



Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP)

CCOP ANNUAL REPORT 2018



*CCOP Technical Secretariat
Bangkok*

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Picture on cover page:

Delegates of the 54th CCOP Annual Session explored Songdo Peninsula Geotrail, Busan, Republic of Korea.

MESSAGE FROM THE CHAIRMAN

Warmest greetings!

My heart is filled with great joy and gratitude as we bid farewell to 2018. I still remember vividly the heaviness I felt as I first began in January 2018 to helm CCOP, an intergovernmental organization whose mission is to facilitate and coordinate the implementation of applied geoscience programmes in East and Southeast Asia region, as the Chairman of the Steering Committee in replacing **Dr. Joong-Ho Synn**, the former Permanent Representative from the Republic of Korea. It has been my pleasure and privilege to watch the great strides made by CCOP during the past 12 months with the tremendous success in carrying out most of its planned activities for the year 2018. Our success would not have been possible without the strong support of the Member Countries, Cooperating Countries, Cooperating Organizations, Advisory Group, Honorary Advisors and especially to the CCOP Technical Secretariat team under the able leadership of **Dr. Adichat Surinkum**, Director of CCOP Technical.



The 54th CCOP Annual Session and the 71st Steering Committee Meeting were smoothly and successfully held in the picturesque Busan City of the Republic of Korea with generous sponsorship and wonderful hospitality of the host country. On behalf of the CCOP family, I would like to sincerely thank the Government of the Republic of Korea and in particular Korea Institute of Geoscience and Mineral Resources (KIGAM) for graciously hosting both events as well as KIGAM's Special Session for Centennial Celebration.

It is also my pleasure to extend my courteous welcome this year to Mongolia into the CCOP family as its 15th CCOP Member Country. The same goes to the other organization such as the Asian Pacific Geopark Network (APGN), American Association of Petroleum Geologists (AAPG), International Atomic Energy Agency (IAEA), International Medical Geology Association, Young Earth Scientist (YES) Network, and Jeju Province Development Cooperation (JPDC) where we hope to be accepted as CCOP Cooperating Organizations by 2019-2020. Surely with these new additions, it would further enhance the cooperation in the field of geoscience in East and Southeast Asia in order to fulfil the mission of CCOP.

It is unfortunate that a string of natural disasters, ranging from earthquake-tsunami, earthquakes, volcanic eruptions, to typhoon, had exerted a severe toll on many of the CCOP Member Countries in 2018. We joined in mourning alongside the people affected in those Member countries and would like to convey words of sympathy and support to friends and relatives of the victims.

All these natural disasters serve to remind us of the importance of the role of geoscience in contributing to the well-being of life and to the economic development. To this end, I am very excited to step into 2019 with high expectation to see many new programmes in the pipe line to be thoughtfully and successfully implemented for the benefit of the Member Countries.

May the new year bring you great success and happiness!

Thank you very much.

Datuk Shahar Effendi bin Abdullah Azizi
Chairman, CCOP Steering Committee

CCOP: VISION, MISSION AND STRATEGY

Vision: A premier intergovernmental Earth science organization in East and Southeast Asia

Mission: To contribute significantly to the economic development and sustainable management of the environment and improvement of the quality of life of its Member Countries by the application of Earth science knowledge.



STRATEGIC FOCUS:

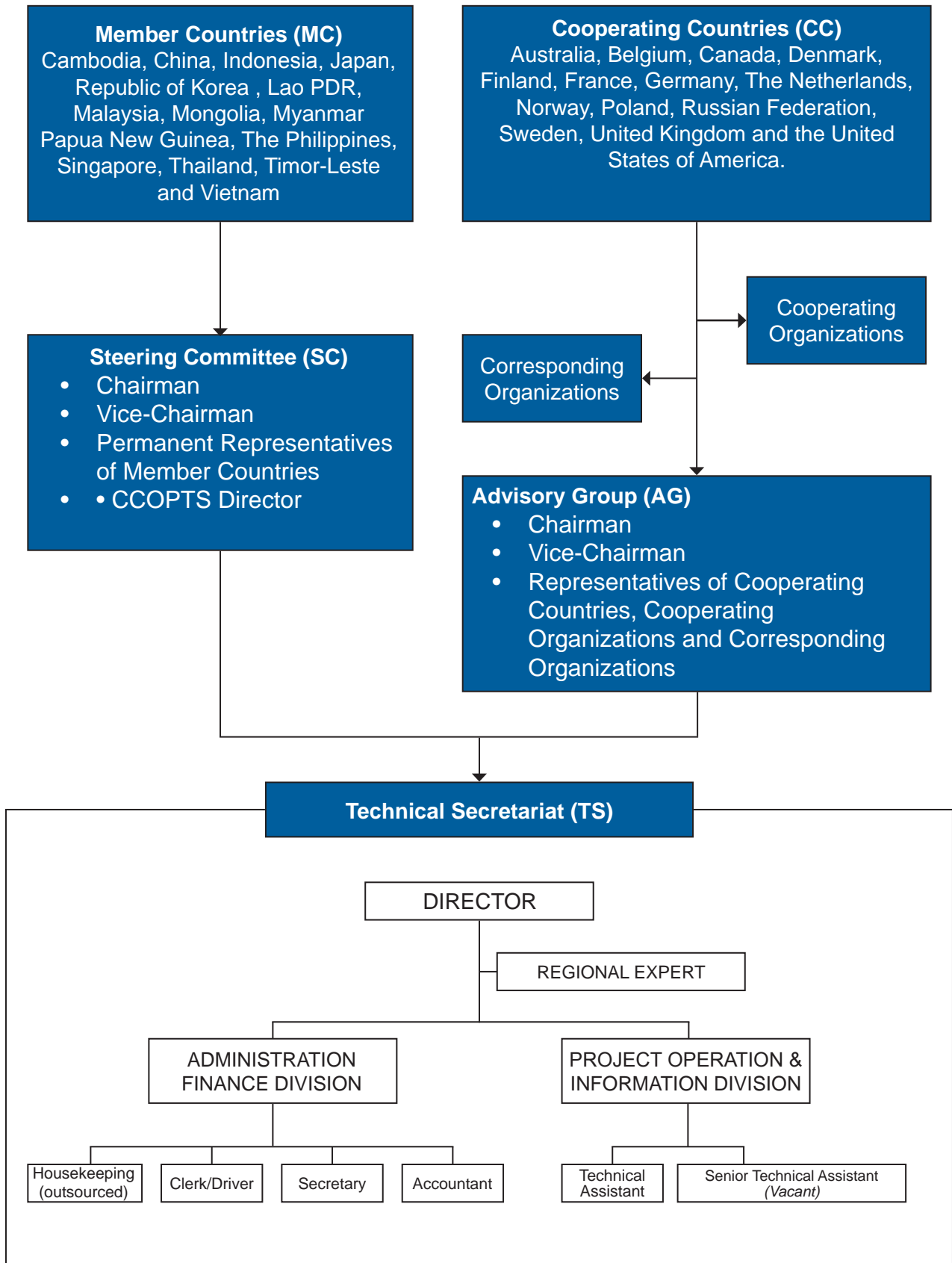
- **Outreach** – to enhance influence with decision makers, investors and the public through the provision of relevant Earth science information and to develop appropriate skills for communicating effectively with CCOP stakeholders.
- **Cooperation and Partnership** – to enhance the internal and external partnerships to improve the quality, reach application and impact of our Earth science information and knowledge.
- **Knowledge Enhancement and Sharing** – to manage, promote, share and exploit the region’s Earth science information and skills.
- **Data and Information** – to advance sharing of data and information and integrate Earth science data across national boundaries.

Member Countries: Cambodia, China, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Myanmar, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste and Vietnam.

Cooperating Countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, The Netherlands, Norway, Poland, Russian Federation, Sweden, United Kingdom and United States of America.

Cooperating Organizations: ASCOPE, CIFEG, CPC, EuroGeoSurveys, GETECH, IOC, IOMAC, IUGS, PETRAD, SPC, UN-ESCAP, UNEP, UNESCO, UKM and THE WORLD BANK.

MANAGEMENT AND ORGANIZATION



As of 31 December 2018, the CCOP Technical Secretariat (TS) has 7 personnel, comprising three professionals, three supporting staff and one outsourced staff.



CCOPTS with the Chairman of the CCOP Steering Committee

From 1 May 2018, **Dr. Dhiti Tulyatid** assumed his position as CCOPTS Regional Expert succeeding **Dr. Kamaludin Bin Hassan**. **Mr. Thawat Phunsang** started his probation period of four (4) months from 1 December 2018 to 31 March 2019 as driver/clerk at CCOPTS replacing **Mr. Pornchai Pattamarat** whose contract with CCOPTS has been terminated due to his state of health which justifies the presumption that he will be unable to perform his duties. **Ms. Supason Lhuangsuwan** will start her probation period of four (3) months from 1 January to 31 March 2019 as an Assistant, Project Operation and Information at CCOPTS replacing **Ms. Piriya Boonsit**. With majority votes from CCOP Member Countries, the Chairman of the CCOP Steering Committee officially appointed **Dr. Young Joo Lee** from the Republic of Korea as the CCOPTS Director for the period 1 April 2019 to 31 March 2022, on 15 December 2018. He will assume office at the CCOPTS on 1 April 2019.

As elected at the 69th CCOP Steering Committee Meeting in Bohol, Philippines, 20-21 October 2017, **Datuk Shahar Effendi bin Abdullah Azizi**, Permanent Representative of Malaysia to CCOP, and **Atty. Wilfredo Moncano**, Permanent Representative of the Philippines to CCOP commenced their term as Chairman and Vice-Chairman of the CCOP Steering Committee respectively, on 1 January 2018. Their term will end on 31 December 2019.

On May 2018, **Dr. Weon Seo Kee**, Vice President, Korean Institute of Geoscience and Mineral Resources (KIGAM) was appointed as Deputy Permanent Representative of the Republic of Korea to CCOP. On 31 August 2018, **Dr. Bok Chul Kim**, President, Korea Institute of Geoscience and Mineral Resources (KIGAM) succeeded **Dr. Joong-Ho Synn** as Permanent Representative of the Republic of Korea to CCOP. On November 2018, **Mr. Nguyen Van Nguyen**, Permanent Representative of Vietnam to CCOP, Deputy General Director, General Department of Geology and Minerals of Vietnam succeeded **Mr. Pham Phu Binh** as Permanent Representative of Vietnam to CCOP.



Dr. Bok Chul Kim
Permanent Representative of
Republic of Korea to CCOP



Nguyen Van Nguyen
Permanent Representative of
Vietnam to CCOP



Signing Ceremony officially welcoming Mongolia as CCOP Member Country at the 71st CCOP SC Meeting in Busan, November 2018

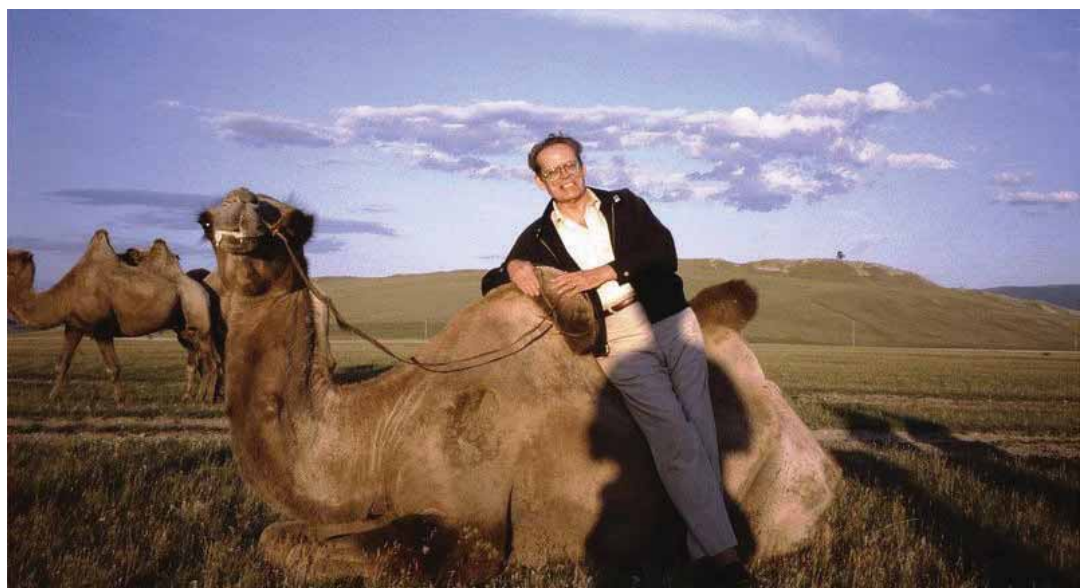
The 71st CCOP Steering Committee Meeting held in Busan, Republic of Korea, 2-3 November 2018 officially welcomed Mongolia as CCOP Member Country with a signing ceremony.

It is with sadness to record in this report the passing of one of CCOP Honorary Advisors, **Dr. Maurice 'Ric' Terman** on 22 March 2018. **Dr. Terman** cared very deeply about CCOP and its member countries and showed that by his tireless efforts, support and devotion to both onshore and offshore geologic studies in the CCOP region. He was a true member to the "CCOP family" and never missed a chance to contribute both as a representative of the USA to CCOP, and later in an emeritus and advisory roles.



Dr. Terman's recent contribution to CCOP is the East Asia Geoscience and Environmental Research (EAGER) Project, a trust fund set up in the Geological Society of America with his personal contribution, to be used for funding research in geoscience in the region. Under this project, grants were made available for research on Geoscience and Environment in East and Southeast Asia to CCOP Member Countries. Since 2003 until the Project's cessation in 2017, 12 researchers from CCOP member countries received the grant; 2 from China, 1 from Indonesia, 2 from Japan, 1 from Republic of Korea, 2 from Malaysia, 1 from Philippines, 2 from Thailand, and 1 from Vietnam.

Dr. Terman is survived by his wife Sigrid, his son Christopher and wife Debbie, his son Mark and wife Susan, and his four grandchildren, Gail, Noam, Stacey, and Mikhail. Donations in his memory can be made to Ric Terman's EAGER Grant Program at the Geological Society of America Foundation (<https://gsafweb.org/>).



HIGHLIGHTS FOR THE YEAR 2018

70th CCOP Steering Committee Meeting

The 70th CCOP Steering Committee (SC) Meeting was held at Crowne Plaza Hotel, Vientiane, Lao PDR. The Meeting was attended by delegates of the following Member Countries (MC): CAMBODIA, CHINA, INDONESIA, JAPAN, REPUBLIC OF KOREA, LAO PDR, MALAYSIA, MYANMAR, PHILIPPINES, SINGAPORE, THAILAND, and VIETNAM. Also present were **Mr. Ioannis Abatzis** and **Dato' Yunus Abdul Razak**, Chairman and Vice-Chairman of the CCOP Advisory Group (AG), and the CCOPTS Director and his staff. A total of 65 delegates (24 from Lao PDR) attended the event.

Welcoming remarks were made by Mr. Keo Khamphavong, Permanent Representative of Lao PDR to CCOP, Director-General, Department of Geology and Minerals (DGM), Ministry of Energy and Mines, Lao PDR.

SC Chairmanship Hand-Over Ceremony

Dr. Joong-Ho Synn, CCOP SC Chairman for 2016-2017, officially handed over the chairmanship to **Datuk Shahar Effendi bin Abdullah Azizi**, Permanent Representative of Malaysia to CCOP, and Director General of the Department of Mineral and Geoscience Malaysia (JMG). **Datuk Shahar** delivered his remarks as SC Chairman from 1 January 2018 to 31 December 2019.



SC Chairmanship Hand-Over Ceremony at the 70th SC Meeting

His Excellency Dr. Sinava Souphanouvong, Vice-Minister of Energy and Mines, Lao PDR officially opened the 70th CCOP Steering Committee Meeting.

Dr. Kong Sitha of Cambodia and **Dr. Toshihiro Uchida** of Japan were elected as Rapporteurs.

CCOPTS Director **Dr. Adichat Surinkum** presented the CCOP Progress Report covering administrative and finance as well as the technical activities and publication during the period 1 January 2017 to 31 December 2017, with update on the first quarter of 2018.

The Meeting expressed appreciation and thanks to **Mr. Simplicio Caluyong**, CCOPTS Project Coordinator whose contract ended in December, as well as to **Dr. Kamaludin bin Hassan**, CCOPTS Regional Expert who resigned in December 2017, for their services rendered to CCOP.

The Meeting welcomed **Mr. Rudy Suhendar**, new Permanent Representative of Indonesia to CCOP and **Prof. Kerry Sieh**, new Permanent Representative of Singapore to CCOP.

The Meeting endorsed the Revised CCOP Workplan 2018 presented by the CCOP TS Director. **Mr. Ioannis Abatzis**, Facilitator of the 19th CCOP Select Finance Committee (SFC) Meeting presented the findings and recommendations of the SFC meeting. The Meeting accepted the report and recommendations of SFC with appreciation, and tasked the CCOPTS to take necessary actions in collaboration with the Member Countries.

CCOPTS Director presented the revised CCOP budget for 2018 which the Meeting endorsed as recommended by the 19th SFC Meeting.

On the Member Countries Annual Cash Contribution, the Representative of Singapore commented that he will exert efforts in forwarding Singapore's contribution starting from the amount of USD10,000 as invoiced by CCOPTS.

As soon as the Member Countries Annual Cash Contribution increases, CCOPTS Director will revise the CCOP Budget 2018 and will present its plan of using it in the next Steering Committee Meeting, in reference to the implementation of the CCOP Strategic Plan 2016-2020.

Delegation of Lao PDR expressed their commitment to forward their 2017 and 2018 cash contribution to CCOPTS soon.

Thailand Delegation informed the Meeting that they will host the 72nd CCOP Steering Committee Meeting in March 2019. They plan to hold it in the Southern Part of Thailand, either in Suratthani or Satun. The exact date and venue will be announced in the next Steering Committee Meeting in Busan, November 2018.

As to the hosting of the 55th CCOP Annual Session (2019) and the 73rd CCOP Steering Committee Meeting, Vietnam Delegation informed that Vietnam requires more time to confirm hosting in 2019, and added that it may be possible for Vietnam to host Annual Session in 2020 or later.

Indonesia Delegation informed the Meeting that they will host the 56th CCOP Annual Session and the 74th CCOP Steering Committee Meeting in November 2020.

CCOPTS Director updated the meeting on the progress of the recruitment of CCOPTS Regional Expert with the term 1 May 2018 to 30 April 2020. CCOPTS Director informed that CCOPTS received two nominations, **Dr. Dhiti Tulyatid** from Thailand on 16 January 2018 and **Mr. Simplicio P. Caluyong** from the Philippines on 31 January 2018. Nine Member Countries sent their votes to CCOPTS, and the majority votes go to **Dr. Dhiti Tulyatid** from Thailand.

The Meeting expressed congratulations to **Dr. Dhiti Tulyatid**, and welcomed him as the CCOPTS Regional Expert from 1 May 2018 until 30 April 2020.

CCOPTS Director updated the meeting of the Working Group members and Contact Persons for CCOP projects and activities - Country Editors, IGDP-II, MAMEA, CCOP Book Project: "Best Practices on Mine Rehabilitation and Decommissioning in CCOP Region", and GSi. He expressed thanks to the Member Countries who forwarded their nomination for each of these activities, and urged the Member Countries who have not yet forwarded their nomination to send it to the CCOPTS for the success of the implementation of these activities.

Japan Delegation announced that the Geological Survey of Japan (GSJ) starts a regular training course for young geological researchers and engineers in the CCOP Member Countries from 2018. This training course focuses on practical geological survey techniques, considering that accurate geological mapping is fundamental for natural resources development, environmental conservation, and mitigation of geological disasters. The first training course is scheduled on 26 June to 13 July 2018 at GSJ, Tsukuba, Japan.

Lao Delegation proposed four new projects for the consideration of the Meeting, (1) Groundwater Project, (2) Geoheritage Project, (3) Geohazards Project and (4) Mine Rehabilitation Project. In reply, CCOPTS Director informed that there are already ongoing activities for these projects.

Singapore Delegation informed the Meeting that Earth Observatory of Singapore (EOS) would consider responding to the Lao PDR's request for a geohazards project. Perhaps, EOS could offer field training in earthquake science in Northern Laos. This could be like what EOS has already been doing in Northern Thailand, and Central and Eastern Myanmar in the past two years.

Dr. Adichat Surinkum reminded the Member Countries on the timetable for the Election of CCOPTS Director (Term: 1 April 2019 - 31 March 2022).

Thailand Delegation expressed their view that the CCOP Select Finance Committee (SFC) has basically fulfilled their task in making sure that CCOPTS operate on a balanced budget. **Thailand Delegation** proposed that SFC tasks be extended to include strategic plan implementation. The Meeting agreed to take this into consideration in the next Steering Committee Meeting.

The Vice-Chair of CCOP Advisory Group (AG) shared that the SFC was formed based on the recommendation of the AG. Throughout the time, the SFC has improved its understanding of the financial aspect of the CCOPTS. The primary role of SFC is to provide financial oversight for the organization, typically in the areas of budgeting and financial planning, financial reporting and the creation and monitoring of internal controls and accountability policies.

The Meeting agreed on the proposal of Korea Delegation in changing the date of CCOP Annual Sessions to mid of November.

On the **Philippine Delegation's** proposal of increasing the maximum number of member country delegates' participation to Steering Committee Meetings, the Meeting decided to maintain the maximum country delegates participation to three (3) delegates. However, in special cases Member Countries can write a request letter to the SC Chairman stating the reasons of more than 3 country delegates participation.

Field trip to Vientiane Province and Vang Vieng District to visit geological sites was organized on the last day.



70th SC meeting delegates at Nam Ngum Dam, one of the stops during the field trip

54th CCOP Annual Session

The 54th Annual Session of the Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP) was held at the Haeundae Grand Hotel, Busan, Republic of Korea on 28 October – 1 November 2018. It was organized by the Korean Government through the Korea Institute of Geosciences and Mineral Resources (KIGAM), Ministry of Trade, Industry and Energy, Ministry of Science and ICT, National Research Council of Science & Technology, Busan Metropolitan City and other relevant Korean agencies with the CCOP Technical Secretariat (CCOPTS).

The Session was attended by representatives of the following Member Countries: CAMBODIA, CHINA, INDONESIA, JAPAN, REPUBLIC OF KOREA, LAO PDR, MALAYSIA, MYANMAR, PHILIPPINES, SINGAPORE, THAILAND and VIETNAM. MONGOLIA attended as an observer. From the Cooperating Countries, CANADA, DENMARK, FINLAND, FRANCE, GERMANY, THE NETHERLANDS, UNITED KINGDOM and UNITED STATES OF AMERICA were in attendance. From the Cooperating Organizations, IUGS, PETRAD, and Universiti Kebangsaan Malaysia (UKM) attended the session. Geological Society of Malaysia (GSM) attended as an observer organization. Also present at the Meeting were the Honorary Advisers of CCOP. The staff of the CCOP Technical Secretariat (CCOPTS) were also in attendance.

The welcome addresses were delivered by **Dr. Bok Chul Kim**, Permanent Representative of Korea to CCOP and President of Korea Institute of Geoscience and Mineral Resources (KIGAM), and **Mr. Hyun Min Jung**, Deputy Mayor of Busan Metropolitan City. Special messages were delivered by **Mr. Ioannis Abatzis**, Chairperson of the CCOP Advisory Group and Representative of Denmark to CCOP; and **Datuk Shahar Effendi Abdullah Azizi**, Chairperson of the CCOP Steering Committee, Permanent Representative of Malaysia to CCOP and Director General of the Department of Mineral and Geoscience Malaysia. **Dr. Kwang Yun Wohn**, Chairperson of National Research Council of Science and Technology (NST), officially opened the 54th CCOP Annual Session.



VIPs at the Opening Session of the 54th CCOP Annual Session. From left to right – **Dr. Adichat Surinkum**, **Ioannis Abatzis**, **Dr. Bok Chul Kim**, **Datuk Shahar Effendi Abdullah Azizi**, **Dr. Kwang Yun Wohn** & **Hyun Min Jung**

Dr. Adichat Surinkum, CCOPTS Director, summarized the Progress Report of CCOP including organizational changes (personnel), the current financial situation, technical activities and cooperation and support from Cooperating Countries and Organizations during the year 2017 with emphasis on the progress during January to June 2018.

The Delegation of Vietnam informed the Session that **Dr. Nguyen Van Nguyen**, Deputy Director General of the General Department of Geology and Minerals of Vietnam, MONRE has been appointed as the new Permanent Representative of Vietnam to CCOP. The CCOPTS Director requested that Vietnam sends an official letter to CCOPTS for this new appointment.



Delegates of the 54th CCOP Annual Session from CCOP Member Countries



Thematic Session at 54th Annual Session.



Cooperating Countries, Cooperating Organizations and Honorary Advisers



Permanent Representatives of Member Countries to CCOP, Representatives of Cooperating Countries, and CCOP Honorary Advisers joined KIGAM in its centennial celebration, highlighted with the British Geological Survey's turn-over of the first geological map of Korea to KIGAM.

The Session congratulated **Dr. Ye Myint Swe**, the Permanent Representative of Myanmar to CCOP, who has recently been appointed as Deputy Minister of Myanmar's Ministry of Natural Resources and Environmental Conservation (MONREC). **Dr. Ye Myint Swe** informed that with this current change, Myanmar will send an official notification letter to CCOP.

The Delegation of Mongolia coming as Observer at the 54th CCOP Annual Session introduced to the Session the Mineral Resources and Petroleum Authority of Mongolia (MRPAM) and its activities in the mineral and petroleum sectors. MRPAM is the main contact organization for CCOP. More information about MRPAM is available at <https://www.mrpam.gov.mn/>

Thematic Session

The Thematic Session of the 54th CCOP Annual Session, was held at the Haeundae Grand Hotel, Busan, the Republic of Korea. The Session was organized into four subthemes for oral presentation and one Poster session, including

1. Subtheme I: Geo-information and Geoheritage, Status & Future
2. Subtheme II: Geohazard Mitigation and Response: Active Fault, Earthquake, Tsunami, Volcano & Landslide
3. Subtheme III: Climate Change and Adaptation: CCUS, Groundwater, Coastal-hazard & Paleoclimate
4. Subtheme IV: Environment-Friendly and Smart Technology for Mineral and Energy Resources

For Oral Presentations, there are a number of people who help chairing the session as follow:

Subtheme	Chairperson, Position & Affiliation	Co-Chairperson, Position & Affiliation
I	Dr. Toshihiro Uchida Leader, International Coordination Group, Geological Survey of Japan, AIST	Dr. Saro Lee Principal Researcher, Geological Research Center Korea Institute of Geoscience and Mineral Resources (KIGAM)
II	Mr. Zamri Bin Ramli Principal Geoscience Officer Minerals and Geoscience Department Malaysia	Dr. Jung-ho Park Principal Researcher, Earthquake Research Center Korea Institute of Geoscience and Mineral Resources (KIGAM)
III	Dr. Shu Siqi Director of International Cooperation Division Department of Science & Technology & International Cooperation China Geological Survey (CGS)	Dr. Yongje Kim Principal Researcher, Groundwater & Ecohydrology Research Center Korea Institute of Geoscience and Mineral Resources (KIGAM)
IV	Dr. Shu Siqi Director of International Cooperation Division Department of Science & Technology & International Cooperation China Geological Survey (CGS)	Dr. Chul Ho Heo Principal Researcher, Mineral Resources Development Research Center Korea Institute of Geoscience and Mineral Resources (KIGAM)
V	Ms. Melita V. Obillo OIC Director Department of Energy, Energy Center, Philippines	Dr. Won Suk Lee Oil & Gas Research Center Korea Institute of Geoscience and Mineral Resources (KIGAM)

There were a total of 50 technical presentations presented at the Thematic Session (39 oral presentations and 11 poster presentations). For the oral presentations, each of the subthemes has a number of presentations as follow: Subtheme I = ten (10) presentations; Subtheme II = eight (8) presentations; Subtheme III = five (5) papers; and Subtheme IV = sixteen (16) papers.

Dr. Dhiti Tulyatid, Regional Expert, CCOP TS, facilitated the session, edited the abstracts of these technical papers and published them in the form of the Proceedings of the Thematic Session (Abstract Volume). KIGAM kindly printed this book and distributed to all participants).

Special Session for Centennial KIGAM

In celebration of KIGAM's 100 years anniversary, a special session with theme, "Shifting the Geoscience Paradigm", has been organized inviting leaders from the world's leading geoscience institutes to share their visions and goals.

71st CCOP Steering Committee Meeting

The 71st CCOP Steering Committee (SC) Meeting was held at Haeundae Grand Hotel, Busan, Republic of Korea on 2-3 November 2018. The Meeting was attended by delegates of the following Member Countries (MC): CAMBODIA, CHINA, INDONESIA, JAPAN, REPUBLIC OF KOREA, LAO PDR, MALAYSIA, MYANMAR, THAILAND, PHILIPPINES and VIETNAM. MONGOLIA and YES Network attended as Observers. Also present were **Dato' Yunus Abdul Razak**, Vice-Chair of the CCOP Advisory Group (AG), and the CCOPTS Director and his staff.



Delegates of the 71st CCOP Steering Committee Meeting, 2-3 Nov 2018, Busan, Republic of Korea

On behalf of the Permanent Representative of the Republic of Korea to CCOP, **Dr. Young Joo Lee**, Director of Global Cooperation Division, Korea Institute of Geoscience and Mineral Resources (KIGAM), delivered the welcoming remarks. **Datuk Shahar Effendi bin Abdullah Azizi**, Chairperson of the CCOP Steering Committee, Permanent Representative of Malaysia to CCOP and Director-General of Department of Mineral and Geoscience Malaysia, officially opened the 71st CCOP Steering Committee Meeting.

Signing Ceremony – Mongolia as new Member Country of CCOP

A signing ceremony to officially welcome Mongolia as CCOP Member Country was held. Representing Mongolia is **Ms. Sunjidmaa Byamba**, Head of Geological and Exploration Division, Mineral Resources and Petroleum Authority of Mongolia (MRPAM), and CCOP is **Datuk Shahar Effendi bin Abdullah Azizi**, Chairperson of the CCOP Steering Committee. It was witnessed by **Dr. Yusaku Yano**, Permanent Representative of Japan to CCOP, Director-General of the Geological Survey of Japan (GSJ) and **Dr. Adichat Surinkum**, CCOPTS Director.



The CCOPTS Director tabled the CCOP Progress Report covering the period 1 January to 30 June 2018. The report included the administration and personnel, finance, technical cooperation and project support, technical activities, fellowships and grants, publications and documentations.

All Member Countries are invited to the proposed Workshop for the CCOP Action Plan 2016-2020 Review, scheduled on 17-19 December 2018. In principle, the Meeting agreed to organize this workshop and requested Member Countries who cannot participate to email their relevant ideas for the CCOPTS to compile and table in the workshop.

The Meeting endorsed the CCOP Workplan 2019 presented by the CCOP TS Director. The China Delegation reiterated that the 3rd Workshop of IGDP Project Phase II will be held in China. However, they will exert efforts for the possibility of holding the workshop outside of China. They requested that CCOP consider organizing a geohazard workshop, possibly on landslides, next year in China. Representative of Myanmar suggested to include in the workplan short course training on methods of “Ore Reserve Estimation” for the consistency between Member Countries and international standards. At present situation, some countries accept Joint Ore Reserve Committee (JORC) code and some follow United Nation Framework Classification for Resources (UNFC), etc. The Representative of Myanmar’s idea is to follow the standard of internationally accepted ore reserve ranking/estimation method.

Dato’ Yunus Abdul Razak presented the findings and recommendations of the 20th SFC meeting. In accordance with the decision of the Steering Committee that every two years, two new members will be invited in the SFC, Malaysia and Vietnam volunteered to leave the SFC. Indonesia and Thailand volunteered to send representatives to the SFC, for the term 2019-2020 with China, Japan, Republic of Korea, and Philippines.

The CCOPTS Director presented the proposed CCOP budget for 2019 which the Meeting endorsed as recommended by the 20th SFC Meeting. By the acceptance of the Government of Indonesia, through the Ministry of the Foreign Affairs and with great efforts of the Permanent Representative of Indonesia to CCOP, Indonesia decided to increase its annual cash contribution from USD 40,000 to USD 55,000 starting year 2019.

Dato Yunus Abdul Razak presented the findings and recommendations of the CCOP Advisory Group’s Meeting held at the 54th CCOP Annual Session. On the schedule of the AG meeting during the CCOP Annual Session (AS), the Meeting agreed to schedule it in the afternoon, and SFC meeting in the morning, on the day before AS opening ceremony.

Next Steering Committee Meeting and Annual Sessions

Thailand Delegation informed the Meeting that Thailand is pleased to host the 72nd CCOP Steering Committee Meeting, planned to be held on 4-7 March 2019 in Suratthani Province of Thailand. Thailand Delegation acknowledged the issue of hosting the 55th Annual Session (55AS) and 73rd CCOP Steering Committee Meeting (73SC) in 2019, and realized the importance of continuation of CCOP family’s firm cooperation under the CCOP Annual Session mechanism. Thailand is pleased and honored to accept hosting the 55AS & 73SC. Due to the short notice, and considering that AS is a big event, there are many matters to look upon, such as budget, preparation and coordination among the partners. In principle, Thailand accepted hosting the 55AS & 73SC, and after sorting things out, Thailand will confirm and inform the SC Chairman and the CCOPTS immediately. For the 56th CCOP Annual Session and the 75th CCOP Steering Committee Meeting, Indonesia Delegation reiterated its offer of hosting it in year 2020. From year 2021, the following countries offered hosting AS.

- 2021, 57AS & 77SC – Vietnam
- 2022, 58AS & 79SC – Malaysia
- 2023, 59AS & 81SC – Lao PDR

MoU Signing between YES Network and CCOP

The Memorandum of Understanding (MoU) between The Young Earth Scientists (YES) Network and CCOP was signed at the meeting. Representing YES Network is its president, **Dr. Meng Wang** and **Dr. Adichat Surinkum** for CCOP. It was witnessed by **Datuk Shahar Effendi bin Abdullah Azizi**.

GSJ International Training Course for 2019

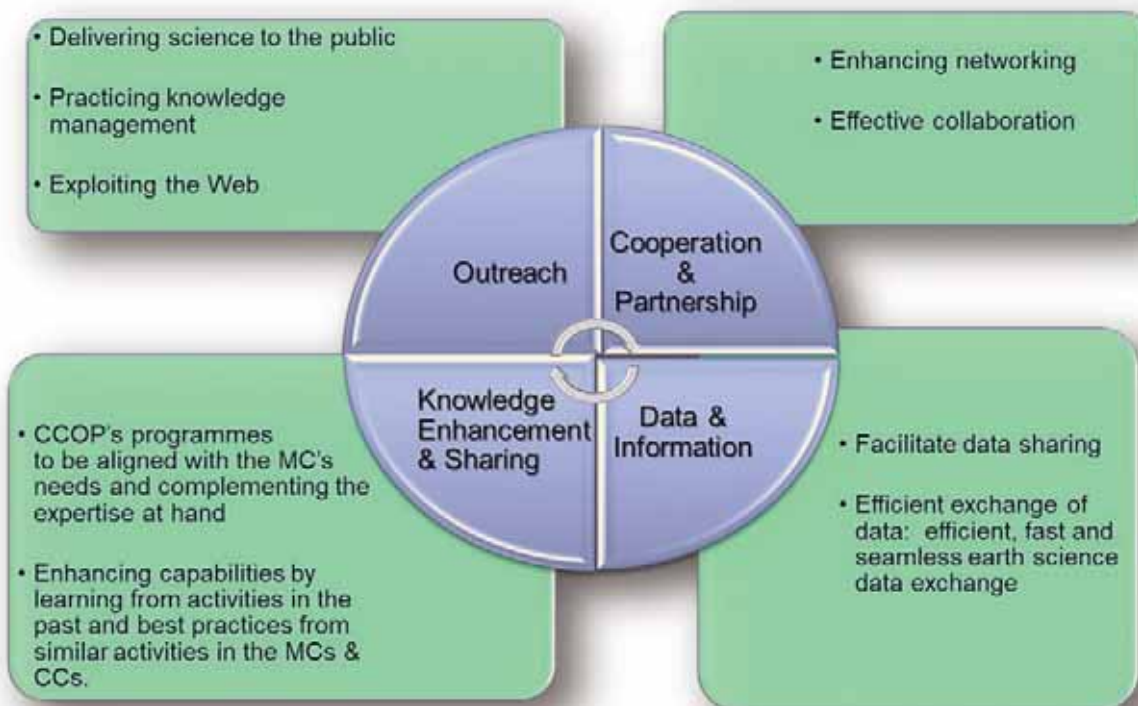
The Geological Survey of Japan (GSJ) announced that the GSJ International Training Course on Practical Geological Survey Techniques will be held on 4-21 June 2019 in GSJ, Tsukuba, Japan. One young geological researcher/engineer from each member country will be invited to join the course, except from China and Korea. The training course is free of charge, and GSJ will provide all participants economy return air-ticket and accommodation at GSJ Guest House.

TECHNICAL PROGRAMMES AND ACTIVITIES

In 2018, a total of 62 training/workshop activities were carried out and attended by 1,457 participants from the CCOP Member Countries. With strategic focus on capacity building, knowledge sharing and technology transfer; the workshops, training courses, symposiums, working group meetings and expert visits were conducted during the reporting period and Member Countries participation were highly appreciated.

Summary of CCOP Member Countries' Participation in Technical Activities

STRATEGIC GOAL	NO. OF ACTIVITIES	NO. OF PARTICIPANTS
Outreach	9	107
Cooperation & Partnership	21	459
KES	27	773
Data & Information	5	118
TOTAL	62	1,457



CCOP Strategic Plan for 2016-2020 was approved by the 65th SC Meeting, Xian, China, 28-29 Nov 2015

OUTREACH

In 2018, the outreach initiatives carried out include attending technical meetings, giving lectures, discussions and telephone conferences. The activities are reported in accordance to the 2018 CCOP Workplan.

Third International Congress on Geology, Resources and Geohazards of Myanmar (GEOMYANMAR 2018)

Myanmar Geosciences Society organized the Third International Congress on Geology, Resources, Geo-hazards of Myanmar and Surrounding regions, GEOMYANMAR2018, during 31 January to 2 February 2018 in Yangon, Myanmar. The first one was organized in 2012. GEOMYANMAR 2018 is intended to expand participation from geoscience communities from SE Asia and worldwide to open a new chapter of collaboration among international geological institutions. More than 400 geoscientists from over 12 countries attended this conference. CCOPTS Director was invited to give a presentation on “Roles of CCOP on Promoting the Geoscience Cooperation in Southeast Asia. The presentation provided the information on how CCOP was established and what are her current strategic plans. It was also included with the 2018 action plan where all Member Countries, including Myanmar, are involved on both leading and supporting roles. CCOPTS Director also attended the discussion with **Dr.Thet Tin Nyunt** of Department of Geology, Yangon University on the CCOP Higher Education Program and with **Dr. Myint Soe**, of the Department of Geological Survey and Mineral Exploration (DGSE), Myanmar on the Geo-site evaluation program for Aspiring Geo-park of Myanmar for further collaboration.

ASEAN NEXT 2018 on Landslide Realtime Monitoring System

National Electronics and Computer Technology Center (NECTEC) of Thailand organized a workshop on “Landslide Preparedness in the ASEAN Member States: A data Fusion Approach to Real-Time monitoring System and Information management” during 21-22 March 2018 as part of ASEAN NEXT 2018. The workshop aims to strengthen strategic collaboration among academia, research institutions, and network of excellence in ASEAN. ASEAN Committee of Science and Technology (COST) endorsed this project in 2017 and funded through ASEAN Science, Technology and Innovation (ASTIF). CCOPTS Director was invited to be the Advisor of the project. After a discussion, the Group decided to have Ban Mong Doi Pui in Chiang Mai Province as the study site. The Thai government also provided an addition fund for capacity building topic on this project. The output of this project is expected to be shared through CCOP GSi project too.

DMR-CCOP Regional Geoheritage Conference 2018 “Geoheritage for People”

CCOP co-organized the Third Regional Geo-heritage Conference with the Department of Mineral Resources Thailand and the National Geopark Committee of Thailand during 2-4 April in Khon Kaen Province. The main objective is to improve the most active role of geologists in utilization of geo-heritage in the form of geo-tourism and public education. More than 80 geoscientists from CCOP MCs, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand and Vietnam, made their presentations on both the best practice and the progress on their study areas. CCOPTS Director also provided information on the capacity building for geoscientists and local administration staff on geo-heritage management both as on the job trainings and intensive courses in Japan Korea and China. There was a special field trip on the 4th April, where all participants visited the dinosaur excavation sites both as the on-site museum, geo-heritage sites and the current study sites. The CCOP/ASEAN Geo-heritage Network was established with an agreement among the participants. CCOPTS was asked to facilitate the scope and action plan of 2018 first. The proposed network and action plan for 2019-2020 will be discussed during the 71st CCOP Steering Committee Meeting in Busan, November 2018.

RFG 2018: Resources for Future Generations

Resources for Future Generations or RFG 2018 Conference was organized during 16-21 June at the Vancouver Convention Center, Canada. This is the premier international conference on Energy, Minerals, Water and the Earth where more than 1,000 participants attended the 6-day conference and 4-day seminar. There are also other topics related to education on geo-resources management both on the pre-university and post-university levels. CCOPTS Director made a presentation on the topic of “CCOP Transboundary Geoscience Programs in Southeast Asia” in the Resources and Society Session. Other bi-lateral meetings with representatives from IUGS (Geo-information), BGS (Urban Geology), BGR (Geothermal), KIGAM (Unconventional Energy), EGS (Intermin) and Canadian Geological Survey (Higher Education) were also organized during the seminar. Future collaborations were also discussed between CCOPTS Director and Young Earth Scientist (YES) Network.

45th IAH Congress - GROUNDWATER AND LIFE: Science and Technology into Action

CCOPTS Director was invited to participate in IAH 2018 Conference as a session chairman and a member of scientific committee, during 9-14 September in Daejeon, Republic of Korea. Theme of the conference is Groundwater and Life, where more than 1,000 hydrogeologists attended. A young geo-hydrogeologist from Vietnam who made a presentation in this conference was supported by CCOPTS for her registration fee. During his participation, CCOPTS Director had discussions with experts from Vietnam, Cambodia, China and Japan on the cooperation on the study on Arsenic contamination in Groundwater along the Lower Mekong Basin. The project proposal will be proposed to seek a support from Belt and Road scientific research fund of China.

10th Jeju Water World Forum

During the 10th Jeju World Water Forum on 10-11 October, Jeju Provincial Development Cooperation (JPDC) by CEO **Kyong-Soo Oh** and CCOPTS Director signed a MoU on the Water Resources Management program in Asia Pacific for 2019-2022. CCOPTS Director also made a presentation on International Cooperation Preventing Water Dispute in the Indochina Peninsular. He later participated in two panel discussions, Global Solution for Sustainable Water Management and Global Cooperation for Sustainable Water management. CCOP and JPDC agreed on the cooperation focused on the interaction between groundwater and surface-water in the islands located in Southeast Asia during the first period of their cooperation program.

Workshop on Revised CCOP Action Plan

With the approval from 71st SC Meeting in Busan, representatives from 5 CCOP MCs and CCOPTS attended the Revised Action Plan meeting in CCOPTS office during 17-19 December. Firstly, the meeting discussed on what CCOP had already achieved during 2016-2018. Secondly, the meeting summarized the new initiatives together with UN SDGs, Sendai Framework on geoscience and climate change. Finally, the meeting drafted the 2019-2020 revised work plan aligned with both the 2016-2020 Strategic Plan and CCOP MCs and CCs initiatives. The drafted revised CCOP work plan of 2019-2020 will be provided to CCOP MCs for more comments and then presented for more comments for approval during the 72nd SC Meeting during 5-7 March 2019. During the discussion on 18th December, the workshop on World Bank Small Scale Mining was finalized to be on 4 March as a final output of the project started in 2013.



WEB-GIS

Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project

The Japanese-funded CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project scheduled for 2015 – 2019, aims to develop new geoinformation integration and sharing system using international standards and free and open-source software among CCOP countries.

The 3rd CCOP GSi International Workshop was co-funded by the Geological Survey of Japan, AIST and the Department of Mineral and Geoscience Malaysia (JMG), the Third International Workshop of the CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project was held on 18-20 September 2018 at Aseania Resort Langkawi, Malaysia. Thirty-four (34) participants from the member countries (Cambodia, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam) including the staff of the CCOP Technical Secretariat (CCOP TS) attended the workshop.

Dr. Adichat Surinkum, CCOPTS Director welcomed all the participants to the workshop. **Datuk Shahar Effendi bin Abdullah Azizi**, Director-General of the Department of Mineral and Geoscience Malaysia (JMG), Permanent Representative of Malaysia to CCOP & Chairman of the CCOP Steering Committee, officially opened the workshop, and declared the GSi Web Portals opened to the public.



GSi Main Portal, <https://ccop-gsi.org/main/>

GSi Main Portal

<https://ccop-gsi.org/main/>

Cambodia, General Department of Mineral Resources (GDMR)

<https://ccop-gsi.org/gsi/cambodiawebgisportal/>

Indonesia, Geological Agency, Center for Mineral, Coal, and Geothermal Resources

<https://ccop-gsi.org/gsi/idn/>

Japan, Geological Survey of Japan (GSJ)

https://ccop-gsi.org/gsi/gsj_webgis/

Korea, Korea Institute of Geoscience and Mineral Resources (KIGAM)

<https://ccop-gsi.org/gsi/kigam1000/>

Lao PDR, Department of Geology and Minerals (DGM)

<https://ccop-gsi.org/gsi/Lao/>

Malaysia, Department of Mineral and Geoscience (JMG)

https://ccop-gsi.org/gsi/mys_ccopgsi_portal/

Myanmar, Department of Geological Survey and Mineral Exploration

<https://ccop-gsi.org/gsi/zawmin/>

Papua New Guinea, Mineral Resources Authority (MRA)

<https://ccop-gsi.org/gsi/pngwebgisportal/>

Philippines,
Mine and Geoscience Bureau (MGB)
Philippine Institute of Volcanology and Seismology (PHIVOLCS)

https://ccop-gsi.org/gsi/phl_mgb/

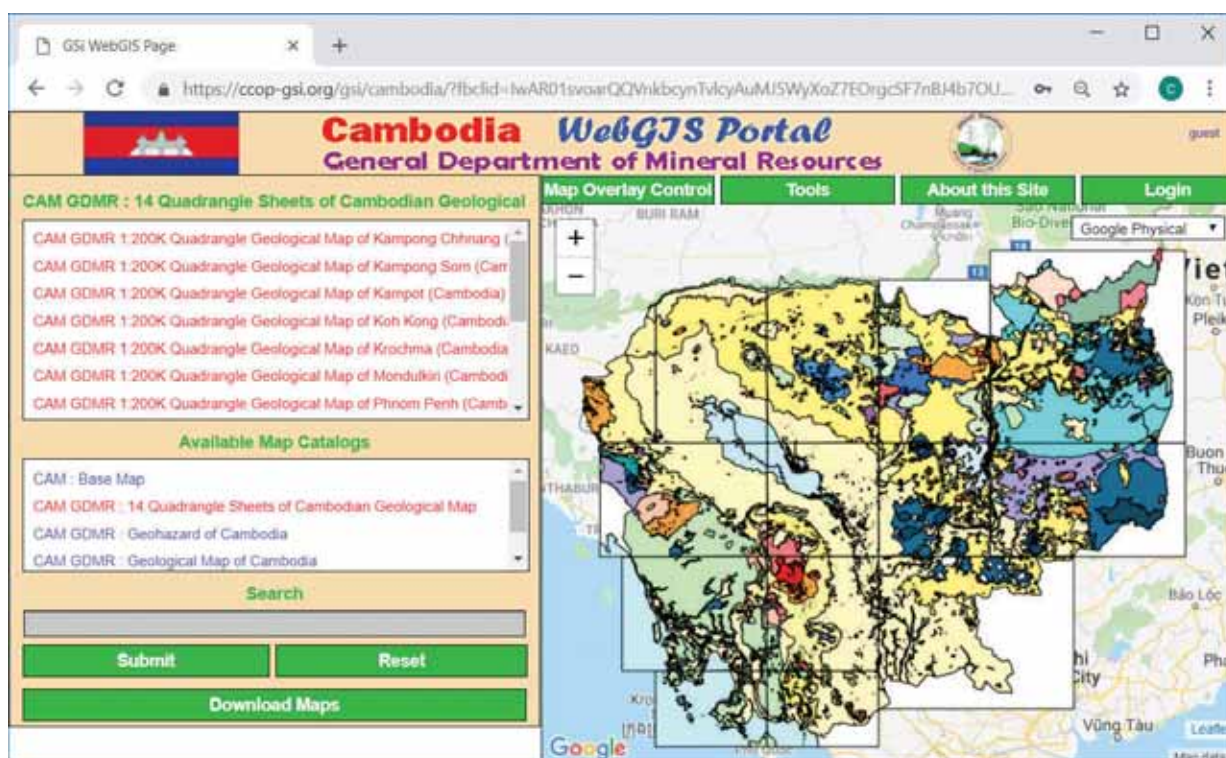
<https://ccop-gsi.org/gsi/phivolcs/>

Thailand, Department of Mineral Resources (DMR)

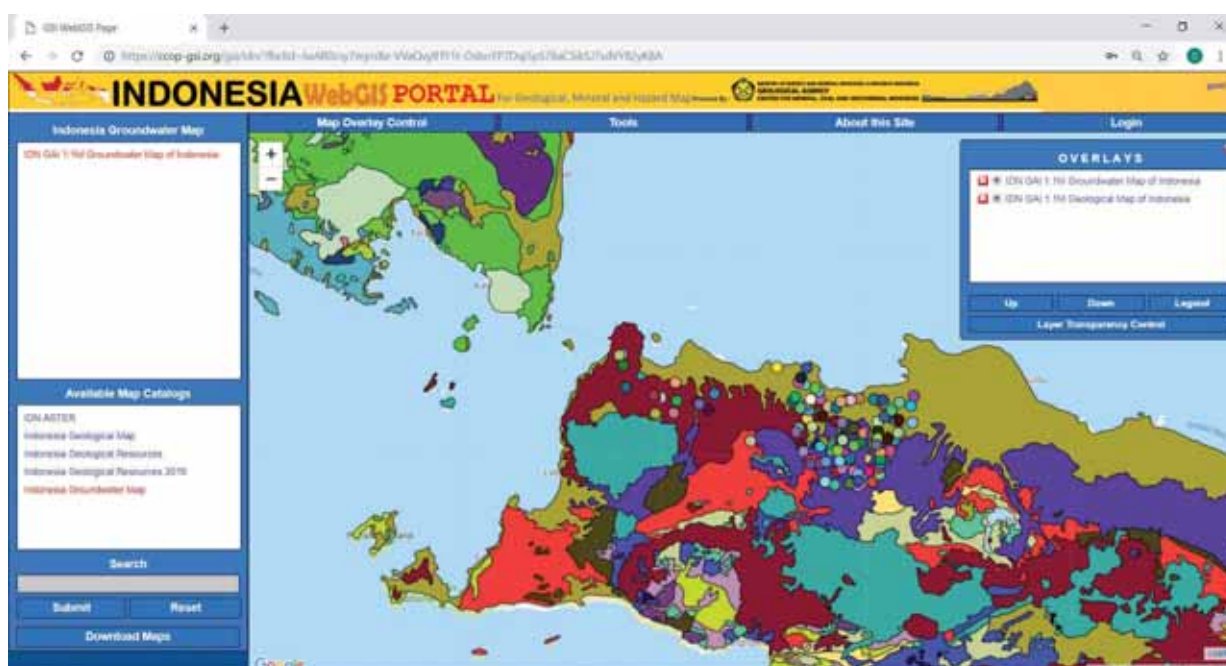
<https://ccop-gsi.org/gsi/thailand/>

Vietnam, General Department of Geology and Minerals of Vietnam (GDGMV)

<https://ccop-gsi.org/gsi/vietnam/>



Cambodia GSi Web Portal, <https://ccop-gsi.org/gsi/cambodiawebgisportal/>



Indonesia GSi Web Portal, <https://ccop-gsi.org/gsi/idn/>

PUBLICATIONS

Proceedings of the 53rd CCOP Annual Session “Geoscience for the Society”

This is the proceedings of the Thematic Session, “The Role of Geoscience in Safeguarding Our Environment” held at the 53rd CCOP Annual Session on 17 -18 October 2017, Cebu City, The Philippines. The proceedings book contains 27 full papers presented at the session, from Member and Cooperating Countries of CCOP. The 223-page publication is available both electronically and in printed book. Its 11MB PDF file can be downloaded from this link, <http://www.ccop.asia/download/as/53as2.pdf>.

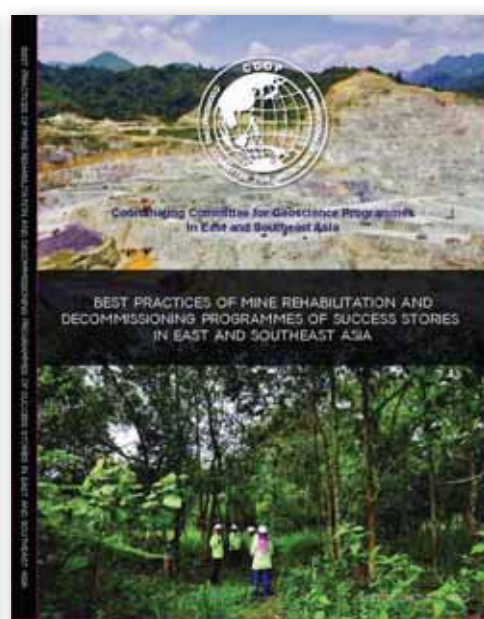
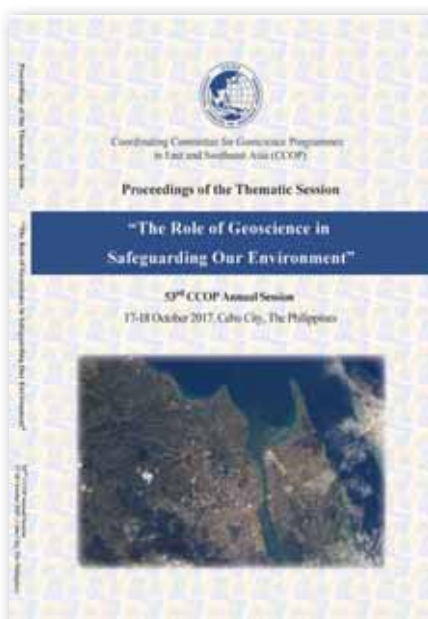
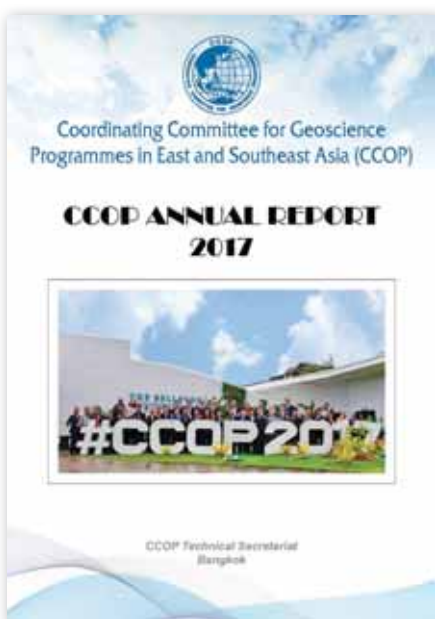
CCOP Annual Report 2017

The CCOP Annual Report for 2017 is now available both in printed and digital formats. The report summarizes the projects and activities carried out during the year 2017, the financial standing and more. It is of 60 colored pages. Its digital file with about 2.5MB size can be downloaded from this link, <http://www.ccop.asia/download/CCOP-AR2017.pdf>

GW-7: Report of the CCOP-GSJ-GAI Groundwater Phase III Project Meeting (GW-7) held on 21-23 March 2017 in Bali, Indonesia has been published, and uploaded to the CCOP website, <http://ccop.asia/pdf/publication/GW-7.pdf>.

CCOP Book, “Best Practices on Mine Rehabilitation and Decommissioning Plan in CCOP Region”

The CCOP’s book project on “Best Practices of Mine Rehabilitation and Decommissioning Programmes of Success Stories in East and Southeast Asia” was originally proposed by the Mines and Geosciences Bureau, Republic of the Philippines in 2013. The book is a compilation of CCOP Member Countries’ contributions on their successful case studies of how the mining companies have taken their efforts to maintain and protect the environment and the mining locations. China Geological Survey has supported for printing 300 copies of this book and was distributed to representatives of Member Countries, Cooperating Countries and Organizations in the 54th CCOP Annual Session held during 28 October – 1 November 2018 in Busan, the Republic of Korea. With 194 pages in color, this is available both in printed and electronic formats. It’s PDF format in about 7.5 MB file size can be freely downloaded from this link, <http://ccop.asia/download/2018/MineRehabBk-CCOP201810.pdf>.



COOPERATION AND PARTNERSHIP

In the year 2018, CCOP continued to collaborate with its MCs, CCs and COs to implement the planned activities and adopt activities in new areas of concern. Outreach activities have continuously been developed, thanks to generous support by funding agencies and in-kind contribution by member countries, to optimize the benefits of the partly sponsored programmes. The table below summarizes the cooperation and activities of the Member countries, Cooperating Countries and Cooperating Organizations.

Summary of CCOP Technical Activities with Member Countries, and Cooperating Countries & Organizations in 2018

COUNTRY	CCOP TECHNICAL ACTIVITIES
1) Member Countries	
Cambodia	<p>Geological Department, General Department of Mineral Resources (GDMR), Ministry of Mines and Energy (MME) hosted and co-organized the GSJ Groundwater Project Phase III Meeting, 5-7 March 2018, Siem Reap.</p>
China	<p>China Geological Survey (CGS) support financially and technically the following activity:</p> <ol style="list-style-type: none"> i. The 3rd Workshop & Training Courses on Capacity Building on Marine Geoscience and Geohazards Reduction & Prevention for ASEAN Member States, 15-21 July 2018, Guangzhou, China ii. IGDP Phase II: The 2nd Workshop of CCOP/ASEAN Integrated Geoscience Data Processing and Geophysical Compilation, 17-19 July 2018, Guangzhou, China iii. CGS supported for printing 300 copies of the CCOP Coffee Table Book, "Best Practices on Mine Rehabilitation and Decommissioning Plan in CCOP Region" <p>China organised:</p> <ol style="list-style-type: none"> i. 9th China-ASEAN Mining Cooperation Forum & Exhibition 2018, 14-18 November 2018, Nanning, China ii. Energy China Forum 2018: 8th Asia-Pacific Shale Gas Summit, 17-19 October 2018, Shanghai, China iii. Energy China Forum 2018 Asia-Pacific LNG & Gas Utilization Seminar, 18-19 October 2018, Shanghai, China
Japan	<p>GSJ support financially and technically the following activities:</p> <ol style="list-style-type: none"> i. Groundwater Project Phase III Meeting, 5-7 March 2018, Siem Reap, Cambodia ii. CCOP-GSJ Groundwater Sub-project: Installation of GSHP systems iii. GSJ International Training Course on Practical Geological Survey Techniques 2018 - application to geological disaster mitigation iv. The 3rd GSi International Workshop, 19-21 September 2018, Langkawi, Malaysia. v. CCOP-IUGS Task Group on Geohazards (TGG) Joint Seminar in conjunction with 54th CCOP Annual Session (AS) and 71st Steering Committee Meeting, 30 October 2018, Busan, Republic of Korea. vi. GSi Project Meeting, 30 October 2018, Busan, Republic of Korea. vii. High Education Support Network in CCOP region
Republic of Korea	<p>KIGAM support financially and technically the following projects:</p> <ol style="list-style-type: none"> i. Unconventional Oil and Gas Resources Project: Assessment of Shale Energy Resources in Asia (UnCon Project Phase II) National Coordinators Meeting and Workshop <ol style="list-style-type: none"> a. CCOP – KIGAM UnCon10, 24-26 April 2018, Bangkok, Thailand b. CCOP – KIGAM UnCon11, 10-12 July 2018, Chongqing, China c. CCOP – KIGAM-KNOC UnCon12, 2-4 October 2018, Kota Kinabalu, Malaysia

COUNTRY	CCOP TECHNICAL ACTIVITIES
Republic of Korea	<ul style="list-style-type: none"> ii. “Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin: Application to Transboundary Aquifer Management” • CCOP – KIGAM Groundwater Project Workshop, 11-13 June 2018, Vientiane, Lao PDR • CCOP-KIGAM-DGM on Groundwater Training Course for Lao PDR, 6-10 November 2018, Vientiane, Lao PDR • Diver Installation on Groundwater Monitoring System, 20-21 December 2018, Vientiane Lao PDR <p>KIGAM and IS-Geo continued to support and organize training courses:</p> <ul style="list-style-type: none"> i. Regular Training Course on Unconventional Oil & Gas Hydrate, 22 January - 9 February 2018, Daejeon, Republic of Korea ii. Regular Training Course on Exploration, Development and Processing of Mineral Resources, 9 – 29 April 2018, Daejeon, Republic of Korea iii. IS-Geo Training Course on Urban Geohazards and Landslides, 25 June to 13 July, Daejeon, Republic of Korea iv. Regular Training Course on Groundwater, 27 August - 14 September 2018, Daejeon, Republic of Korea v. Regular Training Course on Geopark, 5 -9 November 2018, Daejeon, Republic of Korea vi. Republic of Korea hosted 54th CCOP Annual Session and 71st CCOP Steering Committee Meeting, 29 October to 3 November 2018, Busan, Republic of Korea
Lao-PDR	<p>Lao PDR hosted the 70th CCOP Steering Committee Meeting, 14-16 March 2018, Vientiane.</p> <p>Lao PDR through the Department of Mines hosted BGR-CCOP Workshop 'Mine Closure Legal Framework in ASEAN Member States', 8-10 May 2018, Vientiane.</p> <p>Through the Department of Geology and Minerals, Lao PDR hosted</p> <ul style="list-style-type: none"> • CCOP-KIGAM-UNESCO-DGM Workshop “Transboundary aquifer-surface water management in Mekong Basin (Phase II), 11-12 June 2018, Vientiane. • CCOP-GST Workshop and on-the-job training course on Geohazards and Geosite on 26 July to 1 August 2018 in Southern area of Lao PDR • CCOP-KIGAM-DGM Training Course on Groundwater training, 6-10 October 2018, Vientiane, Lao PDR • Diver Installation on Groundwater Monitoring System, 20-21 December 2018, Vientiane, Lao PDR
Malaysia	<p>Co-funded by the Geological Survey of Japan, AIST and the Department of Mineral and Geoscience Malaysia (JMG), the Third International Workshop of the CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project was held on 18-20 September 2018 at Aseania Resort Langkawi, Malaysia.</p> <p>Malaysia, thru UKM and CCOP, hosted:</p> <ul style="list-style-type: none"> i. Malaysia Window to Cambridge at UKM (MW2C@UKM), Training Workshop on Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment, Kuala Lumpur, Malaysia, 28-29 June 2018 ii. Malaysia Window to Cambridge at UKM (MW2C@UKM), Workshop on Geohazards and Disaster Risk Reduction on 19-20 September 2018, Penang, Malaysia
Myanmar	<p>Myanmar Geosciences Society invited CCOPTS to participate the Third International Congress on Geology, Resources and Geohazards of Myanmar (GEOMYANMAR 2018), 31 January to 2 February 2018 in Yangon, Myanmar.</p>

COUNTRY/ ORGANIZATION	CCOP TECHNICAL ACTIVITIES
Thailand	<p>DMR hosted the following:</p> <ol style="list-style-type: none"> i. CCOP- DMR Special Talk on "World Bank Funded Mineral Exploration Project in Lao PDR", 9 February 2018, DMR Conference room, Thailand ii. DMR-CCOP Regional Geoh heritage Conference 2018 "Geoh heritage for People" on 2018, 2-4 April 2018, Khon Kaen, Thailand iii. GEOTHAI'2018 Conference in Bangkok, Thailand. The conference theme is "Being Together Preparing for Future Geohazards" on 29-31 August 2018 at the Bekeley Hotel, Pratunam, Bangkok. iv. DMR and Geological Society of Thailand (GST) co-organized the Seminar on Jurassic, 201-145 Million Years on 25 October at the main meeting room of DMR. <p>Thailand invited CCOPTS to participate the following activities:</p> <ol style="list-style-type: none"> i. DMR 4.0 on Mineral Exploration, 17-20 February 2018, Bangkok ii. Petroleum Geoscience Forum, 23 February 2018, Bangkok iii. ASEAN NEXT 2018 on Landslide Realtime Monitoring System, 21 – 22 March 2018, ChiangMai & Bangkok <p>DMR continues to support the siting of the Permanent Office Building for CCOPTS in DMR Complex, Bangkok, Thailand.</p>
Vietnam	<p>Vietnam invited CCOPTS to participate the Vietnam International Water Week-VACI2018, 4-8 March, Hanoi.</p> <p>Vietnam hosted the following activity:</p> <ol style="list-style-type: none"> i. 10th GeoSEA Conference, partly supported by CCOP, in Hanoi, Vietnam during 16-20 October.

2) Cooperating Countries

Belgium	Belgium hosted the INTERMIN Project Kick Off Meeting 13 - 15 February 2018, Brussels.
Germany	<p>BGR financially and technically support the Workshop 'Mine Closure Legal Framework in ASEAN Member States', scheduled on 8-10 May 2018, Vientiane, Lao PDR.</p> <p>BGR financially and technically support training courses on "Risk-Sensitive Spatial Planning in CCOP Member Countries"</p> <p>3rd BGR-CCOP International Training Course on Risk-Sensitive Spatial Planning for CCOP Member Countries, 12 – 22 November 2018, Hanoi, Vietnam</p>

3) Cooperating Organizations

EGS	EuroGeoSurveys or The Geological Surveys of Europe has initiated the participation of CCOP in the European Commission "International Network of Raw Materials Training Centres" (Intermin) Project.
UKM	<p>UKM and CCOP, organized:</p> <ol style="list-style-type: none"> i. Malaysia Window to Cambridge at UKM (MW2C@UKM), Training Workshop on Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment, Kuala Lumpur, Malaysia, 28-29 June 2018 ii. Malaysia Window to Cambridge at UKM (MW2C@UKM), Workshop on Geohazards and Disaster Risk Reduction on 19-20 September 2018, Penang, Malaysia

COUNTRY/ ORGANIZATION

CCOP TECHNICAL ACTIVITIES

ESCAP

Second Asian and Pacific Energy Forum organized by ESCAP in the UN office in Bangkok during 3-5 April, 2018. CCOPTS Director was invited to attend this ESCAP Energy Forum but did not provide a country report as of the other delegations. The forum discussed on various topics both accessibility of electricity on demand side and renewable on a supply chain. Promotion on clean use of coal and natural gas are also one of the main issues of the proposal made by many countries. CCOPTS, based on the output of the forum, will promote more capacity building and knowledge sharing in CCOP MCs through all related energy activities and report back to ESCAP annually.

The Third Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific was held on 10 October 2018, at the Conference Room 2, UNCC, Bangkok, Thailand.

Dr. Dhiti Tulyatid, Regional Expert, represented CCOP as one of the Intergovernmental Organization to attend the Meeting.

UNESCO

UNESCO-Bangkok, KIGAM, and CCOPTS formulated the proposal on groundwater project “Groundwater-surface water interaction and comparative study of groundwater dependent ecosystems in the Mekong basin: application to transboundary aquifer management” phase II.

WORLD BANK

CCOPTS plan to use the remaining World Bank budget from CASM Workshop for GSJ-Myanmar Water Simulation Workshop and CCOP-Philippines Mine Rehabilitation Book Project scheduled in 2018.

European Commission “International Network of Raw Materials Training Centres” (Intermin) Project

CCOPTS was invited by EuroGeoSurveys (EGS), The Geological Surveys of Europe, and had successfully registered itself as one of the 14 partners of the Intermin project. The project, acronym “Intermin”, aims at mapping skills and knowledge in the EU and leading counterparts in third countries, identify key knowledge gaps and emerging needs, develop roadmap for improving skills and knowledge, as well as establish common training programmes in the raw materials sectors. The project coordinator is **Professor Manuel Regueiro y González-Barros** from the Geological Survey of Spain. The project is proposed to run for 3 years with estimated budget of about €1.266 million, whereby CCOP is allocated about €30.4k.



Participants at the Intermin Kick-off meeting in Brussels, Belgium, 13-14 February 2018

CCOPTS Director was invited to attend the kick-off meeting on the Intermin project in Brussels, Belgium during 13-14 February 2018. The meeting focused on the Financial Consortium Agreement and the work plan for the total 36 months of the project. CCOPTS Director, the representative of CCOP as a partner of this project, made a presentation on how CCOP has been doing with the MCs on similar activities. Most of the participants, from many international geoscience organizations around the world, also shared their ideas on how to work on this project. During the meeting, CCOPTS Director and General Secretary of EGS made a discussion on how to work on a specific geoscience program together from 2018-2020, in which be aligned with both CCOP and EGS work plan.

DMR Mineral Exploration Program 4.0

DMR Mineral Exploration Program 4.0 was organized by Department of Mineral Resources during the 2018 Fiscal year for many minerals needed by the future market. Quartz for Solar Cell exploration is focused in the Phetburi area, western Thailand. CCOPTS Director was invited to discuss with exploration team of DMR in the survey area during 17-20 February 2018. The areas were selected from the remote sensing interpretation first and then follow-up by the detailed mapping. Resistivity survey covering the target areas are on the way. However, the survey layout and the configuration are quite important in order to get 3D models because the survey areas are quite rugged. CCOPTS Director shared the experiences from the previous survey with similar condition to DMR team. Some recommended techniques will be applied both for the optimum output and the further research activities.

Petroleum Geoscience Forum

PTT Exploration and Production Public Company Limited (PTTEP) and Department of Mineral Fuel of Thailand co-organized the Petroleum Geoscience Forum on Friday 23 February at the Centara Grand Hotel, Bangkok. The forum focused on the “Marginal Field Development in Thailand”, attended by the geoscientists and petroleum engineers from various agencies both private and government officer. CCOPTS Director was invited to comment on the further collaboration among Thai and the international geoscience organizations. The discussion led them to have an agreement on three key issues, supporting more young geoscientists from Thailand to participant in the International Forum organized by CCOP, facilitating the core study drilled from Sirikit Oil Field to CCOP MCs and inviting lecturer from CCOP MCs to present in the next Forum.

VACI2018

CCOPTS Director was invited to be one of the Organizing Committee of VACI2018, Vietnam International Water Week, held during 4-8 March 2018. CCOP is also one of the co-organizers of this event which has been organized annually in Hanoi, Vietnam. Almaz International Convention Center, east of Hanoi, is the venue where more than 500 participants attended. CCOPTS Director chaired the Groundwater Session during the afternoon of 4 March 2018. There are 11 presentations during that session made by geoscientists from Taiwan, France, Kazakhstan, Russia, Afghanistan and Vietnam. This session is aimed to provide an overall understanding of issues and challenges of groundwater management as well as review recent strategies and initiatives toward improved groundwater management beyond.

Meeting on New GSHP Project supported by JICA, 25 April 2018, Bangkok, Thailand

On track with the GSHP Sub-Project within framework of the on-going GSJ/AISTCCOP Groundwater Project Phase III, the activities in 2018 focus on developing the GSHP in Thailand and CCOP Member Countries with plan to install the pilot systems in suitable locations supported by JICA. In order to promote the project, **Dr. Youhei Uchida**, Groundwater Project Leader visit Thailand and have a meeting with representatives of Department of Mineral Resources (DMR), Department of Groundwater Resources (DGR), Chulalongkorn University and CCOP on 25 April 2018, at the CCOP Building, Bangkok, Thailand. The purpose of this is to discuss about future plan of New GSHP Project in Thailand supported by JICA under GSJ/AIST-CCOP Groundwater Project. AIST and Misawa Environmental Technology Company Limited (Company) had cooperated and send proposal to JICA for an approval by May 2018. The company will formulate the project with AIST under JICA agreement (Propose Golden Jubilee National Geological Museum/ Pathumthani, Thailand and Chulalongkorn University Campus). CCOP Technical Secretariat had facilitated to communicate with DGR, DMR, and Chulalongkorn University researcher for supporting letter for this proposal. The project output is; to reduce electricity consumption and CO2 emission, to have new experts on Ground Source Heat Pump / Renewable Energy Application and more on capacity building program for CCOP Member Countries.

ADB CCS Forum (as part of the Asia Clean Energy Forum, 4 - 8 June 2018)

Deep Dive workshop on Carbon Capture Utilization and Storage as a part of Asia Clean Energy Forum 2018 was organized in the ADB headquarter in Manila during 7-8 June. CCOP was invited to co-host with ADB on this workshop where CCOPTS Director was invited to participate as a panelist on various sessions, especially on opportunities for collaboration and next steps in the near and medium term. A rich mix of experts from the government, academia and industry are attended and case-studies from all stakeholders are also provided. Representatives from CCOP MCs: China, Japan Republic of Korea Indonesia and Thailand, are among 80 participants attended the 2-days workshop. The participants are agreed to have a network on this topic and will make more communications in order to share the updated information of CCUS. They also made a commitment to support Asian countries on the CCUS development through ADB fund.

The World Bank Mineral Exploration Seminar, 28 June 2018, Southern Lao PDR

On 28th June, the Department of Geology and Mineral of Lao PDR organized World Bank Mineral Exploration Seminar at Mercure Hotel, Vientiane, Lao PDR. The seminar focuses on the results of the World Bank funded project, first ever of this kind in Lao PDR on the mineral exploration using airborne geophysical survey. More than 30 participants, both from Department of Geology and Mineral of Lao PDR and Department of Mines attended this one-day seminar and had a discussion with the World Bank's expert. The discussion included not only the advanced geophysical techniques but also the on-line field mapping and report. CCOPTS Director was invited to give comments on the techniques and the output of the project. He also gave a talk on how to compare the training part of this project to other training courses in CCOP MCs and some in Europe. The meeting also agreed to make a new proposal for other areas in Lao PDR with a similar approach and requested CCOP to be one of the project coordinators.

The 8th Liaison Officials' Meeting of China-ASEAN Mining Cooperation Forum & Exhibition: 10-12 July 2018.

The meeting was held on 10 July 2018. **Mr. Lu Jingyu**, China-ASEAN Mining Cooperation Forum Secretariat, Guangxi Department of Land and Resources and **Dr. Sommai Techawan**, Deputy Director-general, delivered Opening Speeches and co-chaired the meeting. There are a total of 39 participants including 12 participants from China and 27 participants from ASEAN countries: Cambodia (1); Indonesia (1); Lao PDR (4); Malaysia (2); Myanmar (2); Philippines (1); Thailand (14); Vietnam (1); and CCOP TS (1: **Dr. Dhiti Tulyatid**, Regional Expert). The meeting briefed on the Introduction of 2018 CAMCF, the enrolment plan and course schedule of the 7th Training Program of CAMPETC; the co-building proposal of China-ASEAN Mining Information Service Platform and the proposed future work for 2018 on the "Silk Road Cooperation, Striving for Green Mining Development" to include: Green Mining Development Policy & Practice, Green Mining Enterprises Development, Mining Projects and Technical Cooperation, Development and Exploitation of Major Mineral Resources and China-ASEAN Geoscience Cooperation Mechanism.



Dr Dhiti Tulyatid, Regional Expert, CCOP TS, and **Mr Lu Jingyu**, China-ASEAN Mining Cooperation Forum Secretariat, Guangxi Department of Land and Resources, discussed on possible cooperation.

The Meeting and Field Study Visit on Jetty Construction and Management: 9-13 July 2018

The coastline of Terengganu in Malaysia is located in The Gulf of Thailand. The distance of Terengganu Coastline is far from Narathiwat Province approximately 150 kilometers. The group of officers from Department of Marine and Coastal Resources (DMCR) visited around Marang River in order to study and discuss on jetty design. The jetty was constructed in symmetry semi-circle pattern. From observation, there is erosion problem on the northern area of the jetty. This jetty was constructed for boat navigation and parking boat area that is similar to the objective to construct the jetty at Besut River. From field visiting in Terengganu, the DMCR team has a chance to exchange knowledge of jetty design and coastal management with Malaysia officers. Knowledge and experience from field visiting are very useful for DMCR officers to apply the knowledge for making coastal management plan in the future.



The 15th Malaysia-Thailand Border Joint Geological Survey Committee Meeting

CCOPTS Director was invited to join the excursion for Geo-site evaluation and Geo-hazard study area along Thai-Malaysia border line during 15-18 August. This is part of the Annual MT-JGSC meeting organized annually in Malaysia or Thailand by Mineral and Geosciences of Malaysia and Department of Mineral Resources of Thailand on geological study along the borderline of both countries. Geoscientist of both countries started to work together since 2000 and produced many scientific researches both national level and international level. This kind of project was then applied to be a model of bilateral geoscience project in many CCOP member countries, Indonesia and Malaysia, Lao PDR and Thailand, etc.

AAPG Geosciences Technology Workshop 2018

The AAPG Geosciences Technology Workshop 2018 “Back to the Future – the Past and Future of Oil and Gas Production in the Asia Pacific Region” was organized on 27 - 28 September 2018 at the Centara Grand Hotel, Bangkok, Thailand, as a collaboration between AAPG Asia Pacific Geosciences Technology Workshop and CCOP with attendance about 163 participants including participants from Thailand’s university and organization, Australia, Bangladesh, Brunei, Germany, Indonesia, Malaysia, Myanmar, Philippines, Qatar, Singapore, USA, and CCOP Technical Secretariat. The workshop brought together experts from around the Asia region and the world to discuss timely topics of interest related to characterization of Asian reservoirs including: Low Permeability Reservoirs, Clastic Reservoirs, Non-Clastic Reservoirs, and Enhanced Recovery technologies. It also provided the opportunity to learn and discuss the latest ideas and technologies applied to Asian petroleum reservoirs which can be utilized to explore for and develop these reservoirs. The workshop also provided a setting for networking and sharing of experiences with fellow petroleum scientists interested in developing and producing the hydrocarbon resources of Asia. The participants are mostly coming from the oil and gas companies & service companies operating in Thailand.

GEOSEA Conference

CCOPTS Director attended 10th GeoSEA Conference, partly supported by CCOP, in Hanoi, Vietnam during 16-20 October. The conference was organized by Geological Society of Vietnam and other geoscience organizations of Vietnam. More than 400 geoscientists attended two-day seminar and both pre-conference and post-conference excursions to various geo-sites in Vietnam. The conference was normally organized in a two-year time by non-government geoscience organization in SE Asia where 2020 event will be in Manila of Philippines. He also joined the post-conference excursion to Song Ma-Song La Ophiolite Suite in the Western part of Vietnam. This tectonic boundary is one of the key locations for the correlation on Transboundary geoscience program currently carried out in CCOP now.

Energy China Forum 2018: 8th Asia-Pacific Shale Gas Summit Energy China Forum 2018 Asia-Pacific LNG & Gas Utilization Seminar

Dr. Dhiti Tulyatid, Regional Expert, represented CCOP and gave a presentation titled “Progress on the Development of Unconventional Oil and Gas Development” at the Energy China Forum 2018. **Dr. Dhiti Tulyatid** was among the panelists on the Panel Discussion: Development of Global Unconventional Oil and Gas. After the presentation, **Dr. Dhiti Tulyatid** distributed packages of USB containing the “Map of Potentially Prospective Shale Energy Resource Basins in Asia” to those who are interested in the GIS package (A total of 14 packages). He also delivered a congratulation message on behalf of CCOP as one of the initiating organizations of the Tech Innovation Award 2018. During ECF2018: 2nd Asia-Pacific LNG & Gas Utilization Seminar. The seminar includes a number of presentations that informed participants about the gas Supply & Demand, the market, the project operation, etc.



Dr. Dhiti Tulyatid delivered a congratulation message and presented the award on behalf of CCOP as one of the initiating organizations of the Tech Innovation Award 2018

2018 (9th) China-ASEAN Mining Cooperation Forum & Exhibition. New Mining Technology, Mining Machinery & Gem Expo

Dr. Dhiti Tulyatid, Regional Expert, represented CCOP at the 2018 (9th) China-ASEAN Mining Cooperation Forum & Exhibition, New Mining Technology, Mining Machinery & Gem Expo.

The Opening Ceremony of the Forum Unveiling Ceremony of China-ASEAN Geoscience Cooperation Center was held at the Osmanthus Hall, District B of Nanning International Convention & Exhibition Center). Nanning, People's Republic of China. The exhibition took place at the Nanning International Convention & Exhibition Center.

Dr. Dhiti Tulyatid attended and gave a presentation on CCOP and the Success Stories on Mine Rehabilitation & Decommissioning Programmes in East and Southeast Asia at the Seminar on China-ASEAN Mining Green Development Policy and Practice (Meeting Hall 101, District D of Nanning International Convention & Exhibition Center). The presentation aims to promote the activities of CCOP and the CCOP's book, “Best Practices of Mine Rehabilitation and Decommissioning Programmes of Success Stories in East and Southeast Asia” that has been recently published. The seminar was sponsored by China Geological Survey; the organizer is the Chinese Academy of Land & Resources Economics. A total of fifteen (15) copies of the Mine Rehabilitation book were distributed through **Ms Katherine Wang**, Coordinator, China-ASEAN Mining Cooperation Forum Secretariat, Nanning, PR China.



Dr. Dhiti Tulyatid, attended and gave a presentation on “CCOP and the Success Stories on Mine Rehabilitation & Decommissioning Programmes in East and Southeast Asia”.

IGCP 608 “Cretaceous Ecosystems and Their Response to Paleo-environment Changes in Asia and the western Pacific”

During 12-16 November, Department of Mineral Resources (DMR) organized the ICGP 608 “Cretaceous Ecosystems and Their Response to Paleo-environment Changes in Asia and the western Pacific” in Khon Kaen, Thailand. There are 3-day pre-conference excursion for all participants to visit the type locations on Cretaceous Ecosystems in North-eastern Thailand both on the outcrops and museums. Participants also enjoyed the local cultural ways of life related directly to Cretaceous fossil found in their own area. During the 2-day seminar, more than twenty oral presentations were discussed and all agreed to work more on Jurassic/ Cretaceous boundary in SE Asia area. Expert working group from East and Southeast Asia on this already submitted the new IGCP proposal, for a follow-up project, in October for a more detailed study in this topic during 2019-2022.

Joint Workshop on Capacity Development focusing on Bottom-Up Approach for Regional Sustainable Development in Khorat Geopark

The Royal Thai Department of Mineral Resources organized a Workshop on “Capacity Development focusing on the Bottom-up Approach for Regional Sustainable Development in Khorat Geopark” during 18-23 November 2018 at De V Loft Hotel, Nakhon Ratchasima, Thailand. The organizers include the DMR, Japanese Geopark Network, Satun UNESCO Global Geopark and Khorat National Geopark. The programme of the workshop was attached with this summary report.

The meeting objectives: Capacity building for Khorat Geopark Network, including the communities and related offices within Geopark area in order to be ready for the international global geopark network. Total participants are 50, five (5) experts and resource person from the International Collaboration Working Group of JGN, Japan National Geopark UNESCO Global Geopark, APGN Advisory Committee Member, Evaluator for UNESCO Global Geoparks, Geopark Promotion Council and Global Geoparks Network Executive Board Member, Asia Pacific Geoparks Network Advisory Board Member, and many more people from Satun & Khorat Geoparks, and DMR. **Dr. Dhiti Tulyatid**, Regional Expert, CCOP; participated in the workshop as a resource person.

GC Landslide in Rayong

During 12-16 November, Department of Mineral Resources (DMR) organized the ICGP 608 “Cretaceous Ecosystems and Their Response to Paleo-environment Changes in Asia and the western Pacific” in Khon Kaen, Thailand. There are 3-day pre-conference excursion for all participants to visit the type locations on Cretaceous Ecosystems in North-eastern Thailand both on the outcrops and museums. Participants also enjoyed the local cultural ways of life related directly to Cretaceous fossil found in their own area. During the 2-day seminar, more than twenty oral presentations were discussed, and all agreed to work more on Jurassic/Cretaceous boundary in SE Asia area. Expert working group from East and Southeast Asia on this already submitted the new IGCP proposal, for a follow-up project, in October for a more detailed study in this topic during 2019-2022.

ASOMM+3

ASEAN and MGB of Philippines organized the 18th ASOMM in the Solaire Resort, Manila during 4-6 December. CCOPTS Director was invited to report on the progress of ASEAN-related activities supported by CCOP in 2016-2018. The presentation is also included with the updated on CCOP Capacity building on Mining and CCOP’s plan for ASEAN Mineral cooperation in 2019-2020. During this meeting, bi-lateral and multi-lateral cooperation on mineral resources under CCOP’s action plan were discussed among the participants from ASEAN Member States and representatives from China (CGS) Japan (GSJ) Korea (KIGAM) and USA (USGS). Representative of Brunei made a statement during the Meeting that Brunei will participate more in ASEAN/CCOP activities in 2019-2020. ASEAN Federation of Mining Association (AFMA) also interested to join CCOP activities. Both parties, CCOP and AFMA, agreed to have a meeting in Bangkok during the first quarter of 2019.

IGCP668: Equatorial Gondwanan History and Early Paleozoic Evolutionary Dynamics

Department of Mineral Resources together with UNESCO, IUGS, the Ministry of Natural Resources and Environment, Mineral Resources Research and Development Center, Coordinating Committee for Geoscience Programmes in East & Southeast Asia (CCOP) and Satun UNESCO Global Geopark has co-organized the IGCP668: Equatorial Gondwanan on History and Early Paleozoic Evolutionary Dynamics on 29-30 November 2018 at Asia Hotel, Bangkok, Thailand. During opening Ceremony, **Dr. Nigel C Hughes** delivered a Welcome Speech; **Dr. Sommai Techawan**, Director-General of the Department of Mineral Resources gave an Opening Address.

Dr. Dhiti Tulyatid, Regional Expert, CCOP, represented CCOP at the Opening Session and participated in the meeting. The meeting of IGCP668 had attracted attendees from 11 countries, 9 of which were non-OEGC nations and 5 were students. There were a total of 50 participants joined the meeting. Participants would also join a Post-meeting Excursion, Tarutao Island, Thailand during 1-5 December 2018.



A group photograph of participants to the IGCP668 Meeting, Bangkok, Thailand.

KNOWLEDGE ENHANCEMENT AND SHARING (KES)

Geo-Hazards Prediction and Mitigation

BGR-CCOP International Training Course on Risk-Sensitive Spatial Planning in CCOP Member Countries

The training course forms a collaborative project between CCOP and the Federal Institute for Geosciences and Natural Resources, Germany (BGR) for the CCOP Member Countries. The project was proposed by BGR and approved at the 66th CCOP Steering Committee meeting in Siem Reap, Cambodia in March 2016, with final approval from the Federal Ministry for Economic Cooperation and Development (BMZ), Germany on July 14, 2016. It is agreed that at least three training courses will be carried out in 2017-2018, each 13 days duration, in Thailand, Philippines and Vietnam.

The training course is funded by BMZ and is conducted by the two BGR experts **Dr. Dirk Balzer** and **Dr. Dirk Kuhn**. It is a capacity building measure on Disaster Risk Management (DRM) and Spatial Planning aimed for professionals in authority and related fields. It aims to support the requirements and future challenges of the Sendai Framework for Disaster Risk Reduction (SFDRR), strengthen disaster risk governance to manage Disaster Risk Reduction (DRR) and to promote the dialogue and cooperation among the relevant authorities and thereby support risk-sensitive spatial planning. The participants are given familiarization with the concepts and dimensions of disaster risk and are provided training in the elaboration of pre-disaster risk assessments from the Latin American Countries (El Salvador, Guatemala, Honduras, Nicaragua) and Pakistan, in order to build the knowledge on Disaster Risk Reduction (DRR).

The first training course was successfully carried out in Bangkok, Thailand during 20 February - 2 March 2017 and the second training course during 18 – 28 September 2017, Quezon City, Philippines both with fifteen participants from the CCOP Member Countries.

In 2018, the 3rd and last course under this project was conducted on 12 – 22 November in Hanoi, Vietnam in cooperation with the General Department of Geology and Minerals of Vietnam (GDGMV) and Vietnam Institute of Geosciences and Mineral Resources (VIGMR). There were fifteen participants from Member Countries – Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam.



Participants showing their certificates of completion at the end of the course, with CCOPTS and lecturers from BGR.

KIGAM's IS-Geo Training Course on Urban Management & Landslide and slope stability, 25 June - 13 July 2018, IS-Geo of KIGAM, Daejeon, Republic of Korea

Under the series of regular training courses provided by KIGAM/IS-Geo in collaboration with CCOP for Member Countries, the KIGAM/IS-Geo training course on Urban Management & Landslide and slope stability was conducted from 25 June to 13 July, 2018 in the International School for Geoscience Resources of KIGAM, Daejeon, Korea, with total 18 participants including 13 participants from CCOP Member Countries, 1 participant from Ecuador, 1 participant from Ethiopia, 1 participant from Fiji, 1 participant from Mongolia and 1 participant from CCOPTS.



Aiming to foster professionals from all over the world in the field of geological environment related research as well as to enhance the capabilities of the cooperating countries/organizations with Korea/KIGAM, this 3-weeks training course provided participants an introduction to Urban Management & Landslides and slope stability, urban geology and groundwater & environmental geology, landslide monitoring and early warning and the role of water in the stability of slopes & debris flow hazard, includes urban geology field excursion.

The trainees visited the landslide field monitoring lab and discussed on soil and rock mechanics as well as KIGAM landslide monitoring system based on the following,

- Rainfall-induced slope stability and geotechnical investigation
- The transition from sliding to flowing in debris deposits
- Quantifying uncertainties in debris flow propagation and risk assessment
- Discussions on a new robust method for landslide monitoring

In overall evaluation, the training course has been successfully organized. It reached the targets and benefited all the attended participants. It would be a good base for future cooperation possibilities among CCOP Member Countries and KIGAM/IS-Geo. The network of Urban Management & Landslide and slope stability should be maintained and developed for further collaborative activities within the region. Advanced courses regarding contents, activities such as field survey and case study & discussion for the network are recommended for consideration of future plans.

During the entire course schedule, Korean Language & Cultural class was held in the 2nd - 3rd week of the course, in the afternoon for an hour in which all the trainees attended and learned how to read and write Korean language, play Korean traditional game and sing a traditional Korean song.

GSJ International Training Course on Practical Geological Survey Techniques 2018 - application to geological disaster mitigation

Geological Survey of Japan (GSJ) organized the training course on “Practical Geological Survey Techniques 2018-application to geological disaster mitigation for 9 CCOP member countries. The training course was commenced during 26 June to 13 July in GSJ headquarter, Tsukuba city of Japan. The training introduced participants on Field mapping, Laboratory study, GIS application and Modeling together with the all geoscience topics. Each of the trainees has to make a presentation of this course based his/her experiences on the geo-hazard mitigation. CCOPTS Director was invited to give a presentation on “Roles of SE Asia Geoscience Organizations in Disaster Mitigation” on 5th of July. During the visit to Tsukuba, CCOPTS Director had a discussion with Director General of GSJ on the current situation on the CCOP activities, especially on the GSJ supporting programs. **Dr. Yoshihiko Shimazaki**, CCOP Honorary Advisor from Japan, also made a visit to the trainees and gave comments during the discussions on the current CCOP activities. CCOPTS Director was also witnessed the MOU signing ceremony between Department of Mineral Resources of Thailand and GSJ on the future collaboration on 6th of July.

Malaysia Window to Cambridge at UKM (MW2C@UKM), Training Workshop on Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment

The workshop on “Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment” 28 - 29 June 2018 was successfully held at the Le Méridien Kuala Lumpur, Malaysia. It was part of workshop series driven by of the ongoing Newton-Ungku Omar Fund (NUOF) project entitled Disaster Resilient Cities: Forecasting Local Level Climate Extremes and Physical Hazards for Kuala Lumpur, to disseminate information and findings, build capacity and interface with stakeholders at the city level. It acted as a platform for sharing knowledge and views on meteorological and hazard forecasting due to extreme weather events. The workshop focussed on advances in meteorological forecasting and hazards assessment, which is of great importance to various stakeholders including government agencies and the private sector in managing risk information, financing and investment. Participants include regional and Malaysian experts as well as early career researchers supported by the Malaysian Window to Cambridge at Universiti Kebangsaan Malaysia (MW2C@UKM), hosted by UKM's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM). A total of 90 researchers including 10 early-career researchers from Asian countries participated in the training as well as sharing case studies from own country. The joint collaboration of CCOP Technical Secretariat and SEADPRI-UKM as CCOP Cooperating Organisation enables exchange of researchers in the region. Representatives from CCOP Member Countries namely Cambodia, Laos, Myanmar, Thailand and Vietnam attended the two-day workshop.

GEOTHAI' 2018 -The Conference on “Being Together Preparing for Future Geohazards”

During 29-31 August, Department of Mineral Resources and other Geoscience Institutes of Thailand co-organized the GEOTHAI'2018 Conference in Bangkok, Thailand. The conference theme is “Being Together Preparing for Future Geohazards”. There are more than 400 participants from the government officials, academics and professionals. CCOPTS Director made a keynote presentation on the Geohazard Mitigation in SE Asia: Way Forward which focused on the how SE Asia countries should work together on minimizing the loss on Geohazard. The main idea is on sharing information via capacity building programs and WebGIS applications. All parties agreed to cooperate with CCOP platform, especially on the transboundary areas.

CCOP-IUGS Task Group on Geohazards (TGG) Joint Seminar in conjunction with 54th CCOP Annual Session (AS) and 71st Steering Committee Meeting

CCOP-IUGS Task Group on Geohazards (TGG) Joint Seminar was organized on the afternoon of 30th October in conjunction with CCOP Annual Session. Participants from six (6) CCOP MCs made presentation on the latest geohazard mitigation of their own countries, earthquake in Korea and landslide in Myanmar, for example. Discussion on the way forward of each case also made during the presentation, especially on how to minimize the losses. The seminar also made some proposals on an early warning mechanism both locally and internationally in East and Southeast Asia. All participants agreed that information regarding geohazard will be shared via the CCOP WebGIS program and more participation will be made through other related international meetings.

Environmental Geology

CCOP- GST Workshop and on-the-job training course on Geoheritage and Geosite

CCOP, Department of Geology and Mineral of Lao PDR and Geological Society of Thailand co-organized Training on the job for Geo-site investigation for eighteen (14) Lao PDR and Thai young geoscientists during 26-30 July. There are 3 geoscientists, supported by CCOP, from Department of Geology and Mines of Lao PDR participated in this training. Two of them from Thailand were supported by Geological Society of Thailand. More than geo-sites in Southern Lao PDR were investigated and categorized. They are classified by using their geological importance and tourist attraction degree. Many of them are quite impressive geologically but most of them are not easy to access by normal tourists and other supporting facilities are really needed.

KIGAM's IS-Geo Training Course on Geopark

During a series of regular training courses provided by the KIGAM/IS-Geo in collaboration with the CCOP for member countries, the KIGAM/IS-Geo training course on Geoparks was held in the International School for Geoscience Resources of KIGAM, Daejeon, Korea, from 5-9 November 2018 with a total of 14 participants from 8 CCOP Member Countries.

Aiming to foster professionals from all over the world in the fields of Geoparks as well as to enhance the capabilities of the cooperating countries/organizations with Korea/KIGAM and to meet the high interest regarding "Geoparks", this 5-day training course provided participants an interdisciplinary approach to explore the academic knowledge and practical skills on the expertise of Geopark or Geological Heritage in the field of Geoparks. The contents of this course comprised a general overview on principles and genetic concepts of UNESCO Global Geoparks (UGGp) and application process, development of successful UGGp, global Geoparks network structure and activities. Total 4 Korean/Foreign instructors were involved in the course.

The course also entailed a briefing with country report session by trainees on 7 November. Participants gave presentation of their own countries' report about the current situation of Geoparks and future plans related research and projects in the field of Geopark promotion and development.

Also 1 night 2 days field excursion was provided on the last day of the training course from 8-9 November. Participants departed to Danyang-gun located in the middle part of Korea and visited site related Danyang Geopark. During the field trip, participants spent time to learn history, terrain and to feel the scenery of Korea through visits of Gudambong Peaks, Aquarium, Gosu cave, Skywalk, Dodamsambong Peaks, etc. in Danyang-gun.



At Mancheonha Skywalk, Danyang during the course' field trip

The training course has been successfully organized and reached the targets and benefited all the attended participants. It would be a good base for future cooperation possibilities among CCOP member countries and KIGAM/IS-Geo. Also the network of UNESCO Global Geoparks should be maintained and developed for further collaborative activities within the region. Advanced courses regarding contents, activities such as field excursion, case study & discussion for the network are recommended for consideration of future plans.

Water Resources Integrated Management

CCOP – KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin: Application to Transboundary Aquifer Management (Phase II)

Since 2013, CCOP, in collaboration with KIGAM and UNESCO, has initiated “Regional study on groundwater resources and its interaction with Mekong River, with a special focus on the TBA management”, in an attempt to achieve sustainable management of groundwater resources in the CCOP regions by sharing information and discussing common issues between neighboring countries. In 2017, CCOP and KIGAM commenced a pilot study project to initiate the study of groundwater flow and its interaction with Mekong River, targeting a transboundary aquifer between Cambodia and Mekong Delta of Vietnam. One of main activities of the project was to install the groundwater monitoring well in the transboundary aquifer region of Cambodia. The objectives of this monitoring well are (1) to collect hydrogeological logging data of the region (2) to monitor continuous groundwater level fluctuation and its interaction with surface water, and (3) to study potential influence of groundwater-surface water interaction on groundwater dependent ecosystems. The target study area is located in the Leuk Daek District of Cambodia. The town is located in the vicinity of the Mekong River and is also close to the international border between Cambodia and Vietnam.

With the above understanding, CCOP and KIGAM agreed to initiate collaborative study entitled “Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin: Application to Transboundary Aquifer Management (Phase II)”, the contract period being 1 March 2018 to 30 November 2018 with a project costs of 100,000,000 Korean won, was signed. The project aims to provide a basis for investigating groundwater-surface water interaction on international transboundary aquifer of GMS. The major activities of the project will include installation of groundwater monitoring systems in the selected TBA of the GMS, collection of groundwater monitoring data to study groundwater-surface water interaction process and its potential influence on groundwater dependent ecosystem (GDE), and comprehensive analysis of groundwater quantity and quality status in GMS.

The workshops of the project carried out during 2018 were listed in the following table:

No.	Event	Venue	Date	Remarks
1	CCOP-KIGAM-UNESCO-DGM Workshop on “Transboundary aquifer-surface water management in Mekong basin (Phase II)	Vientiane, Lao PDR	11-12 June	Conducted with 20 Participants.
2	CCOP- KIGAM - DGM On-the-job Training Course on Groundwater	Vientiane, Lao PDR	24-28 June	Conducted with 20 Participants.
3	CCOP-KIGAM-DGM Training Course on Groundwater	DGM, Lao PDR	7-10 November	Conducted with 20 Participants.
4	The Diver Installation on Groundwater Monitoring System	Vientiane, Lao PDR	20-21 December	Conducted with 10 Participants.

CCOP-KIGAM-UNESCO-DGM Workshop “Transboundary aquifer-surface water management in Mekong Basin (Phase II), 11-12 June 2018, Vientiane, Lao PDR

The CCOP-KIGAM-UNESCO-DGM Workshop “Transboundary aquifer-surface water management in Mekong Basin (Phase II) was held in Mercure Hotel, Vientiane Capital, Lao PDR, during 11-12 June 2018. The workshop was hosted by CCOP, KIGAM (Korea Institute of Geoscience and Mineral Resources), UNESCO Bangkok, and DGM (Department of Geology and Minerals) of Lao PDR. The workshop formed part of the activities programme in the CCOP-KIGAM project “Groundwater-surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystem in the Mekong Basin: Application to Transboundary Aquifer Management”. The objectives of the workshop were to promote the sharing of information and best practices among Mekong countries in transboundary aquifer management. The key players of each country in the Mekong River Basin attended the workshop to address major issues and status of the groundwater management. Strategy to enhance collaboration to adapt to future challenges between neighboring countries was discussed.

A total of 19 participants from CCOP Member Countries (represented by Cambodia, Republic of Korea, Lao PDR, Myanmar, Thailand and Vietnam) UNESCO Bangkok, IWMI and CCOPTS attended the workshop. The workshop was organized to have one day presentation and a full-day excursion to visit proposed site for groundwater monitoring wells.



A group photograph of Delegates and representatives of the CCOP- KIGAM – UNESCO - DGM Workshop “Transboundary aquifer-surface water management in Mekong basin (Phase II)”

At the Opening Ceremony, **Mr. Keo Khamphavong**, Permanent Representative of Lao PDR to CCOP, Director General of DGM, and **Dr. Kyoochul Ha**, Head of Groundwater and Ecohydrology Research Center, KIGAM, delivered welcome speeches. **Dr. Adichat Surinkum**, CCOPTS Director, gave an opening address to the workshop. **Dr. Dhiti Tulyatid**, Regional Expert of CCOP TS facilitated the meeting and **Ms. Marivic Pulvera Uzarraga**, Manager, Project Operation and Information Division, CCOP TS, facilitated the organizing of the workshop. During the first day of the workshop, a total of 10 presentations were given.

After the presentation of participants, **Dr. Adichat Surinkum** led the “Discussion on Lao PDR and Future Plan” of the project. The Meeting agreed on four matters as listed below:

1. Finding the best location for setting up of the monitoring wells for Thai-Lao transboundary aquifer across the borderlines, i.e., one on Lao side and the other on Thai side.
2. The meeting agreed on partly support of some Lao participants to attend and present papers related to this project at the 45th IAH Congress: Groundwater and Life” during 9-14 September 2018, Daejeon, Korea (www.iah2018.org).
3. It is recommended that one published the presented papers to relevant special issues related to the IAH 2018, i.e., Journal of Groundwater Social and Engineering.
4. It was agreed that for future operation, personnel of Lao PDR will be responsible for well monitoring. The location for drilling of monitoring well will be located by the end of June 2018.

In addition, the meeting discuss about geology of Lao PDR and its impacts on groundwater resources and other related matter including sinkholes. Lao PDR representatives have raised their concerns on sinkholes problem that have increasingly impacted Vientiane and its vicinity recently.

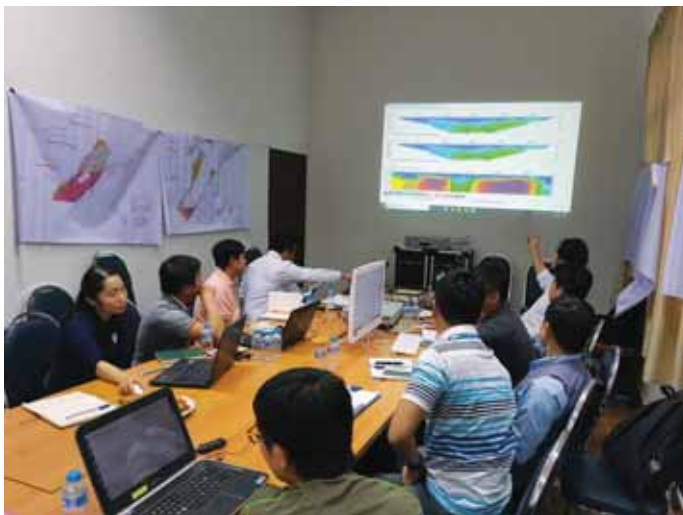
Field Excursion: Participants visited field site within Vientiane Province to locate possible site for groundwater monitoring wells.

CCOP-KIGAM-DGM on Groundwater Training Course for Lao PDR

CCOP-KIGAM-DGM Training Course on Groundwater training was organized in Vientiane of Lao PDR during 6-10 November 2018. There are 16 trainees, two observers and two CCOPTS staff attended this training course. Two resource persons on this course were from Department of Groundwater Resources and Department of Mineral Resources of Thailand. The training contents are theory of groundwater, groundwater management, resistivity survey application for groundwater investigation and resistivity survey interpretation techniques. There was also a resistivity field survey training in the salt producing area north of Vientiane.



Trainees, observers and CCOPTS attended CCOP-KIGAM-DGM on Groundwater Training Course for Lao PDR



Data processing and analysis



Field operation in the salt mining area

Diver Installation on Groundwater Monitoring System in Vientiane of Lao PDR

During the early stage of KIGAM project on “Groundwater- surface water interaction in Lao PDR” two (2) monitoring wells were drilled in Vientiane, one in the recharge area north of Vientiane and one on the Mekong river bank. However, Department of Geology and Mineral Resources of Lao PDR provided more three (3) groundwater wells for monitoring in the vicinity area. All five (5) groundwater monitor divers, provided by KIGAM, were installed during 20-21 December together with the on-job-training for six (6) trainees from Lao PDR. The well installations were made by two KIGAM experts and one Cambodian resource person who made two-years data collection in Cambodia during 2017-2018 already. KIGAM experts and Lao PDR team also made a working plan for 2019-2020 on groundwater monitoring schedule and way forward on Surface water and Groundwater management program in Lao PDR.

KIGAM's IS-Geo Training Course on Groundwater, 27 August to 14 September 2018, IS-Geo of KIGAM, Daejeon, Republic of Korea

The International School for Geoscience Resources of KIGAM in cooperation with CCOPTS conducted the training course entitled "Groundwater" in Daejeon, Korea from 27 August – 14 September 2018. There were 15 participants from CCOP Member Countries and CCOPTS. The objective of this course is to provide participants with a broad understanding of water as a resource, focusing on groundwater but also including surface water with measures to provide for their sustainability. This course provides introduction to groundwater fundamentals and contaminant groundwater hydrogeology as well as participation to the 45th Congress of the International Association of Hydrogeologists (IAH) held in Daejeon on 9-14 September 2018.

During the 15-days of the training course, lectures and exercises covered 3 modules: (1) Groundwater Practices: Fundamentals of Groundwater; (2) Groundwater Practices: Contamination, Remediation and Water Security; and (3) IAH Attendance and Presentation.



Groundwater course exercises and discussion

All the trainees joined IAH's mid-congress excursions on 12th September. There were nine day trips to choose from: (1) Shallow geothermal system and UNESCO World Heritage; (2) World's longest 33.9 km sea dike and historic temple; (3) National groundwater information system and Korean traditional house village; (4) Underground research tunnel and UNESCO World Heritage; (5) Daesan riverbank filtration water supply system and Changnyeong Upo wetland; (6) Geological Park and Cine Theme Park; (7) Gyeongju LILW disposal facility and UNESCO World Heritage; (8) Maisan geologic park and wine cave; and (9) Baengnyong Cave.

On the 13 September, all the trainees gave presentations at IAH, under KIGAM ISGeo's special session on "Groundwater research and development in developing countries". On IAH's last day, all trainees were free to attend any session to their interest.



Trainees' group photo after the special session at 45th IAH Congress.

Energy and Mineral Resources Sustainable Development

KIGAM/IS-Geo Regular Training Course on Unconventional Oil and Gas Resources, 22 January – 10 February 2018, IS-Geo of KIGAM, Daejeon, Republic of Korea

During a series of regular training courses provided by the KIGAM/IS-Geo in collaboration with the CCOP for member countries, the KIGAM/ISGeo training course on Unconventional Oil and Gas Resources was conducted from 22 January – 10 February 2018 in the International School for Geoscience Resources (IS-Geo) of KIGAM, Daejeon, Korea, with 19 participants, 18 of which are from 8 CCOP Member Countries.

Aiming to foster professionals from all over the world in the field of unconventional energy related research as well as to enhance the capabilities of the cooperating countries/organizations with Korea/ KIGAM and to meet the high interest regarding “Unconventional Oil and Gas”, this 3-week training course provided participants an interdisciplinary approach to explore the academic knowledge and practical skills on the application of suitability analysis in the field of unconventional oil and gas. The contents of this course comprised a general overview on Oil Sand, CBM & Shale gas and Gas Hydrate. Seventeen Korean/foreign instructors were involved in the course. Four lecturers from USGS came to KIGAM to take charge of gas hydrate module in this time.

In addition to academics, IS-Geo intended to provide number of activities outside of the classroom during 3 weeks of the training course. The course also entailed a briefing with country report session by trainees during the first week. Participants give presentation of their own countries’ report on the status of unconventional energy and gas hydrate related research and projects. All participants had courtesy visit to MOFA (Ministry of Foreign Affairs) and GECC (Global Energy Cooperation Center) the following week. The half-day seminar on the topic of the overview on the status of energy policies of Korean government and energy cooperation diplomacy with **Mr. Jae-ha Choi**, Director of International Energy Security Division was held and discussion session was followed with other GECC staff. After the meeting, a half-day tour in Seoul was arranged to visit SAMSUNG electronics center.

KIGAM Lab tour by KIGAM researcher from petroleum and marine division was also conducted in the middle of the course. Participants visited the gas hydrate department and marine geology research center as well. The last day of the course, the participants visited R/V TAMHAE 2, the 3-D seismic research vessel in Pohang city. During the entire course schedule, Korean language & cultural class was held for an hour daily in which all the trainees attended and learned Korean alphabet, learned Korean songs and played Korean traditional game. This enhanced the course participants understanding of Korean culture.



Trainees at the R/V TAMHAE 2, the 3-D seismic research vessel in Pohang city

By all accounts, the training course has been successfully organized, reached the targets and benefited all the attended participants. It would be a good base for future cooperation possibilities among CCOP member countries and KIGAM/IS-Geo. The network of unconventional oil and gas should be maintained and developed for further collaborative activities within the region. Advanced courses regarding contents, activities such as case study & field trip for the network are recommended for consideration of future plans.

CCOP - KIGAM - KNOC Unconventional Oil and Gas Resources Project: Assessment of Shale Energy Resources in Asia (UnCon Project Phase II)

The CCOP member countries have carried out an Unconventional Oil and Gas Resources Project (UnCon, phase 1) for three years from 2015 to 2017, which was supported financially and technically by KIGAM. The CCOP-KIGAM UnCon phase 1 project was a mapping project that identified potentially-prospective shale energy resource basins in the CCOP region. Forty six (46) basins were recognized from this project as potentially-prospective shale gas/oil basins. The identified basins were mapped using the GIS software, and finally published by means of USB flashdisk.

The UnCon Phase II project focuses on the calculation and assessment of the shale energy resources for the already identified potentially-prospective shale energy basins. This will enhance the knowledge of the regulatory agencies, energy research organizations and national oil companies in CCOP countries in the exploration of new frontiers of production. The UnCon Phase II Project was launched at the 10th National Coordinators Meeting and Workshop (UnCon10) on 24-26 April 2018 at Sukosol Hotel, Bangkok, Thailand. The Goal is to create the highest possible value for society from oil and gas resources in order to improve the quality of life of the people in the CCOP Member Countries.



UnCon10 participants at U-thong Oil Field, Suphanburi,

The workshops of the project carried out during 2018 were summarized in the following table:

Code	Event	Venue	Date	Remarks
UnCon10	10 th Meeting & Technical Workshop	Bangkok, Thailand	24-26 April	Conducted with 27 Participants.
UnCon11	11 th Meeting & Technical Workshop	Chongqing & Fuling, PR China	10-12 July	Conducted with 35 Participants.
UnCon12	12 th Meeting & Technical Workshop	Kota Kinabalu, Sabah, Malaysia	12-14 Oct	Conducted with 39 Participants.

Below table is a summary of Resource Estimation summarized from the final reports of all participated member countries submitted in November 2018.

Country	Basin Name	Formations estimated	Resource estimated	Remarks
Cambodia	Tonle Sap Basin	Late Carboniferous-Middle Triassic Fm Unit, and Upper Triassic-Middle Jurassic Fm Unit	Only shale volume calculated <i>Permian-Middle Triassic Unit: 4.656E+11 m</i> <i>Upper Triassic - Middle Jurassic Unit: 1.128E+12 m³</i>	<i>Two Formation Units</i>
China	Sichuan Basin	Wufeng-Longmaxi Fm	Shale gas: 709 Tcf	
Indonesia	South Sumatra Basin (Jambi subbasin)	Upper Talang Akar Fm, Lower Talang Akar Fm, and Lahat Fm	Total shale gas in the estimated three formations: 58.12 Tcf	<i>Three Fm. Estimated</i>
Korea	Gyeongsang Basin	Jinju Fm	Shale gas: 72.5 Tcf	
Japan	Akita-Yamagata Basin	Onnagawa Fm	Still in preparation	<i>Lack of available data</i>
Lao PDR	Salavan-Attapeu Basin	Sithat Fm and Phanok Khao Fm	Total shale gas of the estimated two formations: 51 Tcf	<i>Two Fm. estimated</i>
Malaysia	Sarawak Basin	Setap Fm	Total shale gas: 8.19 Tcf	
Myanmar	Central Myanmar Basin	Yaw Fm	Still in preparation	<i>Lack of available data</i>
Philippines	Visayan Basin	Lower Malubog Fm, and Upper Malubog Formation	Shale gas in Lower Malubog Fm: 141.5 Tcf Shale Oil in Upper Malubog Fm: 1.17 Tbbbl Shale Oil in Toledo Formation: 1.21 Tbbbl Total shale oil: 3.38 Tbbbl	<i>Total shale gas: 141.5 Tcf</i> <i>Total shale oil: 3.38 Tbbbl</i>
Papua New Guinea	Papuan Basin	Koi-lange Fm, and Barikewa Fm	Total shale gas of the estimated two formations: 149.8 Tcf	
Thailand	Phu Pra – Mukdahan Basin, and Phitsanulok Basin	Triassic lacustrine Fm (PP-M basin) and Chum Saeng Fm (Phitsanulok Basin)	Shale gas in Triassic lacustrine Fm (PP-M basin): 15.9 Tcf Shale Oil in Chum Saeng Fm (Phitsanulok Basin): 0.00022 Tbbbl	<i>Two Fm. estimated</i>
Vietnam	An Chau Basin	Mia Le Fm, Lang Son Fm, and Van Lang Fm	Total Shale Gas: 77 Tcf Mia Le Fm: 21.1 Tcf Lang Son Fm: 30.9 Tcf Van Lang Fm: 25.0 Tcf	<i>Three Fm. estimated</i>



Behind is Mt Kinabalu, during the UnCon13 field trip, Kota Kinabalu, Malaysia



UnCon11 participants at the shale gas production site in the Fuling field, the Sichuan Basin, China

CCOP- DMR Special Talk on "World Bank Funded Mineral Exploration Project in Lao PDR"

The Department of Mineral Resources (DMR) of Thailand and CCOPTS co-hosted the special talk on 9 February 2018 at the DMR Conference Room. The presentation on "World Bank-Funded Pilot Geological Mapping Project in Northern Laos with the Aid of High Resolution Airborne Geophysics: Methodology and Initial Findings, was made by **Mr. Peter Fiedfield**, currently the leader of this project. He had a lot of experiences working with BGS and had some field works with DMR on SE Asia Granitic Study during 1990s. The special talk was attended by 60 geoscientists from DMR and the Department of Primary Industry and Mines (DPIM).

BGR-CCOP Workshop – “Mine Closure Legal Framework in ASEAN Member States

The CCOP Technical Secretariat (CCOPTS), in cooperation with the Federal Institute for Geosciences and Natural Resources of Germany (BGR) and Laotian Department of Mines (DOM) successfully organized the Workshop on “Mine Closure Legal Framework in ASEAN Member States” on 8 - 10 May 2018 in Vientiane, Lao PDR. There were 41 attendants at senior level officials and managers of state mining management organizations from ASEAN/CCOP member countries (Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines and Thailand); resource persons from DOM, Lao-German TC Project “Support for the Mining Sector”, Earth Systems Australia, InterGovernmental Forum (IGF) on Mining, Minerals, Metals and Sustainable Development, ASEAN Secretariat, Phu Bia Mining Limited, and MMG LXML SEPON Lao PDR; and CCOPTS staff.

Held as a technical seminar for two days in Mercure Hotel in Vientiane and one full-day field trip to Phu Bia gold/copper mine in Phu Kham mountain, this event’s main objective is capacity building in mine closure legal framework of responsible government agencies from CCOP countries / ASEAN states. Methods and tools were presented by invited experts for the participants’ understanding on how to achieve and manage sustainable mine closure.

The first day of the workshop started with the opening ceremony. Chaired by **Dr. Terzan Atmaca**, German Team Leader of Lao-German TC Project “Support for the Mining Sector”, it began with welcome addresses delivered by **H. E. Chansone Senbouttalath**, Vice Minister, Ministry of Energy and Mines (MEM), Lao PDR; **H. E. Jens Lütkenherm**, Ambassador of the Federal Republic of Germany, Lao PDR, and **Dr. Christiane Molt**, Project Coordinator, International Cooperation - Asia and Oceania, BGR. The workshop was officially opened by **Dr. Adichat Surinkum**, CCOPTS Director.

There were two presentations made to set the workshop. First is the introduction to Lao-German Project “Support for a Sustainable Development of the Mining Sector”, SDMS by **Mr. Wolfgang Schirmacher**, Associate Advisor, Lao-German TC Project “Support for the Mining Sector”, BGR, highlighting SDMS contribution and impact to Laos’ mining sector which included capacity building of both government and mining project’s personnel, preparation of 20 legal documents on mining (12 already approved and applied), sector dialog in the mineral sector, awareness raising, etc. Second is the overview of Laos’ mineral sector by **Mr. Khamtanh Vongphansipaseuth**, Director-General of Laos’ Department of Mines (DOM). Lao PDR has seen phenomenal growth in the mining sector over the past decade. In 2013, the value of mine production was more than US\$1.7 billion, an enormous increase from US\$10 million in 2003. The growth is mainly attributed to the two large scale gold-copper operations in Sepon and Phu Bia, the major contributors of revenues to the Lao Government. The impending end of mine life and closure of Sepon and Phu Bia will have a significant effect on government revenues. Its effect to the mine community and environment is dependent to the success of its closure.

Two presentations on mine closure legal framework were made by invited experts. **Mr. Nigel Murphy**, Director, Senior Principal Environmental Scientist, Earth Systems, Australia gave a presentation entitled “Planning for Successful Mine Closure - Leaving a Positive Legacy”. It was emphasized that achieving a successful mine closure requires closure planning since the feasibility assessment of a mine project. The Government must make sure that closure is part of the design of the project and part of the permitting requirements. The Government should ensure that there are incentives for ongoing rehabilitation and reduction of closure risks, and that funds are retained for closure costs. In most situations, the development of local infrastructure and local jobs / training must be encouraged.

Mr. Matthew Bliss, of IGF gave a presentation about “Supporting IGF Members on Post-mining Transition, and APEC Mine Closure Checklist for Governments”. Post-mining transition is one of the six thematic areas of IGF’s Mining Policy Framework (MPF). For post-mining transition, the prioritized MPF implementation gaps include lack of regulatory requirements for post-mining transition plans, and abandoned mines. Capacity building activities and technical support were carried out for the IGF Members to narrow down the identified gaps. One auspicious activity is the publication of APEC Mine Closure Checklist for Governments, https://www.apec.org/-/media/APEC/Publications/2018/3/Mine-Closure-Checklist-for-Governments/218_MTF_Mine-Closure_Checklist-for-Governments.pdf

The last presentation of day one was delivered by **Dr. Terzan Atmaca**, on the development of mine closure regulations in Lao PDR. The draft Mine Closure Decree of Lao PDR ensures a) the development of a mine closure plan at the beginning of a project and the review at periodic intervals; b) the involvement of communities and governments in mine closure planning and implementation; and regulates c) the implementation of the rehabilitation during the operation; d) the tasks of the mining company; e) financial assurance for the mine closure; f) the post-closure monitoring, and relinquishment.

Presentation of ASEAN/CCOP mining authorities on their respective mine closure legal framework according to the provided questionnaire / leading questions were done in the morning of day two. Number of countries who have already closed mines, and will have closed mines in 2 to 10 years was tabulated. There were 7 countries among the 9 present, who have closed mines; 2 countries have mines closing in 2 years, 1 country has mine closing in 5 years, and all 9 countries have mines closing in more than 10 years. On the other hand, 3 countries have already given mining project certificate of relinquishment.

Field trip to Phu Bia Mining was organized on the last day. Participants were shown how Phu Bia Mining had been preparing for their closure.



Field trip to Phu Bia Mining

CCOP-KIGAM-UNECE-PETRAD Workshop on "Application of the United Nations Framework Classification for Resources (UNFC)"

CCOP Technical Secretariat, in cooperation with Korea Institute of Geosciences and Mineral Resources (KIGAM), United Nations Economic Commission for Europe (UNECE) and International Programme for Petroleum Management and Administration (PETRAD), organized the CCOP-KIGAM-UNECE-PETRAD Workshop on "Application of the United Nations Framework Classification for Resources (UNFC)" in conjunction with the 54th CCOP Annual Session. This workshop aimed to update the latest developments in the UNFC information and dissemination to Member Countries. There are 37 participants, (2) resource person from PETRAD, (33) CCOP MCs and four (2) CCOPTS staff attended.

During the Opening Ceremony, **Dr. Dhiti Tulyatid**, Regional Expert, CCOP TS, facilitated the Opening Ceremony Session. **Dr. Synn Joong-Ho**, former President, KIGAM gave a Congratulated and Opening Remark. A VDO Presentation on "A Welcome Address to the Workshop" given by **Mr. Scott Foster**, Director, Sustainable Energy Division. Introduction to Mr. Per Blystad and Mr. Sigurd Heiberg, PETRAD International Programme for Petroleum Management and Administration, resource persons. Mr. Per Blystad introduced the UNFC Classification System to the Audience. At the end of the workshop all participants received certificates.

DATA AND INFORMATION

CCOP-GSJ-MME Groundwater Project Phase III Meeting 5-7 March 2018, Siem Reap, Cambodia

The CCOP-GSJ-MME Groundwater Project Phase III Meeting was held on 5-7 March 2018, in Siem Reap, Cambodia. It was attended by 24 participants from Cambodia, China, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and the CCOP Technical Secretariat. Representatives from Safe Water Supply Team Cambodia and UNESCO-BKK were also present.

Dr. Youhei Uchida presented the progress of the Project from 21 March 2017 to 4 March 2018. During the period, the report of the CCOP-GSJ-GAI Groundwater Phase III Project Meeting (GW-7) held on 21-23 March 2017 in Bali, Indonesia has been published, and uploaded to the CCOP website, <http://ccop.asia/pdf/publication/GW-7.pdf>. **Dr. Gaurav Shrestha** from GSJ reported on the status of the project's main objective of compiling groundwater data of CCOP Member Countries using Open Web GIS System. According to the 2017 Project workplan, Indonesia, Japan, Korea, Malaysia, Philippines and Thailand have submitted their data accordingly, with some variation from the 2017 workplan for Philippines and Korea. The groundwater data submitted are accessible from the GSJ Groundwater Portal, https://ccop-gsi.org/gsi/ccop_water/index.php. Recent data received from Indonesia, Malaysia and Philippines are still to be uploaded to the Portal. China and Vietnam have still to contribute data to the Project as agreed in the previous meetings.

Dr. Youhei Uchida also reported on the CCOP Groundwater Sub-Project: Development of Renewable Energy for Ground-Source Heat Pump System in CCOP Regions. One Heat Exchanger was installed at the National Laboratory for Energy Conversion Technology (B2TKE), Agency for the Assessment and Application of Technology (BPPT), Indonesia in October 2017. Regarding the GSHP system installed at the Chulalongkorn University, Thailand, Thermal Response Test (TRT) was conducted to evaluate the apparent thermal conductivity on the ground. To do TRT, heat medium (water) is circulated in the well with fixed heat load and the temperature at inlet and outlet of the well is measured. It was found out that the ground at the Chulalongkorn University is a good thermal conductor.

Country reports on "Explanation documents for the country's capital city or representative area" (DB1& DB2) and Public policy for Groundwater observation system (Public Policy Group) were presented by the participants. These papers will be published in the Project report, GW-8, within 2018.

Dr. Youhei Uchida presented the required format for the full paper for this meeting report (GW-8), and requested all the participants to revise their paper accordingly if not following this format, and submit to the CCOP Technical Secretariat within August 2018.



Discussion at the meeting

Group discussions were held on the challenges faced in data submission as well as on the project workplan for 2018.

All member countries agree that the full paper of country report presented at this meeting to be published in 2018 will be submitted by 31 August, 2018, and database updating completion will be done by 1 October, 2018.

Additionally, the members agreed that discussions are needed to better utilize the DB in this field, and the interest and cooperation of the CCOP countries. Improvement of the GSi system and further related project will also be needed in the future.

There were three invited lectures, (1) The role of Water in the conservation of the Angkor World Heritage Site, Cambodia by **Dr. Hang Peou** of the APSARA National Authority (2) Groundwater modeling of arsenic contamination in the Mekong Delta Cambodia by **Dr. May Raksmei** and (3) Arsenic removal using Cambodia laterite by **Dr. Pich Bunchoeun** of the Institute of Technology of Cambodia (ITC).

Prof. Dr. Shinji Tsukawaki from Kanazawa University gave an overview of the hydrogeological excursion around the world heritage site, Angkor Wat, and Tonle Sap. The next project meeting will be in Chiang Mai, Thailand in February 2019.

The 3rd Workshop & Training Courses on Capacity Building on Marine Geoscience and Geohazards Reduction & Prevention for ASEAN Member States, 15-21 July 2018, Guangzhou, China

In order to fully understand current status and demands of marine geoscience capacity building for ASEAN member countries, to exchange knowledge and new technologies of marine geology mapping, coastal geohazards monitoring and map compilation, and discuss the future cooperation between China and the ASEAN member countries, China have successfully organized "The 1st and 2nd Workshop & Training Courses on Capacity Building on the Marine Geoscience and Geohazards Reduction & Prevention for ASEAN Member States" which achieved very good results and attracted widespread attention of the domestic Marine Geoscience and the media. China signed a memorandum of cooperation with Laos and Cambodia respectively after the 1st workshop.

To further cooperation with the ASEAN Member States, China organized "The 3rd Workshop & Training Courses on Capacity Building on the Marine Geoscience and Geohazards Reduction & Prevention for ASEAN Member States", on 15 – 21 July 2018. The Workshop acts as the initiation for the China-ASEAN five years' Marine Geoscience Cooperation Plan, and the ASEAN member countries are welcome to participate in this Cooperation continuously in the future. This was supported by China Geological Survey, Ministry of Natural Resources of the People's Republic of China. Guangzhou Marine Geological Survey organized the workshop, which was held in YanLing Hotel, Guangzhou, China.

There were 3 sub-sessions under this 3rd Workshop & Training Course, (1) Mobile seismic station observation technology and deep structure research training; (2) Geological survey of the coastal zone & Technique and method of sea-land compilation; (3) RGIS-IGDP software training.

IGDP Phase II: The 2nd Workshop of CCOP/ASEAN Integrated Geoscience Data Processing and Geophysical Compilation, 17-19 July 2018

The Second Workshop of CCOP/ASEAN Integrated Geoscience Data Processing and Geophysical Data Compilation was held as sub-session three (3) in the 3rd Workshop & Training Courses on Capacity Building on Marine Geoscience and Geohazards Reduction & Prevention for ASEAN Member States.

At the IGDP Phase II second workshop, **Dr. Adichat Surinkum**, CCOPTS Director delivered an opening address and co-chaired the meeting with **Dr. Zhang Minghua**, Senior Geophysicist, Division Director Geoinformation, China Geological Survey. A total of 24 people from Member Countries and CCOP TS participated in this workshop: Cambodia (2), China (6) Indonesia (3), Japan (1), Lao PDR (2), Malaysia (2), Philippines (3), Thailand (2), & CCOP TS (3). **Dr. Dhiti Tulyatid**, Regional Expert, and **Ms. Marivic Pulvera Uzarraga**, Manager, Project Operation and Information, facilitated the meeting. Participants from Member Countries gave country reports to the meeting.

On 17 July afternoon to 18 July morning, **Dr. Zhang Minghua** and his colleagues introduced the RGIS-IGDP (Integrated Geophysical and Geochemical Data Processing) software. **Ms Liu Liang** gave a presentation on how to use the RGIS-IGDP software. Participants practiced their use of software. The hands-on exercise include data processing and enhancement of magnetic and gravity data.

On 18 July afternoon, **Dr. Liu Rongmei**, gave a presentation on “Geochemical database and compilation of China. The CGS has worked on the national geochemical database since 1978. **Dr. Ren Wei** gave a talk on “GeoCloud Technology on Data Sharing of Distributed Geoscience Data Centers of CGS”.



Discussion during the workshop

Dr. Ishihara gave a talk on “CCOP-GSJ MAMEA Project: Compilation and Publication of a Revised “Magnetic Anomaly Map of East Asia 1:4,000,000” on CD-ROM. Some data available to the project include those magnetic of Thailand. PNG provided only ppt image of magnetic data, thus CCOP TS should contact PNG for the digital data. The Philippines have a portion of airborne magnetic data thus Prof Ishihara re-digitized the data and would like to ask whether to access to the data. The Philippines representative replied that the data of 1980 should be available for publication. For Cambodia, there are data in private company in GETECH. CCOPTS will negotiate with Cambodia authority for the get holding to the data. For Lao PDR, as soon as the work has been submitted to the World Bank, then the data will also be available for sharing in this project. Coordinate and projection parameters of data and gravity magnetic reference base data should be provided, preferably in longitude and latitudes. For clarifications on data requirements, each country communicates directly to the IGDP and /or MAMEA Project Leaders. ADMAP-2 compiled the data almost all of the Antarctic area. They also cover toward WDMAM2.1 Brazil (1kmx1km grid with 1km altitude).

A one-day field excursion was provided on 19 July 2018 to all participants to visit a number of geological and historical sites of the area nearby Guangzhou.

IGDP Project Phase II Project Meeting

During the 2018 CCOP Annual Session, IGDP Project Phase II meeting was organized by CCOP and CGS on 30th October. There are eleven (11) representatives from eight (8) CCOP MCs and four (4) CCOPTS staff attended. The meeting agreed on the future cooperation on regional geophysical maps, and will have to complete regional magnetic map in 2019 first. CCOPTS was tasked to contact some member countries on getting scanned maps and transfer them all to GIS format by a supporting fund from CGS of China. More members of the Working Group nominated by CCOP MCs are welcome. CGS will organize a workshop in China in 2019 with an option for one more in Bangkok. Scholarship and high level training program will be provided on a special request from each CCOP MCs too.

FINANCIAL HIGHLIGHTS

From January 1 to December 31, 2018, Member Countries' total cash contributions amounted to USD 400,389.80.00, consisting of Cambodia (USD 10,000), China (USD 50,000), Indonesia (USD 40,000), Japan (USD 50,000), Republic of Korea (USD 60,389.80), Lao PDR (USD 10,000), Malaysia (USD 50,000), Myanmar (USD 5,000) 1/2, Philippines (USD 40,000), Singapore (USD 10,000), Thailand (USD 40,000) and Vietnam (USD 25,000). Lao PDR cash contribution for 2017 was received in 2018 (USD 10,000).

The expected cash contribution to receive from Myanmar for 2018 is USD 5,000.00 (2/2), Papua New Guinea for 2016, 2017 and 2018 is USD 75,000.00 and Timor-Leste for 2017 and 2018 is USD 20,000.00 (Table 1).

Table 1: Cash Contributions of Member Countries for 2017-2018
(Ending 31 December 2018)

Member Countries	2016 Contribution Received in 2017	2017 Contribution Received in 2017	2017 Contribution Received in 2018	2018 Contribution Received in 2018	Arrears Contribution Expected to Receive
Cambodia	5,000.00	10,000.00	-	10,000.00	-
China	-	50,000.00	-	50,000.00	-
Indonesia	-	40,000.00	-	40,000.00	-
Japan	-	50,000.00	-	50,000.00	-
Republic of Korea	-	60,000.00	-	60,389.80	-
Lao PDR	-	-	10,000.00*	10,000.00	-
Malaysia	-	50,000.00	-	50,000.00	-
Myanmar	-	5,000.00	-	5,000.00 (1/2) (Y2018)	5,000.00 (2/2) (Y2018)
Papua New Guinea	-	-	-	-	25,000 (Y2016) 25,000 (Y2017) 25,000 (Y2018)
Philippines	-	40,000.00	-	40,000.00	-
Singapore	-	-	-	10,000.00	-
Thailand	-	-	-	40,000.00	-
Timor-Leste	-	-	-	-	10,000 (Y2017) 10,000 (Y2018)
Vietnam	25,000.00	25,000.00	-	25,000.00	-
Total	30,000.00	330,000.00	10,000.00	390,389.80	100,000.00

*Lao PDR cash contribution for 2017 was received in 2018 (USD 10,000)

In addition to Member Countries' contributions, the amount of **USD 37,778.33** earned from the management of projects during January - December 2018 period which from "CCOP-KIGAM Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)", 1st Installment 2018 (1/2) (USD 2,524.08), "CCOP-KIGAM Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)", 2nd Installment 2018 (2/2) (USD 2,432.87), "CCOP-GSJ-MME Groundwater Project Meeting (Phase III)" (USD 4,206.00), "CCOP-KIGAM-KNOC Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)", 1st installment 2018 (1/2) (USD 2,205.17), "BGR Project Conduct of Workshop Mine Closure Legal Framework in ASEAN Member States" (USD 7,112.00), "KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin to Transboundary Aquifer Management (Phase II)", 1st Installment 2018 (1/2) (USD 4,230.89), "KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin to Transboundary Aquifer Management (Phase II)", 2nd Installment 2018

(2/2) (USD 3,990.18), “PTTGC on Topographic Map for Riverbank Protection in Rayong, Thailand” (USD 108.14), “PTTGC on Topographic Map for Riverbank Protection in Rayong, Thailand” (USD 162.21), “The 3rd International Workshop on CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi), (USD 4,138.35), “PTTGC on Topographic Map for Riverbank Protection in Rayong, Thailand”, (USD 756.98), “The 3rd BGR-CCOP International Training Course on Risk-Sensitive Spatial Planning for CCOP Member Countries”, (USD 5,724.00), “PTTGC on Topographic Map for Riverbank Protection in Chiangmai”, (USD 76.83), and “PTTGC on Topographic Map for Riverbank Protection in Rayong, Thailand”, (USD 110.63) are shown in **(Table 2)**.

Other incomes during the period amounted to USD **-415.18** from interest earned (USD 1,356.43), Processed from Sale of Publications (USD-), Loss on Conversion Currencies and Exchange rate (USD -1,815.47), and miscellaneous incomes (USD 43.86). The total income during the period was **USD 437,752.95**. The expenditure of **USD 407,458.34** was incurred from operation and administrative support. The cash balance as of ending December 2018 amounted to **USD 886,909.53**.

Other Fund (outstanding balanced) (**USD 66,561.80**) that consists of “International Environmental Partnership Grant Award (IEP Grant)”, (USD 855.44), “BGR-CCOP International Training Course on Risk-Sensitive Spatial Planning for CCOP Member Countries” (BGR), Germany (USD 45,484.55), “CCOP-KIGAM Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)” (USD 10,808.15), “KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin to Transboundary Aquifer Management (Phase II)” (USD 21,717.27), “CCOP-KIGAM-KNOC Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)” (USD -20,122.60), and “International Network of Raw Materials Training Centers, INTERMIN Project Number 776642”, (USD 7,818.99)

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, 2018)*

Funding Source	Activities	Country	Period	Amount (USD)
KIGAM	CCOP-KIGAM Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)	Bangkok, Thailand 1 st Installment 2018 (1/2)	March 2018	2,524.08
KIGAM	CCOP-KIGAM Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)	Bangkok, Thailand 2 nd Installment 2018 (2/2)	March 2018	2,432.87
GSJ/AIST	CCOP-GSJ-MME Groundwater Project Meeting (Phase III)	Siem Reap, Cambodia	March 5-7, 2018	4,206.00
KNOC	CCOP-KIGAM-KNOC Unconventional Oil and Gas Project: Assessment of Shale Energy Resources in Asia, (Phase II)	Bangkok, Thailand 1 st Installment 2018 (1/2)	April 2018	2,205.17
BGR	BGR Project Conduct of Workshop Mine Closure Legal Framework in ASEAN Member States	Vientiane, Lao PDR	May 8-10, 2018	7,112.00
KIGAM	KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin to Transboundary Aquifer Management, (Phase II)	Vientiane, Lao PDR 1 st Installment 2018 (1/2)	June 2018	4,230.89

Funding Source	Activities	Country	Period	Amount (USD)
KIGAM	KIGAM Groundwater-Surface Water Interaction and Comparative Study of Groundwater Dependent Ecosystems in the Mekong Basin to Transboundary Aquifer Management, (Phase II)	Vientiane, Lao PDR 2 nd Installment 2018 (2/2)	June 2018	3,990.18
PTTGC	PTTGC on Topographic Map for Riverbank Protection	Rayong, Thailand	July 6-7, 2018	108.14
PTTGC	PTTGC on Topographic Map for Riverbank Protection	Rayong, Thailand	July 18-20, 2018	162.21
GSJ/AIST	The 3 rd International Workshop on CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi)	Langkawi, Malaysia	September 18-20, 2018	4,138.35
PTTGC	PTTGC on Topographic Map for Riverbank Protection	Rayong, Thailand	October 8-12 & 16-19, 2018	756.98
BGR	The 3 rd BGR-CCOP International Training Course on Risk-Sensitive Spatial Planning for CCOP Member Countries	Hanoi, Vietnam	November 12-22, 2018	5,724.00
PTTGC	PTTGC on Topographic Map for Riverbank Protection	Chiang Mai, Thailand	November 19-20, 2018	76.83
PTTGC	PTTGC on Topographic Map for Riverbank Protection	Rayong, Thailand	November 27-28, 2018	110.63
Total Project Management Income				37,778.33
Net Total Project Management Income for Budget Year 2018				37,778.33

CCOP Revenue 2018



CCOP Expenditure 2018



Table 3: CCOP Financial Statement for year ended 31 December 2018 (amount in US Dollars)

DESCRIPTION	2017		2018	
	USD	USD %	USD	USD %
Fund Balance	810,465.29		805,175.92	
Income:				
<i>Member Countries' Contributions</i>	360,000.00	90.71	400,389.80	91.46
<i>Publications sales</i>	-	-	-	-
<i>Project management</i>	34,059.72	8.58	37,778.33	8.63
<i>Others</i>	2,804.26	0.71	(415.18)	(0.09)
Total Income	396,863.98	100.00	437,752.95	100.00
Expenditures:				
<i>Personnel expenses</i>	233,018.21	57.21	228,451.24	56.07
<i>Performance Incentives</i>	21,422.94	5.26	23,531.31	5.78
<i>Meeting/Travel Expenses</i>	80,588.53	19.79	88,247.27	21.66
<i>General Administrative Expenses</i>	27,339.63	6.71	38,798.17	9.52
<i>Extra Meeting/Workshop (Housing Subsidy)</i>	16,096.73	3.95	18,847.53	4.62
<i>Publications</i>	7,830.52	1.92	3,319.56	0.81
<i>Technical activity support</i>	4,958.22	1.22	3,531.48	0.87
<i>Special expenditures</i>	16,052.08	3.94	2,731.78	0.67
Total Expenditure	407,306.86	100.00	407,458.34	100.00
<i>Income over/(under) expenses</i>	(10,442.88)		30,294.61	
<i>Total Fund Balance before adjustment.</i>	800,022.41		835,470.53	
<i>Adjusting entries</i>				
<i>Unrealized gain/(loss) on exchange rate for Retained Earning</i>	5,153.51		1,429.71	
<i>Tax payable</i>	-		-	
Year-end Balance	805,175.92		836,900.24	
<i>Adjustment to reflect actual cash inflow/outflow):</i>				
<i>Account payable</i>	-		-	
<i>Other Fund (outstanding balanced)</i> <i>IEP Grant (USD 855.44)</i> <i>BGR Project (USD 45,484.55)</i> <i>KIGAM Unconventional Oil & Gas Project, Phase II (USD 10,808.15)</i> <i>KIGAM Groundwater Project, Phase II (USD 21,717.27)</i> <i>KIGAM-KNOC UnConventional Oil & Gas Project, Phase II (USD 20,122.60)</i> <i>INTERMIN Project (USD 7,818.99)</i>	55,203.55		66,561.80	
<i>Office equipment (net)</i>	(4,302.38)		(4,812.93)	
<i>Advance</i>	(36.79)		(13,273.45)	
<i>Account Receivable</i>	(19.13)		(19.18)	
<i>Tax deductible</i>	1,318.84		1,553.05	
Year-end Cash Balance	857,340.00		886,909.53	



At the 20th CCOP Select Finance Committee Meeting, October 2018, Busan, Republic of Korea

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ABBREVIATIONS

Below are the meaning of the abbreviations used in the context of this report.

AAPG – American Association of Petroleum Geologists	DMCR – Department of Marine and Coastal Resources, Thailand
ADB – Asian Development Bank	DOE – Department of Energy, Philippines
ADMAP – Antarctic Digital Magnetic Anomaly Project	DOM – Department of Mines, Lao PDR
AFMA – ASEAN Federation of Mining Association	DPIM – Department of Primary Industry and Mines, Thailand
AG – Advisory Group	DRM – Disaster Risk Management
AIST – National Institute of Advanced Industrial Science and Technology, Japan	DRR – Disaster Risk Reduction
APGN – Asia Pacific Geoparks Network	EAGER – East Asia Geoscience and Environmental Research
APSARA – Authority for the Protection and Management of Angkor and the Region of Siem Reap	ECF – Energy China Forum, China
AS – Annual Session of CCOP	EGRC – Expert Group on Resource Classification
ASCOPE – ASEAN Council on Petroleum	EGS – EuroGeoSurveys
ASEAN – Association of Southeast Asian Nations	EOR – Enhanced oil recovery
ASOMM – ASEAN Senior Officials on Minerals Meeting	EOS – Earth Observatory of Singapore
ASTIF – ASEAN Science, Technology and Innovation	ERDB – Energy Resource Development Bureau, Philippines
B2TKE – National Laboratory for Energy Conversion Technology, BPPT, Indonesia	ESCAP – Economic and Social Commission for Asia and the Pacific
BGR – Federal Institute for Geosciences and Natural Resources, Germany	EU – European Union
BGS – British Geological Survey	GAI – Geological Agency of Indonesia
BMZ – Federal Ministry for Economic Cooperation and Development, Germany	GC – Global Chemical Public Company (Thailand)
BPPT – Agency for the Assessment and Application of Technology	GDMR – General Department of Mineral Resources, Cambodia
CAMCF – China-ASEAN Mining Cooperation Forum	GDGMV – General Department of Geology and Minerals of Vietnam
CAMPETC - China ASEAN Mining Personnel Exchange & Training Center	GECC – Global Energy Cooperation Center, Republic of Korea
CC – Cooperating Country	GEOSEA – Regional Congress on Geology, Minerals and Energy Resources of Southeast Asia
CCOPTS – CCOP Technical Secretariat	GETECH – Geophysical Exploration Technology
CCS – Carbon Capture and Storage	GEUS – Geological Survey of Denmark and Greenland
CCUS – Carbon Capture, Utilisation and Storage	GIS – Geographic Information System
CGS – China Geological Survey	GMGS – Guangzhou Marine Geological Survey, China
CIFEG – International Center for Training and Exchanges in the Geosciences	GMS – Greater Mekong Subregion
CO – Cooperating Organisation	GSAF – Geological Society of America Foundation
CO ² – Carbon Dioxide	GSC – Geological Survey of Canada
COST – ASEAN Committee of Science and Technology	GSHP – Ground Source Heat Pump
CPC – Circum Pacific Council	GSI – Geoinformation Sharing Infrastructure
DENR – Department of Environment and Natural Resources, Philippines	GSJ – Geological Survey of Japan
DGM – Department of Geology and Minerals, Lao PDR	GSM – Geological Society of Malaysia
DGR – Department of Groundwater Resources, Thailand	GST – Geological Society of Thailand
DGSE – Department of Geological Survey and Mineral Exploration, Myanmar	GDE – groundwater dependent ecosystem
DMR – Department of Mineral Resources, Thailand	GTK – Geological Survey of Finland
	IAEA – International Atomic Energy Agency
	IAH – The International Association of Hydrogeologists
	IGCP – International Geoscience Programme Project
	IGDP – Integrated Geophysical and Geochemical Data Processing

IGF – InterGovernmental Forum on Mining, Minerals, Metals and Sustainable Development

Intermin – International Network of Raw Materials Training Centres

IOC – Intergovernmental Oceanographic Commission

IOMAC – Indian Ocean Marine Affairs Cooperation

IS-Geo – International School for Geoscience Resources, Republic of Korea

ITC – Institute of Technology of Cambodia

IUGS – International Union of Geological Sciences

IWMI – International Water Management Institute

JICA – Japan International Cooperation Agency

JMG – Department of Mineral and Geoscience Malaysia

JPDC – Jeju Province Development Cooperation

JORC – Joint Ore Reserve Committee

KES – Knowledge Enhancement and Sharing

KIGAM – Republic of Korea Institute of Geoscience and Mineral Resources

KNOC – Korean National Oil Company

MAMEA – Magnetic Anomaly Map of East Asia

MC – Member Country

MGB – Mines and Geoscience Bureau, Philippines

MEMR – Ministry of Energy and Mineral Resources, Indonesia

MME – Ministry of Mines and Energy, Cambodia

MONRE – Ministry of Natural Resources and Environment of Thailand, Vietnam

MONREC – Ministry of Natural Resources and Environmental Conservation, Myanmar

MoU – Memorandum of Understanding

MPF – Mining Policy Framework

MRA – Mineral Resources Authority, Papua New Guinea

MRPAM – Mineral Resources and Petroleum Authority of Mongolia

MT-JGSC – Malaysia Thailand Joint Geological Survey Committee

NECTEC – Thailand National Electronics and Computer Technology Center

NST – National Research Council of Science and Technology, Republic of Korea

NUOF – Newton-Ungku Omar Fund

PETRAD – Petroleum Management and Administration, Norway

PHIVOLCS – Philippine Institute of Volcanology and Seismology

PTT – Petroleum Authority of Thailand

PTTEP – PTT Exploration and Production Public Company Limited

RFG – Resources for Future Generations

SC – Steering Committee

SDMS - Support for a Sustainable Development of the Mining Sector

SEADPRI – Southeast Asia Disaster Prevention Research Initiative, Malaysia

SFC - Select Finance Committee of CCOP

SFDRR - Sendai Framework for Disaster Risk Reduction

SOA – State Oceanic Administration, China

SPC – Pacific Community in the Pacific Islands and Territories

TBA – Transboundary Aquifer

TC – Technical Cooperation

TGG – Task Group on Geohazards

TRT – Thermal Response Test

UGGp - UNESCO Global Geoparks

UKM – Universiti Kebangsaan Malaysia

UN – United Nations

UnCon – Unconventional Oil & Gas Resources Project

UNECE - United Nations Economic Commission of Europe

UNEP – United Nations Environment Programme

UNESCO – United Nations Educational, Scientific and Cultural Organization

UNFC – United Nations Framework Classification

VACI - Vietnam wAter Cooperation Initiative

VIGMR – Vietnam Institute of Geosciences and Mineral Resources

WDMAM - World Digital Magnetic Anomaly Map

YES Network - Young Earth Scientist Network



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