



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

53rd CCOP Annual Session

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Cooperating Country Report of CANADA

Submitted by

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(For Agenda Item 4)



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

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ANNUAL COOPERATING COUNTRY REPORT

Country:

Canada

Period:

1 July 2016 – 30 June 2017

In early 2017, an administrative reorganization within the Ministry of Natural Resources Canada was completed. The Earth Sciences Sector was merged with the Mining and Minerals Sector to form the new Land and Minerals Sector (LMS), which includes the Geological Survey of Canada (GSC). Dr. Philip Hill of the Geological Survey of Canada continues as Canada's representative to the CCOP Advisory Committee.

1. Summary

LMS, primarily through the GSC, collaborates with China, Japan and Korea, supporting the CCOP strategic goals of Cooperation and Partnership, and Knowledge Enhancement and Sharing. The collaborative projects described below have resulted in an improved understanding of geological hazards, technology transfer, capacity building and ongoing knowledge development to support natural hazard risk reduction and natural resource development. Although some projects have a geographic focus within Canada, much of the scientific research and analysis is carried out within the CCOP Member Countries.

2. Review of current technical activities and geoscience programmes in the CCOP Region (Multilateral or Bilateral)

- a. **China:** In May 2017, LMS and the China Geological Survey (CGS) signed a memorandum of understanding (MOU) concerning co-operation in the earth sciences. Following the signing of the MOU in 2017, Dr. Zhong Ziran, the Vice Minister for Geological Survey, Ministry of Land and Resources (MLR), PRC, and President of CGS, led a delegation to NRCan to further strengthen the collaboration between both geological surveys. The Chinese delegation met with their counterparts at the GSC, led by Director General Dr. Daniel Lebel. Both parties have agreed to explore the following collaboration themes: landslides, unconventional oil and gas, geological framework mapping, uranium mineral exploration and global scale geochemistry.
- b. **Japan:** Currently, LMS and Japan have three MOU's in force:
 - Japan Agency for Marine-Earth Science (JAMSTEC) - (2013-2018) to cooperate on the study and observation of earthquake and tsunami cycles on the Pacific coasts of both Canada and Japan. The joint research will be used to improve construction codes and standards for Canadian and Japanese critical infrastructure, and mitigate the economic impacts of earthquakes and tsunamis.

- Japan Oil, Gas and Metals Corporation (JOGMEC) – (2014-2019) to establish a working relationship in the field of unconventional oil and gas technology. JOGMEC and LMS have signed two IAs under this MOU, which relate to the development of natural gas resources in northeast British Columbia.
 - Japan’s National Institute of Advanced Industrial Science and Technology (AIST) – (2015-2020) to investigate modern and ancient earthquakes and tsunamis. The first phase of this work was completed in 2016 and future activities are under consideration.
- c. **Korea:** Natural Resources Canada and the Korea Institute of Geoscience and Mineral Resources (KIGAM) established a broad MOU in September 2015. The present focus of the collaboration is on state-of-the-art characterization and assessment methods for Canadian unconventional plays. Although the geographic focus of the work is in Canada, KIGAM is conducting detailed analysis for sample, reservoir characterization and development of assessment methodology. Chung Buk National University is responsible for detailed core descriptions and will build a depositional environment model for the unconventional gas plays. INHA University is developing a production forecasting model based on geological properties. Energy Holdings Group, a commercial company is developing a production forecasting model using production and using it to evaluate production potential for the unconventional gas plays.

3. Proposed future activities and assistance to CCOP in support to current and future activities

Canada continues to work on the organization of the Resources for Future Generations 2018 Conference, June 16-21, in Vancouver (<http://rfg2018.org/>). A full programme of technical sessions has been defined and all CCOP Member Countries and Cooperating Countries are invited to attend. In particular, the special session on “The Changing Role of Geological Surveys” has been approved. The following describes the planned session:

Session Title: **The Changing Role of Geological Surveys**

Session Organizers: Daniel Lebel (Geological Survey of Canada)
Philip Hill (Geological Survey of Canada)
Christian Böhm (Manitoba Geological Survey)
Steve Rowins (British Columbia Geological Survey)
Murray Hitzman (United States Geological Survey)
Harvey Thorleifson (Minnesota Geological Survey)

Session Description:

Geological surveys and affiliated governmental geoscience organizations conduct geoscience programs that provide for state-of-the-art research, systematic mapping, technical publications and assessments of the jurisdiction’s geology, resource vulnerability, and investment potential for resources such as minerals, petroleum and water, while concurrently addressing issues such as hazards and engineering. This information is used increasingly by governments, Indigenous and other community

stakeholders to inform land-use planning and is used extensively by private industry to guide exploration and development decision making. It also represents a key stimulus for economic development, particularly in remote regions, and for protection of public health.

By continually upgrading and improving the geoscience information base, geological surveys facilitate identification of both vulnerabilities and new opportunities for resource exploration and development by private industry and communities as well as infrastructure development by governments with significant direct contributions to local, regional, and jurisdictional economies. Geoscience data by geological surveys need to be readily accessible, relevant and applicable to be integrated into natural resource and environmental information bases.

As countries adopt sustainable development principles and the public becomes increasingly (but not necessarily reliably) informed about environmental issues through the use of social media, the integration of resource development and environmental stewardship becomes increasingly important. These issues require geoscience organizations to conduct more integrated geoscience programs and communicate results to a broader array of stakeholders.

The target audience will range from working geologists and policymakers to senior executives. The sessions will be sequenced to build from reviewing the present day landscape of how geological surveys function to strategic visioning of how geological surveys can respond to emerging local to global issues.

Based on expressions of interest received so far, the session organizers anticipate sufficient attendance for five half-day sub-sessions to be spread out through the week of the conference as described below:

Session 1. Progress in geological surveys: clarifying goals, choosing formats, selecting methods

Geological surveys of the world have varying priorities, from frontier regions to urban issues. As they seek to provide comprehensive and consistent information needed to support management, modeling, and research, all strive to select appropriate resolution levels, formats, and methods. All seek an appropriate mix of collections and databases, 2D and 3D geological mapping, geophysical surveys, geochemical surveys, and programs targeted toward energy, minerals, and water, as well as hazards, public health, and engineering – while contributing to research that supports their survey roles. User needs to bring attention to unmapped regions at each resolution level, while mapped regions must be remapped as science, technology, and accessibility progress. Speakers will describe their programs that address these challenges, including required expertise and infrastructure.

Session 2: Promoting geoscience innovation and excellence within geological surveys

For a variety of reasons including mandates and demographics, geological surveys can become stuck in traditional geoscientific methods and administrative models. Innovation, while universally acknowledged to be important in effective organizations, can be difficult to achieve in geological

surveys, which like many government organizations can be resistant to change. How are geological surveys structuring their scientific research environments to favour innovation? What kinds of partnership with academia and the private sector are effective in promoting innovation for the public good? How are geological surveys staying abreast of the sweeping technological changes and globalization of ideas?

Session 3. Building geological survey capacity globally

The identification and characterization of mineral, energy and water resources by geological surveys is key to sustainable development, optimization of public health, and preservation of landscape integrity throughout the world. Geological surveys concurrently contribute to public safety through the assessment and mitigation of natural hazards and facilitation of engineering solutions. Regional geoscience associations play an important role in capacity building and technology transfer between countries. What models of collaboration are most effective into building effective geological surveys? How has development assistance changed in recent years and what is the potential for assistance in the future? Is there a need for a worldwide network of geological surveys to promote optimization of quality of life globally, through economic development, trade, protection of public health, and geo-diplomacy?

Session 4: Relationships between geological surveys and non-governmental stakeholders: changing needs for information management and communication

In many countries, obtaining the social license for resource development is becoming more complex as the voice of advocacy groups is amplified by social media. For many geological surveys, this represents a change from providing traditional clients, such as industry, with technical reports to informing a broader range of stakeholders, including aboriginal groups, environmental NGO's and the general public, with more condensed and accessible information products. In the social media world, boundaries between scientific information and non-scientific information become blurred, the authoritative voice of scientists becomes more difficult to maintain. How do geological surveys respond to this trend and create a space for authoritative scientific information? Is it sufficient for information to be simply "put out there" or should there be explicit strategies for promoting scientific information? How do geological surveys do this without compromising the public perception of scientists as objective and detached from political decision-making?

Session 5: Changing roles of geological surveys in resource development and environmental stewardship

The World Economic Forum's 2016 report, *Blueprint for a Greener Footprint*, calls for a rethink of how countries manage resource development. "Achieving sustainable development requires explicit recognition that economic development and the environment can no longer be considered in separate spheres. Development is part of, and dependent on, the life-support systems provided by a stable and resilient environment". The report calls for planning at the landscape (or watershed) scale before major project investments are

made, requiring the development of an integrated knowledge base of the landscape, its resources and functions, which are critical to its long-term health and sustainability. This is not common practice in most countries, resource development being driven by discoveries and restrained by local environmental impact studies. Geological surveys could play a major role in shifting the resource development paradigm but this would typically require a change in mandate from being “exploration enablers” to “holistic information providers”. Are geological surveys making changes, do they agree with this approach and if so how do they manage this change?

4. Reports/publications of technical activities for dissemination to CCOP Member Countries including contributions to GRID-Net

Xiang, G.; Wang, K., Rheological separation of the megathrust seismogenic zone and Episodic Tremor and Slip, Nature letter, 2017; doi: 10.1038/nature21389