



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

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Member Country Report of MYANMAR

1 July 2017 – 30 June 2018

Dr. Ye Myint Swe

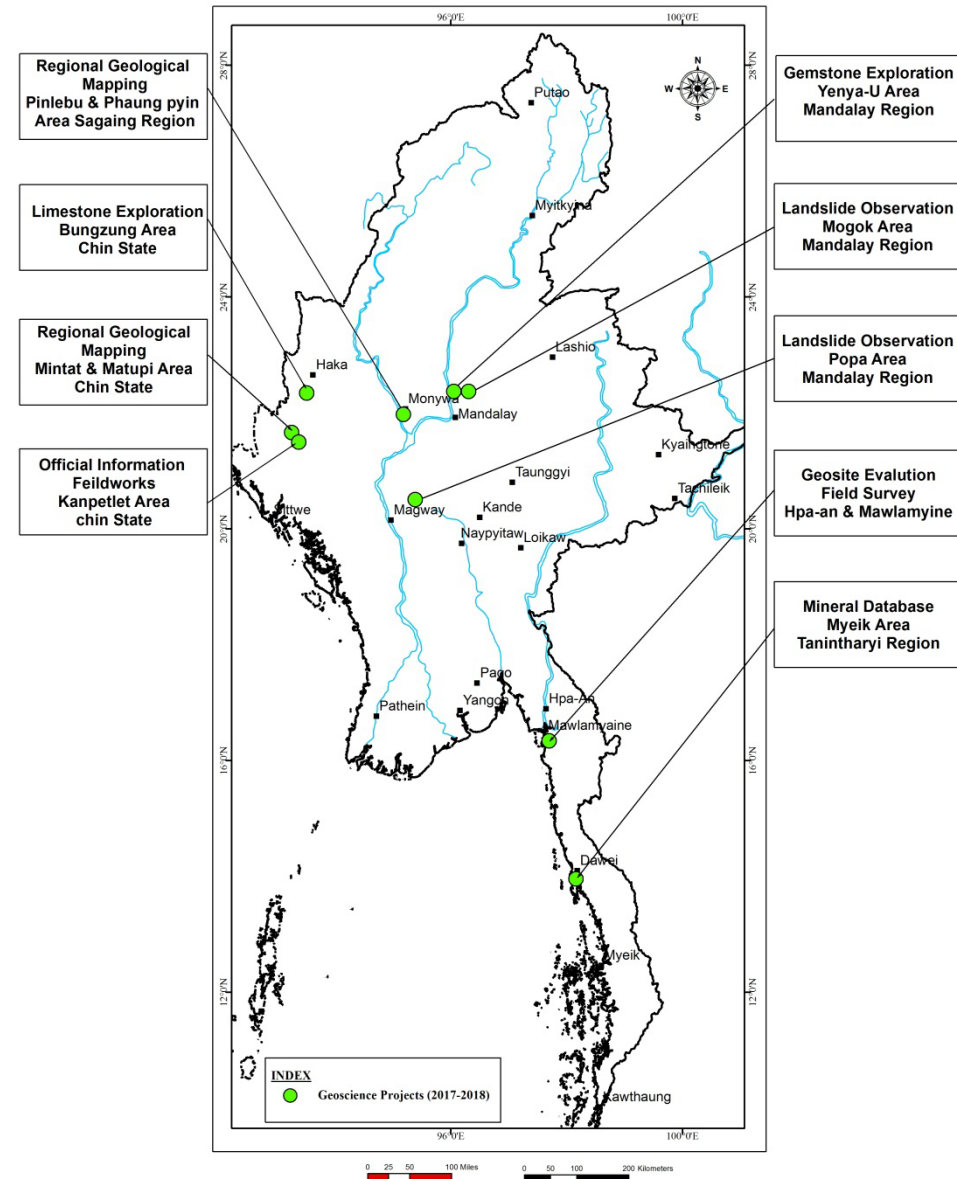
Deputy Minister

Ministry of Natural Resources and Environmental Conservation

October, 2018

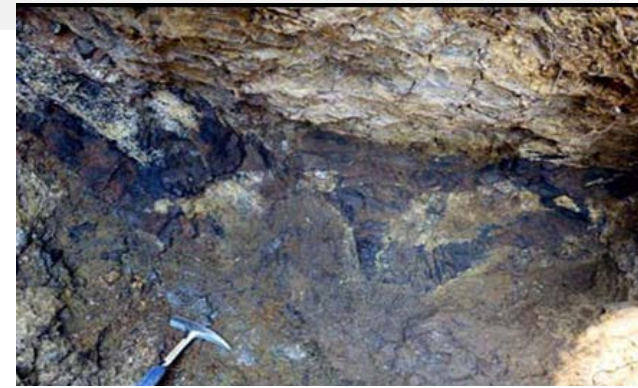
MINERAL PROGRAMME

- The Department of Geological Survey and Mineral Exploration (**DGSE**) is trying to achieve public awareness on landslide and Geo-hazard investigation works done in respective regions, updating mineral database and joint survey with foreign and local companies for mineral exploration. **MOGE** is enhancing oil and gas exploration, exploitation and LNG supply for domestic requirement. **Groundwater Division** is also operating the systematic management on sustainability of ground water resources.
- Mineral Exploration programs** were carried out in Mandalay Region, Magwe Region, Sagaing Region, Shan State and Kayin State for Coal, Graphite, Copper, Limestone and Gemstones potential area
- Mineral Database program** has been conducted in Thanintharyi Region, Magwe Region and Mandalay Region for the mineralization of Tin-Tungsten, Coal, Copper, Lead-Zinc and Barite minerals in respective areas.
- The **geological mapping** (43km²), detailed outcrop mapping 12 km² were done and total 511 million metric tonnes of massive and bedded limestone reserves were estimated in the Bungzung area, Hakha Township, Chin State.
- The gemstone exploration** works in Yenya-U area, Mandalay Region include regional geological mapping about (300 km²) and semi-detailed outcrop mapping (30 km²) were accomplished.
- The landslide and car road uplift** areas lie in one of a village of Mogok Township, Mandalay Region. Geological investigation on 300000 m² is done hazard risk zones are mapped.
- The DGSE **preliminary geosites evaluation field survey** is carried out in the Hpa-An and Mawlamyine area, near Thailand and Myanmar boundary. It is expected that will contribute to CLMTV countries geotourism promotion pilot project.



The DGSE and KIGAM

- ❑ According to the Research Agreement between DGSE and KIGAM, joint field parties carried out geochemical studies of detailed geological mapping in 12 km² of target area and **geophysical studies by Portable Cesium Vapor Magnetometer G-859 SX instrument** in 6.6 km² of Bophivum chromite mineralized target area covering Geochemical Anomalous Zone.
- ❑ Moreover, the party implemented the **enhancement of 3D geological modeling for chromite mineralization** of previous target areas including Cr-Ni geochemical anomaly maps.



- ❑ **DGSE and JOGMEC** have conducted preliminary investigation of antimony, copper, gold, tin-tungsten and Nickel-chromite at Shan Mandalay, Sagaing and Thanintharyi Regions for three year extension period, 1st April 2016 to 31st March 2019.
- ❑ This agreement was signed on 29.7.2016 by the approval of Government Office.
- ❑ The survey team will enhance mutual trust between DGSE and JOGMEC through active exchange of the knowledge and technologies.
- ❑ **Preparation next three extension of MoU for joint field research works (period 2019 to 2022)**



Joint survey team of [DGSE – Director of CCOP](#) has visited to **Mogok Gemstone track** from 27th April 2018 to 1st May 2018. In this trip, the detail outcrops study along and comparative study of satellite images and ground field data were also carried out. Moreover, Gold Mineralization and Current mining activities at Minban Taung and Marble Block production at Sagyin Taung worksites were also studied.



- ❑ The field party of DGSE-DMR-EGAT team visited to Mandalay, Singu, Thabeikkyin, Mogok and Kalewa areas during 25.3.2018 to 9.4.2018. DGSE-DMR joint survey team carried out the preliminary investigation of Gemstone Mine site in **Mogok, Kyatsaung Taung and Pyingyi Taung areas.**
- ❑ The field party carried out the more detailed geological study in this area. It is one of the activities of collaboration in Geosciences among **"Comparative Study on Mineralization of Gemstones in CLMTV Region"** from 2016 to 2019.
- ❑ Joint survey team **including with EGAT** also observed **Kalewa Coal Mines** area during 3rd to 8th April 2018. The effective database of cooperation between DGSE and DMR joint field works based on "Comparative Study on Mineral Potential" can be achieved.



- ❑ The Joint field survey of **DGSE and GSJ** was done at the **Thannintharyi Region**, Southern part of Myanmar for the potential of **Tin-Tungsten and Rare Earth Elements (REE)** and at the **Kyaington and Tachileik**, Shan State for study of gold, copper mineralization system in 2016.
- ❑ At present, DGSE and GSJ are **preparing for next 3 year extension of MoU** for joint field research works.



The foreign companies have applied for mineral exploration rights in Myanmar for Gold, Copper, Lead, Zinc, Tin-Tungsten, and Coal. Currently five foreign companies. have been granted mineral exploration permits in Myanmar and exploration works are being undertaken with DGSE.



Large Scale Exploration Permitted Blocks (Foreign Company) (12-1-2018)

Copper and associated
Exploration
Banmauk Area, Sagaing
(Wuntho Resources)

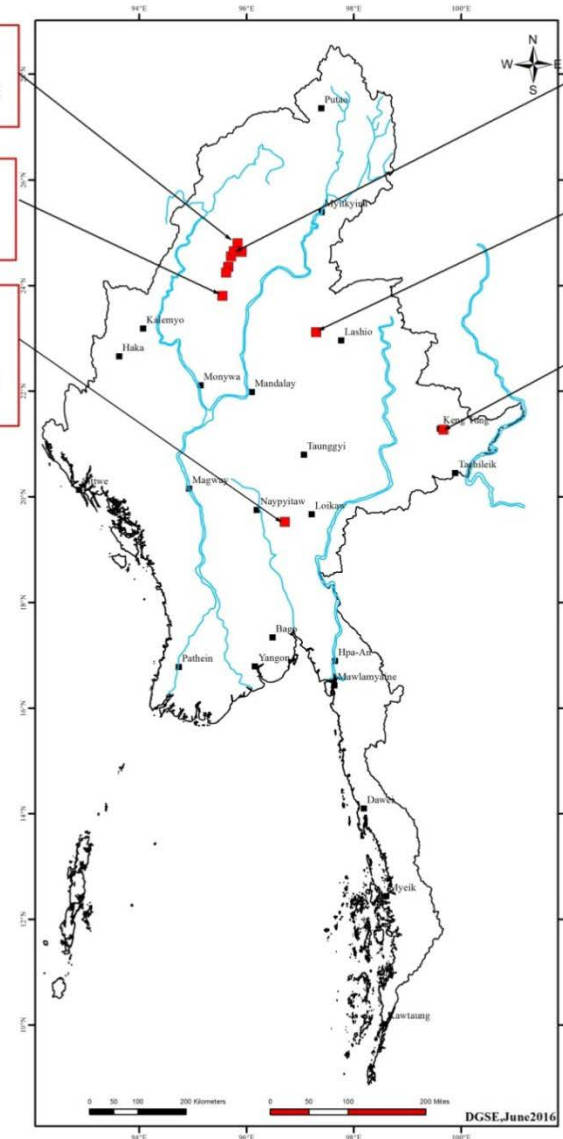
Copper Exploration
Kawlin Area
Sagaing
(Sichuan Chaundi)

Sn - W Exploration
Hpekon Area
Shan(S)
(Southern Nonferrous
Metals)

Gold, Copper and associated
Exploration
Banmauk Area, Sagaing
(Wuntho Resources)

Lead-Zinc Exploration
Namtu Area
Shan(N)
(Asia Pacific Mining)

Coal Exploration
Keng Tong Area
Shan(E)
(Lumpoondum)



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■ Large Scale Foreign Company

- Asia Mining Ltd. Australia is carrying out feasibility study of heavy sand at Mon State.
- Asia Pacific Mining Ltd., Australia is implementing for lead, zinc exploration at Namtu, Bawdwin area, Northern Shan State.
- Wuntho Resources Co., Ltd., Australia is implementing for copper and associated mineral prospecting and Helchain, Pinhinka and Namaw area, Banmauk Township, Sagaing Region.
- Lumpoondum Mining Co., Ltd., Thailand is implementing for coal exploration at Mong Lap, Wankyon area, Kyangtong Township, Shan State.
- Sino Chateau Co., Ltd., England is implementing for Tin Tungsten and associated minerals exploration at Wa Gone area, Dawei Township, Tanintharyi Region.

Proposed Future Activities

DGSE has planned to proceed with **KIGAM for the study of chromite mineralization** and resources estimation, and with JOGMEC for tin-tungsten mineral exploration. The mineralization **of corundum and geo-hazards related to active fault and landslides** have been studied with DMR from 2016 to 2021. **Seamless geological** survey along the cross border with CLMTV is also proposed for future activities.

Assistance Required from CCOP in Support of Future Activities

Technical assistances and financial supporting for joint studies are required.

Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

DGSE can share the technical reports and information, conference papers to CCOP and other member countries.

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Oil and Gas Exploration and Production Activities

On land Oil and Gas Exploration and Production Activities

During the reviewed period, no petroleum contracts were signed for On land blocks. Petroleum contracts namely PSC, IPR, PCC in 25 onland blocks have been signed and currently in operation. A total of 2047.518 km lines of 2D and 448.22 km² of **3D seismic data were acquired and 33 exploration and development wells were drilled**. 2.23 million bl of oil and 17.88 bcf of gas were produced from oil & gas fields.

Offshore Oil and Gas Exploration and Production Activities

During the reviewed period, no PSC contracts were signed for offshore blocks. PSC contracts in **38 offshore blocks have been signed and 27 blocks are currently in operation**. A total of 148.3 km lines of 2D and 15016.41 km² of 3D seismic and 227.773 km² of 4D seismic data were acquired, 41 exploration and development wells were drilled. 1.43 million bl of oil and 655.35 bcf of gas were produced from 4 gas fields.

LNG Project

Two existing offshore projects out of four are currently declining and thus, LNG import is considered to meet the domestic requirement till the production is launched from new discovery in Myanmar offshore region. Therefore, LNG companies were invited to submit EOI (Expression of interest) to Ministry of Electricity and Energy. From these proposals, three companies are chosen to permit NTP (Notice To Proceed). These companies namely Total and Siemens Co; Ltd, Supreme Trading Co. Ltd and Zhefu Holding Group and TTCL Public Co. Ltd, have to import LNG, build the turbines plants and transmission lines to the market. MOGE has to manage about safety of LNG import, environment impact and specification of LNG.

☐ Assistance required from CCOP in support of future activities

None

☐ Assistant offered to CCOP / other member countries in support of future activities

None

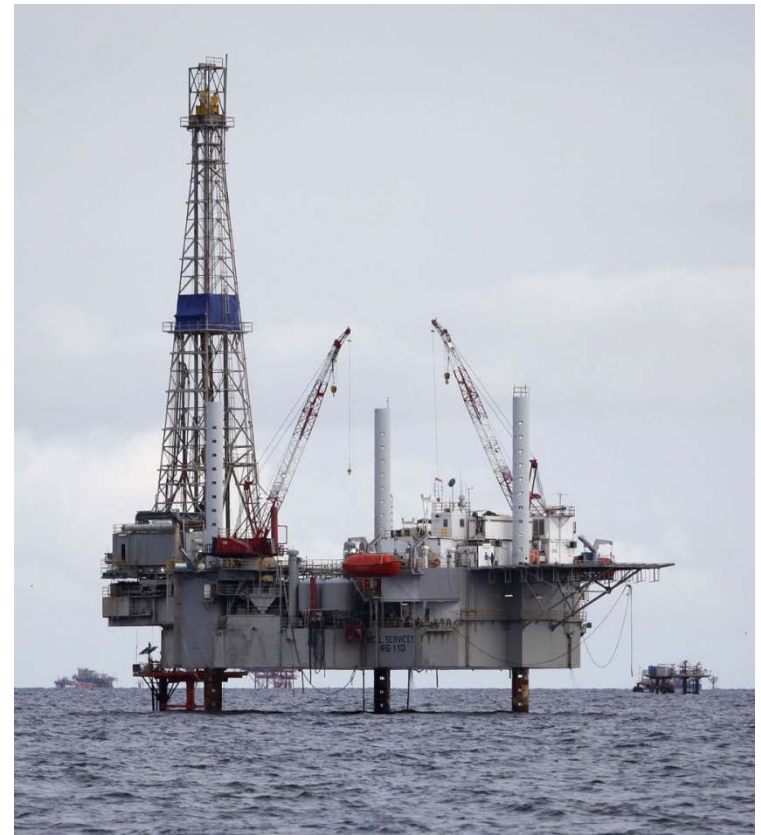
☐ Other Comment

None

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GROUNDWATER PROGRAMME 2018

- ❑ In Myanmar, **Irrigation and Water Utilization Management Department (IWUMD)** is the key department which was established under the guidance of Ministry of Agriculture, Livestock and Irrigation (Mo ALI).
- ❑ The main purpose for the groundwater activities of IWUMD is to measure for the sustainable groundwater management in the country and to boost crop production by supplementary groundwater irrigation projects and drinking water supply in dry zone, remote and hilly states and regions.
- ❑ The water well drilling for agriculture and drinking purposes, construction of groundwater monitoring wells, artesian aquifer management works, groundwater investigation in coastal aquifer and cooperative **groundwater research works with international organizations** were done during the July 2017 to June 2018.



Photograph showing the water well drilling in Hard Rock Formation (Southern Shan State)

Water well drilling for the agriculture water and drinking water supply-

The total of (516) irrigation tubewells and (203) drinking water tubewells were sunk by department. The majority of diameter of the tubewells is ø4" inches.

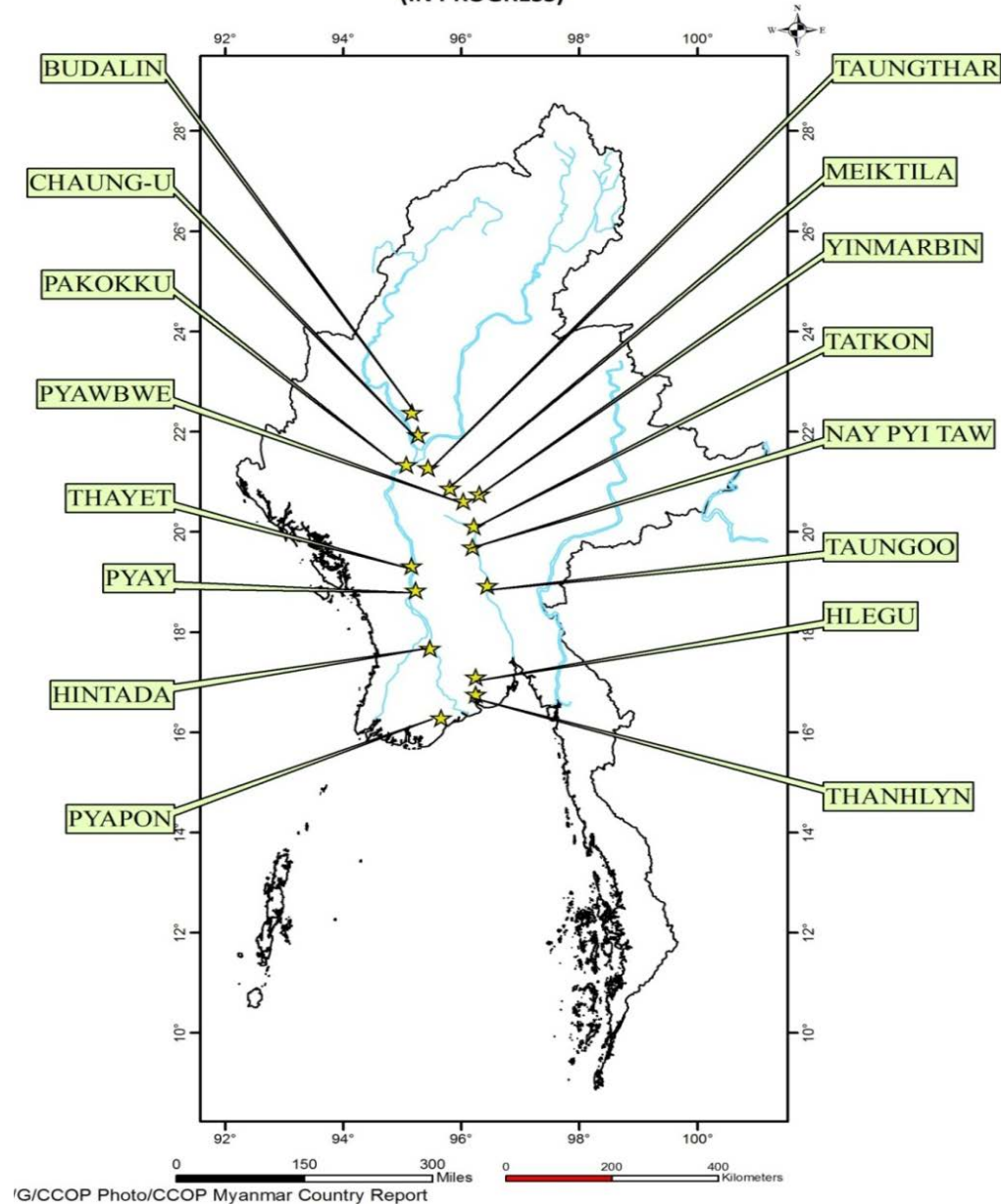
IWUMD's Achievement of Water Well Drilling

| Sr.no | State/Region | No. of Irrigation tubewell | No. of Drinking water tubewell | Total number of Tubewells |
|-------|-------------------------------|----------------------------|--------------------------------|---------------------------|
| 1 | Union Territory (Nay Pyi Taw) | 18 | 15 | 33 |
| 2 | Kachin | 31 | - | 31 |
| 3 | Kayah | - | 20 | 20 |
| 4 | Kayin | 1 | 23 | 24 |
| 5 | Sagaing | 261 | 12 | 273 |
| 6 | Bago | 65 | 28 | 93 |
| 7 | Magway | - | 7 | 7 |
| 8 | Mandalay | 2 | 5 | 7 |
| 9 | Mon | - | 16 | 16 |
| 10 | Shan | 2 | 36 | 38 |
| 11 | Ayeyarwaddy | 136 | 41 | 177 |
| | Union Total | 516 | 203 | 719 |

Construction of groundwater monitoring wells

- ❑ The total of **16 groundwater monitoring wells** were drilled and the groundwater monitoring devices with remote data sending and receiving systems were installed in each monitoring wells.
- ❑ The monitoring sensors recorded groundwater level fluctuation, Electrical Conductivity (EC) and **groundwater temperature** in real time.

16 GROUNDWATER MONITORING STATIONS (2017-18) FISCAL YEAR
(IN PROGRESS)



Artesian aquifer management

- ❑ Yinmarbin artesian zone is situated at the western edge of central dry zone, Yinmarbin District, Sagaing Region of Myanmar.
- ❑ The potential artesian aquifer composed of Tertiary coarse sand and gravel aquifer is favorable for over flowing tubewells with high yield and good water quality. In this connection, uncontrolled water well drilling and no systematic water usage by community practice lead to the groundwater wastes.
- ❑ This situation leads to over exploitation of groundwater and then to continuous dropping of groundwater table.
- ❑ The IWUMD is implementing the necessary measures to recover the previous over flowing condition in the artesian zone by means of piezometric level pipe installation in all **artesian tubewells** and public awareness including groundwater education trainings to local people.



Artesian wells in Yinmarbin



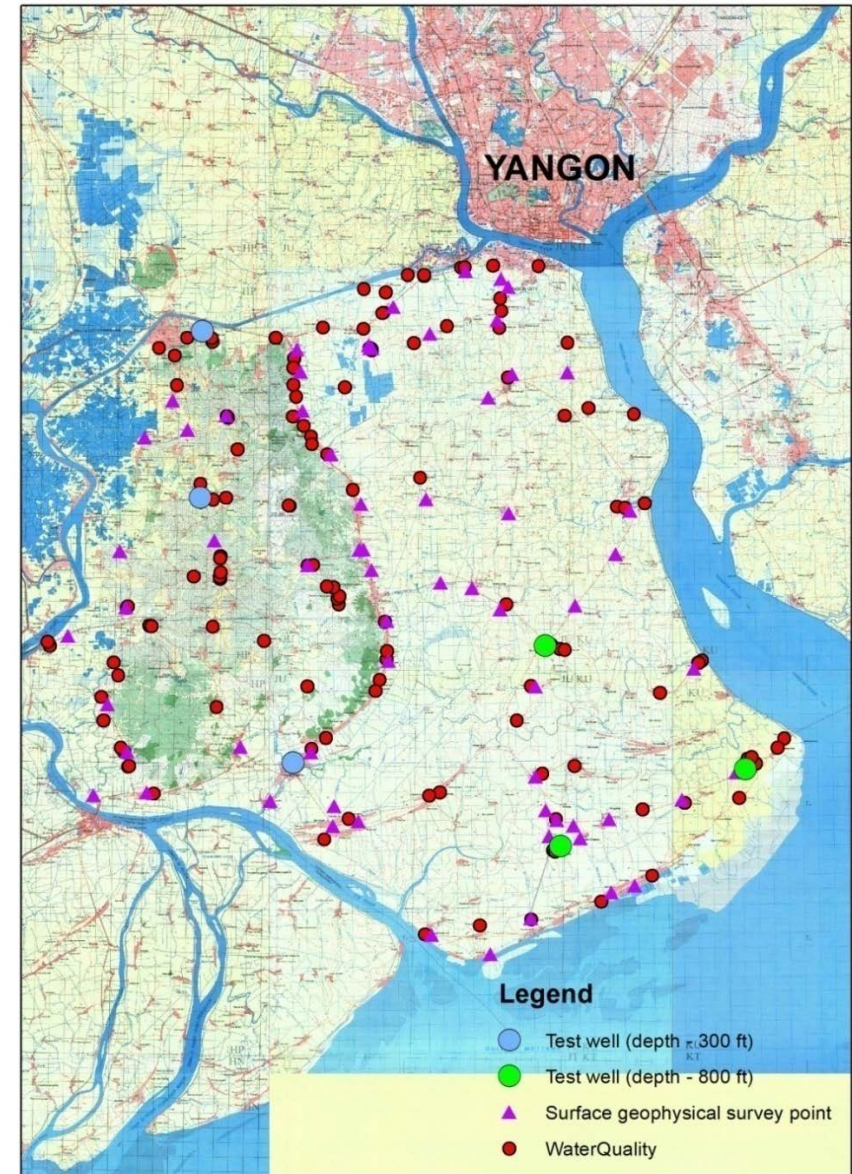
Public Awareness (knowledge sharing of groundwater nature to local people)

Groundwater investigation in coastal aquifer

- ❑ IWUMD is also carrying out the groundwater research work on **the coastal aquifer investigation in Yangon Region**.
- ❑ The investigation includes surface and sub-surface geophysical surveying, test well drilling and water quality assessment.
- ❑ The total of (6) test wells are being drilled and resistivity survey and groundwater sampling and analysis are taking place in necessary areas. Finally, the groundwater assessment report will be established for research areas.



Test well drilling near coast



Surface Geophysical Surveying (Resistivity Survey) at near coast

- ❑ **Cooperative groundwater research works**
- ❑ The groundwater research works with international organizations, have been carrying out as follow:-
- ❑ Feasibility survey for ***“Solar-powered Irrigation Improvement Project”*** cooperation between IWUMD and Korea Rural Community Cooperation (KRC) in Central Dry Zone – Myanmar.
- ❑ Preparing the project concept note on the ***“Project of Groundwater Monitoring for Climate Change and Sustainable Utilization for Agriculture and Rural Development in Myanmar”***.
- ❑ ***Myanmar language translation and official book launching of previously published Hydrogeology of Central Dry Zone – Myanmar by English language*** which was supported by Australian Water Partnership (AWP).



Geophysical Borehole Logging



☐ **Proposed Future Activities**

Solar-powered Irrigation Improvement Project in Central Dry Zone collaboration with KRC.
 Project of Groundwater Monitoring for Climate Change and Sustainable Utilization for Agriculture and Rural Development in Myanmar with KRC.
 Hydrogeological GIS System and Central Database with AWP.
 Artesian aquifer management pilot study of the Yinmarbin-pale sub-basin with AWP
 Hydrogeological Mapping in Eastern Highland including Shan State with AWP.

☐ **Assistance required from CCOP in support of future activities**

Transboundary aquifer study with CCOP and member countries.
 Capacity building for groundwater related subjects under the program of CCOP.
 Seminars, workshops and knowledge sharing programme on ground water and related subjects under the arrangement of CCOP.

☐ **Assistance offered to CCOP/Other Member Countries in support of future activities**

Transboundary aquifer study in Greater Mekong Basin.
 Knowledge sharing and capacity building program with member countries.

☐ **Other Comments:**

Nothing to report

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GEO-HAZARD PROGRAMME

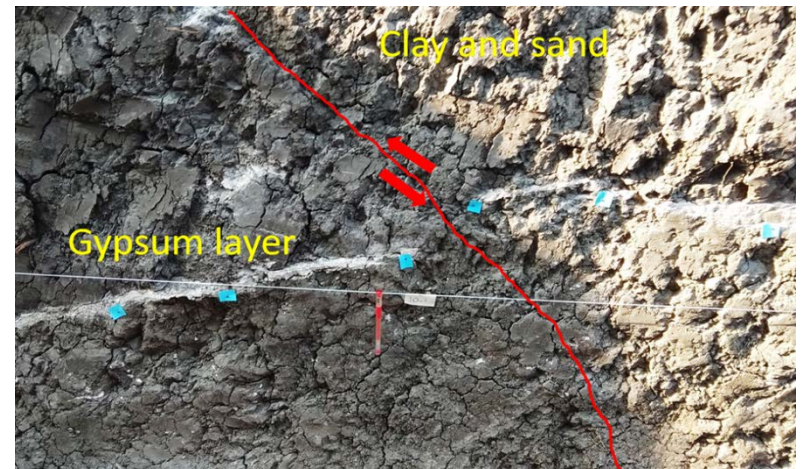
Department of Geological Survey and Mineral Exploration (DGSE) cooperated with DMR, YEA and EOS have carried out geological investigation of potential seismic hazard areas including Sagaing and Singu -Thabeikkyin areas in Mandalay Region.

Annual Review of Individual Technical Activities

DGSE and International Organizations including DMR, YEA and EOS have carried out geological investigation of potential seismic areas and also recommended to Regional Government Organizations and local communities for future prevention and mitigation of geo-hazard events.



Observation trench across the Sagaing Active Fault



Minor fault cut-across the gypsum veinlet in trench

Investigation with International Organizations in Myanmar

- ❑ Department of Geological Survey and Mineral Exploration (**DGSE**), Myanmar Earthquake Committee (**MEC**), Geology Departments of Myanmar Universities, Department of Hydrology and Meteorology (**DMH**), Department of Mineral Resources (DMR), Yunnan Earthquake Administration (**YEA**), Institute of Geology of China Earthquake, Earth Observatory Singapore (**EOS**), Department of Geosciences National Taiwan University and **Oregon State University (USA)** participated in joint survey.
- ❑ The survey team has observed Active Sagaing Fault and Earthquake simulating areas during 16th to 21st November 2017 and 23rd February to 5th March 2018. In this study, field party carried out and recorded the Paleo-seismology, Active Tectonic and Earthquake Potential, Movement **of Sagaing Active Fault and Earthquake affect areas.**
- ❑ The observed areas are **Yega Lake, Ywatharya village, In-wa Ancient City, Mingun area and Singu-Thabeikkyin area.**



**Mingun Pagoda, after effected by
Ava Earthquake (1893) and
Sagaing Earthquake
(RM=7.0),(1956)**

Proposed Future Activities

Proposed future activities are cooperation study not only on seismic hazard investigation and mitigation but also on an active Sagaing Fault.

Assistance Required from CCOP in Support of Future Activities

- Workshop or training course related to seismotectonic studies in CCOP member countries.
- Exchange of information in the field of geo-hazards management and international cooperation network on geo-hazards prevention and mitigation.

Assistance Offered to CCOP/ Other Member Countries in Support of Future Activities

DGSE can share some kinds of data for geo-hazard effected areas in Myanmar to compare with that of other CCOP member countries.

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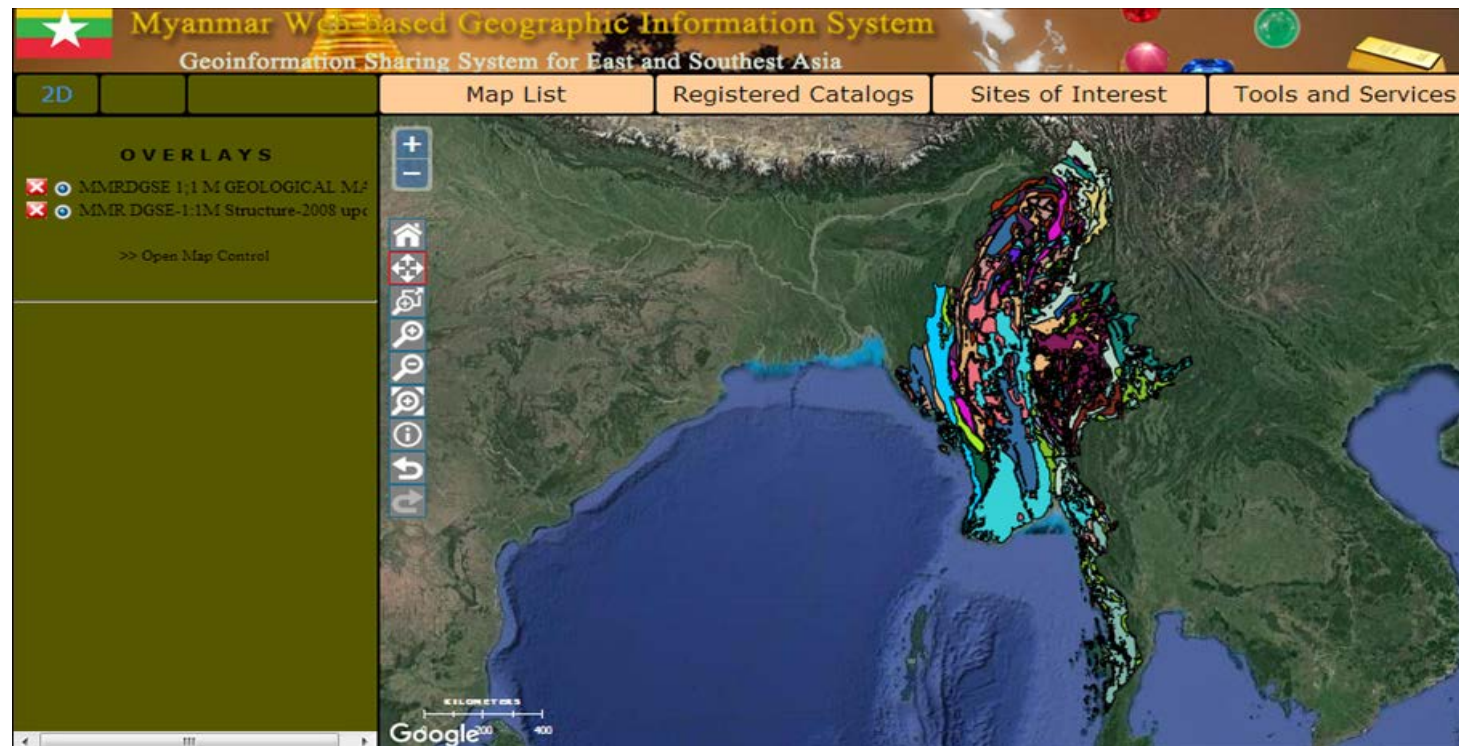
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DATA AND INFORMATION

Annual Review of Individual Technical Activities

- DGSE delegates participated workshop on ASEAN Web-based Mineral Resources Database and Remote Sensing held on 3rd September 2017 to 6th October 2017 in Japan and Lao PDR.
- One of a DGSE delegate also participated in the 2nd International Workshop on CCOP Geoscience Sharing Infrastructure for East and Southeast Asia (GSi) Project held on 5th – 7th December 2017 in Luang Prabang, Lao PDR .
- **Under the ASEAN Mineral Database Programme**, a new database system is being discussed before uploading data/information into a **Web GIS system**.



Proposed Future Activities

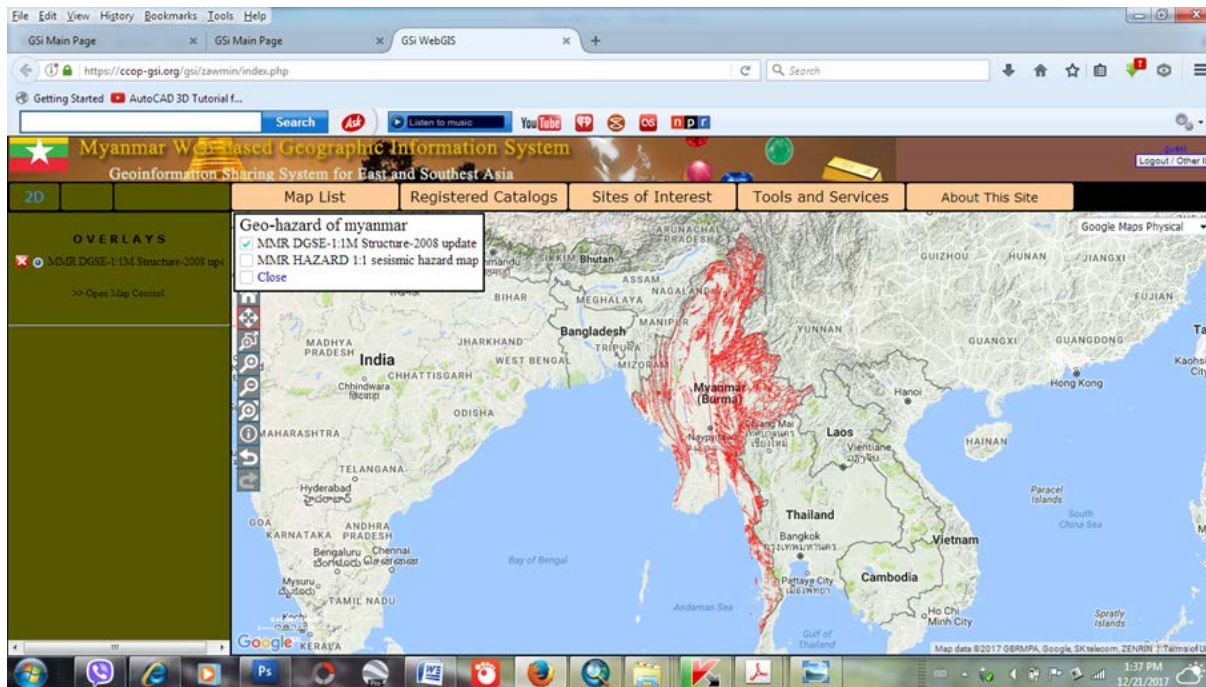
- Joint ASEAN Seamless Geology ground field checking survey will be carried out with CGS .The Geosite evaluation and ground field checking survey will be carried out at Hpa-an area, Southern Myanmar in late 2018.

Assistance Required from CCOP in Support of Future Activities

- More trainings on Web-GIS are requested to JICA for better understanding of practical application.

Assistance Offered to CCOP/Other Member Countries in Support of Future Activities

- DGSE can share the ASEAN Web-based on mineral database, geoscience and geological information to CCOP Member Countries.



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A scenic view of a hilltop with a temple complex, surrounded by trees and a hazy background. The temple complex is situated on a steep, dark hill, with several spires and a central structure visible. The foreground is filled with green and yellow foliage, and the background is a hazy, misty landscape. The text "The End" and "Thank for your Attention" is overlaid in large, red, bold letters.

The End
Thank for your Attention

We hope there'll be more cooperation between Myanmar and your country in the near future.