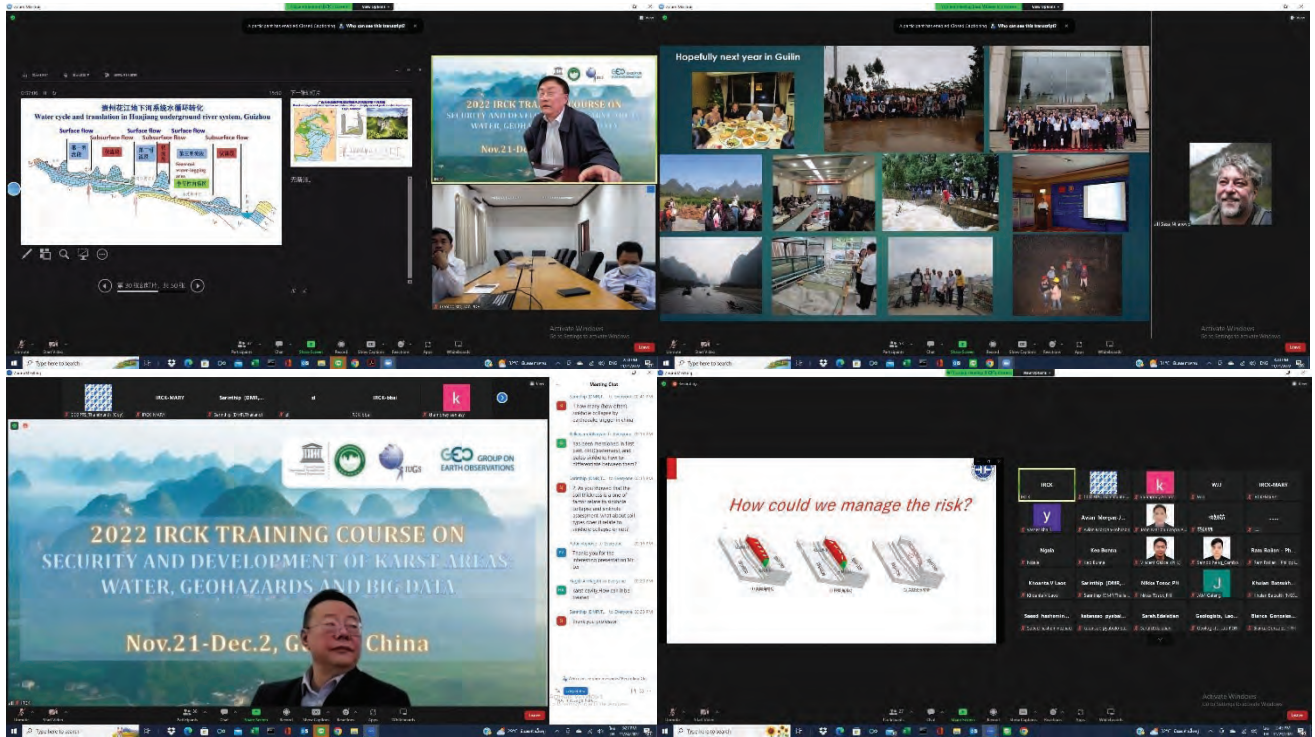


This workshop is the first time ever physical meeting for CCOP-KIGAM Urban Geology Project. In addition, it has been one of the most successful hybrid CCOP international geoscience workshops of the year in the region.



Online International Training Course on Security and Development of Karst Areas: Water, Geohazards, and Big Data

On 21 November to 2 December 2022, the International Research Centre on Karst (IRCK) was successfully organized the International Training Course on Security and Development of Karst Areas: Water, Geohazards, and Big Data via online, with the aim of enhancing research cooperation and academic exchange between China and other countries and sharing Chinese successful experience in karst scientific research with colleagues overseas. There were about 50 online participants which included 20 trainees from CCOP Member Countries.



CCOP- KHAN - KIGAM Meeting

On 28 November 2022, 14:00 – 17:00 PM., Bangkok Time, CCOP- KHAN - KIGAM Meeting was held at CCOP Technical Secretariat office in Bangkok, Thailand that attended by representatives from CCOP Technical Secretariat Director **Dr. Young Joo LEE** and Regional Expert, **Dr. Songyang Wu**, **Dr. Kim Young Ju**, and staffs' KIGAM, and **Mr. Kim Sung Kyu**, and staff's KHAN.

1. The meeting agreed to implement consignment project between KIGAM and CCOP on small scale gas power plant issue within CCOP region from 2023 to 2024.
2. The scope and contents of consignment project between KIGAM and CCOP in 2023 will be as follows:
 - A. Survey and data collection on the status of Gas field development in Thailand and Indonesia
 - B. Survey on status of gas power plant and its market in Thailand and Indonesia
3. The meeting agreed that technical explanatory document on small scale gas power plant which has been achieved from KHAN and KIGAM so far will be delivered to CCOP together with survey templates on gas power plant.
4. The meeting agreed to hold technical workshops on the progress of project for gas power plant in Thailand and Indonesia in 2023, respectively.



STRATEGIC AIM I: PROVISION OF GEOSCIENCE SOLUTIONS, ADVICE AND RELIABLE INFORMATION THROUGH COOPERATION AND PARTNERSHIP

OBJECTIVE 3: To promote the establishment of the International Centre of Excellence.

WCOGS Activities Committee (WAC)

On 26 January 2022, **Dr. Young Joo LEE** (CCOPTS Director), **Dr. Steve Hill** (Geoscience Australia), **Dr. Bill Cunningham** (USGS), and Dr. Daniel Lebel (GSC, Director of Research Partnerships) participated in Part 1 of the WCOGS Activities Committee (WAC) Online. The WCOGS Activities Committee (WAC) touched briefly on this. Dr. Daniel Lebel mentioned that he has been careful not to move too fast in increasing the numbers of signatories due to GSC capacity limitations in managing WCOGS, and to manage expectations. The number of GSOs reached through the associations that have now signed up 130 individual GSOs.

The GEM-GNS (NZ)-GSC-led Disaster Risk Reduction webinar has tentative dates: Three sessions over the weeks of June 20 or 27, 2022 that will be modelled after the Critical Minerals Forum i.e. three separate sessions, staggered to accommodate time zones, pre-recorded talks from experts, panel discussions. It will include a strong Indigenous thread. **Dr. John Schneider** (Secretary General, GEM Foundation) will work on developing the program, **Dr. Sonia Talwar** (GSC Pacific) is contacting AGI (audio-visual supplier) and a facilitator for the panel discussions. Dr. Gill Jolly (GNS NZ - Natural Hazards and Risk Theme leader), has approached **Dr. Gary Wilson** (GNS, Director of Research Partnerships) about financial support for the event.

On 28 June 2022, the building of better public geoscience for a better world: Introduction to the World Community of Geological Surveys was organized online by the Geological Survey of Canada. Governments around the world are using next generation public geoscience to meet many of the same challenges and opportunities, including meeting increased demands for critical minerals, clean energy supply, and disaster risk reduction. As such, many national and regional geological survey organizations and related associations (GSOs) have banded together under the banner of the World Community of Geological Surveys –WCOGS – connecting people and organizations, generating synergies, and providing mutual support via a global dialogue to share best practices on how geoscience can address some of the most pressing national and global issues, now and into the future.

A BEST PRACTICE COMMUNITY OF ASSOCIATIONS...



EuroGeoSurveys Directors' Workshop on World Community of Geological Surveys Forum-Shaping the Earth for Tomorrow

On 26-27 October 2022, Director of CCOPTS, **Dr. Young Joo LEE** participated EuroGeoSurveys 53rd Directors' Workshop on World Community of Geological Surveys Forum which was convened in Brussels Information Place (BIP), Brussel on 26-27 October 2022. He gave a presentation on "Activities of CCOP across borders and beyond history toward a safe and sustainable Earth". This workshop was commemorating 50th Anniversary of EuroGeoSurveys with the title of "Shaping the Earth of Tomorrow".

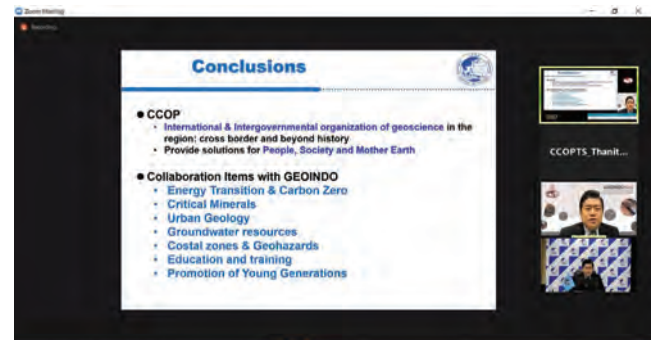
For the workshop, heads of the world top level geosurveys like USGS, GSC, BGR and heads of regional geological organizations such as Association of Iberoamerican Geological and Mining Surveys (ASGMI) and Organization of African Geological Surveys (OAGS) gave presentations on diverse topics how we could shape the Future of our mother Earth.



STRATEGIC AIM I: PROVISION OF GEOSCIENCE SOLUTIONS, ADVICE AND RELIABLE INFORMATION THROUGH COOPERATION AND PARTNERSHIP

OBJECTIVE 4: To strengthen cooperation & partnership.

THE ONLINE INTERNATIONAL CONFERENCE ON GEOLOGY, GEOTHECHNOLOGY AND MINERAL RESOURCES OF INDOCHINA (GEOINDO 2022)



On 11 February 2022, 9:00-13:30 (Bangkok Time), the International Conference on Geology, Geotechnology and Mineral Resources of Indochina (GEOINDO 2022) was organized by the Faculty of Technology, Khon Kaen University together with government, private organizations, educational institutions and the Geoscience Society via an online conference. CCOP was invited as a co-organized and **Dr. Young Joo LEE**, Director of CCOP Technical Secretariat joined as a keynote speaker and gave a presentation on title ‘CCOP: Historic Geoscience Partnerships Cross Borders’. The 90 attendees in the meeting consisted of Experts, academics, professors and students from government and private organizations inside and outside the Indochina region.

The conference is aimed at updating geologists, geotechnologists and engineers on the recent development in geology, engineering geology, and other related fields within the Indochina region. The conference will provide a broad platform for participants to express new ideas, achievements and experiences through technical presentations and discussions. The pre-conference excursion will introduce a wonderful Khon Kaen Geopark with well-known dinosaur fossils sites and more. The post-conference excursion will give a comprehensive view of the geology, geotechnical engineering and mineral resources of the Indochina region. The conference experience was valuable for technical and academic aspects as well as bridging the opportunities for future collaboration.

11th Liaison Officials Meeting, China-ASEAN Mining Cooperation Forum & Exhibition

The 11th Liaison Officials Meeting of the 12th China-ASEAN Mining Cooperation Forum & Exhibition 2022 was held on Tuesday 22 February 2022 during 08:30 – 11:00 (Bangkok Time). The meeting was held online and face-to-face at Howard Johnson CAEXPO Plaza Nanning, China. Participants of 10 ASEAN Member States and representatives of China (20) and ASEAN (50) joined the meeting.

Dr. Dhiti Tulyatid, Regional Expert, represented CCOP at the on-line meeting. He also delivered a speech on behalf of CCOP.



The meeting was facilitated by **Mr. Ye Shaobo**, Director, General Affairs Department, CAMCF Secretariat, **Ms. Ann Xie**, Assistant on Chat Function, and **Ms. Lyu Zhishan**, Interpretation Coordinator. Mr. Zhou Tao, Secretary-General CAMCF Secretariat, delivered the welcome speech and briefing on the 2021 Mining Forum. **Mr. Ye Shaobo** gave a speech on 'information on the relevant programmes of the 2022 Mining Forum; China-ASEAN Mining Personnel Exchange & Training Center and other projects.

A Speech given by **Ye Shaobo**, Director of General Affairs Department of CANCF Secretariat: 2022 is the year of the 20th National Congress of the Communist Party of China, the first year of China-ASEAN comprehensive strategic partnership, the year when the Regional Comprehensive Economic Partnership (RCEP) came into force. It is a year of acceleration in the country's high-quality joint construction of the "Belt and Road" and the implementation of the Action Plan for the Implementation of the Joint Declaration on China-ASEAN Strategic Partnership (2021-2025).

The meeting will be held during 18th – 22nd May 2022 (2 days of conference; 4 days of exhibition). The Venue is Nanning City, Guangxi Zhuang Autonomous Region, China.

Theme: Mining transformation and upgrading green development policy and practice, development and utilization of important mineral resources, geoscience cooperation mechanism and prospects, application and cooperation of satellite remote sensing technology, mining ecological restoration standards and exploration practice, case analysis of overseas cooperation between enterprises and legal policy support 10 other topics.

Work Suggestion for Liaison Officers:

1. To establish a regular online communication mechanism to consolidate the mining cooperation platform.
2. All liaison officers and guests are welcome to participate in the online related activities of the Mining Forum held in mid-to-late May this year, and sincerely invite and warmly welcome the ministerial leaders of the mining authorities of ASEAN countries to deliver speeches at the opening ceremony through video recording;
3. The ASEAN Secretariat, the liaison officers of ASEAN countries and the China-ASEAN Mining Forum Secretariat further strengthen communication and contact, exchange information on mining exhibitions organized by mining departments and mining associations of various countries, and report on time the relevant situation of participating in the mining forum every year;
4. CAMCF continues to carry out personnel exchange training.
5. Liaison officers work together to share important information on mining policy trends, mineral resources exploration and development, and supply and demand of mining projects, and jointly participate in the construction of China-ASEAN Geoscience Cooperation Center and China-ASEAN Mining Information Service Platform, and share the results of mining development cooperation.
6. It is recommended to jointly build a China-ASEAN Satellite Remote Sensing Application Center, and actively carry out cooperation in satellite remote sensing and Beidou positioning technology applications.

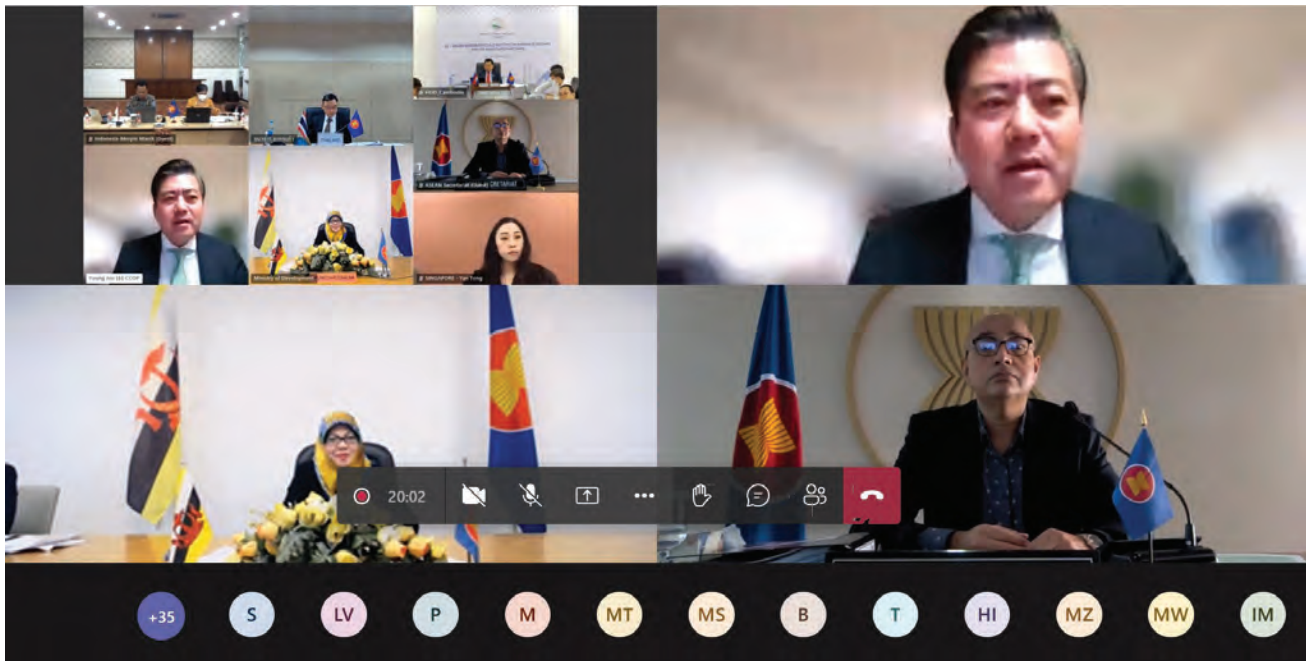
The Secretary-General Zhou Tao at the meeting can be summarized as follow:

- The China-ASEAN Mining Talent Exchange and Training Center and the ASEAN Academy have been established;
- The Satellite Remote Sensing Application Center has been established;
- Cambodia National Geological Laboratory was built with the support from the Guangxi Zhuang Autonomous Region Government.
- Guangxi has become the center for connecting with ASEAN countries through the 'Belt-and Road' with focuses on 'Green Mining', as well as jointly building, expanding and upgrading China-ASEAN Geoscience Cooperation Center, China-ASEAN Information Harbor, China-ASEAN Mining Cooperation Forum and other platforms including the new ones such as, the China-ASEAN Satellite Remote Sensing Application Center and the Green Mining Development Regional Alliance.
- Relying on the advantages of the platform, promote the interconnection of the mining economy.
- Relying on the advantages of scientific and technological innovation, deepen international cooperation in green mining production capacity.

The Delegations of ASEAN states and organizations gave speeches. They reported the latest development, stated how important the mining sector is for the current and future challenge critical/strategic minerals toward SDGs and zero-emission and look forward to further cooperation with CAMCF. The meeting was adjourned at 11:00.

22nd ASEAN Senior Officials Meetings on Minerals (ASOMM) and Its Associated Meeting / Event

The CCOP Technical Secretariat Director, **Dr. Young Joo LEE**, attended the relevant session of the first day 22nd ASOMM on 22 November 2022 hosted virtually by the Ministry of Development, Brunei Darussalam. **Dr. Young Joo LEE** presented the project initiative under formulation on Critical Mineral Management & Strategy for Sustainable Environment in ASEAN. Together with KIGAM and the Geological Agency of Indonesia as co-proponent, the CCOPTS is developing the project proposal for funding under ASEAN's partner housed at the ASEAN Secretariat.



The Meeting is supportive to the project initiative. Deputy Secretary of ASEAN for ASEAN Economic Community, **H.E. Satvinder Singh** stated that the mineral occurrence mapping in ASEAN is of utmost priority for the region and to be placed in the ASEAN minerals information system (AMIS) to help promote exploration investment of the region. This would also entail capacity-building. Indonesia Delegation recommended focusing on critical minerals which are commonly found in the ASEAN region. The CCOPTS Director conveyed appreciation for the support expressed by ASEC, Brunei Darussalam and Indonesia. All comments are taken into consideration in the finalization of the project proposal for official submission to the funder.

STRATEGIC AIM II: ADAPTING TO DIGITAL TRANSFORMATION IN GEOSCIENCE FOR FUTURE EARTH

OBJECTIVE 1: To utilize the latest technology to develop digital culture and capability.

OBJECTIVE 2: To digitally transform geoscience data management.

OBJECTIVE 3: To develop cloud technology for interoperable geoscience data consolidation

The 3rd working and task group leaders meeting online (DDE)

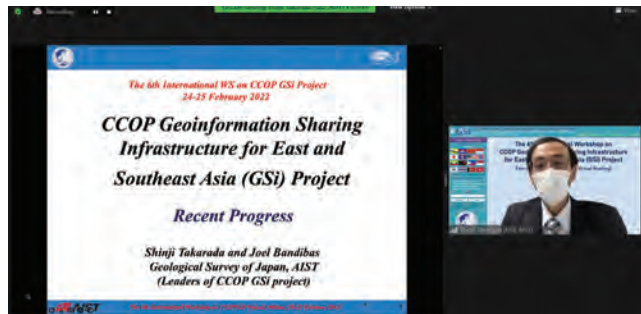
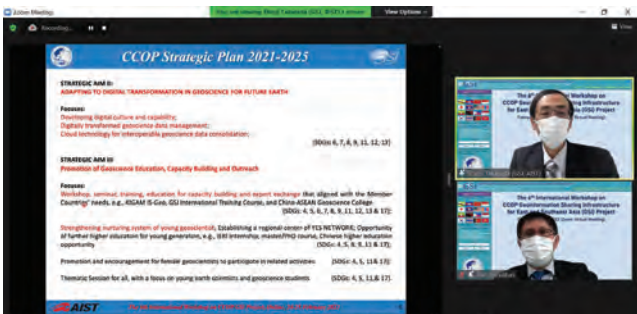
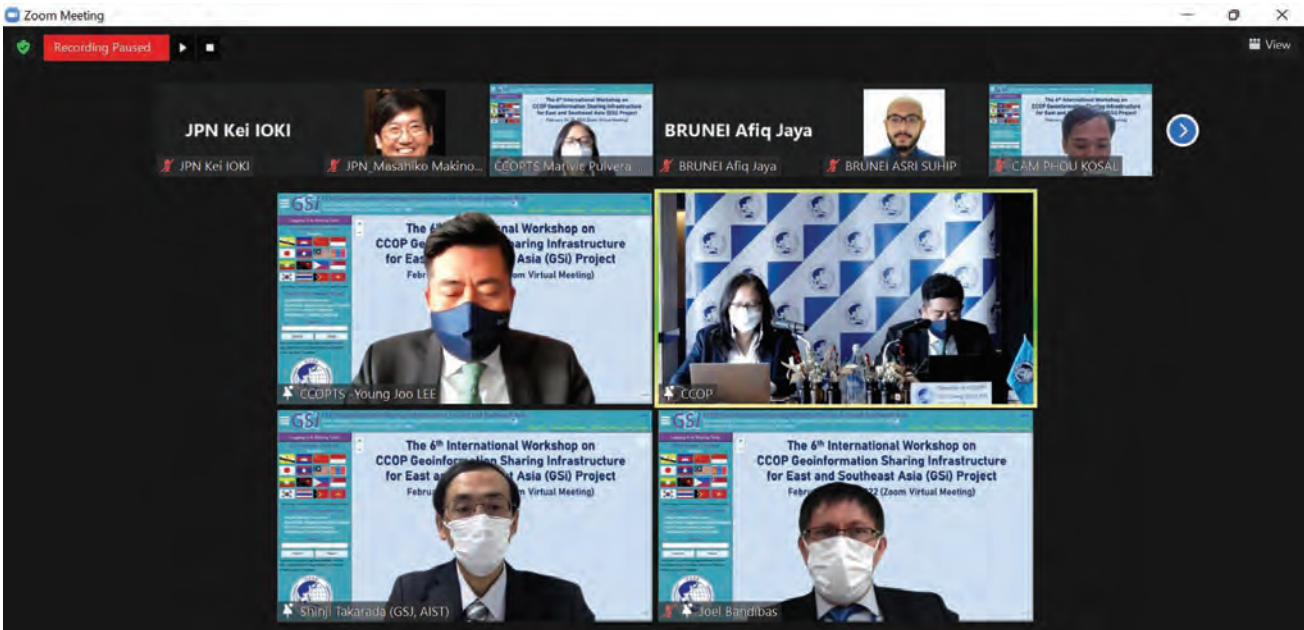
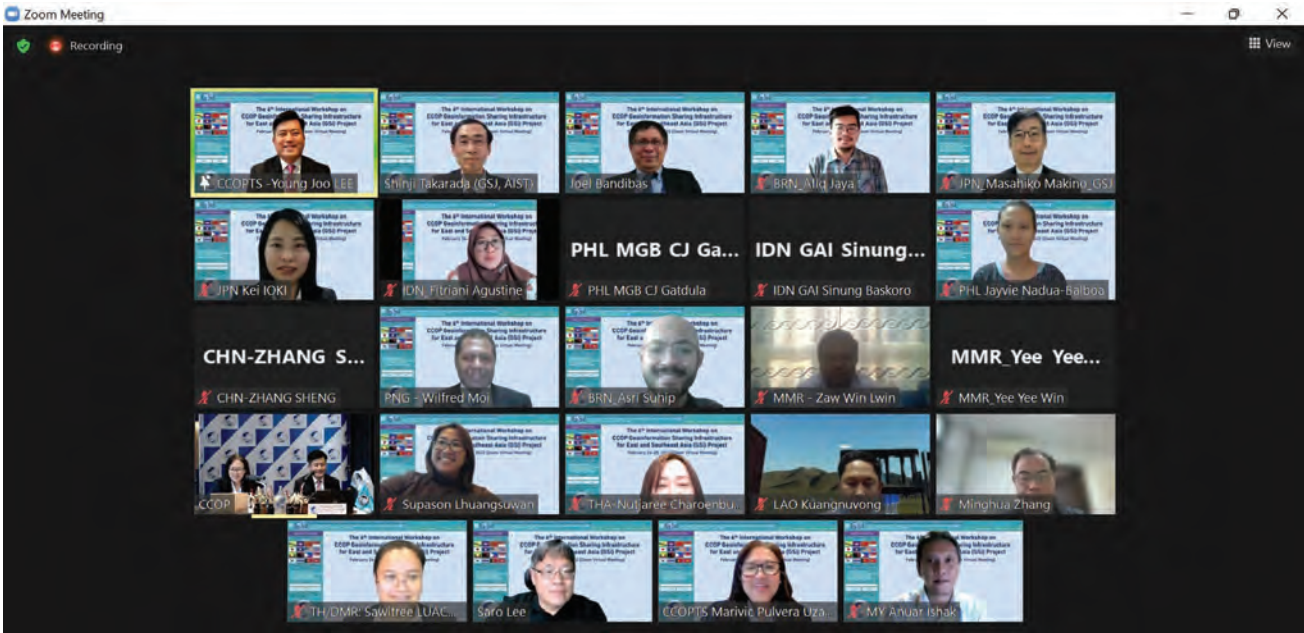
On 14 January 2022, 13:00-17:00, Paris time, the 3rd working and task group (WTG) Meeting was organized online via Zoom application. Participants: DDE WTGs: Leaders and Co-Leaders, other appointed members of the group, Governing Council: **Jennifer McKinley**, Executive Committee: **Chengshan Wang, Susan Nash, Junxuan Fan, Natarajan Ishwaran** (Meeting Chair), Science Committee: **Roland Oberhansli**, Secretariat: **Chao Li, Whitney Landress, Juxin Shen** and Special Guests: **Quiming Cheng, Mike Stephenson, James Ogg**. CCOPTS attended as an observer.



The 6th International Workshop on CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project

The 6th International Workshop of the CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project was held virtually using Zoom Meeting on 24-25 February 2022, hosted by the CCOP Technical Secretariat (CCOP TS). It was attended by 27 participants from the member countries (Brunei Darussalam, Cambodia, China, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, and Thailand) and CCOP TS. The objectives of the workshop are to update the progress of the GSi Project and status of data uploading in each of the CCOP Member Countries, and to discuss suggestions on CCOP GSi System, Hazards Information System, and Natural Resources Information System as well as possible collaborations with KIGAM GDR, IUGS DDE, and other Projects.

Dr. Young Joo Lee, CCOPTS Director welcomed all the participants and officially opened the virtual workshop. **Dr. Shinji Takarada**, the GSi Project Leader and **Dr. Joel Bandibas**, the GSi system developer, updated the workshop on the progress of the project and the recent developments of the GSi information system. As of February 2022, there are 1,100 map layers accessible in the GSi System, 145 map catalogs, and 23 portal sites.



On top of the country portal sites, the following thematic and project portal sites are accessible via the GSi Web System as follows.

- Asia-Pacific Region Geological Hazards Information System, <https://ccop-gsi.org/gsi/geohazard/>
- East Asia Georesources Information System, <https://ccop-gsi.org/gsi/georesources/>
- CCOP-GSJ Groundwater Project: https://ccop-gsi.org/gsi/ccop_water/
- OneGeology Eastern Asia Portal Site, <https://ccop-gsi.org/gsi/onegeologyasia/>
- ASEAN Mineral Database and Information System (AMDIS), <https://ccop-gsi.org/amdis/>

Recent updates of the GSi Web System include the following.

- Module for attaching documents to maps
- Module for appending, editing & deleting database records
- Spreadsheet spatial data entry regardless of projections
- Hue, Saturation & Luminosity (HSL) option to set legend color
- Multi-band satellite data integration from all sensors
- New GSi-Based Portals (AMDIS and GeoResources)

Each country national coordinator (or representative) presented the progress of data upload and country portal sites with requests and suggestions on the GSi information system, as well as recent geoinformation developments in the country.

Listed below are the map layers uploaded from 2021 to February 2022 by country.

COUNTRY MAP CATALOGS	MAP LAYERS
BRUNEI DARUSSALAM BRUNEI DARUSSALAM GEOLOGICAL MAPS BRUNEI DARUSSALAM LANDSLIDE HAZARD MAP BRUNEI DARUSSALAM SOILS	BRU PWD 1:500K GEOLOGICAL MAP WITH AGE BRU PWD 1:500K GEOLOGICAL FORMATION WITH SERIES BRU PWD 1:500K LANDSLIDE OCCURRENCE BRU PWD 1:500K SPT
Cambodia	
Indonesia	
Japan Japan Landsat Image Japan Sentinel Satellite Image Japan Aster Satellite Image JPN-GSJ: Distribution Map of Ignimbrite	2 Layers 4 Layers 1 Layer 1:250k Distribution map of Ito Ignimbrite
Korea	
Lao PDR Geological Map of Southern part of Lao PDR ASTER Satellite in Lao PDR	Scale: 1:200.000 (2 Sheets) 28 sheets
Malaysia JMG-CCOP Portal Remote Sensing	ASTER L1T Reflectance Imageries (Peninsular)

COUNTRY MAP CATALOGS	MAP LAYERS
MYANMAR MMR-DGSE: ASEAN GEOLOGICAL MAP MMR-DGSE: GEOENVIRONMENT MAP OF MYANMAR MMR-DGSE: GEOGRAPHIC MAP OF MYANMAR MMR-DGSE: GEOHAZARDS MAP OF MYANMAR MMR-DGSE: GEOLOGICAL MAP OF MYANMAR MMR-DGSE: MINERAL RESOURCES MAP OF MYANMAR MMR-DGSE: SATELLITE IMAGES OF MYANMAR	28 LAYERS 1 LAYER 10 LAYERS 4 LAYERS 12 LAYERS 15 LAYERS 10 LAYERS
Papua New Guinea (10 map catalogs) PNGRIS Inundation by Province Western Province Airmag Geophysical Survey Index	80 Layers
Thailand (236 map layers as of 2020) Active crust and Geohazard Mineral resources Geological maps Satellite Image (New)	+70 map layers in 2021 Total map layers: 306 as of 2021 Active Fault (Line) Update Earthquake Zone (Polygon) New Mineral Potential Area (Polygon) Update Mineral Occurrences (Point) New THA DMR 1:250K Geological Map of Thailand (New) THA DMR 1:250K Structural Geology Map of Thailand (New) THA DMR 1:50K MAL THAI Geological Site Visit (Thai side) New THA DMR Satellite Landsat 8 Thailand (29 images) New THA DMR Satellite Landsat 9 Thailand (38 images) New

Suggestions and recommendations from the Member Countries represented in the virtual workshop include the following.

- To consider applications of Geoinformation for spatial prediction in Geoscience, such as Geospatial Correlative Integration (GCI) and Machine Learning.
- Create a new Map Catalog to add External Web Map Services.
- To reduce the manpower for inputting the updated data. An additional function for connecting to the database via Web services URL is required.
- Automated Hazard Assessment capability.
- Merge web portals for the Philippines (data from MGB and
- PHIVOLCS will be separated into catalogs maintained by specified coordinators)
- Possibility to add a function to edit legend styles from the View and Edit Data.
- Possibility to add a temporary data loading feature for users to load their data into GSi to see the relationship with GSi portal data.

2022 Data upload plans of each Member Country are as follows:

Brunei Darussalam

- 16 map layers in 2022 including geological maps (2), earthquake (1), geohazards (5), geo-environment (2), geochemical data (1), groundwater (2), minerals and oil resources (2), and topographic map (1).

Cambodia

- 1:1M Geochemical Map of Cambodia;
- 1:500,000 Hydrogeological Map of Cambodia;
- 1:500,000 Environmental Geological Map;
- Groundwater Monitoring Well (upcoming meeting in March 2022).

Japan

- 1:200K Marine Geological Maps around Japan (> 20 maps);
- 1:200K Gravity Maps (Bouger Anomalies) (> 20 maps);
- ASTER Satellite Image data (>30 images);
- 1:50K Geological Maps in Japan (150 layers);
- ASTER Satellite image data (>30 maps);
- Geological Maps of Geothermal Area in Japan (9 maps);
- 1:200K Seamless Geological Map of Coastal area around Japan (>4 maps).

Malaysia

- JMG-CCOP Portal
 - » Remote Sensing (ASTER L1T Reflectance Imageries, Landsat 8 OLI-TIRS Imageries, Sentinel 2 Imageries)
 - » Geohazards in Malaysia (Landslide Occurrences)
- MT-JGS PORTAL
 - » Correlation of Jentik Formation and the Pa Samed Formation Map
 - » Case study on active faults map

Philippines

- MGB
 - » Geohazards (10K Flood Susceptibility, 10K Landslide Susceptibility)
- PHIVOLCS
 - » Active Faults Map (as of October 2021)
 - » Liquefaction Hazard Map (as of November 2021)
 - » Taal Base Surge Hazard Maps (5 Scenario Map Models as of 2021)
 - » Earthquake-induced Landslide Hazard Map (NEW!)
 - » Ground Shaking Map (as of 2022)
 - » Tsunami Hazard Map (as of 2021)
 - » Tsunami Prone Areas
 - » Distribution of Volcanoes
 - » Volcano Danger Zones
 - » Lahar Hazard Map
 - » Lava Flow Hazard Map
 - » Pyroclastic Flow, Density Current
 - » Volcano Tsunami Map (formerly Seiches/ Lakewater Oscillation map)

Papua New Guinea

- Satellite images of mining or disaster impact areas
- Target to have 100 map layers by end of 2022

Thailand (2022-2025)

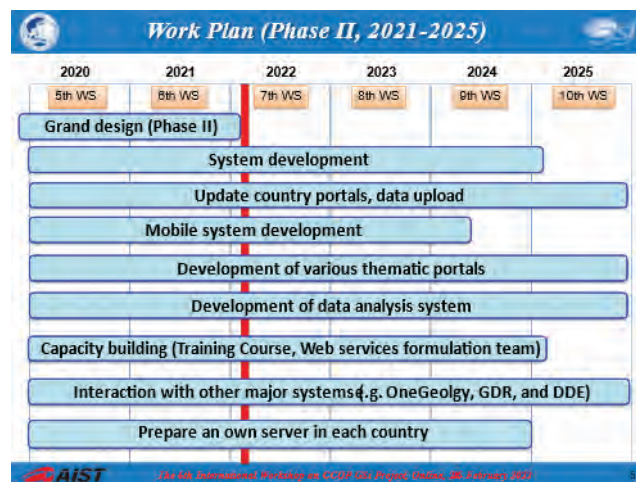
- Active crust and Geohazard
 - » Earthquake Zone (Polygon) New
- Mineral resources
 - » Mineral Potential Area (Polygon) Update;
 - » Mineral Occurrences (Point) New
- Satellite Image
 - » Satellite Sentinel 1&2 of Thailand (New)

Dr. Joel Bandibas led the hands-on exercises on the new features of the GSi System, focusing on the uploading of satellite images.

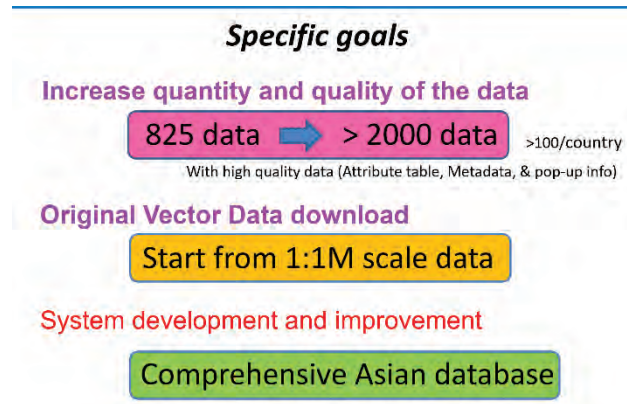
Dr. Zhang Minghua made a presentation on IUGS DDE Standard Task Group and its activities, and expressed interest to collaborate with GSi Project. As the Project Leader of the CCOP IGDP Project, he conveyed the intention of the IGDP Project to work together with GSi Project.

During the discussion, the following were agreed:

1. Agreements – NO CHANGE
2. Data Policy – NO CHANGE
3. Suggestions on CCOP GSi system
 - » Delete all the test map layers currently available in GSi System
 - » For future training, all test data map layers should start with the name “TEST”
 - » Naming convention for Satellite Data:
Country code Satellite/Sensor date region (Bands)
e.g., **CAM ASTER** 2019-05-26 Kampong Chhnang (B01...)
Dr. Bandibas will add country code column for automatic naming.
4. Development Team – need volunteers. **Ms. Marivic P. Uzarraga** (CCOPTS) and **Mr. Wilfred Moi** (PNG) volunteered. **Dr. Zhang Minghua** will send one of his team members to be part of the GSi Development Team.
5. Hazards Information System, <https://ccop-gsi.org/gsi/geohazard/>
 - » GSi main page already has the link to this system
 - » CCOP website will have a direct link to this system
6. Georesources Information System, <https://ccop-gsi.org/gsi/georesources/>
 - » To open this link to the public
 - » CCOP website will have a direct link to this system
7. Data Analysis System (according to priority)
 - » Volcanic Hazards Assessment System
 - » Landslide susceptibility mapping
 - » Slow-moving (creep) landslide and subsidence susceptibility mapping
 - » Coastal flooding assessment system
8. Collaboration among CCOP member countries
 - » Make thematic maps
9. Collaborations with other major projects
 - » CCOP GDR Project – when the project is completed
 - » OneGeology – continue
 - » IUGS DDE – Will find ways to collaborate
 - » CCOP IGDP Project – for discussion
10. Work Plan



11. Specific goals



The 7th International Workshop of GSi will be held online, within November to December 2022. **Dr. Young Joo Lee** officially closed the Workshop, congratulating the GSi Project Team under the leadership of **Dr. Shinji Takarada** and **Dr. Joel Bandibas** for the accomplishments of the project despite the challenges and limitations faced during this pandemic.

The 7th ASOMM Joint Working Group (JWG) and Associated Meetings

The 20th Meeting of the Working Group on Mineral Information and Database (WGMID)

The ASEAN Secretariat together with Brunei Darussalam were chaired and hosted the 7th ASOMM Joint Working Group (JWG) and Associated Meetings to be held on 8-10 March 2022 via videoconferencing.

The main agenda of the meeting is to finalize the ASOMM+3 Work Plan for 2022-2025 (AP #2), ASEAN-IGF Work Plan for 2022-2024 (AP#1), discuss the progress of the 2021 and 2022 work plan from the four Working Groups (WGTIM, WGSMD, WGCBM, WGMID) based on the recently adopted AMCAP III Phase 2, and discuss potential collaboration with new partners as well as cross-sectoral cooperation. We welcome and expect that participation in this meeting will be from ASOMM and focal points from the four Working Groups (WGTIM, WGSMD, WGCBM, WGMID) and relevant dialogue partners. CCOP was invited to attend the 20th Meeting of the Working Group on Mineral Information and Database (WGMID) on 9 March 2022 at 09.00 – 12.00, Brunei Time, GMT+8, Video Conference.

Dr Young Joo LEE, Director CCOP Technical Secretariat attended and gave a presentation during Agenda Item 5: Cooperation with CCOP. The Chair invited CCOP to brief on the following;

- i. CCOP's activities relevant to the establishment of data and information on minerals relevant to the works of WGMID, and,
- ii. potential cooperation/collaboration with ASEAN in 2022-2023 in line with the AMCAP Phase 2: 2021-2025. The Meeting to consider and provide guidance.

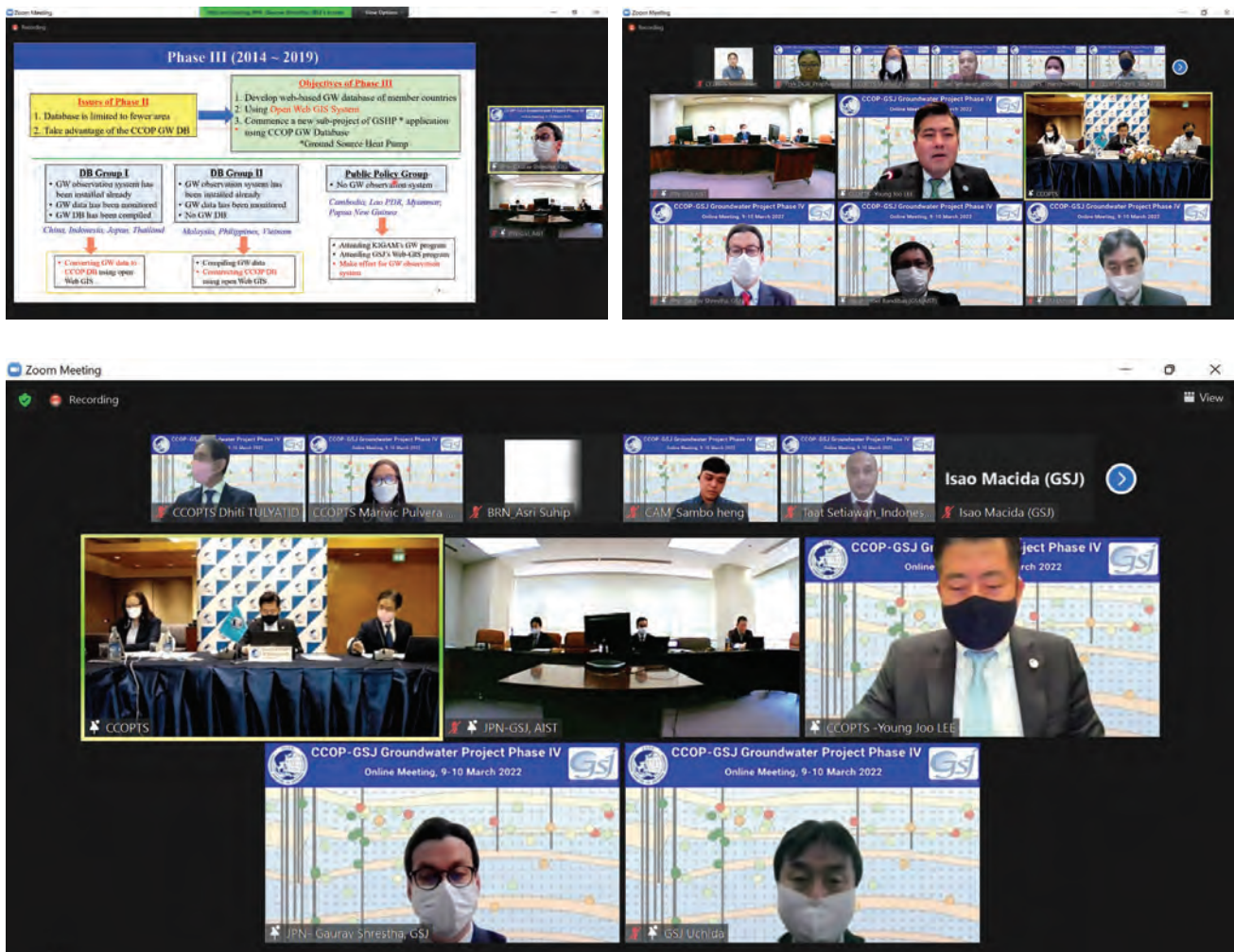


CCOP-GSJ Groundwater Project Phase IV Meeting

The CCOP-GSJ Groundwater Project Phase IV Meeting was held on 9-10 March 2022 via Zoom Meeting application. It was attended by 26 participants from Brunei Darussalam, Cambodia, China, Indonesia, Japan, the Republic of Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and the CCOP Technical Secretariat (CCOPTS).

Dr. Young Joo Lee, CCOPTS Director welcomed all the participants and officially opened the virtual meeting.

Dr. Gaurav Shrestha, the GSJ Groundwater Project Phase IV Leader, presented the Past Achievements of the CCOP-GSJ Groundwater Project & Review of Plan and Objective of Phase IV. The Phase IV kicked off in Bali, Indonesia, and its meeting report has been published and its electronic version has been made available at the GSJ website, <https://www.gsj.jp/en/publications/ccop-gsj/index.html> as well as at the CCOP website, <https://ccop.asia/e-library>. During this phase, the project will update, expand and improve the CCOP Groundwater Database made accessible via the GSi System, <https://ccop-gsi.org/gsi/groundwater/index.php>. The project's annual meetings will include technical field survey and discussions to solve groundwater pollution problems in DB II countries.





Country reports on “Current groundwater and surface water problems in one’s country, and possible solutions” were presented, and summarized below.

COUNTRY/WATER ISSUES	POSSIBLE SOLUTIONS
<p>BRUNEI DARUSSALAM</p> <ol style="list-style-type: none"> 1. Insufficient water supply for rice farming 2. Peat forest fire due to anthropogenic disturbances 3. Landslide occurrences 	<p>Groundwater extraction</p> <p>Monitoring of groundwater level</p> <p>Landslide Hazard and Risk Mapping <i>(Other solution)</i></p> <p>Soil investigation report digitization</p>
<p>CAMBODIA</p> <ol style="list-style-type: none"> 1. Annual shortage and extremely flooding 2. Over extraction and contamination of groundwater 3. Overlapping and limited cooperation between relevant agencies and stakeholders at national and sub-national level 	<p>Modernization of the water management system, improve the irrigation system and increase storage</p> <p>Improve coordinate and cooperate with relevant agencies and stakeholders to collect, share and upgrade data and related information.</p>
<p>INDONESIA</p> <ol style="list-style-type: none"> 1. Excessive groundwater usage due to limited availability of surface water, both in quality and quantity, which is one of the causes of land subsidence in northern Java Island 2. Groundwater as well as surface water are subjected to a high pollution loads 3. Decrease in groundwater level due to agricultural development 	<p>Necessary to make derivative regulations for the management of integrated water resources.</p> <p>Coordination between Ministries in water resources planning and between the Central and local governments need to be strengthened.</p> <p>Institutions need to be strengthened to become as second echelon level that specifically manages groundwater and establishment of groundwater offices in several parts of Indonesia.</p>
<p>JAPAN</p> <ol style="list-style-type: none"> 1. Problem with surface water is renewal of old water supply system. High renewal fee. 2. Problems of groundwater quality (pollutions) with high nitrate concentration. Decline of groundwater level 	<p>Integration of water distribution system. Changing of the management system. Collaboration with private companies.</p> <p>Enact of the basic law. Encourage of governance for groundwater resources by local governments.</p>

COUNTRY/WATER ISSUES	POSSIBLE SOLUTIONS
REPUBLIC OF KOREA 1. Groundwater depletion due to increasing demand particularly for agricultural activities. 2. Groundwater quality deterioration by surface pollutants.	Technology developments for securing large scale groundwater resources and optimum utilization to climate change
LAO PDR 1. Water quality, water shortage, human capacity, flood and drought, missing data.	Adoption of regulation on groundwater management. Development of groundwater management plan with 5 years action plan.
MALAYSIA 1. Prolonged drought, water crisis, flooding	Groundwater exploration and development in water stress areas. Mapping of national groundwater exploration. Review of National Water Management Policy. Develop conjunctive water supply infrastructure.
MYANMAR 1. Shift of saline front towards upstream due to rising sea level and decreasing river flow in dry season. 2. Saltwater intrusion to shallow aquifer. Contamination of ponds.	Construction and upgrading dikes, island-round embankments and polders to prevent saline water intrusion Hydrogeological study for feasibility of fresh deep confined aquifers in delta area
PAPUA NEW GUINEA 1. Contamination of shallow unconfined aquifers and surface water sources 2. Poor maintenance of shallow wells and borehole pumps 3. Tidal influence and saltwater intrusion	Increment of rainwater harvesting tanks. More awareness programs on proper set up of villages. Proper training for maintenance of pumps within rural areas. Improved and thorough mapping of freshwater zones for saline and tidal affected areas.
PHILIPPINES 1. Data gaps in groundwater quality data	Application of geospatial and statistical tool for data processing.
THAILAND 1. Risk of water shortage in dry season. 2. Flood, drought, wastewater, saltwater intrusion, groundwater fluctuation, contaminated groundwater	Groundwater distribution in the affected area. Preparation of relevant laws, policies and water resources management master plan. Alleviating and solving drought and flooding problems. Groundwater conservation and restoration.

Dr. Joel Bandibas, the GSi System developer from the Geological Survey of Japan, led the workshop on Groundwater Database Compilation using the CCOP GSi System which included training of the usage of the system. Hands-on exercises in uploading groundwater well data to the GSi system were also carried out.

The participants requested to have more training sessions on the usage of GSi system. The Project Coordinator responded that there will be training session during project annual meetings. Participants can also contact their respective GSi Project National Coordinator for assistance in using the GSi system. They may also contact the CCOP Technical Secretariat or to **Dr. Joel Bandibas** directly. It was also suggested that the function to upload/append/edit/delete CSV to the GSi system be more user friendly. The GSi system developer took note of the suggestion.

The next project meeting will be held within December 2022 and January 2023. It may be held either in Vietnam or Thailand. The CCOP Technical Secretariat will contact both countries for confirmation.

Before the next meeting in December 2022 (or January 2023), the participants committed to populate the Groundwater Well Database in GSi Portal as follows.

COUNTRY	NUMBER OF WELL DATA /AREA
Brunei Darussalam	10 wells additional
Indonesia	50 more well data on Kalimantan Island
Japan	Akita Plain, Kinokawa
Korea	update data
Malaysia	100 more data
Myanmar	10 more data before next meeting.
Philippines	Add 4 more provinces in Central Luzon, about 600 groundwater sources. Update existing data.
Thailand	Inform later.

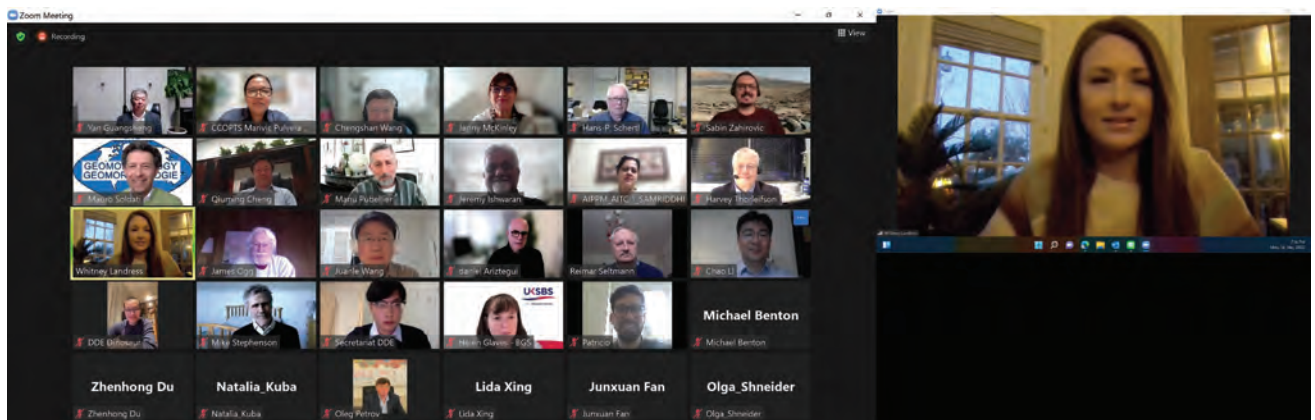
If hydrogeological maps or relevant raster data are available, participants are encouraged to upload it in the GSi Groundwater Portal. The meeting was officially closed by **Dr. Youhei Uchida**, Project Supervisor, and **Dr. Young Joo Lee**, CCOPTS Director.

4th Meeting of the Governing Council of the Deep-time Digital Earth (DDE)

On 14 March 2022, 13:00-16:00 hrs CET (Paris time); 20:00-23:00 Beijing time, the 4th Meeting of the Governing Council of the Deep-time Digital Earth (DDE) was held online by the representatives of the 22 DDE Founding Members; Mike Stephenson, Former Chair, DDE/GC & Director of DDE Europe Affairs; Chengshan Wang, Chair, DDE/EC; Roland Oberhansli, Chair, DDE/SC; Qiuming Cheng, Chair, DDE/StC; Ishwaran Natarajan, Deputy Secretary-General, DDE/EC, Representatives from WTGs (by invitation), Representatives from Secretariat DDE, DDE Observations (EGI, NHM)

Items had been reported and discussed include:

1. Nomination and election of a new Chair for the GC;
2. Progress on the organization of the DDE Forum sponsored by UNESCO, IUGS & DDE on 8 June 2022 in UNESCO, Paris;
3. DDE Alliances/collaboration network;
4. DDE cyberinfrastructure – Progress updates from Group Leaders of DDE Knowledge, DDE Scholar and DDE Platform;
5. General discussion on the DDE annual report 2021;
6. Closure of the meeting.



STRATEGIC AIM II: ADAPTING TO DIGITAL TRANSFORMATION IN GEOSCIENCE FOR FUTURE EARTH

OBJECTIVE 1: To utilize the latest technology to develop digital culture and capability.

OBJECTIVE 2: To digitally transform geoscience data management.

OBJECTIVE 3: To develop cloud technology for interoperable geoscience data consolidation

CCOP-KIGAM GDR Project Meetings, 4-6 July 2022, Bangkok, Thailand

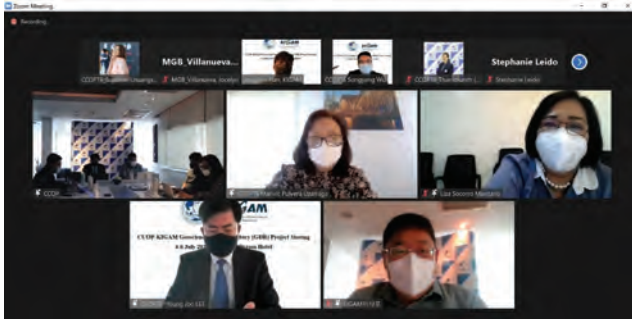
CCOPTS and KIGAM organized bilateral meetings with Thailand, Philippines and Mongolia during 4-6 July 2022. The main purpose of these meetings is to know the possibility of GDR web system technology transfer to these countries.



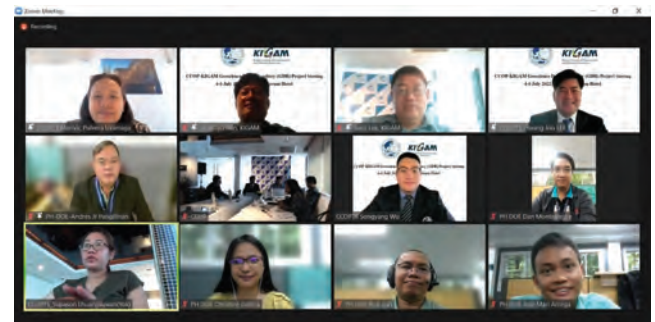
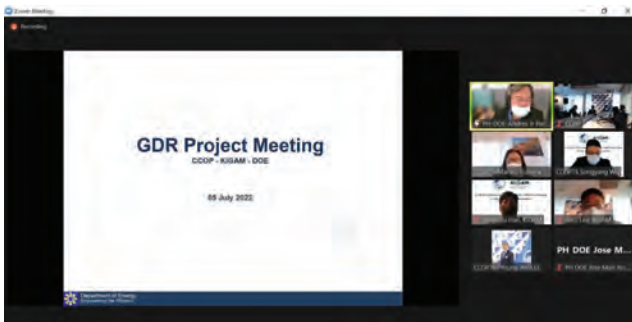
On 4 July 2022, **Dr. Young Joo Lee**, Director of CCOP Technical Secretariat, **Dr. Saro Lee**, Principal Researcher, Director of Geoscience Platform Research Division, Geoscience Data Center (KIGAM) and **Dr. Jong Gyu Han**, Principal Researcher, Geoscience Platform Research Division, Geoscience Data Center (KIGAM) had discussions with **Mr. Teerapon Wongprayoon**, Senior Geologist, Geological Survey Division, Department of Mineral Resources (DMR) and DMR Team. The Meeting agreed that technology transfer will be included in the signed minutes of this meeting.



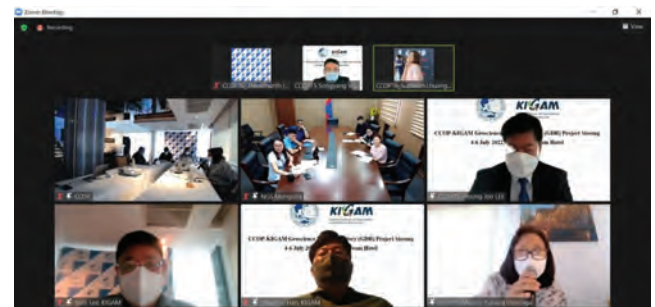
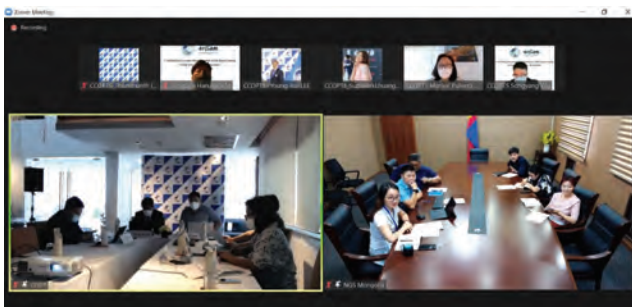
In the morning of 5, July 2022, CCOPTS and KIGAM had discussions with **Ms. Liza Socorro J. Manzano**, Chief, Lands Geological Survey Division, Mines and Geosciences Bureau (MGB) and MGB Team. The Meeting agreed that a technology transfer agreement shall be drafted and signed within July to August 2022. KIGAM will provide a physical server to MGB, and will install it in MGB office once the agreement is signed. Training will also be conducted after installation of the server.



In the afternoon, CCOP and KIGAM had discussions with **Mr. Guillermo H. Ansay**, Chief Science Research Specialist, Department of Energy (DOE), **Mr. Andres O. Pangilinan Jr.**, Supervising Science Research Specialist, Department of Energy (DOE), Philippines and DOE Team. DOE team has been invited to join the training for MGB tentatively scheduled end of August 2022, to further assess the possibilities of using the GDR web system in their office.



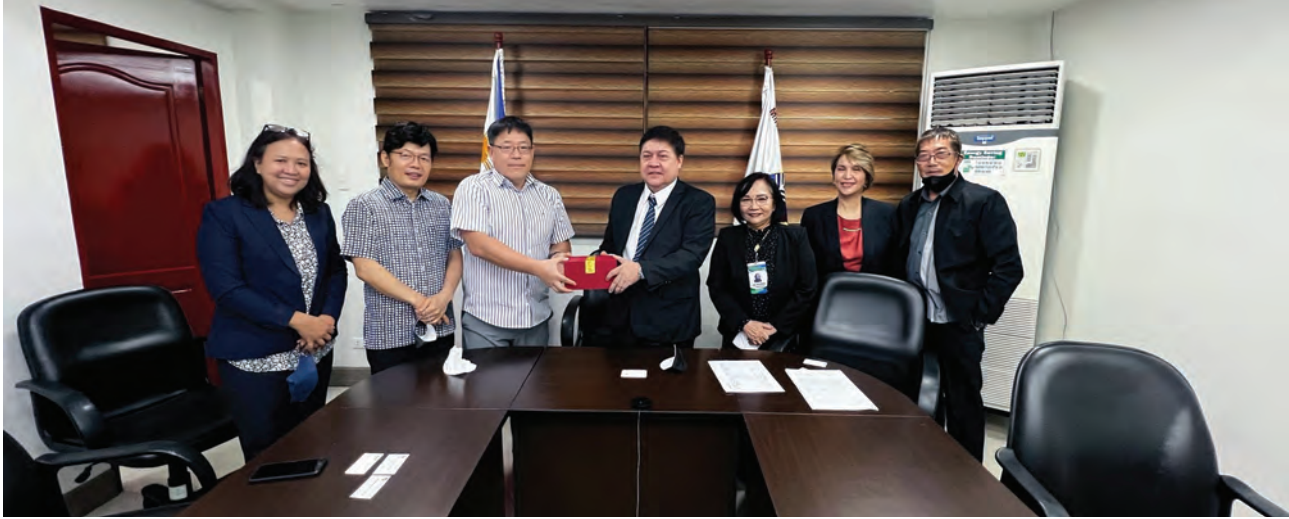
On 6, July 2022, CCOP and KIGAM had discussions with **Ms. Bayasgalan M.**, the head of central geological archive, National Geological Survey of Mongolia (NGS) and NGS Team. The Meeting agreed that NGS will send participants at scheduled GDR Workshop in September 2022, Phuket, Thailand. Before September, NGS will further check the possibilities of using the GDR Web System at NGS offices.



The meetings received good cooperation from all participants of Thailand, Philippines and Mongolia. Conclusion of the meetings was satisfactory for all.

GDR Web System Training for MGB, Philippines

On 22-28 August 2022, the Philippine Minerals and Geoscience Bureau (MGB) invited **Dr. Saro Lee**, Director of Principal Researcher, Geoscience Platform Research Division, Geoscience Data Center (KIGAM) and **Dr. Jong Gyu Han**, Head of Principal Researcher, Geoscience Platform Research Division, Geoscience Data Center (KIGAM) together with **Ms. Marivic Pulvera Uzarraga**, Manager, Project Operation & Information, CCOPTS to visit its office and conduct training to relevant staff for the installation of the server for the CCOP-KIGAM Geosamples Data Repository (GDR) Web System, and its usage.



CCOP-KIGAM Geoscience Data Repository (GDR) Project

Third Working Group Meeting/Workshop, 27-29 September 2022, Phuket, Thailand

There were 24 participants from 13 Member Countries [Brunei (4), Cambodia (3), China (3), Indonesia (1), Japan (1), Korea (3), Lao PDR (1), Malaysia (1), Mongolia (1), Myanmar (1), Philippines (3), Thailand (1), Vietnam (1)] and CCOP Technical Secretariat (5). **Ms. Marivic Pulvera Uzarraga**, Manager, Project Operation and Information, CCOP Technical Secretariat hosted the workshop.



During the Opening Ceremony, **Dr. Saro Lee**, CCOP-KIGAM GDR Project Leader and **Dr. Young Joo Lee**, Director of CCOP Technical Secretariat delivered the Welcoming and Opening Address. **Dr. JongGyu Han**, CCOP-KIGAM GDR Project Leader, provided updates on the project including the developments of the GDR Web System.

Representatives from Member Countries gave presentations on updates of their country's data upload and plan, challenges encountered in the process as well as recommendations for the system improvement.





Dr. Saro Lee, Dr. JongGyu Han, Dr. Sooyeon Han and Ms. Marivic Pulvera Uzarraga worked together to train participants to try out the program and solve problems that arose during the data uploading to the GDR web system.



Discussions on the GDR Web System Technology Transfer were made. The following countries (organizations) expressed interest in adopting the system for their organization: the Philippines (Department of Energy) and Vietnam. Other countries will explore more on the usage of the system and take this into consideration.

This workshop is the first physical meeting for CCOP-KIGAM GDR Project after the Covid-19 pandemic. It has been one of the most successful hybrid CCOP international geoscience workshops of the year in the region.

STRATEGIC AIM II: ADAPTING TO DIGITAL TRANSFORMATION IN GEOSCIENCE FOR FUTURE EARTH

OBJECTIVE 2: To digitally transform geoscience data management.

CCOP-IGDP online workshop

The workshop on geoscience information of the CCOP-IGDP project was successfully held online on 22 to 23 November 2022. Thirty-six (36) participants from CCOP Member Countries and CCOPTS attended the two-day workshop, including Brunei, Cambodia, China, Japan, Malaysia, Myanmar, Philippines and Thailand. **Dr. Young Joo LEE**, CCOPTS Director, **Mr. Ma Yongzheng**, Vice-Director of Science Technology and International Cooperation Division of China Geological Survey (CGS).



Day 1 was on reports from newly developed big data, remote sensing and AI technologies for Earth science in some well-recognized international geoscience programs. Day 2 was focused on relevant integrated geoscience data processing capacity building and a discussion on CCOP regional gravity compilation. Techniques for the training included integrated data processing software RGIS and RGIS.online, intelligent geological map compilation system iMapower, fossil and rock reorganization with machine learning. Progresses of CCOP urban geological information platform and ASEAN-China geoinformation platform were also introduced at the meeting.

This CCOP regional gravity map is important for understanding the underground geological structures that may help CCOP MCs in the exploration of natural resources including oil and minerals and in the mitigation of geohazards. The workshop participants discussed and agreed to submit data and maps before the end of 2022 for the IGDP project to complete the preliminary draft of CCOP gravity map for a view and discussion next spring, hopefully in person in China. Thailand submitted the data right at the meeting.

Further training on the compilation technique and on the software usage were requested by some member countries. It can be conducted online or in person in China in the future. For the next work of IGDP project, participants agreed to start the regional geological map compilation after gravity map is completed and released via CCOP website.



STRATEGIC AIM III: PROMOTION OF GEOSCIENCE EDUCATION, CAPABILITY BUILDING AND OUTREACH

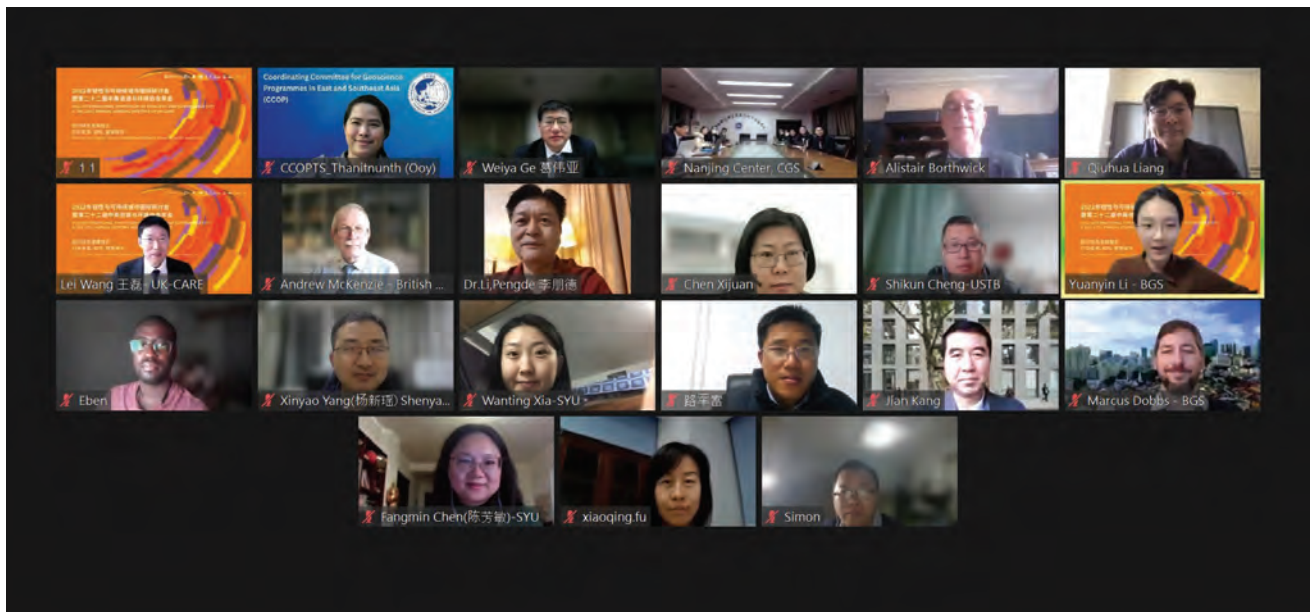
OBJECTIVE 1: To provide workshop, seminar, training programmes to MCs, CCs, COs.

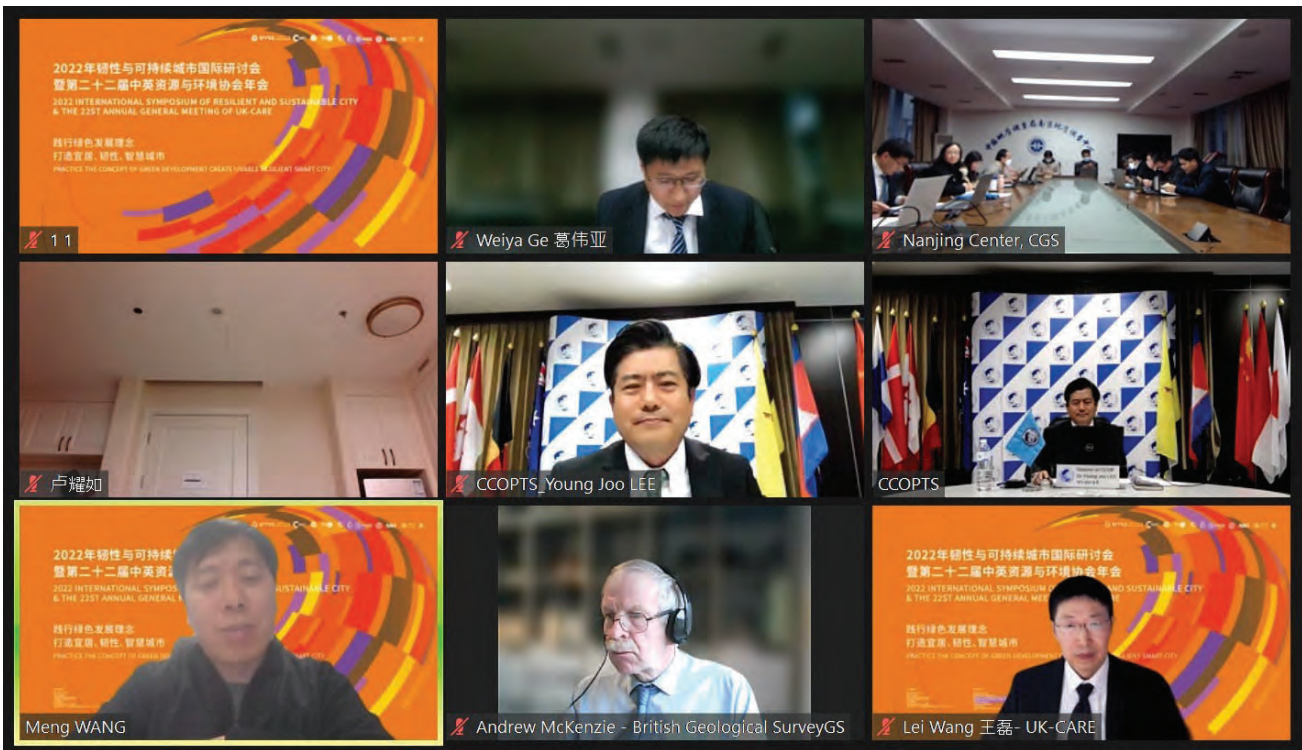
International Symposium 2022 on Resilient and Sustainable Cities

On 6-8 December 2022, the 2022 International Symposium on Resilient and Sustainable Cities with theme 'Practicing the concept of green development to create liveable, resilient and smart cities', was successfully organized online by Zhejiang Association for Science and Technology; The Wenzhou Municipal People's Government; Nanjing Centre, China Geological Survey; UK China Association of Resources and Environment (UK-CARE); the Educational Department of Liaoning Province; Young Earth Scientists (YES) Network; Research Centre on Urban Geology of Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP-RCUG).

The Opening Session: Vice President of China Geological Survey, Ministry of Natural Resources, **Dr. Pengde Li**, Education Counsellor of the Chinese Embassy in the UK, **Jianjiang Kuang**, Director of UK Research and Innovation China (UKRI-China), **Daniel Brooker**, Research & Innovation lead for Land Use Change and Climate Change adaptation, British Geological Survey, **Andrew McKenzie**, President of Shenyang University, **Yanzhi Zhao**, Director of CCOP Technical Secretariat, **Dr. Young Joo LEE**, Chief of Degree Management and Postgraduate Education Division, Educational Department of Liaoning Province, **Yu Yang**, gave an addressed.

The event was attended by 100 participants via online. There were 4 topics of parallel forums: 1) Urban geological survey and its application, 2) Multidisciplinary methods in exploration, evaluation, and planning of underground space, 3) Coastal zone ecological protection, restoration and disaster reduction and 4) Smart cities responding to extreme Situations. The symposium was moderated by **Dr. Meng Wang**, Executive Secretary of World Young Scientist Summit; **Dr. Lei Wang**, Senior Research Fellow, British Geological Survey; Honourable Professor, Jilin University; Visiting Research Fellow, Chinese Academy of Sciences; President of UK-CARE.



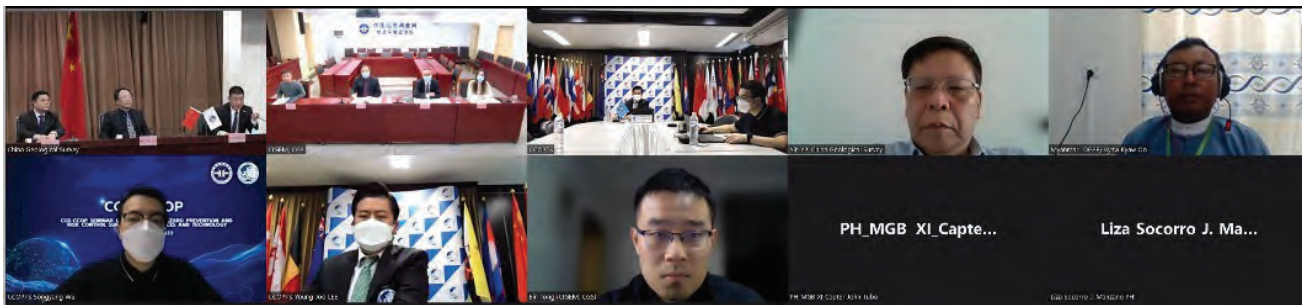


CGS-CCOP Seminar on Geological Hazard Prevention and Risk Control Supported by Sciences and Technology (Online)

On 25 November 2022, CGS-CCOP Seminar on Geological Hazard Prevention and Risk Control supported by Sciences and Technology was successfully organized by the China Geological Survey (CGS) together with CCOP online. There were also 70 participants from CCOP Member Countries such as Brunei Darussalam, Cambodia, China, Lao PDR, Malaysia, Mongolia, Myanmar, Papua New Guinea, Philippines, and Thailand attended this seminar online.

The Opening Ceremony started with the Welcome Remarks and Addresses delivered by **Dr. Niu Zhijun**, Vice President of China Geological Survey, Ministry of Natural Resource and the opening speech was made by **Dr. Young Joo LEE**, Director of CCOP Technical Secretariat. There were six experts of relevant fields to give academic presentation. There were two experts from CCOP Member Countries attended as the keynote speaker, **Dr. Dita Arif Yuwana**, Engineering Geologist, Center for Groundwater and Environmental Geology, Geological Agency of Indonesia, and **Ms. Liza Socorro J. Manzano**, Alternate Representative of the Philippines to CCOP, Chief, Geohazard and Engineering Geology Section (GhEGS) / LGSD, Mines and Geosciences Bureau, Philippines.

The theme of this seminar is "Prevention and control of geological hazard risk supported by science and technology". In this seminar, the presentations focused on the major issues of geological hazard prevention and control including risk identification, monitoring, early warning, mitigation, and information service.



The 5th Training Courses on Capacity Building on Marine Geosciences and Geohazards Reduction & Prevention for ASEAN Member States

On the 29-30 November 2022, the 5th Training Courses on Capacity Building on Marine Geosciences and Geohazards Reduction & Prevention for ASEAN Member States was organized by Guangzhou Marine Geological Survey, China Geological Survey National Engineering Research Center for Gas Hydrate Exploration and Development, China. Co-organizer by Qingdao Institute of Marine geology, China Geological Survey. Sponsor by China Geological Survey, Ministry of Natural Resources, P.R. China and Coordinating Committee for Geosciences Programmes in East and Southeast Asia. There were about 80 participants attend this training course online.



IS-Geo Regular Training Course on “3D Geological Modelling – SKUA GOCAD”

The International School for Geoscience Resources of KIGAM was organized the regular training course on “3D Geological Modelling – SUKA GOCAD” from November 27 to December 3, 2022 in KIGAM, Daejeon (Republic of Korea). This course aims to foster professionals in ASEAN countries in the fields of Geoscience and Resources as well as to enhance the capabilities of the cooperating countries/organizations with Korea/KIGAM. This course is practical software training to learn SKUA-GOCAD, 3D geological modeling software, for mineral exploration applications. A total of 11 participants from CCOP Member Countries and CCOP Technical Secretariat attended the training course onsite.



IS-Geo Regular Training Course on ‘Geopark: preparation and management’

The International School for Geoscience Resources of KIGAM was organized the regular training course on “Geoparks: preparation and management” from December 4 to 10, 2022 in KIGAM, Daejeon and Jeju island (Republic of Korea). This course aims to foster professionals in ASEAN countries in the fields of Geoscience and Resources as well as to enhance the capabilities of the cooperating countries/organizations with Korea/KIGAM. A total of 21 participants from CCOP Member Countries and CCOP Technical Secretariat attended training course onsite.



STRATEGIC AIM III: PROMOTION OF GEOSCIENCE EDUCATION, CAPABILITY BUILDING AND OUTREACH

OBJECTIVE 2: To strengthen nurturing system for young geoscientists & to promote gender equality

On 28 June 2022, TS sent the call for applications for the Ric Terman Award to Cambodia, Lao PDR, Papua New Guinea, Singapore and Timor-Leste. For this year 2022, only one (1) successful PhD candidate, or two (2) Master Degree candidates from any of these 5 countries, will be awarded. Selected three proposals should reach the CCOP Technical Secretariat by 20 August 2022, and these proposals will be forwarded to members of the Review Group headed by the Chairman of the CCOP Advisory Group the following day, for their evaluation and recommendation on the successful proposal to win the EAGER award.

The successful proposal has recognized at the 58th CCOP Annual Session in Bandung, Indonesia, 9-12 October 2022. Awarding of the EAGER Grant 2022

On behalf of the Geological Society of America (GSA), **Mr. Ioannis Abatzis**, Chairperson of the CCOP Advisory Group, together with **Dr. Eko Budi Lelono**, Vice-Chairperson of the CCOP Steering Committee and **Dr. Young Joo Lee**, the Director of CCOP Technical Secretariat, presented the East Asian Geoscience and Environmental Research (EAGER) / Ric Terman Award of USD 5,000 cheque and certificates from GSA and CCOP, to **Mr. Kimhak NEAK**, for his research proposal “Analysis of Integrated Petrophysical and Petrographical Studies for Characterization of Reservoirs: A Case Study of Cambodian Block A in Khmer Basin, Gulf of Thailand”. **Mr. Kimhak NEAK** is currently a Ph.D. candidate in the research unit for Energy Technology and Management (ETM), Institute Technology of Cambodia.



FINANCIAL HIGHLIGHTS

From 1 January to 31 December 2022, Member Countries' total cash contributions amounted to **USD 420,000.00**, consisting of Cambodia (USD 10,000), China (USD 60,000), Indonesia (USD 55,000), Japan (USD 60,000), Republic of Korea (USD 60,000), Malaysia (USD 50,000), Myanmar (USD 10,000), Papua New Guinea (USD 25,000), Philippines (USD 50,000) and Singapore (USD 10,000).

Thailand cash contribution year 2022 (USD 50,000) was received in 2021, Brunei Darussalam cash contribution year 2021 (USD 10,000) was received in 2022 and Lao PDR cash contribution year 2020 and 2021 (USD 20,000) was received in 2022.

The arrears cash contribution expected to receive from Brunei Darussalam year 2022 (USD 10,000), Lao PDR year 2022 (USD 10,000), Mongolia year 2022 (USD 10,000), Timor-Leste year 2019-2022 (USD 40,000), and Vietnam year 2022 (USD 25,000) (Table 1).

**Table 1: Cash Contributions of Member Countries for 2020-2022
(Ending 31 December 2022)**

Member Countries	2020 Contribution Received in 2020	2021 Contribution Received in 2021	2022 Contribution Received in 2022	Arrears Contribution Expected to Receive
Brunei Darussalam	10,000.00	-	*10,000.00(Y2021)	10,000.00
Cambodia	-	10,000.00 (Y2020) 10,000.00	10,000.00	-
China	60,000.00	60,000.00	60,000.00	-
Indonesia	55,000.00	55,000.00	55,000.00	-
Japan	60,000.00	60,000.00	60,000.00	-
Republic of Korea	60,000.00	60,000.00	60,000.00	-
Lao PDR	10,000.00 (Y2019)	-	**10,000 (Y2020) **10,000 (Y2021)	10,000.00
Malaysia	50,000.00	50,000.00	50,000.00	-
Mongolia	10,000.00	10,000.00	-	10,000.00
Myanmar	10,000.00	10,000.00	10,000.00	-
Papua New Guinea	Waived Fee	Waived Fee	25,000.00	-
Philippines	40,000.00	40,000.00	***50,000.00	-
Singapore	10,000.00	10,000.00	10,000.00	-
Thailand	40,000.00	****49,136.69 ****50,000.00	****	-
Timor-Leste	-	-	-	10,000.00 (Y2019) 10,000.00 (Y2020) 10,000.00 (Y2021) 10,000.00
Vietnam	25,000.00	25,000.00	-	25,000.00
Total	440,000.00	499,136.69	420,000.00	95,000.00

* Brunei Darussalam cash contribution for 2021 was received in 2022 (USD 10,000)

** Lao PDR cash contribution for 2020 and 2021 was received in 2022 (USD 20,000)

*** Philippines increased cash contribution for 2022 from USD 40,000 to USD 50,000

**** Thailand cash contribution for 2022 was received in 2021 (USD 50,000)

In addition to Member Countries' contributions, the amount of **USD 35,731.09** earned from the management of projects during January - December 2022 period which from "CCOP-KIGAM Groundwater Project: Vulnerability Assessment to Climate Change of Groundwater System in Greater Mekong Subregion and Comparative Study of Groundwater Dependent Ecosystem", 1st Installment 2022 (1/2) (USD 8,034.69) and 2nd Installment 2022 (2/2) (USD 7,667.20), "CCOP-KIGAM GDR Project: Sharing System Establishment of Digital Geological Sample Data in CCOP Countries", 1st Installment 2022 (1/2) (USD 4,948.23) and 2nd Installment 2022 (2/2) (USD 4,602.56) and "CCOP-KIGAM Urban Geology Project: Urban Geology Technology Transfer for Sustainable Cities in East and Southeast Asia", 1st Installment 2022 (1/2) (USD 5,272.54) and 2nd Installment 2022 (2/2) (USD 5,205.87) are shown in **(Table 2)**.

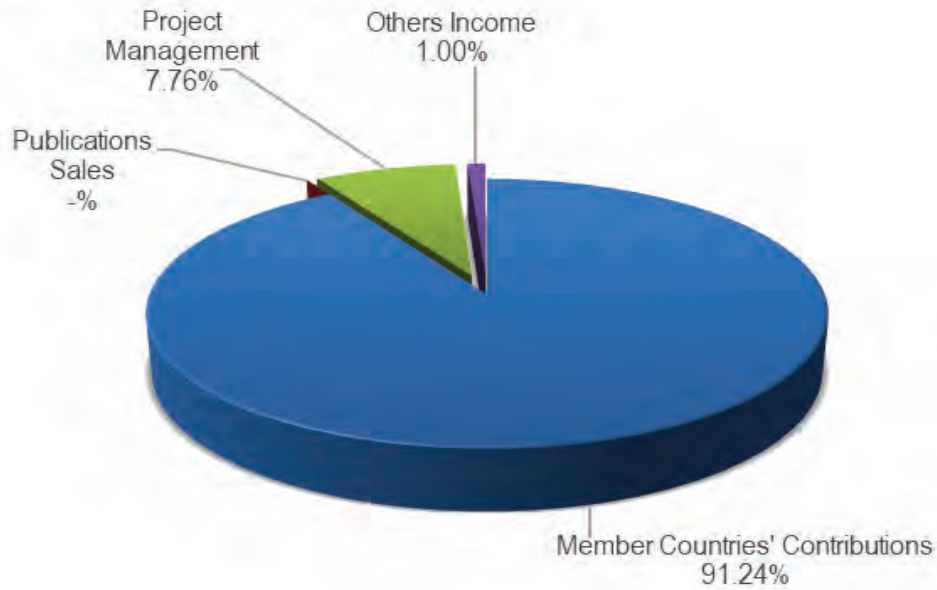
Other incomes during the period amounted to **USD 4,575.14** from interest earned (USD 1,477.83), processed from sale of CCOP official car (USD -), loss on current exchange rate (USD -0.02), miscellaneous incomes (USD -) and unrealized gain on conversion currencies exchange rate (USD 3,097.33). The total income during the period was USD 460,306.23. The expenditure of **USD 488,738.97** was incurred from operation and administrative support. The Cash at Bank as of December 31, 2022 amounted to **USD 1,051,364.03**.

The Technical Secretariat office premise is continuously provided by the Royal Thai Government, through the kind arrangements of the Department of Mineral Resources (DMR), Ministry of Environment and Natural Resources, at the CCOPTS Building, DMR Complex, Rama VI Road, Bangkok, Thailand.

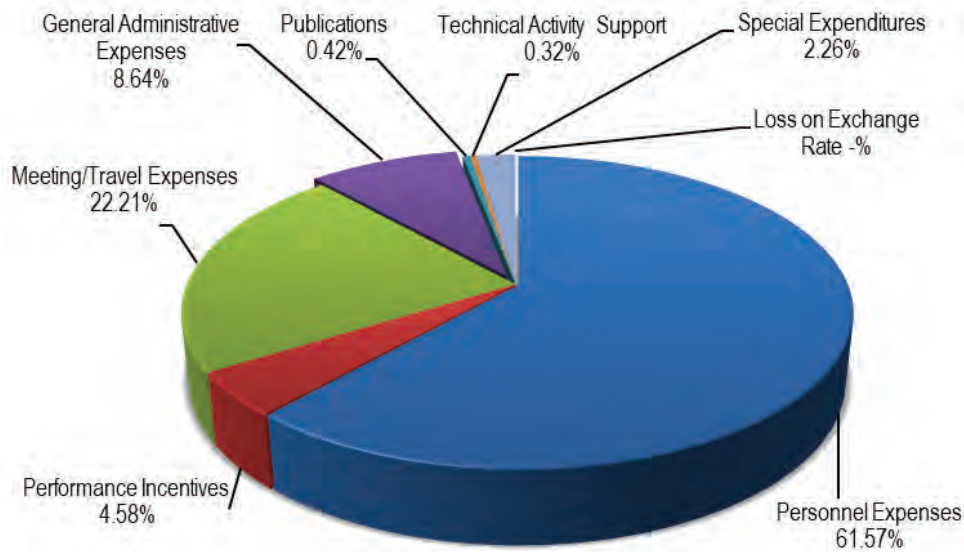
**Table 2: Management Income from Execution of Project and Activity
(January 1 - December 31, 2022)**

Funding Source	Activities	Country	Contract Period	Amount (USD)
KIGAM	CCOP-KIGAM Groundwater Project: Vulnerability Assessment to Climate Change of Groundwater System in Greater Mekong Subregion and Comparative Study of Groundwater Dependent Ecosystem	1 st Installment 2022 (1/2)	March 1, 2022	8,034.69
		2 nd Installment 2022 (2/2)		7,667.20
KIGAM	CCOP-KIGAM GDR Project: Sharing System Establishment of Digital Geological Sample Data in CCOP Countries	1 st Installment 2022 (1/2)	March 1, 2022	4,948.23
		2 nd Installment 2022 (2/2)		4,602.56
KIGAM	CCOP-KIGAM Urban Geology Project: Urban Geology Technology Transfer for Sustainable Cities in East and Southeast Asia	1 st Installment 2022 (1/2)	April 1, 2022	5,272.54
		2 nd Installment 2022 (2/2)		5,205.87
Total Project Management Income				35,731.09

CCOP Revenue 2022



CCOP Expenditure 2022



LIST OF CONTACTS

CCOP STEERING COMMITTEE

MEMBER COUNTRIES PERMANENT REPRESENTATIVES (16)

The Steering Committee is a policy making body of CCOP, which shall establish policies and principles for CCOP activities, approve work plan, budget, accounts for each year, new programme proposals, establish subsidiary bodies, appoint the Director, receive and consider the reports of Director on the functions delegated to him.

BRUNEI DARUSSALAM:

Ir. Norazmi bin Othman
Permanent Representative of Brunei Darussalam to CCOP
Act. Director of Water Services
Public Works Department
Ministry of Development
Brunei Darussalam

CAMBODIA:

Mr Cheap Sour
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Director-General
General Department of Petroleum
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Permanent Representative of China to CCOP
Vice Minister for Geological Survey, MNR
President of China Geological Survey
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Head, Geological Agency, Ministry of Energy and Mineral Resources (MEMR)
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President, Korea Institute of Geoscience and Mineral Resources (KIGAM), 124, Gwahak-ro Yuseong-gu, Daejeon, 34132, Republic of Korea

LAO PDR:

Permanent Representative of Lao PDR to CCOP
Director-General, Department of Geology and Minerals
Ministry of Energy and Mines
Khounboulom Road, Vientiane

MALAYSIA:

Ybrs Tuan Haji Hisamuddin Bin Termidii
Permanent Representative of Malaysia to CCOP.
Director-General
Department of Mineral and Geoscience Malaysia (JMG)
Aras 9, Menara PJH, No. 2, Jalan Tun Abdul Razak, Presint 2, 62100 Putrajaya, Malaysia

MONGOLIA:

Dr Uyanga Bold
Permanent Representative of Mongolia to CCOP
Director-General of the Geological Policy Department, Ministry of Mining and Heavy Industry
Government building 2, United Nation's Street-5/2, Ulaanbaatar, Mongolia

MYANMAR:

Dr Thet Tin Nyunt
Permanent Representative of Myanmar to CCOP
Director-General, Geological Survey and Mineral Exploration (DGSE)
Ministry of Natural Resources and Environmental Conservation
Nay Pyi Taw, Republic of the Union of Myanmar

PAPUA NEW GUINEA:

Mr Harry Kore
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