



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

CCOP ANNUAL REPORT 2015



*CCOP Technical Secretariat
Bangkok*

CONTENTS

- Message from the Chairman 2
- CCOP: Vision, Mission and Strategy 3
- Management and Organization 4
- Highlights for the Year 2015 5
- Technical Cooperation 10
- Technical Programmes and Activities 15
 - Geo-Resources Sector 15
 - Geo-Environmental Sector 30
 - Geo-Information Sector 36
- Fellowships and Grants 41
- Meetings and Missions 41
- Publications 42
- Financial Highlights 44
- List of Contacts 47



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Picture on cover page:

The dammed "Tianchi Lake" (Sky Lake). The formation of the lake was caused by landslide of Cuihoa mountain occurring in multiple phases starting ~2800 years ago.

MESSAGE FROM THE CHAIRMAN



CCOP will celebrate its 50th anniversary next year. Comparing it to the human life cycle, it is in the mature phase, the prime of life when a person is both mentally and physically fulfilled and able to pursue the goal with great confidence backed by a range of experience. So it is with CCOP. I see that the efforts we have made during the past half century are bearing big fruits as both tangible and intangible outcomes.

I would like to express my sincere appreciation to all the CCOP fellows for their enthusiastic participation in our activities. I also acknowledge the hardworking Technical Secretariat for their excellent performance under the leadership of the Director Dr. Adichat Surinkum. I am very proud of having such dedicated and good quality staff. Another special appreciation goes to Ms. Franca Schwarz for serving as the Chairperson of the Advisory Group. She and other Advisors devote hours to improve CCOP. Their honest advice and helpful recommendation are essential for the steady development of CCOP.

In November, the 5^{1st} Annual Session and the 65th Steering Committee Meeting held in an ancient capital of Xi'an of China were successfully ended with fruitful discussion and results, thanks to the efficient administration and warm hospitality of the local organizer. I sincerely appreciate the government of the People's Republic of China for their strong support to CCOP.

As CCOP will celebrate its Golden Anniversary Ceremony, which will take place under the theme of "CCOP's 50th: Geoscience for the Society" in Thailand in October 2016, a new five-year Strategic Plan and Action Plan have been drafted by the Working Group and approved by the Steering Committee at Xi'an.

One of its key words is "the visibility of CCOP." To increase our visibility to the world means to show our rich human resources and valuable data to the people outside the CCOP. In this respect, strengthening a function of geoscience data center of CCOP is a matter of high priority, and we need both well-experienced geoscientists and high-quality geoscientific data from each member country. It is worth special mention that several member countries in Southeast Asia have proposed and initiated an increasing number of projects for the Action Plan. I understand this is a very favorable movement. Let the Anniversary be a milestone for CCOP to take another step forward, and it is your contribution that makes CCOP keep growing.

My Chairpersonship will be completed by the end of 2015. The new Chair Dr. Kyu Han Kim of the Republic of Korea and new Vice-Chair Mr. Mior Sallehuddin Mior Jadid of Malaysia will lead CCOP in the coming two years. I sincerely hope that our human network will be strengthened further under their leadership so that we could support the development of the life of our region toward the future.

I wish all of you a prosperous New Year 2016!

*Dr. Eikichi Tsukuda
Chairman, CCOP Steering Committee*

Dr. Eikichi Tsukuda
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:

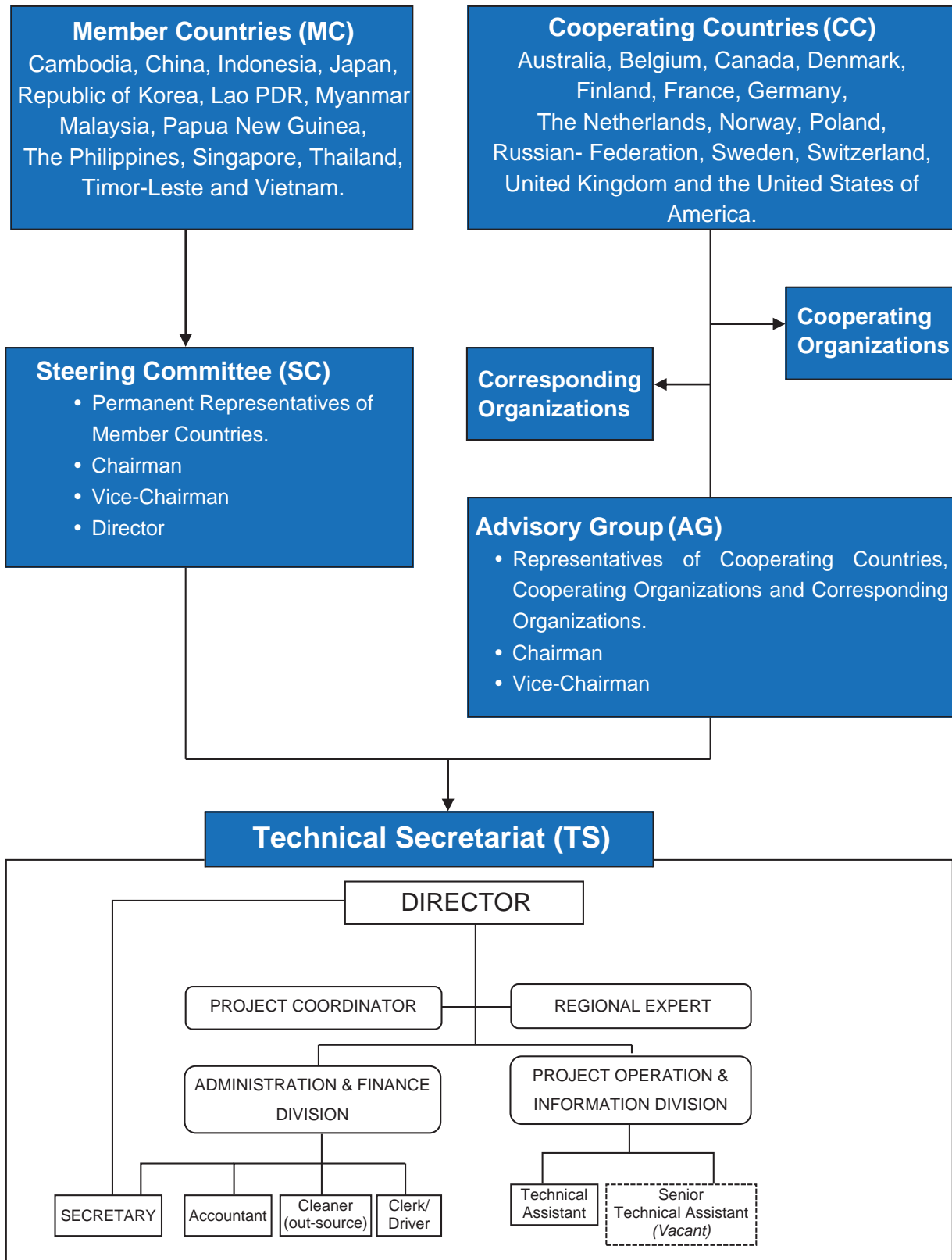
- **Outreach** – to enhance influence with decision makers, investors and the public through the provision of relevant Earth science information and to develop appropriate skills for communicating effectively with CCOP stakeholders.
- **Cooperation and Partnership** – to enhance the internal and external 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, 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, EURO-GEOSURVEYS, GETECH, IOC, IOMAC, IUGS, PETRAD, UN-ESCAP, UNEP, UNESCO, UKM and THE WORLD BANK.

MANAGEMENT AND ORGANIZATION



As of 31 December 2015, the CCOP Technical Secretariat (TS) has 10 personnel, comprising four professionals, five supporting staffs and one outsourced staff.

In 2015, **Dr. Eikichi Tsukuda**, Permanent Representative of Japan to CCOP and **Dr. Kyu Han Kim**, Permanent Representative of Korea to CCOP, continued to serve as Chairman and Vice-Chairman of the CCOP Steering Committee (SC), respectively. Their term started in January 2014, and will end on 31 December 2015. **Ms. Franca Schwarz**, Representative of Germany to CCOP and Head of Sub-Department International Cooperation, Federal Institute for Geosciences and Natural Resources (BGR), continued her services as Chairperson of the CCOP Advisory Group, with **Mr. Ioannis Abatzis**, Representative of Denmark to CCOP and Senior Geophysical Adviser, Department of Geophysics, Geological Survey of Denmark and Greenland (GEUS), as Vice-Chairperson.

The 64th Steering Committee Meeting in Krabi, Thailand, March 2015, approved the proposed Recruitment Procedure for CCOPTS Director for 1 April 2016 to 31 March 2019. Accordingly the CCOPTS together with the SC Chairman carried out the election process. The SC Chairman only received 1 (one) nomination from Thailand, nominating the incumbent CCOPTS Director. Therefore, **Dr. Adichat Surinkum** has been officially re-elected and signed the official appointment for the second term at the 65th Steering Committee Meeting in Xi'an, People's Republic of China held on 28-29 November 2015.

In August 2015, ACTION PLANNING MEETING for the CCOP Strategic Plan 2016-2020 was held at the Asia Hotel, Bangkok, Thailand. The Meeting was attended by delegates of the following Member Countries (MC): Cambodia, China, Indonesia, Japan, Republic Of Korea, Lao Pdr, Malaysia, Thailand and Vietnam. Also in attendance were Dr. Eikichi Tsukuda, Chairman, CCOP Steering Committee, **Ms. Franca Schwarz**, Chairperson of the Advisory Group (AG), **Dr. Oystein Berg**, Representative of PETRAD to CCOP, the Director and staffs of the CCOP TS. The CCOP Action Plan 2016-2020 was presented at the 65th SC Meeting and was endorsed with amendments.

Regarding the changes of Permanent Representative (PR) of Member Countries to CCOP in the year 2015, **Mr. Mior Sallehuddin Mior Jadid**, Director General, Mineral and Geoscience Department, Malaysia succeeded **Dato' Yunus Abdul Razak** as Permanent Representative of Malaysia to CCOP.

HIGHLIGHTS FOR THE YEAR 2015

The 64th and 65th CCOP Steering Committee Meetings and the 51st CCOP Annual Session

The 64th Steering Committee Meeting

The 64th CCOP Steering Committee Meeting was held at the Krabi Resort, Krabi, Thailand on 24-26 March 2015. The Meeting was attended by delegates of the following Member Countries (MC): Cambodia, China, Indonesia, Japan, Republic Of Korea, Lao Pdr, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Timor-Leste and Vietnam. Also present were **Ms. Franca Schwarz**, Chairperson of the Advisory Group (AG), and the Director and staff of the CCOP Technical Secretariat (CCOP TS).

Welcoming remarks were made by **Mr. Arkom Youttana**, the Director, Provincial Office of Natural Resources and Environment, Krabi Province and **Mr. Supot Jermsawatdipong**, Permanent Representative of Thailand to CCOP, Director-General of the Department of Mineral Resources, Thailand. The Chairman of the CCOP Steering Committee Meeting, Permanent Representative of Japan to CCOP and Director-General of the Geological Survey of Japan, AIST, **Dr. Eikichi Tsukuda** opened the 64th CCOP Steering Committee Meeting.

A Signing Ceremony, formally accepting Myanmar as a Member of CCOP took place after the Opening Ceremony of the 64th SC Meeting. Representing Myanmar is **Dr. Ye Myint Swe**, Director General, Department of Geological Survey and Mineral Exploration, Ministry of Mines, and representing CCOP is **Dr. Eikichi Tsukuda**, Chairman of CCOP Steering Committee and Permanent Representative of Japan to CCOP. The signing ceremony was witnessed by **Mr. Supot Jermsawatdipong**, Permanent Representative of Thailand to CCOP and Director-General, Department of Mineral Resources (DMR) and **Dr. Adichat Surinkum**, Director, CCOP Technical Secretariat.



(L-R) *Mr. Supot Jermsawatdipong, Dr. Ye Myint Swe, Dr. Eikichi Tsukuda, Dr. Adichat Surinkum.*

Aside from the endorsed Revised Workplan and Budget for 2015, the following decisions were made by the Meeting.

The Meeting adopts the proposed Strategic Plan 2016-2020 in principle, and tasked the CCOPTS to circulate the proposed Strategic Plan to all the Member Countries for final comments by end of April 2015. After which, the CCOP TS will request the MC to submit their proposed Action Plan based on the final Strategic Plan before August 2015. A technical working group will be formed and given the tasked to finalize the Action Plan in August 2015.

On the 50th year anniversary celebration of the founding of CCOP, the Meeting decided the theme, “CCOP’s 50th: Geoscience for the Society”, and agreed to produce a jubilee book. This book will be an update of the 2006 CCOP book ‘A World of Difference’, to bring each chapter up to date by adding important changes to CCOP and its procedures / programmes in the period 2006 – 2016, plus a pictorial history of 50 years of CCOP (meetings, programmes, personalities, events from the CCOP archive, from Member Countries, Cooperating Countries and personal archives). All countries have to be involved; a core team could be the voluntary editorial team of Indonesia, Japan, Lao PDR, Malaysia, Thailand, and Vietnam, plus Dr Anthony Reedman. The Meeting tasked the CCOP TS to facilitate sending out letters to MCs for nomination of contributors to this book. All the contributions for the book will be forwarded to the CCOP TS. The Meeting also decided to have a logo for this 50th year anniversary celebration, and considers inviting high ranking personalities at the celebration, and previous SC Chairmen, CCOP TS Directors, Honorary Advisers.

The Meeting endorsed the proposal of the CCOP TS to formalize CCOP’s role as a Principal Member of 1G Consortium, starting with minimum annual membership fee of Euro 5,000.

On the recruitment of the CCOP TS Director for 1 April 2016 to 31 March 2019, the Meeting approved the proposed timetable of the election process. In addition, the candidates will be asked to send a paper on his/her vision and plans for CCOP as CCOP TS Director.

The Memorandum of Agreement between CCOPTS and KIGAM for the implementation of the Unconventional Oil & Gas Project was signed at the Meeting by **Dr. Young Joo Lee**, Executive Director of KIGAM’s Petroleum & Marine Research Division, and Dr Adichat Surinkum, CCOP TS Director, and witnessed by **Dr. Eikichi Tsukuda**, Chairman of the CCOP Steering Committee. Financially sponsored by KIGAM, this Project will run for 3 years starting from 2015.

The 51st CCOP Annual Session

The 51st Annual Session (AS) of the Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP) was held at Shaanxi Guesthouse in Xi'an, People's Republic of China on 24-27 November 2015. It was organized by China Geological Survey (CGS), Ministry of Land and Resources of the People's Republic of China, and co-organized by Xi'an Center of Geological Survey, CGS Qingdao Institute of Marine Geology, CGS Guangzhou Marine Geological Survey, CGS Shaanxi Yanchang Petroleum (Group) Co., Ltd., Qinling Zhongnanshan Global Geopark Park Tourism Development Co., Ltd. and Henan Shanshui Geological Tourism Resources Development Co., Ltd, with the CCOP Technical Secretariat (CCOP TS).

The Session was attended by 109 delegates coming from the Member Countries (Cambodia, China, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Timor-Leste, Thailand and Vietnam), Cooperating Countries (Denmark, Finland, And United Kingdom), Cooperating Organizations (EuroGeoSurveys and Universiti Kebangsaan Malaysia), Observer (Secretariat of the Pacific Community Geoscience Division, formerly SOPAC) as well as Honorary Advisers of CCOP and staff of the CCOP Technical Secretariat.



Delegates from CCOP Member Countries and, Cooperating Countries and Organizations, CCOP Honorary Advisers, and staff of the CCOP TS, at the 51st CCOP Annual Session.

At the Session's Opening Ceremony, welcome addresses were delivered by **Dr. Li Jinfa**, the Permanent Representative of China to CCOP, and Vice-President of China Geological Survey (CGS), Ministry of Land and Resources (MLR), P.R. China; and **Mr. Bai Xingbi**, the Deputy Director-General of Department of Science, Technology, and International Cooperation, Ministry of Land and Resources of P. R. China. Special Messages were given by **Mr. Ioannis Abatzis**, Vice-Chairperson of CCOP Advisory Group, Representative of Denmark to CCOP, Chief Geoscientific Advisor, Geological Survey of Denmark and Greenland (GEUS); and **Dr. Eikichi Tsukuda**, Chairperson of CCOP Steering Committee, Permanent Representative of Japan to CCOP & Director-General of the Geological Survey of Japan, AIST.

The opening address was delivered by **Dr. Zhang Hongtao**, the Counsellor of State Council of P. R. China (former Permanent Representative of China to CCOP and former Chief Scientist of Ministry of Land and Resources of P. R. China). **Mr. Ma Yongzheng**, Deputy Permanent Representative of China to CCOP, was elected Chairperson of the Session, and **Mr. Surachai Siripongsatian** and **Mr. Sommai Techawan**, from Thailand, were elected Vice-Chairpersons. As Rapporteurs were elected representatives from Republic of Korea (**Mr. Hee Soo Kim**) and United Kingdom (**Dr. Michael Patterson**).

The CCOP Progress Report started by a presentation of the updates of the CCOP CO₂ Storage Mapping Program (CCS-M) by its Project Coordinator, **Mr Simplicio Caluyong**. **Dr. Adichat Surinkum**, Director of the CCOP Technical Secretariat, 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 2014 with emphasis on the progress during January to June 2015. The Member Countries, Cooperating Countries and Cooperating Organizations represented at the Session made presentations on their country and organization report.

KIGAM-GTK MoU Signing Ceremony

On the occasion of the 51st CCOP Annual Session, the Korea Institute of Geoscience and Mineral Resources (KIGAM) and the Geological Survey of Finland (GTK) represented by **Dr. Kyu Han Kim**, Permanent Representative of Korea to CCOP, President of KIGAM and **Mr. Mika Nykanen**, Director General of GTK, signed an Annex to the existing KIGAM-GTK Memorandum of Understanding (MoU) October 2013, for future collaboration, starting from the field of the High Level Radioactive Waste Disposal. The signing ceremony was witnessed by **Mr. Ma Yongzheng**, Chairman of the 51st CCOP Annual Session and **Dr. Eikichi Tsukuda**, Chairman of the CCOP Steering Committee, together with all the delegates from Member Countries and Cooperating Countries and Organizations.

The CCOP Workplan for 2016 was presented by the CCOPTS Director for the information and comments of the Session. The Advisory Group met and discussed separately, and presented at the Session their recommendations for CCOP. Thailand Delegation informed the Session that Thailand will host the 52nd CCOP Annual Session in 2016 that is also the 50th year anniversary of the founding of CCOP. It will be held on 30 October to 3 November 2016 in Bangkok, Thailand.

A thematic session on the topic “Coastal Geology & Disaster Prevention and Reduction” was held with contribution of 51 presentations, including 22 talks and 29 posters. Aiming to exchange updated information and research results on coastal and marine geology, with application in understand the risk and mechanism of coastal geohazards in East and Southeast Asia, the Thematic Session included the 4 sub-sessions: S-1: Coastal geological survey & research activities, technologies and methods; S-2: National and regional coastal disaster status and challenges; S-3: National strategy and action on coastal disaster prevention and reduction and Keynote session: Future collaboration suggestion under CCOP framework. Field investigation of Cuihua rock avalanche was organized on the last day. Highlights of the investigation include visits to the Cuihuashan scenic area, geological museum, icy and windy caves, landscapes of residual peaks, and the barrier lake.



51AS Delegates at the Museum of Qinling Zhongnan shan Geopark, first stop during the field investigation.

The 65th Steering Committee Meeting

Following the 51st CCOP Annual Session is the 65th CCOP Steering Committee Meeting held on 28-29 November 2015 at the same venue. The Meeting was attended by delegates of the following Member Countries: Cambodia, China, Indonesia, Japan, Republic Of Korea, Lao Pdr, Malaysia, Myanmar, Thailand, Timor-Leste and Vietnam. Also present was **Dato' Yunus Abdul Razak**, member of the Advisory Group (AG) and the Director and staff of the CCOP Technical Secretariat (CCOP TS). The Director presented the CCOP Progress Report covering the period from 1 January 2015 to 30 June 2015. The report included the administration and personnel, finance, technical cooperation and project support, technical activities, fellowships and grants, publications and documentations. He also presented the actions taken according to the recommendations of all previous CCOP Steering Committee Meetings and proposed workplan, budget for 2016, which were consequently approved by the Meeting with some amendments.

Mr. Simplicio Caluyong, CCS-M Program Coordinator presented the report of the CCOP CO₂ Storage Mapping Program (CCS-M).

The Meeting endorsed the Action Plan for the CCOP Strategic Plan 2016-2020 presented by the CCOP TS Director with amendments.

The Cambodia Delegation informed the Meeting that the 66th CCOP Steering Committee Meeting is planned to be held on 9-11 March 2016 at Sokha Angkor Resort, in Siem Reap, Cambodia.

The Thailand Delegation reported that the 52nd CCOP Annual Session and the 67th CCOP Steering Committee Meeting will be held on 30 October to 5 November 2016 in Bangkok, Thailand. The CCOP TS Director reported the preparations being made for CCOP's 50th year celebration, in close cooperation with Thailand, as host of the 52nd CCOP Annual Session in year 2016 which includes: logo making, MC/CC Embassies in Bangkok visits, road shows, special exhibition with international organizations on the themes - Geopark, Dinosaur, Water.

The Meeting endorsed the Director's proposal on the process and time table for the recruitment of Headquarter-based Regional Expert of CCOP Technical Secretariat (16 August 2016 - 15 August 2018).

The Meeting elected **Dr. Kyu Han Kim**, Permanent Representative of the Republic of Korea as Chairperson, and **Mr. Mior Sallehuddin Mior Jadid**, Permanent Representative of Malaysia as Vice-Chairperson of the CCOP Steering Committee for the term January 2016 to December 2017.

On the copyright of GSJ-CCOP Map publications, the Meeting gave permission to the Geological Survey of Japan, to apply the same copyright rule they are adopting for the use of other GSJ Map publications.

On EAGER Project, the Meeting agreed on the proposed revision of utilizing an alphabetical listing of the countries to receive the annual EAGER Award, with amendments for the first cycle as follows: 2016 - Timor-Leste, 2017 - Myanmar, 2018 - Cambodia and 2019 - Lao PDR. As for the 2nd cycle, the listing of countries will be confirmed by the Steering Committee in 2019.

As proposed by Japan Delegation, **Dr. Adichat Surinkum** and **Dr. Eikichi Tsukuda** as Chairman of the CCOP SC signed the official appointment for **Dr. Adichat's** second term as the Director of the CCOP TS, from April 2016 to March 2019.



*Official appointment of **Dr. Adichat Surinkum** for his second term as CCOP TS Director.*

CCOP New Membership

A Signing Ceremony, formally accepting Myanmar as a Member of CCOP took place at the 64th CCOP Steering Committee Meeting held on 24-26 March 2015 in Krabi, Thailand. Continuing efforts are being made in expanding membership and network of CCOP. Towards this, the following countries and organizations have been invited as Observers to the 51st CCOP Annual Session in Xi'an: Brunei, Mongolia, ASEAN Secretariat, Earth Observatory of Singapore, Global CCS Institute, International Atomic Energy Agency (IAEA) and SOPAC.

The CCOP TS continued its efforts in pursuing new memberships in particular, Brunei and Mongolia as new Member Countries.

TECHNICAL COOPERATION

In 2015, CCOP continued to collaborate with its MCs, CCs and COs to implement the planned activities in the approved CCOP Workplan 2015, and also adopt activities in the addressed new areas of concern as they arose. With strategic focus on outreach activities for the benefit of societies, activities have been continuously developed thanks to generous support by funding agencies and in-kind contribution by member countries to optimize the benefits of the partly sponsored programmes.

Below table summarizes the ongoing activities and cooperation in planning or discussion among Member countries, Cooperating Countries and Cooperating Organizations.

Other Cooperating Countries generally continued their technical support to a number of multilateral and bilateral technical cooperation (TC) activities in CCOP Member Countries by providing valuable advice and guidance as well as resource persons and technical assistance. Thanks are due to all the Cooperating Countries and Organizations for their provision of representatives to CCOP who have contributed in large measure to the review, assessment and formulation of CCOP work programmes and for the contribution of technical information.

Summary of CCOP Technical Activities with Member Countries, and Cooperating Countries & Organizations in 2015

Country/ Organization	CCOP Technical Activities
CAMBODIA	Cambodia continues to provide resource persons to participate in CCOP technical activities.
CHINA	<p>China hosted the 51st CCOP Annual Session, the 65th CCOP Steering Committee and side meetings in conjunction.</p> <p>MRL/SCORG of China organized and sponsored MLR China-ASEAN Conference on Shale Gas Exploration and Development for CCOP member countries on 17 - 19 November 2015, Chongqing, China, together with one side event - MLR – CCOP – KIGAM Project Coordination Meeting on 16 November 2015.</p> <p>ECF of China organized in cooperation with CCOP the 5th Asia Shale Gas Summit and Asia-Pacific Unconventional Resource Tech & Equip EXPO (ECF2015) on 12-14 October 2015 in Shanghai, China.</p> <p>China Geological Survey (CGS) continues to support for the CCOP-CGS Capability Enhancing in Integrated Geophysical and Geochemical Data Processing Project (IGDP) with The 3rd IGDP Workshop/Training held on 12-14 November 2015 in Beijing, China.</p> <p>CGS continues to support for the CCOP/ASEAN Geochemical Mapping Project 2011-2015.</p> <p>CGS continues to support for AMOS project.</p>
INDONESIA	<p>Geological Agency of Indonesia (GA) and LEMIGAS cooperated with CCOP to hold CCS-M Indonesia case study workshop (C1W1) in Bali, Indonesia on 25-27 February 2015.</p> <p>Geological Agency of Indonesia (GA) and LEMIGAS cooperated with CCOP to hold CCS-M C1W2: Indonesia case study- Workshop on Public Engagement (C1W2) on 4-6 November 2015, Surabaya, Indonesia.</p> <p>Indonesia continues to provide own-cost resource persons to participate in CCOP technical activities.</p>
JAPAN	<p>GSJ continued to support for Phase III of the CCOP-GSJ Groundwater Project. In 2015, the CCOP-GSJ Groundwater Project meeting was held on 10-12 February 2015, in Bangkok, Thailand. Within this project, a Sub-Project Meeting on "Development of Renewable Energy for Ground-Source Heat Pump System (GSHP)" was being implemented with one meeting organized on 10 June 2015 at Department of Geology, Chulalongkorn University in Bangkok, Thailand. A demonstrative site GSHP System is under preparation for installing at Golden Jubilee Geological Museum in Phatum Thani province in February 2016.</p>

Country/ Organization	CCOP Technical Activities
JAPAN	<p>GSJ continues to support for Phase III of the CCOP-GSJ DeISEA project. In 2015, within framework of this project, the CCOP-GSJ/AIST-KIGAM-PKNU DeISEA III Kick-off meeting was organized on 2-6 March 2015 in Busan, Republic of Korea. In addition, the project leader has facilitated for the Delta Session in the XIX INQUA (International Union for Quaternary Research) to be co-organized by GSJ/AIST and CCOP, with attendance by 2 DeISEA participants from CCOP member countries.</p> <p>GSJ continues to support for the CCOP/ASEAN Harmonized Geology Project, including a series of Web-GIS training courses and meetings in CCOP member countries.</p> <p>GSJ supports for the GSi project with kick-off meeting on 1-2 September 2015 in Bangkok, Thailand and coordination meeting on 25 November 2015, during the 51st CCOP Annual Session in Xi'an, China.</p> <p>GSJ continues to support for the new initiative on High Education Support Network in CCOP region.</p> <p>GSJ continues to support for the CCOP Book Project on “Stone Heritages in East and South East Asia”, which plans to be released and distributed in February 2016.</p>
REPUBLIC OF KOREA	<p>KIGAM continued to sponsor for CCOP-KIGAM Unconventional Oil & Gas Project (UNCON): Mapping of Black Shale Formations for the Prediction of Shale Resources, with the 3rd Technical Meeting and Workshop (UCM3) on 22 – 24 September 2015 in Chiangmai, Thailand and a coordination meeting among MLR, CCOP and KIGAM on this project, as a side meeting of the MLR China-ASEAN Conference on Shale Gas Exploration and Development on 16 November 2015 in Chongqing, China.</p> <p>KIGAM continued to support for a 5-year CCOP-KIGAM Project (2013-2017) “Solution for Groundwater problems in CCOP region” with one CCOP-KIGAM-UNESCO-DGR Workshop on Sustainable Groundwater Management in Mekong River Basin on 19-20 May 2015 in Bangkok, Thailand. A CCOP-KIGAM-UNESCO publication on “Current Status and Issues of Groundwater in the Mekong River Basin” was also released in December 2015, which will be distributed to CCOP member countries in 2016.</p> <p>KIGAM/ ISGeo cooperated with CCOP to organize S18 - A technical session at ICAMG-8 in Jeju, Korea on 5-10 October 2015 for CCOP member countries as a module of the Coastal Geology and Geohazards regular training course.</p> <p>KIGAM and ISGeo continued to support and organize 04 Regular Training Courses in ISGeo, Daejeon, Korea for CCOP MCs:</p> <ol style="list-style-type: none"> 1- Petroleum Exploration, Development and Production, held on 19 January through 13 February 2015. 2- Exploration and Evaluation of Mineral Resources on March 2 through April 20, 2015. 3- Coastal Geology and Geohazards, held as a technical session at ICAMG-8 in Jeju, Korea on 5-10 September 2015 and on 11-21 September 2015 in IS-Geo, Daejeon, Korea. 4- Landslide and slope stability assessment & Groundwater Theory and Practices on November 9 ~ December 4, 2015. Korea continues to provide own-cost resource persons to participate in CCOP technical activities.

Country/ Organization	CCOP Technical Activities
LAO PDR	<p>Lao PDR cooperated with CGS (China) to host a field trip and technical seminar with CGS in 2015 in Lao PDR within the framework of the project CCOP/ASEAN Geochemical Mapping Project, supported by CGS, China.</p> <p>Lao PDR continues to provide resource persons to participate in CCOP technical activities.</p>
MALAYSIA	<p>Minerals and Geoscience Department and PETRONAS cooperated with CCOP to conduct the CCS-M Workshop (C2W1): Malaysia Case Study on 2 – 4 June 2015 in Penang, Malaysia.</p> <p>Malaysia continues to provide own-cost resource persons to participate in CCOP technical activities.</p>
PAPUA NEW GUINEA	<p>PNG gave more effort in providing resource persons from different sectors to participate in CCOP technical activities.</p>
PHILIPPINES	<p>The Mines and Geosciences Bureau (MGB) continues to support the CCOP Book Project: “Best practices on Mine Decommissioning & Rehabilitation Plan in CCOP region”. MGB, DENR cooperated with CCOP to organize a Regional Meeting on the Production of CCOP Coffee Table Book “Best practices on mine rehabilitation and decommissioning” on 22-25 June 2015 in the Philippines.</p>
SINGAPORE	<p>Singapore continues to be updated with CCOP activities from CCOP TS.</p>
THAILAND	<p>DMR hosted the 64th CCOP Steering Committee in Krabi, Thailand on 22-26 March 2015 and 2 side meetings:</p> <ol style="list-style-type: none"> 1- UNCON Coordination meeting on 22-23 March 2015. 2- Seamless Geology Project meeting on 23 March 2015. <p>Department of Mineral Fuels (DMF) cooperated with CCOP to organize CCS-M S4: Workshop on Assessment of Oil and Gas Resource/Reserves Reports on 22- 23 April 2015 in Bangkok, Thailand; and CCS-M S5 (CCOP-DMF Proj – WS3) Project on Petroleum Resources / Reserves Classification and Reporting System - 3rd Workshop: Maximizing the value of oil and gas resources on 8-10 September 2015 in Bangkok, Thailand.</p> <p>DMR and EGAT co-organized with CCOP the CCOP- DMR-EGAT Mae Moh Workshop on Clean and Green Mining on 21- 24 January 2015 in EGAT Mae Moh, Lampang, Thailand.</p> <p>DMR co-organized with CCOP, GTK (Finland) and VIETADAPT (Vietnam) the GTK - CCOP - DMR Workshop on Geohazards and Climate Change on 15 June 2015 at DMR Conference Room in Bangkok, Thailand.</p> <p>DMR and DGR of Thailand continued to support and provide sites for installing a GSHP System within sub-project “Development of Renewable Energy for Ground-Source Heat Pump System” of the CCOP-GSJ Groundwater Project.</p> <p>DMR of Thailand hosted and co-organized with CCOP the 2nd CCOP-UNESCO Symposium on Developing Geoparks within East & Southeast Asia region - Geoparks in Mekong Countries on 22-24 July 2015 in Nakhon Ratchasima, Thailand.</p> <p>DMR of Thailand hosted and co-organized with CCOP the GSi Project Kick-Off Meeting on 1-2 September 2015 in Bangkok, Thailand.</p> <p>Thailand continued to invite CCOP to attend and present technical reports at geoscientific meetings in Thailand to promote the visibility of CCOP in the region. DMR continues to support for the Permanent Office Building for CCOP T/S in DMR Complex, Bangkok, Thailand.</p>

Country/ Organization	CCOP Technical Activities
VIETNAM	<p>VIETADAPT (Vietnam) co-organized with CCOP, GTK (Finland) and DMR the GTK - CCOP - DMR Workshop on Geohazards and Climate Change on 15 June 2015 at DMR Conference Room in Bangkok, Thailand.</p> <p>VIGMR, DGMV, VACI and VIETADAPT Project of Vietnam continued to invite CCOP to attend and present technical reports at geoscientific meetings in Vietnam to promote the visibility of CCOP in the region.</p>
Cooperating Countries	
AUSTRALIA	<p>Australia supported the establishment of Global CCS Institute (GCCSI). The GCCSI supported the First Phase of CCS-M amounting to USD 0.5 Million. Australia also provides resource persons to the CCOP activities in the energy sector.</p>
BELGIUM	<p>Belgium continues to be updated with CCOP activities from CCOP TS.</p>
CANADA	<p>Canada is now more focus on geohazards during winter, which are the same with China and Japan. Canada also offer scholarship and CCOP TS is now following up with Ms. Carmel Lowe, Director of GSC.</p>
DENMARK	<p>Denmark continues to assist CCOP in seeking funding support for CCOP activities.</p>
FINLAND	<p>GTK (Finland) and VIETADAPT project team (Vietnam) co-organized with CCOP and DMR the GTK - CCOP - DMR Workshop on Geohazards and Climate Change on 15 June 2015 at DMR Conference Room in Bangkok, Thailand.</p> <p>GTK (Finland) and VIETADAPT project team (Vietnam) invited CCOP representatives to attend the Project meeting in Da Nang, Vietnam on 23-26 October 2015 and continued to cooperate with CCOP to plan for further meetings in 2016 for CCOP member countries on the topics of groundwater and climate change.</p>
FRANCE	<p>UNESCO in France sent resource persons to facilitate the 2nd CCOP-DMR-UNESCO Symposium on Developing Geoparks within East & Southeast Asia region - Geoparks in Mekong Countries on 22- 24 July 2015 in Nakhon Ratchasima, Thailand.</p> <p>France continues to be updated with CCOP activities from CCOP TS.</p>
GERMANY	<p>BGR continues to assist CCOP MCs in Geoscience programs, especially focusing on requests from MCs.</p> <p>BGR supported for CCOPTS to attend the BGR-VACI Workshop on Integrated management of coastal groundwater in East and Southeast Asia in Hanoi, Vietnam on 19-21 October 2015.</p>
THE NETHERLANDS	<p>The Netherlands continues to be updated with CCOP activities from CCOP TS.</p>
NORWAY	<p>The Norwegian Government through the Royal Norwegian Embassy (RNE) – Jakarta is also providing funds to support some of the activities of the CCS-M Program. The Norwegian Petroleum Directorate (NPD) also provided resource persons in the CCS-M Program and PETRAD activities. PETRAD, organized the CCS-M Case Study Tour in Norway on 5-10 May 2015.</p>
POLAND	<p>Poland continues to be updated with CCOP activities from CCOP TS.</p>
RUSSIA	<p>Russia continues to be updated with CCOP activities from CCOP TS.</p>
SWEDEN	<p>Sweden continues to be updated with CCOP activities from CCOP TS.</p>
UNITED KINGDOM	<p>BGS continues to support bilateral projects with MCs. Cooperated with GETECH in the production and sale of aeromagnetic and gravity maps for CCOP.</p> <p>BGS visited CCOPTS in Bangkok, Thailand on 14-15 September 2015 to discuss on cooperation possibilities.</p>

Country/ Organization	CCOP Technical Activities
UNITED STATES OF AMERICA	<p>Annual EAGER Research Grant by the Geological Society of America for CCOP Annual Session host country.</p> <p>USGS provided resource persons to the CCS-M Program in the area of national assessment of geological CO₂ storage sites and UnCon Project.</p>
Cooperating Organizations	
ASEAN COUNCIL ON PETROLEUM (ASCOPE)	<p>ASCOPE maintained close cooperation with CCOP TS through jointly organized seminars and information exchange for the benefit of the Member Countries.</p> <p>ASCOPE recently published the ADG (ASCOPE Decommissioning Guideline) Book that was developed in cooperation with CCOP and PETRAD.</p> <p>CCOP TS participated in ASCOPE Joint Committee meetings to discuss current issues on CCOP and ASCOPE energy program.</p>
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP)	<p>Information exchange and discussion, cooperation on technical activities as well as organizing workshops and conferences. CCOP reports to the UN-ESCAP Commission Session and participates in the subcommittee meetings.</p> <p>CCOP participated in the 71st UN-ESCAP Session (Phase II) on 25 to 29 May 2015 in Bangkok, Thailand.</p>
EURO- GEOSURVEYS	<p>CCOP TS and EuroGeoSurveys continue to exchange information on Geosciences. EuroGeoSurveys invited CCOP TS to join the Annual Session meetings.</p>
GETECH	<p>Supported in the production and sale of aeromagnetic and gravity maps.</p>
INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)	<p>CCOP is an Associate Member of IUGS and annually submits an activity report.</p>
PETRAD	<p>All reports from previous PETRAD seminars in East and Southeast Asia are available through the CCOP TS in Bangkok.</p> <p>PETRAD cooperated with CCOP in organizing the CCS-M study tour in Norway on 5-10 May 2015.</p>
Universiti Kebangsaan Malaysia (UKM)	<p>UKM continued to facilitate the connection between CCOP and other geoscience agencies / associations.</p>
UNEP	<p>CCOPTS continued to submit report to UNEP annually and has attended the 71st UN-ESCAP Session (Phase II) on 25 to 29 May 2015 in Bangkok, Thailand.</p>
UNESCO	<p>UNESCO cooperated with CCOP and DGR to compile and edit the CCOP-KIGAM-UNESCO publication on “Current Status and Issues of Groundwater in the Mekong River Basin”, released in December 2015.</p> <p>UNESCO cooperated with CCOP and co-sponsored for the 2nd Symposium on Developing Geoparks within East & Southeast Asia region - Geoparks in Mekong Countries on 22-24 July 2015 in Nakhon Ratchasima, Thailand.</p> <p>UNESCO, ADB in Lao PDR and CCOPTS formulated the proposal on groundwater to apply for the Adaptation Fund in September 2015.</p> <p>UNESCO continues to assist CCOP in seeking funding support for CCOP activities. A proposal on groundwater development has been submitted to Adaptation Fund in late 2015.</p>
WORLD BANK	<p>CCOPTS plan to use the remaining World Bank budget from CASM Workshop for technical activities scheduled in 2016.</p>

TECHNICAL PROGRAMMES AND ACTIVITIES

During 1 January to 31 December 2015, within framework of 24 on-going programs/projects under 3 sectors, a total of 33 training/workshop activities have been carried out and attended by 883 participants from the Member Countries. With strategic focus on capacity building, knowledge sharing and technology transfer, workshops, seminars, training courses, working group meetings and expert visits were conducted during the reporting period and were highly appreciated by the Member Countries participation.

Summary of CCOP Member Countries' Participation in Technical Activities

Sector	No. of activities	No. of participants
Geo-resources	20	599
Geo-environment	8	187
Geo-information	5	97
TOTAL	33	883

GEO-RESOURCES SECTOR

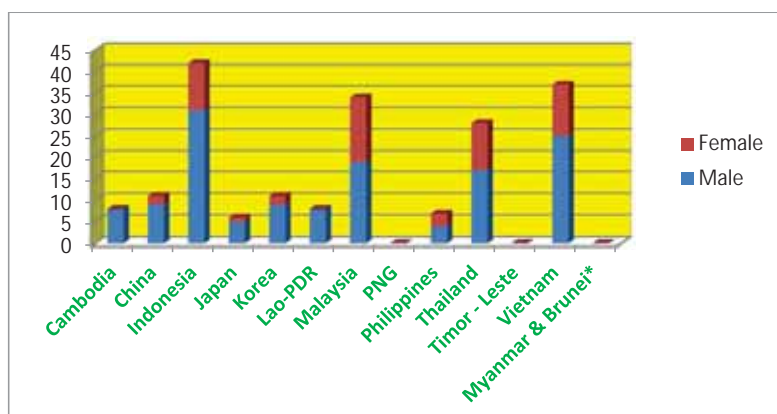
CCS-M PROGRAM

The CCOP CO₂ Storage Mapping Program (CCS-M) is a 4-year program that promotes collaboration among CCOP Member Countries in mapping potential geological storage of CO₂. The program started in April 2013 with the Signing of the Agreement between CCOP and Global Carbon Capture & Storage Institute (GCCSI) during the 60th CCOP Steering Committee Meeting in Ubon Ratchathani, Thailand (March 26, 2013), CCOP and Global CCS Institute signed the Agreement to implement the Facilitation Phase (Year 1).

The Agreement includes a fund commitment from GCCSI in the amount AUD0.5 Million to support the capacity building activities of CCS-M. On November 28, 2013, the Norwegian Government through the Royal Norwegian Embassy in Jakarta signed with CCOP an Agreement to support the CCS-M Program with a fund commitment of NOK5.0 Million to cover the activities of CCS-M during the period 1 December 2013 – 31 December 2015. The total budget requirement of CCS-M is USD2.0 Million. The goal of the CCS-M is to enable the government organizations in the CCOP Member Countries to:

1. Provide a high level overview of the potential for large-scale CO₂ storage;
2. Enhance their capacity and capability in the assessment of geological sites for the safe and long-term storage of CO₂; and
3. Increase their understanding of the potential of CO₂ for enhanced oil/gas recovery.

During the reporting period, CCS-M Program implemented 5 technical Workshops, 5 coordination meetings and a Study Tour in Norway for the case study host countries. The CCOP Guideline on the Methodologies for Selecting Geological CO₂ Storage and Estimation of Storage Capacities (version 1) or CCS-M Guideline was tested by the case study countries, particularly Indonesia and Malaysia in their basin assessment for potential CO₂ storage. A total of 244 participants from the Member Countries participated in the technical activities of CCS-M bringing to 607, the total number participants since the Program's launching in April 2013. Female participants represented 30% of the total.



During the year 2016, the CCOP TS will continue to promote CCS-M and seek for additional funding to support the technical activities planned for the next two (2) years. For details on the technical activities, please see the CCS-M Webpage, <http://www.ccop.or.th/ccsm>.



Participants at the C1W1 Field Trip.

CCS-M Indonesia case study workshop (C1W1)

The C1W1 was organized in Bali, Indonesia on 25-27 February 2015 in cooperation with the Geological Agency and LEMIGAS, both under the Ministry of Energy and Mineral Resources (ESDM)- Indonesia, supported by the Norwegian Ministry of Foreign Affairs thru the Royal Norwegian Embassy - Jakarta and Global CCS Institute.

The Workshop aims for the participants to have a deeper understanding on the methodologies for the selection of technically accessible CO₂ storage reservoir and estimation of storage capacity. The agenda included hands-on exercises to assess and test the CCOP Guideline on the methodologies using data from selected basins in Indonesia. Case studies and discussions on geological storage characterization were also accomplished in the Workshop.

There were 49 participants including Resource Persons from Australia and Indonesia (LEMIGAS and ITB) representatives from CCOP member countries and the CCOP Technical Secretariat.

CCS-M S4: Workshop on Assessment of Oil and Gas Resource/Reserves Reports

Under the CCOP – DMF Project on Petroleum Resources /Reserves Classification and Reporting System, this Workshop was successfully conducted in Bangkok, Thailand on 22-23 April 2015, with a total attendance of 44 participants from 8 CCOP Member Countries and Norway. The number includes the experts on resource classification and reporting from Norwegian Petroleum Directorate (NPD), Gaffney Cline & Associates (GCA), PETRONAS (Malaysia) and SINOPEC (China) and from the CCOP Technical Secretariat. About half of the participants are from Thailand, representing the Department of Mineral Fuels (DMF Thailand), subsidiaries of PTT and Professional organizations. About 30% of the participants are female.

S4 provided a forum of sharing experiences and best practices to contribute to the capacity development objectives of CCOP. In this particular workshop the success stories of selected CCOP countries (Malaysia and China) and Norway, in petroleum classification and reporting are presented (and discussed) with potentials to be replicated and adapted by other member countries. GCA, a very prestigious consulting company, was also invited to present the challenges and solutions involved in the resource maturation process, and some of the 'grey areas' that companies and regulators must deal with.

The member countries were given the task of reviewing their petroleum reporting and classification system and to look for areas of improvement. They can also conduct an exercise of mapping their system either into the UNFC 2009 or Petroleum Resource Management System (PRMS) systems. Any issues/problems encountered during the mapping exercise have to be communicated immediately to CCOP TS for possible solutions.

The workshop concluded that petroleum classification and reporting in CCOP countries are mostly based on PRMS system (modified according to country needs). The PRMS system is aligned to UNFC 2009 and therefore, the national systems can be aligned to UNFC 2009. There is an agreement among countries to use UNFC 2009 as common template for future reporting. The workshop also provided opportunities to learn from one another not only in the reporting procedures but also how each country is leveraging on their data for national planning and investment promotions. Some of the best practices presented and discussed can be replicated to improve the national reporting system.



Participants from CCOP Member Countries and resource persons attending the CCS-M S4 in Bangkok

CCS-M Workshop (C2W1): Malaysia Case Study

The C2W1 was organized on June 2 - 4, 2015 in Kuala Lumpur, Malaysia in cooperation with the PETRONAS and Minerals and Geoscience Department (JMG), supported by the Norwegian Ministry of Foreign Affairs and Global CCS Institute.

The objectives are to have a deeper understanding of the methodologies for the selection of technically accessible CO₂ geological storage reservoir and estimation of storage capacity. The agenda included hands-on exercises to assess and test the CCOP Guideline on the Methodologies for selecting CO₂ storage sites and estimation of capacities (Guideline) using data from selected basins in Malaysia. Invited resource persons were from Australia, Norway and CCOP member countries. There were 47 participants including Resource Persons and CCOP Technical Secretariat.

The presentations provided updates on the Global Status Storage, CCS Pilot Project in the Gundi field - Indonesia, Development of CO₂ Storage Atlas of Norway, methodologies for selection geological storage sites, Case studies on CO₂ for EOR, and Opportunities and Challenges for CCS deployment in Southeast Asia. The CCOP TS also updated the Workshop on the status of UNFC 2009, particularly its application in classifying and reporting of CO₂ injection projects.

The Workshops/group sessions on the application of the CCOP Guideline were facilitated by the experts from PETRONAS with assistance from the resource persons listed above. The data set from the Sarawak basin that was prepared by PETRONAS were of excellent quality and fully satisfied the screening parameters of the Guideline. With the data, the groups were also able to make meaningful assessment of the storage sites and estimates of the potential of various storage prospects. It was also noted that PETRONAS have already published their (own) internal Guideline to facilitate consistency on assessing CO₂ storage sites in Malaysian basins. PETRONAS also is planning to use their Guideline as standard methodology to be used by all companies operating in Malaysia.

With the knowledge learned from the Workshop, particularly on what data to use, the assessment workflow, and the sample cases (case studies), all the participating CCOP countries are now encouraged to use the CCOP Guideline to assess their own sedimentary basin for potential of storing CO₂. Any future comments/suggestions related to their assessment works will have to be forwarded to the CCOP TS, as usual, for immediate actions. A follow up Workshop, C2W2, will be scheduled again in Malaysia in the 4th Quarter of 2015.



H.E. Hans Ola Urstad (Ambassador of Norway to Malaysia) together with officials from the Malaysian Government, participants from CCOP member countries, and resource persons from Canada, Australia and Norway at the opening ceremony of CCS-M Malaysia case study workshop (C2W1) in Kuala Lumpur.

CCS-M Case Study Tour in Norway

The purpose of the visit to Norway is to build technical capacity of the China case study team at SINOPEC that will be hosting the CCS-M China case study workshop sometime in the second half of 2015. The visit took place in the period 5-10 May 2015 (departing 5 May) with 10 representatives from the CCS-M case study countries of China and Malaysia, together with the CCS-M Program Coordinator from the CCOP Technical Secretariat (CCOP TS) and 4 PETRAD experts.

The study tour program covered visits to industrial sites, research centres and academic institutions in Stavanger, Oslo and Trondheim. This provided valuable information and insights about Norway in general and the research activities related to CCUS, particularly the CO₂ for EOR technologies and the development of the Storage Atlas of Norway. The meetings with the key persons in the Institutes visited, offered opportunities for future collaboration in the form of providing knowledge resources to CCOP during the conduct of CCS-M activities.



CCS-M Study Tour participants from China, Malaysia and CCOP TS together with PETRAD executives at the PETRAD office in Stavanger, Norway.

CCOP - Norway CCS-M Program Annual Meeting

This Annual Meeting was held at the Royal Norwegian Embassy (RNE) – Jakarta, Indonesia on 27 August 2015. It was attended by **Ms. Hilde Solbakken**, Minister Counselor, RNE – Jakarta; **Ms. Rahima**, Program Officer, RNE – Jakarta; **Dr. Adichat Surinkum**, CCOP TS Director; and **Mr. Simplicio P. Caluyong**, CCS-M Program Coordinator, CCOP TS.

The agreed on CCOP's proposal to extend the period of the Grant to 30 June 2016 at no cost. The extension will allow the CCOP TS to implement special training courses for Myanmar (a new Member Country of CCOP) and specific countries that are not hosting a case study (Lao-PDR, Philippines, Timor-Leste, and Vietnam) and also training on the usage of WebGIS for all countries in preparation for the CCOP CO₂ Geological Storage Atlas development. The series of trainings will run up to the publication of the CCOP Atlas in 2017 and a new fund request will be submitted to Norway in the 1st Quarter of 2016. A Project review is planned to be conducted within the 1st half of 2016. The CCOP TS will prepare the draft Terms of Reference for the said review to be submitted to RNE- Jakarta before the end of 2015.

CCS-M S5 (CCOP-DMF Proj – WS3) Project on Petroleum Resources / Reserves Classification and Reporting System - 3rd Workshop: Maximizing the value of oil and gas resources.

The 3rd Workshop of the CCOP-DMF Project was successfully conducted at the Grand Mercure Hotel in Bangkok, Thailand, on 8-10 September 2015. The CCOP - DMF Project is conducting a series of capacity building workshops related to petroleum resources and reserves classification system and reporting. The workshops are participated by representatives from the Government oil and gas upstream regulators, national

oil/gas companies, research organizations, academia, and serves as a forum for CCOP member countries to share their experiences and best practices in the overall oil and gas resource management system - the workflow, data analysis, capacities developed, planning and reporting system used. The activities also leveraged on the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources (UNFC 2009) and availability of the Expert Group on Resource Classification (EGRC) where the CCOP Technical Secretariat, Thailand, China, Vietnam and some of the member countries are actively participating. Topics on the use of UNFC 2009 for Injection Projects such as CO₂ geological storage were also presented and discussed in the workshops.

A total of 51 participants from the Cambodia, China, Indonesia, Korea, Lao-PDR, Malaysia, Philippines, Vietnam and Thailand. The number also includes the participation of ASCOPE members, from various petroleum-related organisations in Bangkok and CCOP Technical Secretariat staff. S5 provided a forum of sharing best practices and this time on maximizing the value of oil and gas resources from the experiences of the member countries and invited organisations from cooperating countries. Resource persons were invited from Malaysia, Indonesia, China, Norway and Australia) to share their best practices. The other CCOP member countries (Vietnam, Thailand and Philippines) also shared their experiences and updates related to the subject matter.



Participants from CCOP Member Countries and resource persons attending the CCS-M S5 in Bangkok.

CCS-M C1W2: Indonesia case study- Workshop on Public Engagement (C1W2) on 4-6 Nov 2015, Surabaya, Indonesia

The Case Study Workshop, C1W2, was organised in Surabaya, Indonesia on 4-6 November 2015 in cooperation with the Geological Agency of Indonesia and LEMIGAS, both with the Ministry of Energy and Mineral Resources. The CCS-M is financially supported by the Norwegian Ministry of Foreign Affairs thru the Royal Norwegian Embassy (RNE) - Jakarta and Global CCS Institute.

The Workshop discussed deeper into the experiences and detailed case studies of public outreach practices (lessons learned) of various CCS Projects. The resource persons are led by **Peta Ashworth** and **Franz Curran** of the University of Queensland, Australia. Peta is formerly a research group leader of CSIRO-Australia. The rest of the resource persons are from Indonesia's CCS Gundih Pilot Project and other CCOP member countries.

A total of 50 participants from CCOP member countries: Cambodia, China, Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Thailand and Vietnam attended the Workshop. The number also includes the resource persons from Australia, CCOP TS and representatives from Taiwan CCSU Association that participated as observers.

The presentations and discussions covered the following topics:

- Overview and update of the CCS Gundih Pilot Project
- Why the need for Outreach and Public Engagement (PE) for CCS Projects?
- Technology and other tools/ techniques to improve PE
- PE case studies: best practices and lessons learned

Presentation of the results from the early Public Engagement activities for CCS Gundih Project (Indonesia) - stakeholder mapping activities. In addition to the presentation related to Public Engagement, some member countries (China, Malaysia, Japan and Korea) presented updates related to CCS Technology and policy developments in their country. The learnings from the workshop can also be applied to other projects that require public engagement and outreach.

A 1-day field trip was organised by the host to visit the Gundhi CCS Pilot Project in Blora. This CO2 injection Project is the first in Southeast Asia and will offer a valuable learning experience not only to Indonesia but to all CCOP countries.



Participants at the Gundhi CCS Pilot Project in Blora, Indonesia.

CCOP - KIGAM UNCONVENTIONAL OIL AND GAS PROJECT - "MAPPING OF BLACK SHALE FORMATIONS FOR THE PREDICTION OF SHALE RESOURCES" (UNCON PROJECT): PROJECT LAUNCHING, SYMPOSIUM AND TECHNICAL MEETING

Signing of Memorandum of Agreement between CCOPTS and KIGAM for the Unconventional Oil & Gas Project

The Signing of Memorandum of Agreement between CCOPTS and KIGAM for the Unconventional Oil & Gas Project was organized in conjunction with the 64th Steering Committee Meeting in Krabi, Thailand on 24-26 March 2015.

On behalf of KIGAM, **Dr. Young Joo Lee**, Executive Director of Petroleum & Marine Research Division, KIGAM, and Dr Adichat Surinkum, CCOP TS Director, signed the Memorandum of Agreement between CCOPTS and KIGAM for the Unconventional Oil & Gas Project, witnessed by **Dr. Eikichi Tsukuda**, Chairman

of the CCOP Steering Committee. The Meeting expressed appreciation to KIGAM for the continuous support to CCOP, and through this Project in particular.

Financially sponsored by KIGAM, this Project will run for 6 years starting from 2015.

Coordination Meeting of CCOP-KIGAM UnCon Project (UCM1)

The Coordination Meeting of UnCon Project, which was held in Krabi, Thailand on 22-23 March 2015 was attended by the national coordinators from 11 member countries of CCOP. The objectives are to have a common understanding of the goal and objectives of the Project and to discuss the work plan for 2015. The agenda included a technical session on the overview of black shale mapping and reporting of the CCOP member countries on their shale potential.

UCM1 was attended by 15 participants, including the CCOP Technical Secretariat and resource persons from KIGAM.

Project Launching, Symposium and Technical Meeting (UCM2)

The Korean launching of the UnCon Project was conducted in Gyeongju City last 9 June 2015 with nearly 100 participants from various Korean governmental organizations, oil and gas companies, and CCOP member countries.

After the launching, a Technical Session and Meeting (UCM2) was held on 10-11 June 2015 and was attended by 21 participants from the CCOP member countries (including the CCOP TS). Dr Christopher Schenk presented the USGS Assessments of Unconventional gas and oil resources- the methodology and US experience and best practices. Dr Schenk's presentation was done online (via Skype) as he was not able to travel to Korea due to other commitments in his home office. The reports of the member countries (Cambodia, China, Indonesia, Japan, Korea, Lao-PDR, Malaysia, PNG, Philippines, Thailand and Vietnam) were also in the technical session agenda.



UCM2 field trip at the Pohang Basin, Korea

A workshop to test the USGS methodology using local data from the member countries was also conducted. The general feedback from the workshop showed that the member countries would need more time to fully test the USGS methodology as it is based on very high level of knowledge on the assessed area whereas most basins in the CCOP region are still considered frontier when it comes to oil and gas shale assessment, although some basins are considered mature in oil & gas exploration.

The 3rd Meeting and Workshop (UCM3)

The 3rd Meeting or UCM3 was conducted in Chiangmai, Thailand on 22-24 September 2015 in Chiangmai, Thailand, with 28 participants from the member countries of CCOP. The objectives of UCM3 are to use a geology-based assessment methodology to assess the potential of oil and gas shale resources in the CCOP member countries. The technical sessions looked deeper into the various methodologies used in the assessment and included presentations from member countries, sharing the methodologies and workflow of their own assessments. Invited resource persons were from the British Geological Survey (BGS), KIGAM, Pertamina (Indonesia) and LEMIGAS (Indonesia).

All the presentations by the Resource Speakers and discussion made resulted into an enhanced understanding of the shale resource methodologies and workflow. There is a better understanding now of the challenges and knowledge gaps in the member countries that will have to be addressed in future UC activities.

The Meeting agreed to adopt the US Energy Information Agency (EIA) / Advance Resources International, Inc (ARI) methodology for World Shale Gas and Shale Oil Resource Assessment (June 2013) as the methodology to use in the assessment of sedimentary basins in the CCOP region. All the participating CCOP member countries present in UCM3 submitted shale samples that will be analyzed by KIGAM, the results of which will be presented in the next meeting.

UCM4 is tentatively on 10-12 May 2016 in Korea. The suggested agenda are as follows:

- Training on Quantifying of mineral contents, sample analysis and TOC calculation
- Presentation and workshop on common method and consistency of data analysis
- Presentation and discussions on regional tectonics
- To discuss about the regional knowledge and look into the need for additional funding possibility (if there is a need to acquire new data)
- To discuss issues encountered / perceived by the member countries.

In addition, a side meeting of the MLR China-ASEAN Conference on Shale Gas Exploration and Development on 16 November 2015 in Chongqing, China (see more details at the next session).



UCM3 field trip at the Pha Chor, Chiang Mai, Thailand

MLR China-ASEAN Annual Conferences on Shale Gas Exploration and Development

MLR China-ASEAN Conference on Shale Gas Exploration and Development

The MLR China-ASEAN Conference on Shale Gas Exploration and Development was fruitfully held on 17 - 19 November 2015, Chongqing, China, as a collaborative effort by the Strategic Research Centre of Oil & Gas Resources (SRCOG), Ministry of Land and Resources of China (MLR) and CCOP. It is the 10th year that China and ASEAN have kept cooperative relationship until 2015 and this conference aims to reinforce the cooperation and communication in oil and gas between China and ASEAN. There were hundreds of international attendants from governments and private sectors related to shale gas resources at the meeting to share information, expertise and experiences how to explore and develop Shale Gas during the two-day seminar on 17-19 November 2015. Twenty (20) participants from CCOP member countries (Cambodia, Japan, Republic of Korea, Lao PDR, Indonesia, Philippines, Thailand, Vietnam) and CCOP Technical Secretariat also contributed country report presentation on national Shale Gas potential and issues on exploration and development of this unconventional resource. As a side meeting of this conference, there has a coordination meeting among MLR, CCOP and KIGAM to discuss on the possibilities to collaborate among three sides on this topic.

Side event: MLR – CCOP – KIGAM Project Coordination Meeting

The Coordination Meeting was organized on 16 November 2015 in Chongqing, China, with attendance by 8 participants representing for MRL (3), KIGAM (2) and CCOPTS (3). Objectives of the meeting are to identify similarities and differences in two Projects: 1) MLR China-ASEAN Shale Gas Exploration and Development Project (referred to as “MLR Project”) and 2) CCOP – KIGAM Unconventional Project (referred to as “KIGAM Project”), then identify also opportunities for cooperation and ways for collaboration.

All parties agreed that a common activity could be organized starting in 2016. The CCOP Technical Secretariat will play a central role as the main coordinating body for the common activity. It was also agreed that:

1. China, through MLR, will continue to participate in the activities of the KIGAM Project. Considering MLR’s internal approval, CCOP TS will provide MLR the planned activities of the KIGAM Project for the succeeding year in the month of November each year.
2. For 2016, the KIGAM Project planned to conduct the meeting/workshop (coded UCM4) in Cheju on 10-12 May 2016 and UCM5 on 16-18 August 2016 in Vietnam (date/venue subject to confirmation).

China will host a meeting/conference in November 2016 (UCM6). The topic of UCM6 and sponsorship of specific budget items will be discussed and agreed upon by the contact persons from MLR, KIGAM and CCOPTS.

THE ANNUAL ASIA SHALE GAS SUMMITS AND EXPO IN SHANGHAI (ECF)

The 5th Asia Shale Gas Summit and Asia-Pacific Unconventional Resource Tech & Equip EXPO (ECF2015)

The 5th ECF Asia Shale Gas Summit (Shanghai) 2015 and 2nd Asia-Pacific Unconventional Resources Tech & Equip EXPO have been successfully co-organized on 12-14 October 2015 in Shanghai, China by the Energy China Forum (ECF), Shanghai United Institute for Unconventional Resources, Shanghai Energy Economy Committee of SEA and the Coordinating Committee For Geoscience Programmes in East and Southeast Asia (CCOP), under the host by SZ Energy Intelligence Co., Ltd. Free registration fee was offered for participants from CCOP member countries. There were attendants from governments and private sectors related to conventional and unconventional oil and gas resources, including resource persons and 1 speaker from CCOP Technical Secretariat. A keynote lecture on “Capacity building of an intergovernmental organization in East & Southeast Asia – CCOP, in transboundary geosciences, with focus on unconventional oil & gas resources” was presented in order to make CCOP more visible in the international network of researchers in oil and gas sector.

KIGAM/ISGEO REGULAR TRAINING COURSES RELATED TO GEO-RESOURCES SECTOR

Updates on the courses offered by KIGAM’s International School for Geoscience Resources (IS-Geo) can be found at IS-Geo’s website, <http://isgeo.kigam.re.kr/>.

KIGAM/ISGeo training course on “Petroleum Exploration, Development and Production”

Within a series of regular training courses provided by KIGAM/ISGeo in collaboration with CCOP for member countries, the KIGAM/ISGeo training course on “Petroleum Exploration, Development and Production” was conducted from 19 January through 13 February 2015 in Daejeon, Republic of Korea with attendance by 20 attendants from CCOP Member Countries (China, Cambodia, Indonesia, Lao PDR, Malaysia, Papua New Guinea, Thailand, Timor Leste and Vietnam) and CCOP TS together with other international and Korean students. During 26 days of the training course, participants gained knowledge from four modules: “Petroleum Economics”, “Reservoir & Sequence Stratigraphy”, “Reservoir Geophysics & Petrophysics” and “Petroleum Engineering” and also took part in the session of country report presentation. KIGAM Lab-tour, visit to Ministry of Foreign Affairs (MOFA), together with daily Korean culture and language classes were also arranged to strengthen the network.



Trainees of the Training Course receiving certificates.

KIGAM/ISGeo training course on “Exploration and Evaluation of Mineral Resources”

The KIGAM/ISGeo training course on “Exploration and Evaluation of Mineral Resources” has been conducting in collaboration with CCOP in Daejeon, Republic of Korean, from March 2 through April 20, 2015. There are 12 invited participants from Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, Vietnam, Timor Leste and Papua New Guinea. This 8-week training course is designed for geoscientists or engineers involved in geoscience and mineral resources management, aiming to foster professionals from all over the world in the fields of geoscience and mineral resources as well as to enhance the capabilities of the cooperating countries/organizations with Korea/KIGAM. For this purpose, this course consists of two parts, “exploration geology” and “exploration management and evaluation”. Outcomes of this training course will be reported in the next quarterly report.

CCOP- DMR-EGAT MAE MOH WORKSHOP ON CLEAN AND GREEN MINING

The CCOP Technical Secretariat, together with Department of Mineral Resources (DMR) and Electricity Generating Authority of Thailand (EGAT), has successfully co-organized the Technical Workshop on Clean & Green Mining on 21- 24 January 2015 in EGAT Mae Moh, Lampang, Thailand. There were 36 participants, including 4 resource persons from the Geological Survey of Finland (GTK), International Atomic Energy Agency (IAEA), Federal Institute for Geosciences and Natural Resources (BGR), Germany and EGAT, 7 CCOP Member Countries (Cambodia, China, Indonesia, Lao PDR, Malaysia, Thailand, Vietnam and Myanmar), 4 CCOP TS and local organizer attending the two-day technical seminar and two-day excursion in Mae Moh Mine, Lampang and Siam Cement Group (SCG), Chaehom District, Lampang.

The keynote lectures and country presentations put forth information on clean and green mining approaches and shared experiences, lessons learnt in application of these techniques to the practices of mining and mineral management. A discussion session was conducted at the final part of the workshop, focusing on how Thailand and other CCOP member countries can collaborate and promote application of clean and green techniques on the mining field, for a sustainable development.

At the field trip to the Mae Moh Mine and SCG Lampang, the participants got an impressive view on how these companies exerted great efforts in providing a clean and green environment to the community surrounding their mines.



Q&A during the workshop.



At the Mao Moh Mine Control Center.

CCOP-CGS GEOCHEMICAL BASELINE PROJECT

Stage 1: Feasibility study of the CCOP-CGS Geochemical Baseline Project started in 2012 with a Kick-off seminar in March 2012 in Nanjing, China and followed by the CGS-CCOP-ASEAN Workshop on Geochemical Mapping on 3-8 September 2013, Nanning, China.

Stage 2 - Technical manual preparation and Training course is on-going with focus on two activities as follows:

- 1) Preparation of a Technical manual of sampling, analysis, data management and map production based on the IGCP259/360 final report “the Blue Book” – scheduled to be completed in 2013.
- 2) Revision and finalization of the manual through pilot study in the typical geomorphological landscapes of the CCOP MCs, which was scheduled to be completed in 2013. CGS is in discussion with PNG and Lao PDR on the possibility of a case study and field trip for sampling and analysis in late 2014 and 2015 in these two CCOP member countries.

In 2014-2015, CGS scheduled to conduct field trips for sampling and analysis in Lao PDR and Papua New Guinea. There were no reports on the project progress received by the CCOP Technical Secretariat during the reported periods.

ANNUAL GEOPARK SYMPOSIUMS

After the successfully co-organized First Symposium on Developing Geoparks within East & Southeast Asia region - Opportunities and Challenges on September 9-12, 2014 in Hanoi city and Ha Giang province in Vietnam, the second symposium was scheduled and organized on 22-24 July 2015 in Nakhon Ratchasima, Thailand.

The 2nd CCOP-UNESCO Symposium on Developing Geoparks within East & Southeast Asia region - Geoparks in Mekong Countries

The 2nd CCOP-DMR-UNESCO Symposium on Developing Geoparks within East & Southeast Asia Region-Geoparks in Mekong Countries was held on 22-24 July 2015 at Sima Thani Hotel in Nakhon Ratchasima, Thailand, as a collaborative effort by CCOP Technical Secretariat, the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Bangkok and the Department of Mineral Resources of Thailand (DMR). The meeting was attended by 65 participants from CCOP Member Countries, including 1 from Cambodia, 5 from Republic of Korea, 1 from Lao PDR, 1 from Myanmar, 2 from Philippines, 1 from Vietnam, 3 UNESCO resource persons, 48 local participants in Thailand and 3 CCOP TS staff.

By attending this symposium, the participants benefited much from the keynote lectures and country reports, share issues of concern and experiences to deal with Geopark application dossiers and Geopark development, discuss and foster future collaboration works in the East and Southeast Asia region.

Taken together they demonstrate the growing concern that is being given to issues such as Geopark common sense, role of local community in geopark development and dossier application, and also to finding effective measures to enhance the institutional capacity of the state managers in geopark development.

Participants enjoyed meeting and excursion, found it informative and especially appreciated their ideas, commitments on cooperation opportunities between UNESCO and CCOP Member Countries in the field of geopark management and development. It is proposed for training course on Geopark for member countries and similar workshop and/or technical seminar on specific issues in geopark dossier preparation to be considered for continuously organized in the region, in order to enhance the national capacity of state management and strengthen the cooperation among CCOP Member Countries, in connection with UNESCO.



Excavation site of dinosaur bone.



Morjabok potholes, Sikhio.

CCOP-GSJ/AIST PROJECT ON GROUNDWATER ASSESSMENT AND CONTROL IN THE CCOP REGION

Under support by GSJ/AIST of Japan, phase I and phase II of the CCOP-GSJ/AIST Groundwater Project had been implemented since 2005 until March 2014. Phase I, focusing on evaluation of groundwater resources and environments through its monitoring, composed of highly structured program towards groundwater related problems challenging all countries. Phase II, starting since 2008, focused more on evaluation of groundwater resources by mean of database, in order to facilitate all CCOP member countries to share information in the standard format.

Phase III of the project, entitled “Development of Geoinformation Sharing Infrastructure for East and Southeast Asia”, started in March 2014. Scopes of Phase III are to compile various geoscientific information in CCOP countries, and to construct a web based database, using the OGC standard formats. Under this program, each member country will be responsible for maintaining the data quality and updating the database. Final objective is to establish a basic geoinformation infrastructure in Asia and for the world.

CCOP-GSJ/AIST-DGR Groundwater Project Phase III Kick-off Meeting

The CCOP-GSJ/AIST-DGR Groundwater Project Phase III Kick-off Meeting was held on 10-12 February 2015, in Bangkok, Thailand. It was attended by forty-five (45) participants from Cambodia, China, Indonesia, Japan, Korea, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, Vietnam and the CCOP Technical Secretariat. The outline of Groundwater Project Phase III with the main theme, “Renewal of database for the hydro-geological map in CCOP regions” was presented by **Dr. Youhei Uchida**, the Project leader from the Geological Survey of Japan (GSJ/AIST). He then made an update on the status of the CCOP Groundwater Sub-Project “Development of Renewable Energy for Ground-Source Heat Pump System in CCOP Regions”. He also introduced the new CCOP project funded by Japan, the Geoinformation Sharing Infrastructure (GSi) Project with the main aim of compiling various geoscientific information in CCOP countries, and constructing a database on an open Web, using the world standard formats and GIS. Each CCOP Member Country made a country presentation on the topic, Country’s Activity Plan and Possibility of Compiling GW Data under CCOP GW Project Phase III.

Since the current status on the groundwater database management system varies from one CCOP member country to another, three (3) groups have been formed accordingly as follows, and Group Leader for each was identified:

DB Group I – Korea (Group Leader), China, Indonesia, Japan, Thailand

- GW observation system has been installed already
- GW data has been monitored
- Web-based GW DB has been compiled

DB Group II – Indonesia (Group Leader), Malaysia, Philippines, Vietnam

- GW observation system has been installed already
- GW data has been monitored
- There is no Web-based GW DB

Public Policy Group – CCOP TS / Dr Adichat (Group Leader), Cambodia, Lao PDR, Myanmar, PNG, Timor-Leste

- There is no GW observation system

For fiscal year 2015, the following workplan for each group has been agreed:

DB Group (I & II)

- System design for GW Geo-Portal (GSJ will propose the design)
- Selection of area for converting Web GIS System
- Try to convert GW data to the Web GIS System

Public Policy Group

- Attending to GW Training program
- Making a report for draft of public policy for GW management

Ms Marivic Uzarraga from the CCOP Technical Secretariat made a presentation on the progress of the recent developments of the CCOP-GSJ Geoinformation Sharing Infrastructure for East and Southeast Asia (GSi) Project, including the tentative date of the GSi Project's First Meeting, 1 – 4 September 2015 in Bangkok, Thailand. **Dr. Reo Ikawa** from GSJ gave a lecture with the title: "Sustainable Water Resource Management and Development Using a Groundwater Database". His presentation gave concrete examples of the use of groundwater database, and provided analytical possibilities which can be embedded in the GSi Project system. He also recommended that aside from groundwater data, surface water data be collected for the Project as well. **Dr. Kyoochul Ha** from KIGAM presented on KIGAM's activity for GW training course in CCOP.

A visit to the ground-source heat pump systems installed at Kasetsart and Chulalongkorn Universities in Bangkok were made during the field trip.



Q&A at the workshop.

CCOP-GSJ/AIST Groundwater Phase III: Sub-Project Meeting on "Development of Renewable Energy for Ground-Source Heat Pump System (GSHP)"



GSHP Meeting at the Department of Geology, Chulalongkorn University in Bangkok, Thailand.

On 10 June 2015, Sub-Project Meeting on "Development of Renewable Energy for Ground-Source Heat Pump System (GSHP)" was organized at Department of Geology, Chulalongkorn University in Bangkok, Thailand, with attendance by 23 participants, including project team from GJS/AIST (Japan), experts from Renewable Energy Research Center/AIST, representatives of Japan embassy experts from Kasetsart University, Chulalongkorn University (Thailand), Department of Groundwater (DGR) and Department of Mineral Resources (DMR) of Thailand and CCOP Technical Secretariat. The meeting is within framework of a sub-project under CCOP-GSJ/AIST Groundwater Phase III, of which, activities in 2015 focus on developing the GSHP in Thailand with plan to install the pilot systems in suitable locations. Purposes of this meeting are 1) To inspect GSHP system in Chula 2) To understand availability of GSHP system in Thailand 3) To discuss about future plan of GSHP Project in Thailand (i.e. Possibilities to install GSHP on branch of Chulalongkorn University in Saraburi province and Golden Jubilee National Geological Museum, DMR in Phatum Thani province).

On the next day, 11 June 2015, the project team, together with DMR & CCOPTS, visited the Golden Jubilee National Geological Museum, DMR in Phatum Thani to check the tentative site for installing the GSHP system. After short introduction about the purpose of visit, summary on initial results of the installed GSHP system in Chulalongkorn University, the delegation visited the museum to compare suitable sites and decided to select the room of the Souvenir shop as a demonstration site to install the GSHP system. Under the agreement by Dr. Suree Teeratungsigul, Director, Mineral Resource Regional Office 3, the project team plan to approach DMR for permission for installing the system. A visit to the first GSHP system in Thailand at Kasetsart University, which was installed by **Prof. Isao Takashima** in 2005, was arranged in the afternoon. This Sub-Project is within framework of the on-going Phase III of the GSJ/AIST-CCOP Groundwater Project, with the activities in 2015-2016 focusing on developing the GSHP in Thailand and Vietnam as pilot systems at suitable locations.

Under permission by Director General of Department of Mineral Resources (DMR) in the reported period, the project team is preparing for installation of a GSHP System at Golden Jubilee Geological Museum in Phatum Thani province in February 2016.

GEO-ENVIRONMENT SECTOR

CCOP-KIGAM PROJECT “SOLUTION FOR GROUNDWATER PROBLEMS IN THE CCOP REGION”

The Project was proposed by KIGAM and adopted as new initiative at the 48th CCOP Annual Session in November 2012 with updates at the 60th CCOP Steering Committee in March 2013. This 5 year (2013-2017) project is sponsored by KIGAM, Korea and participated in by all CCOP Member Countries. The first phase – Step I, aiming to contribute to the understanding of groundwater problems in the CCOP regions with focus on: 1) Identifying groundwater problems in each country and 2) Building trust and enhancing reliability to cope with groundwater problems in each country, had been completed with 1 training course in Korea and 1 workshop in Thailand. Step II (year 2014) focuses on finding cooperative measures to solve the groundwater problems with two main tasks: 1) Establishment of the international network and 2) Priority decision making for solving the groundwater problems in the CCOP region and Step III (year 2015) focuses on Cooperative actions to solve the groundwater problems. In 2015, KIGAM and CCOP have cooperated with UNESCO and DGR of Thailand to organize one technical workshop in Bangkok with attendance by member countries.

CCOP-KIGAM-UNESCO-DGR Workshop on Sustainable Groundwater Management in Mekong River Basin

The CCOP Technical Secretariat, in collaboration with the Korea Institute of Geoscience and Mineral Resources (KIGAM), the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Bangkok and Department of Groundwater Resources (DGR) of Thailand, has successfully co-organized the Workshop on Sustainable Groundwater Management in Mekong River Basin on 19-20 May 2015 at Pullman King Power Hotel in Bangkok, Thailand. This meeting is within the framework of the 5 year CCOP-KIGAM Project “Solution for groundwater problem in CCOP region”, kindly funded by KIGAM since 2013.

The meeting was attended by 26 participants from CCOP Member Countries, including 2 from Cambodia, 2 from Republic of Korea, 2 from Lao PDR, 2 from Myanmar, 3 from Thailand, 2 from Vietnam, 9 international resource persons and 4 CCOP TS staff.

It was recognized from the presentation of country reports that Cambodia, Lao PDR and Myanmar have limited information available on groundwater resources and lack any mechanisms to regularly monitor groundwater for quality or quantity. Thailand and Viet Nam, meanwhile, have adequate monitoring data at the national level. To address this dearth of information on groundwater and encourage collaboration in its management, a proposal was made during the workshop for the creation of a groundwater monitoring network and to provide technical support to countries in needs of developing sustainable management plans for this resource.



At Khaoyai National Park.

Through this new partnership CCOP, and KIGAM and UNESCO will collaborate to prepare a proposal for increased capacity-building to approach groundwater assessment and management in an integrated manner for more effective resource management as well as to build institutional capacity to implement best practices in this regard. All country reports presented at the workshop are being compiled into a publication on the groundwater status of Mekong countries

Based on the outputs of the workshop, a CCOP-KIGAM-UNESCO publication on “Current Status and Issues of Groundwater in the Mekong River Basin” has been compiled from country reports submitted at the mentioned workshop and released in December 2015, which will be distributed to CCOP member countries in 2016. The next project meeting is scheduled on April 2016 in Cambodia.

KIGAM-ISGEO-CCOP REGULAR TRAINING COURSES RELATED TO GEO-ENVIRONMENT SECTOR

Aiming to foster professionals from the developing countries as well as to enhance cooperation between MCs and Korea, KIGAM and International School for Geoscience Resources (ISGeo) continue to support and cooperate with CCOP to organize regular training courses for CCOP Member Countries with sponsorship for two participants per country. For each training course, CCOPTS also sent one staff as a trainee, in order to gain geoscientific knowledge and enhance capacity for better service to Member Countries. In 2015, three training courses have been conducted on different fields of geosciences.

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Under Geo-Environment Sector, a training course was scheduled in the reporting time but latter postponed to the second haft of the year 2015.

ISGeo/KIGAM Regular Training Course on “Landslide and slope stability & Groundwater Theory and Practices”

The CCOP Technical Secretariat and Korea Institute of Geoscience and Mineral Resources (KIGAM) have successfully co-organized the CCOP/KIGAM/IS-Geo training course on Landslide and slope stability & Groundwater Theory and Practices on 9 November – 4 December 2015 in the International School for Geoscience Resources of KIGAM, Daejeon, Korea, with total 27 participants including 20 participants from CCOP Member Countries.

This training course has been conducted during 4 weeks, aiming to foster professionals in the fields of landslide and groundwater from all over the world as well as to promote cooperation between CCOP Member countries/organizations and Korea/KIGAM. It had 4 Modules. Module 1 was about Landslide Monitoring and Early Warning led by **Prof. Filippo Catani** (University of Firenze, Italy). And module 2 was about Slope Stability Analysis and Reinforcement by 4 Korean lecturers – **Dr. Jeong Hae Choi** (KIGAM), **Dr. Yong Bok Jeong** (KIGAM), Prof. Hyeok Jin Park(Sejong University) and **Prof. Yo Sun Choi** (Pukyong National University). Module 1&2 provided a basic and intermediate introduction to the principles and practical methods of landslide monitoring and early warning. The participants faced state-of-the-art techniques and methodologies to expand their capabilities and understanding on the course topics. The theme of Module 3 was Fundamentals of Groundwater. And Module 4 was about Contaminant Groundwater Hydrogeology and Field tests. Module 3&4 had a goal of providing participants with a broad understanding of basic groundwater concepts and theories, which bore on groundwater utilization as a resource, and with necessary measures to provide for its sustainability. To achieve this goal, **Prof. Frank W. Schwartz** (Ohio State University), Prof. **Eung Seok Lee** (Ohio State University) and **Dr. Yong Cheol Kim** (KIGAM) gave lectures, hands-on practical exercises and field work.

To help participants easily adapt to Korea and KIGAM, various activities were done. The first one was welcome party. At the welcome party on November 16th, **Dr. Kyu Han KIM** (President of KIGAM) delivered the welcoming address and **Dr. Yun Ho Song** (Executive director of geologic environment Division) raised a toast. Each participant gave introduction of themselves and closing address was given by **Dr. Choon Sunwoo** (Executive Director of IS-Geo). Second, Korean Language & cultural class was held every morning for an hour in which all the trainees attended and learned how to read and write Korean Language, how to play Korean traditional game and how to sing a traditional Korean song. Participants also took culture trip to Jeonju which is an important tourist center famous for Korean food, historic buildings, sports activities and innovative festivals.

On November 20th, participants gave presentation of countries' reports and shared experiences about Landslide and Groundwater. And on the last day of training course, participants had visited Korea Water Resources Corporation to see how Korea manages the national water supply facility capacity.

On balance, the training course has been successfully organized, achieved the goals and benefited all the participants. It is expected to be a solid base for future cooperation between CCOP member countries and KIGAM/IS-Geo. Advanced training courses are recommended in that the network of geoscience and mineral resources should be maintained and developed for further collaborative activities.

ISGeo/KIGAM Regular Training Course on “Coastal Geology and Geohazards”

The CCOP Technical Secretariat, together with International School for Geoscience Resources (IS-Geo) of the Korea Institute of Geoscience and Mineral Resources (KIGAM) has successfully co-organized the Regular Training Course on “Coastal Geology and Geohazards” on 5 – 21 October, 2015 in Jeju Island and Daejeon, Republic of Korea, with 13 participants from CCOP Member Countries and 3 participants KIGAM’s network. As mentioned, the Module 1 of the training course was organized as Session S18 of the 8th International Conference on Asian Marine Geology (ICAMG-8) and the other modules were then conducted at International School for Geoscience Resources (IS-Geo) in Daejeon, Republic of Korea. The content of the training course include Module 2 on “Tide-dominated Coasts and Human Impacts”, instructed by **Prof. Burg W. Flemming** (Senckenberg Institute, Germany) and Module 3 on “Wave-dominated Coasts and Coastal Geohazards”, instructed by **Prof. Andrew Short** (University of Sydney, Australia). The trainees learned about the basics of the coast, effects of climate change and solutions against the effects of tide and waves. A 2-day fieldtrip around the Eastern Korean Coast was arranged and led by **Dr. Se Won Chang** (KIGAM), for all the participants. After the training course, all the trainees received certificate of completion of the training course, granted by **Dr. Choon Sunwoo**, Director of ISGeo.



Participants of the Coastal Geology and Geohazards Training Course at the field trip around the Eastern Korean Coast.

THE 8TH INTERNATIONAL CONFERENCE ON ASIAN MARINE GEOLOGY (ICAMG-8)

The 8th International Conference of Asian Marine Geology (ICAMG-8) was successfully organized by the Korea Institute of Geoscience and Mineral Resources (KIGAM) and the Korea Institute of Ocean Science and Technology (KIOST), Republic of Korea on 5 – 10 October, 2015 in Jeju Island, Republic of Korea. Session 18 of this conference was co-organized by the CCOP Technical Secretariat, as a back-to-back event with the CCOP-ISGeo Regular training course on “Coastal Geology and Geohazards” on October 12-21, 2015 at International School for Geoscience Resources (IS-Geo) in Daejeon, Republic of Korea. The session 18 was attended by 16 CCOP participants (including 13 trainees of the training course from CCOP Member Countries, 2 resource persons from Malaysia and Indonesia, and 1 representative of CCOP Technical Secretariat) together with several international audients attending ICAMG-8.

The ICAMG-8 has its main goal to provide an open stage to those enthusiastic marine geologists to tell their new experience and findings gained from research fields and their related activities. For CCOP trainees, it was an open forum to share updated national issues on coastal and marine geology and also precious moments to step forward to professional marine geological society. The Session S18 was opened by **Dr. Se Won Chang** (KIGAM) and chaired by **Prof. Burg W. Flemming** (Senckenberg Institute Germany) and Mr. Kumala Hardjawidjaksana (Marine Geological Institute, Indonesia). After the keynote presentation on CCOP Capacity building role on coastal and marine geology, presented by Dr. Nguyen Thi Minh Ngoc (CCOP Regional Expert), the country reports of 9 CCOP member countries (Cambodia, China, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, Vietnam), together with Bangladesh, Sri Lanka, was presented by the trainees. Excursion was organized in 2 days with Day 1 (October 8, 2015) focusing on geodiversity on the southwestern coast of Jeju Island from continental shelf to volcanic land and Day 2 (October 9, 2015) visiting temperate carbonate sediments in Jeju Island.



ICAMG-8 Excursion around Jeju Island.



ICAMG-8, Jeju Island

CCOP-GSJ/AIST PROJECT ON INTEGRATED GEOLOGICAL ASSESSMENT OF DELTAS IN SOUTHEAST ASIA PHASE 3 (DELSEA III PROJECT)

GSJ-CCOP Project “Integrated Geological Assessment for Deltas in Southeast and East Asia – Phase III (DelSEA III)”

The Project on Integrated Geological Assessment for Deltas in Southeast and East Asia, Phase II (DelSEA-II) has been implemented and is scheduled for 2008 – 2014, under the support by Japan (AIST/GSJ). In 2014, two workshops have been held in Thailand and Indonesia. After the successfully implemented phase I and II, phase III of the GSJ-CCOP project “Integrated Geological Assessment for Deltas in Southeast and East Asia (DelSEA project-III)” started in 2015 with kick-off meeting on 2-6 March 2015.

CCOP-GSJ/AIST-KIGAM-PKNU DelSEA III Kick-off meeting

The kick-off meeting for phase III of the GSJ-CCOP project “Integrated Geological Assessment for Deltas in Southeast and East Asia (DelSEA project-III)” on 2-6 March 2015 in Busan, Republic of Korea as a collaborative effort among CCOP, GSJ/AIST, KIGAM and PKNU. The meeting consists of a two-day meeting with country report presentation on coastal geological information and followed by a three-day excursion to coastal sand beaches in Pohang, Gampo, Songjeong, Haeundae and Nakdong. The meeting was attended by 24 participants, including 1 resource person, 14 participants from CCOP Member Countries (Cambodia, China, Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Thailand, and Vietnam), 7 local participants, CCOPTS Director and CCOPTS Regional expert. During the meeting, the participants listened to the Project Leader - Dr Yoshiki Saito summarizing the project outlines of Phase I and II, and presented the country report on 1) Geo-Information on onshore and offshore coastal geology; and 2) Strato-type study in coastal zones. Excursion to different sandy beaches along the coastline from Pohang to Nakdong estuary provided participants field information of riverine and long-shore sedimentary process and practical experience with effect of pine plantation to the natural coastal area, which caused serious erosion and destroyed the natural system. A wrap-up meeting at Nakdong Estuary Eco Center was arranged to gather feedback and ideas by CCOP member countries on details of future activities for phase III of the project, with focus on the topics of coastal mapping, coastline database and cooperative possibility of using Ground-penetrating radar (GPR) for coastal and marine survey.



Field Trip during the CCOP-GSJ/AIST-KIGAM-PKNU DelSEA III Kick-off meeting.

Delta Session in the XIX INQUA (International Union for Quaternary Research)

Within framework of the International Union for Quaternary Research (XIX INQUA), the Delta Session was co-organized by GSJ/AIST and CCOP as an advanced course of the phase III of the GSJ/AIST-CCOP project “Integrated Geological Assessment for Deltas in Southeast and East Asia (DelSEA project-III)”. The session was held in Nagoya Congress Center, Nagoya, Japan on July 27th to August 2nd, 2015. The Delta Session brought together more than 60 participants from many countries and regions from all over the world. There were 2 former DelSEA participants attended and had scientific presentation at the Delta Session, under sponsorship by the GSJ/AIST-CCOP DelSEA-III project.

Delta Session coded C11 is titled DELTAS: Evolution, Morphodynamics, Human Impacts, and Sustainability (short title: Delta), lead convener was **Yoshiki Saito** together with **Edward Anthony, James P.M. Syvitski, Steven L. Goodbred, Kazuaki Hori**. This session focused on delta evolution, morpho- and sediment-dynamics based on field surveys, experimental approaches, and modeling for better understanding of delta systems in terms of natural functioning and/or human impacts, and discussed sustainable deltas during the Anthropocene. This session is a contribution to ICSU Sustainable Deltas 2015. There were total 20 oral presentations and 14 poster presentations in Delta Session on 28 July 2015. It was interesting with a lot of attractive presentations expressed new findings and results. The subject meeting also brought fine discussions as well as suggestions of further research orientation on future deltas in the context of climate changes and sea-level rise.

GTK - CCOP - DMR WORKSHOP ON GEOHAZARDS AND CLIMATE CHANGE

CCOP Technical Secretariat, in cooperation with Geological Survey of Finland (GTK), has organized a Technical Workshop on Geohazards and Climate Change on 15 June 2015 at DMR Conference Room in Bangkok, Thailand. The workshop includes a full-day seminar in Bangkok with 58 participants, including 3 resource persons from Geological Survey of Finland (GTK), 2 from Chaipattana Foundation, 1 from Asian Disaster Preparedness Center, 2 from Indonesia, 46 from Thailand, 2 from Vietnam and 3 from CCOPTS. The subject workshop is within framework of the VIETADAPT II-project on “Developing and implementing climate change adaption measures at local level in Vietnam”, sponsored by GTK.

Phase I was completed with result disseminated for CCOP member countries in a technical workshop organized in conjunction with the 48th CCOP Annual Session in Malaysia in 2012. Phase II starts this year for the period from 2015-2016, targets at two case studies in Vietnam and with a plan for dissemination seminars for CCOP member countries at CCOP annual sessions in 2015-2016. Aims of this workshop were to have an interactive exchange of ideas as well as insights by CCOP member countries on aspects related to geohazards and climate changes, such as: groundwater modeling in coastal areas, community-based landslide programme, geohazard early warning system.

Keynote lectures provided the contents and achievements of the VIETADAPT II project, groundwater modeling in coastal areas, as well as recent examples of urban flood management in the Helsinki Metropolitan area. A discussion session was followed with focus on extension possibilities and planning for future activities in the other CCOP member countries.



GTK-CCOP-DMR Technical Workshop on Geohazards and Climate Change, 15 June 2015, DMR Conference Room, Bangkok, Thailand

CCOP- VIGMR - DMR PROJECT ON COMMUNITY-BASED LANDSLIDE MITIGATION

This project was proposed within the cooperation framework between CCOP, Department of Mineral Resources of Thailand (DMR) and Vietnam Institute of Geosciences and Mineral Resources (VIGMR) with attendance of some CCOP Member Countries with serious problems of landslide geohazards (Thailand, Vietnam, Philippines, Indonesia, and Malaysia). The project aims to establish the Landslide Watch Network in a project area (Vietnam as a case study during 2013-2014) and enhance the skills of counterparts in landslide hazard analysis, landslide risk mapping and Landslide Watch Network establishment. After the joint field trip and two workshops held in 2013, during 2014 Thailand and Vietnam continued to discuss and exchange information. Dissemination workshops are planned for 2015 to promote transfer of know-how and possibility of expansion projects in other CCOP Member Countries.

JMG 7-DAY ADVANCED COURSE IN GEOCHEMICAL ANALYSIS

Malaysia government through Minerals and Geoscience Department Malaysia (JMG) in collaboration with CCOP Technical Secretariat was conducted the CCOP-JMG Advanced Training in Geochemical Analysis: Base Metal by Inductive Couple Plasma Optical Emission Spectrometer (ICP-OES) and Gold by Fire Assay/ Cupellation Techniques that held at Roccana Hotel, Kuantan and Geochemical Laboratory, Minerals and Geoscience Department, Kuantan Pahang, Malaysia from 8 to 15 March 2015. This training program consists of 2-day lecture (9 – 10 March 2015) at Roccana Hotel, Kuantan, Pahang, 2-day hands on session (11 - 12 March 2015) at JMG Geochemical Laboratory, Kuantan Pahang and 2-day site visit - visit to Penjom Gold Mine, Kuala Lipis on 13 March and Sightseeing at Kuala Lumpur and Putrajaya on 14 March 2015. The training course was attended by 28 CCOP participants, including 7 resource persons, 7 participants from CCOP Member Countries (Cambodia, Indonesia, Lao PDR, Philippines, Thailand, Timor Leste and Vietnam), 28 local participants. According to the participant feedback, the training programs are meeting the needs of all related to the field of laboratory analysis. Give a useful practical guide on how to setting up the geochemical lab in their country. At the end of the course, the participants have a good understanding of method development and major analytical parameters of ICP/OES and Fire-Assay/Cupellation technique. The participant also got the additional benefits of understanding work place environment through interaction with our technical staff.

The course also lays stress on basic laboratory procedures which often get overlooked.

ENVIRONMENTAL ANALYSIS SUPPORT PROGRAMME IN THE CCOP AND OTHER REGIONS

The 48th CCOP Steering Committees Meeting in Daejeon, Korea endorsed the Environmental Analysis Support Programme in the CCOP and Other Regions proposed by AIST/GSJ under the auspices of Japan Radioisotope Association and Iwate Medical University. This programme has continued supporting in-kind services on environmental specimens, which are analyzed by PIXE method. The service is still open up to the maximum number of 500 samples per year and it will be continued annually.

GEO-INFORMATION SECTOR

CCOP-CGS CAPABILITY ENHANCING IN INTEGRATED GEOPHYSICAL & GEOCHEMICAL DATA PROCESSING PROJECT (IGDP)

The CCOP-CGS Capability Enhancing in Integrated Geophysical and Geochemical Data Processing Project (IGDP) started with the first workshop on 18-20 June 2013 in Kunming, China, under the support of China Geological Survey (CGS). The aim of this project is to keep CCOP Member Countries continuously benefit from modern information technology in geoscientific study and mineral exploration technology in the member countries and around the world, based on IGDP – a designed software for regional geophysical and geochemical data processing and mapping in mineral resource assessment and exploration. CGS continues with methodology and software training and case studies in some areas with local data in 2015.

The 3rd IGDP Workshop/Training

The Third Workshop/Training of the CCOP-CGS Project on Integrated Geophysical and Geochemical Data Processing (IGDP) was held on 12-14 November 2015 in Beijing, China, hosted and funded by China Geological Survey (CGS) through its Development and Research Center (DRC), in cooperation with CCOP. There were 27 participants in the workshop/training from CCOP Member Countries, Cambodia, China, Indonesia, Japan, and Malaysia including the staff of CCOP Technical Secretariat.

During the meeting, **Dr. Zhang Minghua**, IGDP Project Leader and Division Director, DRC, CGS introduced the IGDP Project by presenting the general concept of geophysical exploration, its methods and applications, gave an overview of the RGIS-IGDP software, its general function, geophysical/geochemical/geological databases, and gravity/magnetic / data processing application. He also presented application case studies using the software.

Chinese Experts from CGS ran the training session in the use of the IGDP Software, which were provided to all the participants of the training. **Dr. Liu Rongmei**, DRC, CGS presented on the update of OneGeologyChina. The 1 million scale geological map of China is now accessible from OneGeology Global Portal, <http://portal.onegeology.org/OnegeologyGlobal/> and China OneGeology Portal, <http://onegeologychina.cgs.gov.cn:8081/>. More information about OneGeology China can be obtained from this website: <http://onegeologychina.cgs.gov.cn:8080/en/>. There were 2 case studies presented by Resource Persons from China and Indonesia and country reports presentation by CCOP member countries.



Dr. Zhang Minghua introducing the RGIS-IGDP software, and its latest updates.

During the discussion, the following were the recommendations from the participants for the improvement of the software:

- add statistical analysis, correlation of geochemical elements, histogram.
- add 2D/3D MT inversion
- include interpretation functions, well-logging, seismic interpretation such as SMT kingdom

The member countries were also requested to send feedback before the end of the year about the IGDP Project, answering the following questions:

- Have you used the RGIS-IGDP Software in your work? If yes, state the ways how you used it. If no, why? Do you have any plans in using it in one way or another?
- What are the impacts of IGDP Project in your country?
- What are your recommendations for the improvement of the software?
- Other demands/requests

Since this is the last activity for the first phase of the IGDP Project, discussion on the second phase of the project were also raised. The following are the prospective activities for the second phase:

- Compilation of 1:1M Geophysical/Geochemical Map of CCOP Member Countries or 1:1M Database of Geology, geophysics, geochemistry, etc.,

- no seismic
- working together with CCOP OneGeology may be considered.

- Customized RGIS-IGDP Training for a CCOP Member Country using own data in site.

- Indonesia, Cambodia, PNG...
- Should point out contact person for further proposal and actions

All the participants received a package of the RGIS-IGDP Software as well as certificate of participation at the end of the workshop. **Dr. Tan Yongjie**, Chief Scientist, DRC, CGS, officially closed the workshop after thanking all the participants in their active partaking and the CCOP Technical Secretariat for the close collaboration in the organization of the workshop.



Hands-on Training led by CGS experts.

ASEAN HARMONIZED GEOLOGY PROJECT (ASEAN Seamless Geology Project)

The meeting ASEAN+3 Geological Mapping (Myanmar, Lao PDR & Cambodia) was held on 10 – 14 January 2015 in Myanmar, as one activity in the Workplan of the Harmonized Geology Project.

On 23 March 2015, CCOP coordinated with DMR of Thailand to hold the business meeting of the CCOP-ASEAN Harmonized Geology Project in Krabi, Thailand with 12 participants from Member Countries, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Thailand and Vietnam and 2 from CCOPTS. The main objectives of this meeting are to prioritize seamless geological map of the Indo-China Peninsula, discuss problems and solutions, and plan for future actions.

Thailand has come up with a draft map of seamless geology for consideration by and in collaboration with other member countries and tabled at the meeting problems encountered in making the map. The Meeting agreed that the Project will use WGS84 as Reference System and considered not having national boundary in the harmonized geological map. The Meeting further agreed that all the Member Countries present shall provide the 1:1M geological map, in digital or printed form to CCOP TS and DMR/Thailand by 1 May 2015 and that the draft CCOP-ASEAN Harmonized Geological Map will be produced by end June 2015. **Dr. Okubo** informed the Meeting that two activities for the Project will be organized within this year to be funded by JICA, 1) ASEAN Mineral Resources Database Training, Tsukuba, Japan and 2) On-Site Workshop, Cambodia.

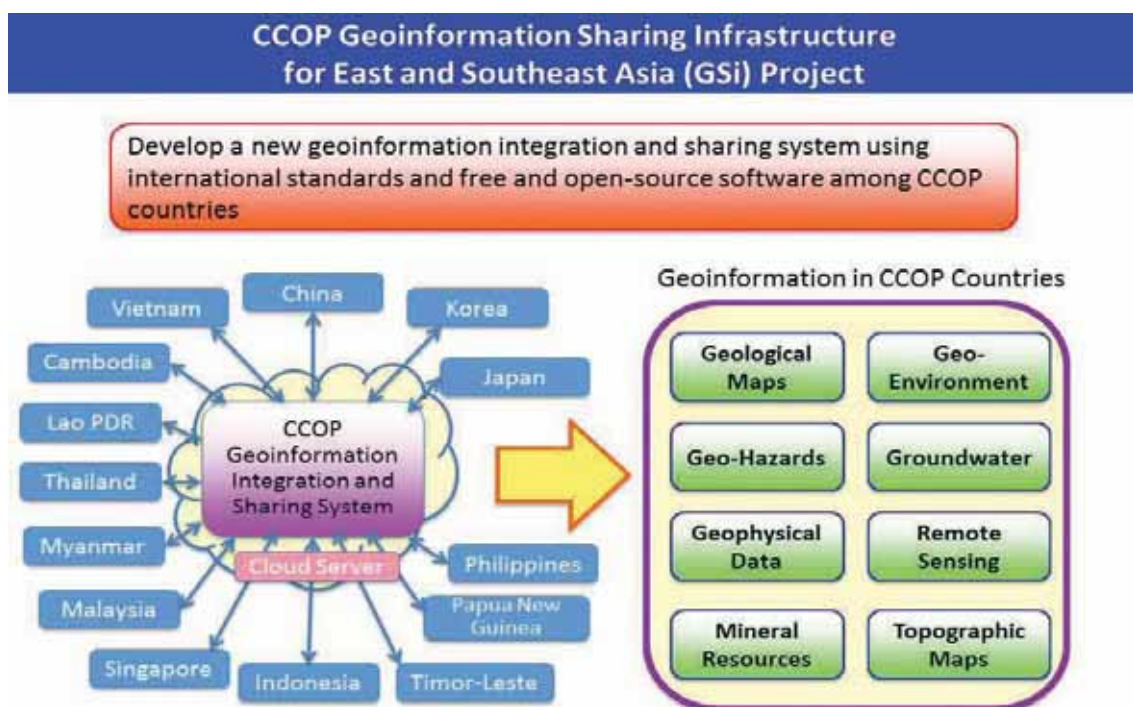
The Member Countries are requested to specify geological discontinuities over cross-border areas and to discuss solutions by the Training in Tsukuba tentatively scheduled in October 2015. The next project meeting is scheduled on 8 March 2016 in Siem Reap, Cambodia, in conjunction with the 66th CCOP Steering Committee Meeting.

CCOP GEOINFORMATION SHARING INFRASTRUCTURE FOR EAST AND SOUTHEAST ASIA (GSI) PROJECT

The Japanese-funded CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSI) Project Year, scheduled for 2015 – 2019, aims to develop a new geoinformation integration and sharing system using international standards and free and open-source software among CCOP countries. Scope of the project includes:

- Compile various geoscientific information in CCOP countries, and construct a database on an open Web, using the world standard formats and GIS,
- Each member country is responsible for updating the database and maintaining the data quality,
- Upload already-published geoscience data and maps with the GIS format,
- Establish a basic geoinformation infrastructure in Asia and for the world.

The first-version official database is targeted to be opened in 2019. During the reported period, there have been 2 meetings held with attendance by CCOP member countries.



GSI Project Kick-Off Meeting

The Kick-off Meeting of the Japanese-funded CCOP Geoinformation Sharing Infrastructure for East and Southeast Asia (GSI) Project was held on 1-2 September 2015 at Holiday Inn Hotel Silom, Bangkok, Thailand. Twenty-three (23) participants from the member countries (Cambodia, Indonesia, Japan, Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam) including the staff of the CCOP Technical Secretariat (CCOP TS) attended the meeting.

Dr. Adichat Surinkum, Director of the CCOP Technical Secretariat welcomed all the participants to the meeting and gave the opening address. **Dr. Shinji Takarada** of the Geological Survey of Japan (GSJ), AIST introduced the GSI Project to all the participants. **Dr. Joel Bandibas** of GSJ, AIST gave an overview of the GSI system being developed for the Project.

All the CCOP member countries present gave a report on their country's current status of Spatial Data Information System, extent of Geographic Information System usage, availability of sharable data and availability of national data policy.

Hands-on training on the usage of the GSi System with real data was conducted by **Dr. Bandibas** on the second day of the meeting.

Discussion on the scope of the project, roles and responsibilities, workplan and data policy was made. The following are the next steps to be made until September 2016.

- Submit a tentative data upload plan for 5 years (by CCOP Annual Session in Nov. 2015)
- Start data upload and try to make an own portal site
- System development and improvement (requests from National and Data Coordinators)
- Provide user manual for National and Data Coordinators
- Make a mailing-list service and wiki site for discussion among participants (knowledge database)

Agreed minutes of the meeting has been circulated to all the Member Countries Permanent Representatives.



Hands-on training on the usage of the GSi System

GSi Project Coordination Meeting

The GSi Project had a side-meeting on 25 November 2015, during the 51st CCOP Annual Session in Xi'an, China. There were 18 participants attending the meeting, including SPC Geoscience Division (formerly SOPAC) and CCOP TS.

Dr. Shinji Takarada, GSi Project Leader, updated the participants on the progress of the project.

The results of the discussion included the following:

- The GSi cloud server for CCOP (<http://ccop-geoinfo.org>) is ready for the data upload.
- Detailed user manual is needed (online e-learning system is useful).
- Training course should be classified based on the type of users (data coordinator, server developer, young GIS staff, and normal geologist).
- Mirror server is needed for data backup (initially CCOP and GSJ servers should be mirrored).
- In case of own server accident in a member country, GSi system is useful for data backup.

The immediate action items for each member country are:

- To submit preliminary 5-year data upload plan to CCOP TS <marivic@ccop.or.th> and the GSi mailing list <ccop-gsi@g-ever.org> by the end of January 2016.
- To nominate Data Coordinators by the 66th CCOP Steering Committee meeting on 9 March 2016.

CCOP BOOK PROJECT: “STONE HERITAGE IN EAST AND SOUTHEAST ASIA”

The project was proposed by Japan at the 60th CCOP Steering Committee in March 2013. A network of National Coordinators in CCOP Member Countries has been established to compile national chapters according to the guidelines for Authors and draft manuscript of the Japan Chapter provided by the project leader, **Dr. Hirokazu Kato**. Three business meetings of the Heritages Stone Task Group were held on October 22, 2013 in Sendai, in conjunction with the 49th CCOP Annual Session, on March 3, 2014 in Chiangmai, Thailand and on October 22, 2014 in Kokopo, Papua New Guinea, in conjunction with the 50th CCOP Annual Session. During the reporting time, CCOP editors received the chapters of Cambodia and the Philippines and have been editing those, together with completion of the other chapters received from 7 countries (Indonesia, Japan, Korea, Malaysia, Thailand, Papua New Guinea and Vietnam). The book was planned to be published in February 2016 for distribution at the upcoming CCOP Steering Committee meeting in March 2016 in Siem Reap, Cambodia.

CCOP BOOK PROJECT: “BEST PRACTICES ON MINE DECOMMISSIONING AND REHABILITATION PLAN IN CCOP REGION”

The project was proposed by the Philippines at the 48th Annual Session and 59th Steering Committee last November with updates to be reported the 60th Steering Committee. A network of National Coordinators in CCOP member countries has been established. The Philippines is in communication with CCOP Member Countries on availability of documents and possibility of co-support. CCOPTS in cooperation with MGB of Philippines organized the kick-off meeting in Manila in 2015.

Regional Meeting on the Production of CCOP Coffee Table Book “Best practices on mine rehabilitation and decommissioning”

CCOPTS, together with the Mines and Geosciences Bureau (MGB), DENR, Philippines, has organized a Regional Meeting on the Production of CCOP Coffee Table Book on the “Best practices on mine rehabilitation and decommissioning” on 22-25 June 2015 in the Philippines, with attendance by 19 national coordinators from CCOP member countries and CCOP Technical Secretariat. Part of this meeting is a three-day fieldwork/site visit in Rio Tuba Nickel Mining Corporation and Coral Bay Nickel Corporation in Bataraza, Palawan on 23-25 June 2015.



This book project aims to provide a material or platform showcasing different mine rehabilitation success stories throughout East and Southeast Asia. It aims to promote responsible mining. It intends to reach out private (e.g. nongovernmental organizations) and public sector especially the policy-making body to

provide them relevant information for policy making and decision as far as mining is concerned.

This meeting kicked off this book project, providing a forum for presentations of best success stories and best practices. After the country report presentation, discussions on the outline of the book chapters were also accomplished.

CCOP JUBILEE BOOK FOR THE CCOP’S 50th ANNIVERSARY

The 6th Steering Committee Meeting held on March 2015 in Krabi, Thailand decided the theme of the 50th year anniversary celebration of the founding of CCOP as “CCOP’s 50th: Geoscience for the Society”, and produce a jubilee book. This book will be an update of the 2006 CCOP book ‘A World of Difference’, to bring each chapter up to date by adding important changes to CCOP and its procedures / programmes in the period 2006 – 2016, plus a pictorial history of 50 years of CCOP (meetings, programmes, personalities, events from the CCOP archive, from Member Countries, Cooperating Countries and personal archives). All countries have to be involved; a core team could be the voluntary editorial team of Indonesia, Japan, Lao PDR, Malaysia, Thailand, and Vietnam, plus **Dr. Anthony Reedman**. **Dr. Nguyen Thi Minh Ngoc**, CCOP TS Regional Expert, has been appointed the Project Coordinator for this book project. Progress of the Jubilee book was presented at the recent 51st CCOP Annual Session in Xi’An to update the member countries. Preparation on the Jubilee Book is now ongoing, by the CCOP TS and the members of the CCOP Editorial Network.

CCOP HIGH EDUCATION SUPPORT NETWORK PROGRAM

Following the first facilitation meeting on 21 October 2013 in Sendai, Japan, the second facilitation meeting of the CCOP High Education Support Network Program was held on 3 March 2014 in Chiang Mai, Thailand, in conjunction with the 62nd CCOP Steering Committee meeting and the third meeting was organized on October 23, 2014 in Kokopo, Papua New Guinea, in conjunction with the thematic session of the 50th CCOP Annual Session. During the reported period, no meeting has been planned and implemented.

AUTOMATED MANAGEMENT AND OPERATION SYSTEM (AMOS)

At the 62nd CCOP Steering Committee, the China delegation informed the Meeting that the overall design of AMOS is already completed. The first two sub-systems, the administration and financial systems, are put in place, and ready to be tested. China will discuss with CCOP TS for the ways to test these systems.

FELLOWSHIPS AND GRANTS

East Asia Geoscience and Environmental Research (EAGER) Project

The EAGER Project is a trust fund set up in the Geological Society of America with personal contribution of **Dr. Maurice “Ric” Terman**, CCOP Honorary Advisor, to be used for funding research in geoscience in the region. Under the programme, a grant will be made available for research on Geoscience and Environment in East and Southeast Asia to candidates from the Member Country hosting the CCOP Annual Session since 2003.

The EAGER Grant for 2015 was awarded to **Mr. Hui Wang**, a Ph.D. Student at the Institute of Mineral Resources, Chinese Academy of Geological Sciences. The title of his research proposal is “Genetic model of the Saishitang Cu deposit, Qinghai Province, China”.



*Awarding of the EAGER Grant for 2015 at the 51st CCOP Annual Session (L-R: **Ma Yongzheng, Ioannis Abatzis, Hui Wang, Eikichi Tsukuda, Adichat Surinkum**).*

The 65th CCOP Steering Committee Meeting held on 28 – 29 November 2015 in Xi’an, China, agreed on the proposed revision of utilizing an alphabetical listing of the countries to receive the annual EAGER Award, with amendments for the first cycle as follows: 2016 - Timor-Leste, 2017 - Myanmar, 2018 - Cambodia and 2019 - Lao PDR. As for the 2nd cycle, the listing of countries will be confirmed by the Steering Committee in 2019.

MEETINGS AND MISSIONS

In 2015, mission to CCOP Member Countries: Cambodia, China, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Thailand and Vietnam; and CCOP Cooperating Organizations: Australia and United Kingdom were made. During these missions, the CCOP TS visited relevant geoscientific organizations and participated conferences and meetings to promote CCOP as well as discuss possibilities of cooperative activities. Courtesy visit to ASCOPE (Cooperating Organization) were also done for the same purpose.

To expand networking and cooperation, the CCOP TS also visited several international organizations including ADPC, ASEAN and UNEC.

PUBLICATIONS

The following publications were produced during the year. The workshop and seminar reports and proceedings of the CCOP CO₂ Storage Mapping Program (CCS-M) were published on the CCOP website.

General Publication

CCOP Annual Report 2014

The CCOP Annual Report for 2014 is available both in printed and digital formats. The report summarizes the projects and activities carried out during the year 2014, the financial standing and more. It is of 40 colored pages. Its digital file with about 2MB size can be downloaded from this link: <http://www.ccop.or.th/download/CCOP-AR2014.pdf>.

CCOP E-Newsletters Vol 6 No 1, June 2015

CCOP E-News June 2015 is available for download from this link: http://www.ccop.or.th/download/e-news/CCOP_e-news2015-06v6n1.pdf. It is of 18 colored pages, and 1.2MB file size.

CCOP Annual Session Proceedings

Proceedings of the 50th CCOP Annual Session Part I

The Proceedings of the 50th CCOP Annual Session held in Kokopo, Papua New Guinea on 20-24 October 2015 is available for download from this link, <http://www.ccop.or.th/download/as/50as1.pdf>. The proceedings include the minutes of the session, CCOP Progress Report and its Workplan, Member and Cooperating Countries Reports as well as Cooperating Organizations Reports, among others. This proceedings is in PDF format, with 358 pages, and is of 11.1MB filesize.

CCOP Steering Committee Meeting Reports

Report of the 63rd CCOP Steering Committee Meeting

Report including the minutes of the Steering Committee Meeting held in 25-26 October 2014, Kokopo, Papua New Guinea has been published electronically in PDF format.

Report of the 64th CCOP Steering Committee Meeting

Report including the minutes of the Steering Committee Meeting held in Krabi, Thailand on 24 – 26 March 2015 has been published electronically in PDF format.

Technical Activities Reports/Proceedings

GW-5: Report of the CCOP-GSJ/AIST-DGR Groundwater Phase III Project Kick-Off Meeting, 10-12 February 2015, Bangkok, Thailand

This report contains the minutes of the CCOP-GSJ/AIST-DGR Groundwater Project Phase III Kick-off Meeting held on 10-12 February 2015, in Bangkok, Thailand, as well as country reports on "Country's Activity Plan and Possibility of Compiling GW Data under CCOP GW Project Phase III".

This report is of 111 colored pages, and is available both in printed and digital format. The PDF file is of 5.6MB file size and can be downloaded from this link, <http://www.ccop.or.th/download/GW5.pdf>.

Current Status and Issues of Groundwater in the Mekong River Basin

This publication contains updates on the CCOP-KIGAM Groundwater Project, a paper on "Groundwater Level Monitoring – Importance of Global Groundwater Monitoring Network", and country reports from Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam on Groundwater Issues and Hydrogeological Survey of the Mekong River Basin". These paper and reports were presented at the CCOP-KIGAM-UNESCO-DGR Workshop on Sustainable Groundwater Management in Mekong River Basin held on 19-20 May 2015 at Hotel Pullman Bangkok King Power, Bangkok, Thailand.

This publication is available both in printed and digital forms. The publication's PDF file is of 126 colored-pages and of 5.3MB file size, and can be downloaded from this link, <http://www.ccop.or.th/download/CSI-GW-MRB.pdf>.

GW-5



Project Report of the
CCOP-GSJ/AIST-DGR
Groundwater Phase III Project Kick-Off Meeting
10-12 February 2015, Bangkok, Thailand

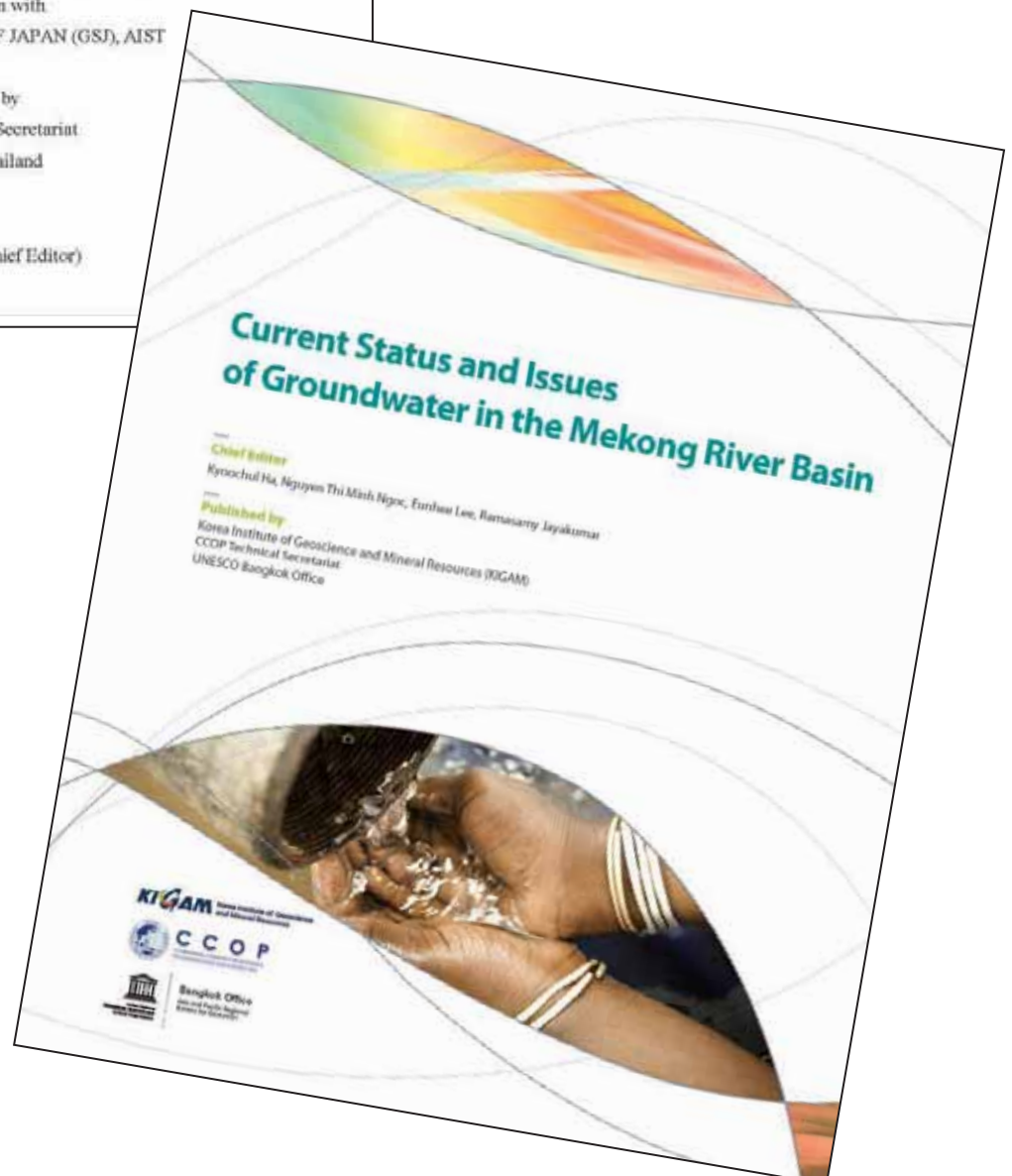


COORDINATING COMMITTEE FOR GEOSCIENCE PROGRAMMES
IN EAST AND SOUTHEAST ASIA (CCOP)

In cooperation with
GEOLOGICAL SURVEY OF JAPAN (GSJ), AIST

Published by
CCOP Technical Secretariat
Bangkok, Thailand

Youhei Uchida (Chief Editor)



Current Status and Issues of Groundwater in the Mekong River Basin

Chief Editor
Kyochoul Ha, Nguyen Thi Minh Ngoc, Eunhee Lee, Ramasamy Jayakumar

Published by
Korea Institute of Geoscience and Mineral Resources (KIGAM)
CCOP Technical Secretariat
UNESCO Bangkok Office



FINANCIAL HIGHLIGHTS

From January 1 to December 31, 2015, Member Countries' total cash contributions amounted to USD 450,000.00, that consists of Cambodia (USD 5,000), China (USD 50,000), Indonesia (USD 40,000), Japan (USD 50,000), Republic of Korea (USD 60,000), Lao PDR (USD 10,000), Malaysia (USD 50,000), Myanmar (USD 5,000), Papua New Guinea (USD 25,000), Philippines (USD 40,000), Thailand (USD 40,000), Timor-Leste (USD 10,000), and Vietnam (USD 25,000). Philippines cash contribution for 2014 was received in 2015 (USD 40,000). (Table 1)

Table 1. Cash Contributions of Member Countries for 2014-2015
(Ending 31 December 2015)

Member Countries	2014 Contribution Received in 2013	2014 Contribution Received in 2014	2014 Contribution Received in 2015	2015 Contribution Received in 2015
Cambodia		5,000.00		5,000.00
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		60,000.00
Lao PDR		10,000.00		10,000.00
Malaysia		50,000.00		50,000.00
Myanmar				5,000.00
Papua New Guinea		10,000.00		10,000.00
Philippines			40,000.00	40,000.00
Singapore				
Thailand	39,111.92	*		40,000.00
Timor-Leste		10,000.00		10,000.00
Vietnam		25,000.00		25,000.00
Total	39,111.92	310,000.00	40,000.00	410,000.00

*Thailand cash contribution for 2014 was received in advance since 2013 (Amount received is less than the expected because of loss of exchange rate from Thai Baht to US Dollar)

In addition to Member Countries' contributions, the amount of USD 37,820.47 earned from the management of projects during January - December 2015 period which from "CCOP-BGR Workshop State Management of Mining Activities in ASEAN Countries" (USD 5,219.00), "CCOP-GSJ/AIST-DGR Groundwater Project Phase III Kick-off Meeting" (USD 3,925.00), "CCOP-GSJ/AIST-KIGAM-PKNU DeSEA III Kick-off Meeting" (USD 3,164.00), "1st Installment Year 2015: CCOP-KIGAM Unconventional Oil and Gas Project: Mapping of Black Shale Formations for the Prediction of Shale Resources" (USD 10,351.50), "CCOP-KIGAM-UNESCO Groundwater Meeting" (USD 3,768.00), "The 1st CCOP Geo Information Sharing Infrastructure for East and Southeast Asian (Gsi) Workshop" (USD 1,688.00) and "2nd Installment Year 2015: CCOP-KIGAM Unconventional Oil and Gas Project: Mapping of Black Shale Formations for the Prediction of Shale Resources" (USD 9,704.97) details are shown in (Table 2).

Other incomes during the period amounted to USD - 4,120.83 from interest earned (USD 1,550.17), Processed from Sale of Publications (USD -), Loss on Conversion Currencies and Exchange rate (USD - 6,062.26), and miscellaneous incomes (USD -). The total income during the period was USD 483,699.64 The expenditure of USD 424,651.33 was incurred from operation and administrative support. The cash balance as of ending December 2015 amounted to USD 936,046.79.

Other Fund (outstanding balanced) (USD 131,377.88) that consists of "CCOP-BGR-DOM Workshop: State Management of Mining Activities in ASEAN Countries" (USD 14,235.01), "CCOP-KIGAM Unconventional Oil & Gas Project: Mapping of Black Shale Formations for the Prediction of Shale Resources" (USD 106,481.06), and "CCOP-KIGAM-UNESCO Groundwater Meeting" (USD 10,661.81).

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 CCOP TS Building, DMR Complex, Rama VI Road, Bangkok, Thailand.

Table 2. Management Income from Execution of Project and Activity (January 1 - December 31, 2015)

Funding Source	Activities	Country	Period	Amount (USD)
BGR	CCOP-BGR Workshop: State Management of Mining Activities in ASEAN Countries	Vientiane, Lao PDR	November 25-27, 2014	5,219.00
GSJ/AIST	CCOP-GSJ/AIST-DGR Groundwater Project Phase III Kick-off Meeting	Bangkok, Thailand	February 10-12, 2015	3,925.00
GSJ/AIST	CCOP-GSJ/AIST-KIGAM-PKNU DeISEA III Kick-off Meeting	Busan, Republic of Korea	March 2-6, 2015	3,164.00
KIGAM	CCOP-KIGAM Unconventional Oil and Gas Project: Mapping of Black Shale Formations for the Prediction of Shale Resources	Bangkok, Thailand 1 st Installment Y2015 (1/2)	March 2015	10,351.50
KIGAM	CCOP-KIGAM-UNESCO Groundwater Meeting	Bangkok, Thailand	May 19-20, 2015	3,768.00
GSJ/AIST	The 1 st COOP Geo Information Sharing Infrastructure for East and Southeast Asian (Gsi) Workshop	Bangkok, Thailand	September 1-2, 2015	1,688.00
KIGAM	CCOP-KIGAM Unconventional Oil and Gas Project: Mapping of Black Shale Formations for the Prediction of Shale Resources	Bangkok, Thailand 2 nd Installment Y2015 (2/2)	December 2015	9,704.97
Total Project Management Income				37,820.47
Net Total Project Management Income for Budget Year 2015				37,820.47

Target Project Management Income for year 2015, USD 57,000.00

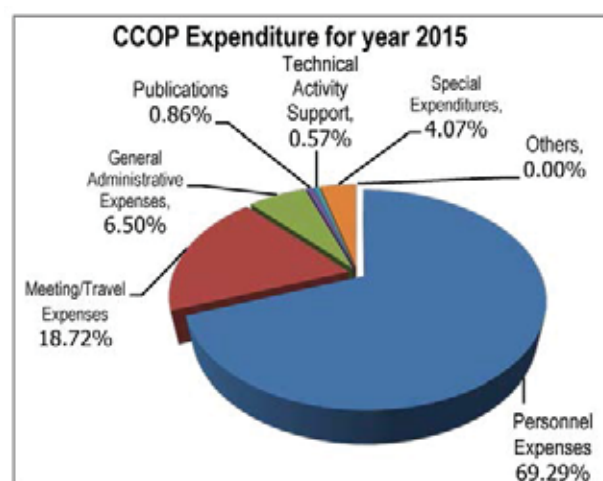
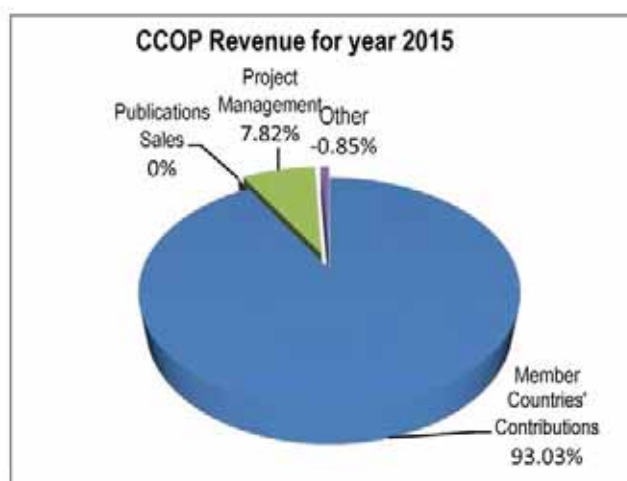


Table 3: CCOP Financial Statement for the year ended 31 December 2015 (amount in US Dollars)

Description	2014		2015	
	USD	%	USD	%
Fund Balance	832,258.00		778,320.37	
Income:				
<i>Member Countries' Contributions</i>	310,000.00	75.91	450,000.00	93.03
<i>Publications sales</i>	-	-	-	-
<i>Project management</i>	97,802.17	23.95	37,820.47	7.82
<i>Others</i>	584.03	0.14	(4,120.83)	(0.85)
Total Income	408,386.20	100.00	483,699.64	100.00
Expenditures :				
<i>Personnel expenses</i>	315,138.15	67.97	294,243.25	69.29
<i>Meeting / travel expenses</i>	91,674.22	19.77	79,494.25	18.72
<i>General administrative expenses</i>	24,814.13	5.35	27,608.68	6.50
<i>Publications</i>	6,699.44	1.45	3,633.88	0.86
<i>Technical activity support</i>	7,091.51	1.53	2,408.91	0.57
<i>Special expenditures</i>	18,212.43	3.93	17,262.36	4.07
<i>Others</i>	-	-	-	-
Total Expenditure	463,629.88	100.00	424,651.33	100.00
<i>Income over/(under) expenses</i>	(55,243.68)		59,048.31	
<i>Total Fund Balance before adjustment.</i>	777,014.32		837,368.68	
<i>Adjusting entries</i>				
<i>Unrealized gain/(loss) on exchange rate for Retained Earning</i>	1,306.05		(1,876.38)	
<i>Tax payable</i>	-		-	
Year-end Balance	778,320.37		835,492.30	
<i>Adjustment to reflect actual cash inflow/(outflow) :</i>				
<i>Account payable</i>			240.75	
<i>Other Fund (outstanding balance)</i>	(3,862.96)		131,377.88	
<i>Office equipment (net)</i>	(50,316.38)		(31,468.88)	
<i>Advance</i>	(6,996.06)		(864.75)	
<i>Tax deductible</i>	1,167.29		1,269.49	
Year-end Cash Balance	718,312.26		936,046.79	

Table 4: Project Financial Statement: CCOP-CCS-M Fund for the year ended 31 December 2015 (amount in US Dollars)

Description	CCS-M Fund 2013 (USD)	CCS-M Fund 2014 (USD)	CCS-M Fund 2015 (USD)
Fund Balance	-	860,078.07	481,894.92
Income :			
<i>Received from GCCSI</i>	287,523.00	165,209.16	-
<i>Received from RNE-Jakarta</i>	868,391.40	-	-
<i>Others</i>	(3,023.10)	(439.77)	(2,896.78)
Total Income	1,152,891.30	164,769.39	(2,896.78)
Expenditures :			
<i>Technical Activities Expenses</i>	294,857.71	543,586.28	301,044.54
Total Expenditure	294,857.71	543,586.28	301,044.54
<i>Income over/(under) expenses</i>	858,033.59	(378,816.89)	(303,941.32)
<i>Adjusting entries :</i>	-	-	-
<i>Unrealized gain/(loss) on exchange rate for Retained Earning</i>	2,044.48	133.74	(463.05)
Year-end Balance	860,078.07	481,394.92	177,490.55
<i>Adjustment to reflect actual cash inflow/(outflow):</i>	-	-	-
<i>Tax deductible</i>	-	22.57	-
<i>Advance</i>	(5,261.56)	(10,002.19)	-
<i>Remittance to CCOP General Fund</i>	-	-	-
Year-end Cash Balance	854,816.51	471,415.30	177,490.55

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

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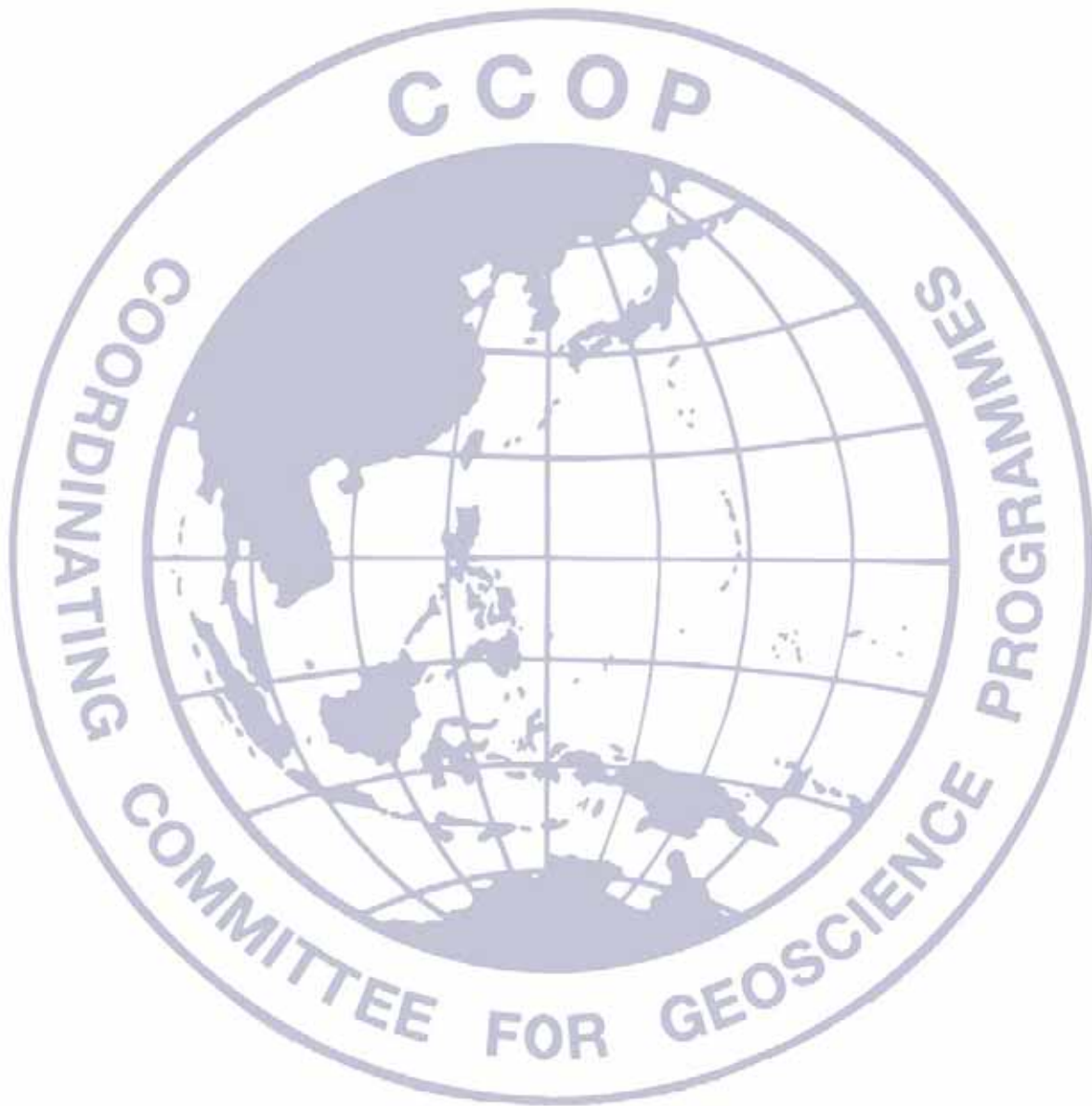
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