



Providing geoscience data globally

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Introduction

Letter from Matt Harrison



Dear OneGeology members and supporters,

What a year 2018 has been for OneGeology and geoscience data interoperability!

Inside you will find updates from each of the OneGeology regions and information about major upgrades made to the OneGeology website, along with some interesting statistics on how our data is being accessed globally from the OneGeology portal.

During June 2018, OneGeology held a three-day event hosted by the Geological Survey of Canada at their offices in Vancouver. This included the annual one day face-to-face board meeting, a workshop entitled 'The next ten years of OneGeology with particular focus on North American involvement' and the Technical Implementation Group annual meeting. This event was organised aligned to the RFG2018 conference. Dr Carina Kemp from GeoScience Australia, François Robida of BRGM and I gave OneGeology presentations at the conference and sat on a panel session for OneGeology. Full details of all events, discussions and outcomes can be found in this newsletter.

2019 will see some minor changes in the governance model for OneGeology. The board see this as an improvement in the representation of members and delivery of OneGeology and its strategic goals. The first meeting of the new OneGeology Strategic Steering Committee (OSSC) will be in Sweden on 21–March (see [upcoming events](#)).

There has been great progress with the LOOP project with a kick-off meeting in Australia and the recruitment of the team. OneGeology will retain an important role on the steering committee, as you will read in the [news article](#) by Boyan Brodaric and Carina Kemp.

As you know, OneGeology can only continue with the support of the principal members and I commend principal membership to as many geological surveys and organisations as possible. Now it additionally provides access to the OSSC directors meeting.

We look forward to working with you and to your continued support in 2019. Hopefully we may get the chance to meet up at one of the many interesting and exciting events happening around the globe.

Matt Harrison

Director of informatics, British Geological Survey

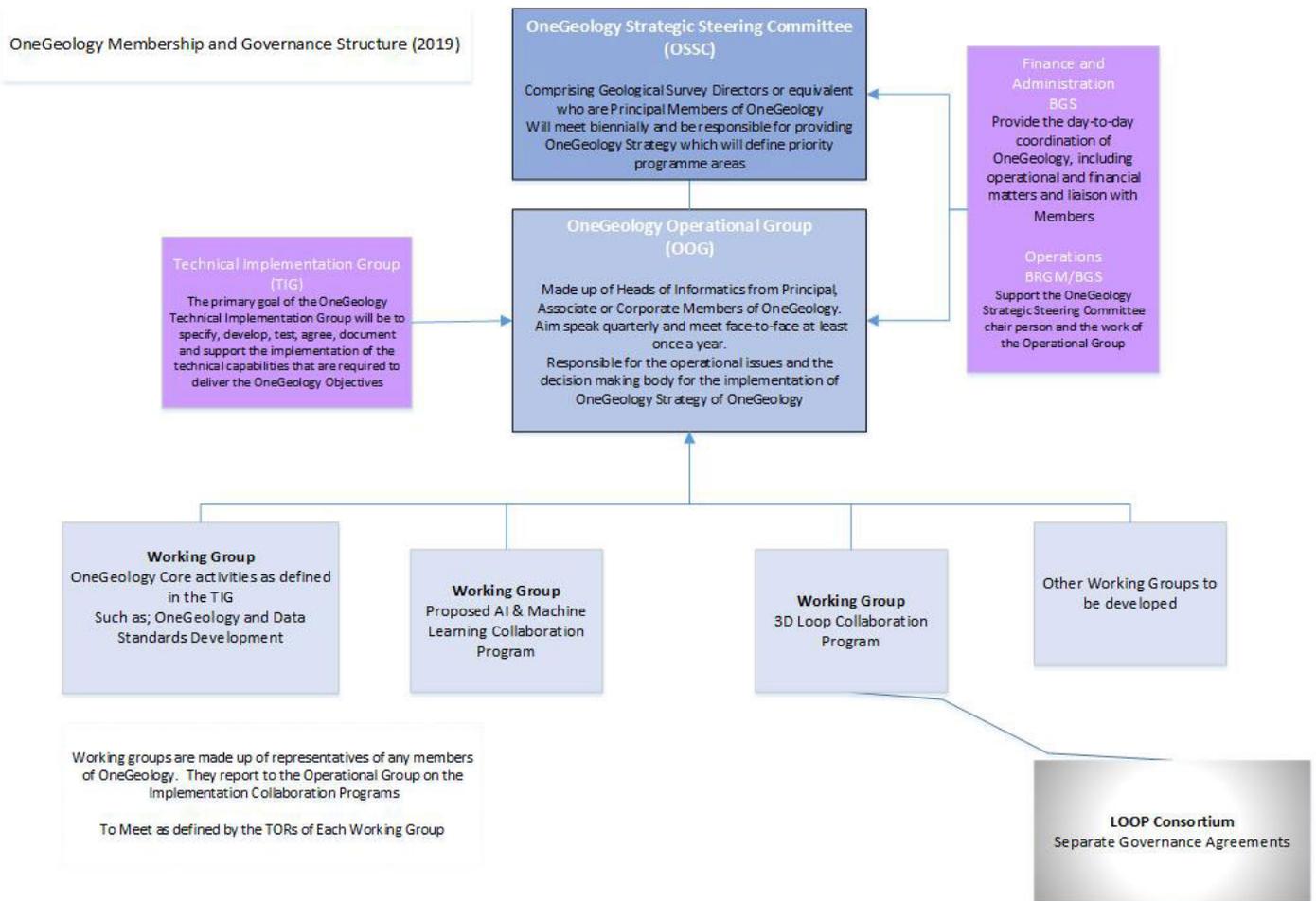
Governance

Author: OneGeology administration

During the 17th annual face-to-face Board Meeting in Vancouver, Canada, in June 2018, discussions centred around:

- the availability of decision-making Board members
- the great engagement that we were receiving from Principal Members
- the challenges of representing a whole continent
- the pro-active governance required when the OneGeology community were engaging in one or multiple projects
- the strong desire to maintain the 'core' OneGeology activities and support to the wider membership

As a result of these discussions and further consultation with Principal Members, to encompass the new opportunities and the factors above, the Board agreed some minor changes to the governance model as detailed in the diagram.



The minor changes put in place by the OneGeology Board are intended to increase and improve the representation of Principal Members. The new strategic steering committee will consist of the directors or chief executives of all Principal Members and will meet biennially. The first meeting of this group will be held in March 2019, with the aim of identifying and addressing shared big science questions, especially those that OneGeology members may be well placed to respond to. At the same time, some of the questions identified may be outside of the scope of OneGeology to address.

You can find more details about the new governance model, such as terms of reference for the strategic steering committee and the operations group, in section 4 of the 2019 Consortium Agreement, which you can find on the [OneGeology website](#).

OneGeology Strategic Steering Committee (OSSC) Meeting in Sweden

As part of the OneGeology Governance changes we will be holding our first OneGeology Strategic Steering Committee (OSSC) meeting in Uppsala, Sweden on 21–22 March 2019.

News and updates

The LOOP kick-off meeting, Bermagui, Australia, November 2018

Authors: Boyan Brodaric — research scientist, Geological Survey of Canada; Carina Kemp on behalf of GeoScience Australia

Several OneGeology members recently participated in the kick-off meeting of the LOOP research project, held in Bermagui, Australia, 19–23 November 2018. This three-year project aims to develop next-generation software for 3D geological modelling to represent more complex geological scenarios than is currently possible.

Led by researchers from Monash University, Australia, LOOP involves many international organisations from academia, government and industry, with OneGeology participants consisting of Geoscience Australia, BRGM, the BGS and GSC. The meeting reviewed the research landscape, refined approaches and goals and developed a working structure that includes six work packages and a governance framework that reserves a seat for OneGeology.

OneGeology's participation in LOOP highlights a strategic broadening of its interests from 2D to 3D national geology, echoing the strategic directions of several of its members. Results from LOOP will provide OneGeology members and the wider geoscience community with valuable new tools, which are expected to accelerate the development of national 3D models that in turn are expected to form a foundation for the next evolution of OneGeology.



LOOP kick-off meeting attendees learning about geological structures at Bermagui, NSW, Australia. Photo courtesy of Alex Ip, Geoscience Australia.

Central and South America

Authors: Maria Glícia da Nóbrega Coutinho, head of international affairs, and the technical team at CPRM

Based on GeoSciML, the OneGeology standard harmonisation process of geological data has, since 2016, provided accessibility via the [Geological Survey of Brazil](#) (CPRM) to the following maps at the OneGeology portal

- simple lithology map of Brazil (1:5 000 000 scale)
- geochronological map of Brazil (1:5 000 000 scale)
- hydrological map of Brazil (1:5 000 000 scale, WMS format)

Because of this effort OneGeology awarded CPRM with five stars accreditation. Recently, CPRM was invited to join the IUGS Commission for the Management and Application of Geoscience Information's Geoscience Terminology Working Group.



Homogenised geochronology and lithology maps of Brazil.

Tectonic map of South America

More recently, we concentrated our efforts in the continental context, with the 1:5 000 000 tectonic map of South America, published in 2016 by the Commission for the Geological Map of the World (CGMW) during the 35th International Geological Congress, held in Cape Town, South Africa. The CGMW approved and authorised CPRM to process the map to GeoSciML 4.1 standard. The version is available in WMS format and consists of 25 distinct layers, all with already defined addresses. The CPRM geoprocessing division is in contact with the OneGeology technical support to publish the map on the OneGeology portal and it should be accessible shortly.



Tectonic map of South America.

Venezuela

At a regional level, CPRM has been collaborating with the South American countries. The geological map of Venezuela was processed to WMS format and is hosted by CPRM, in accordance with the Geological Survey of Venezuela (INGEOMIN) authorisation. We are now working on getting a new authorisation from the INGEOMIN to add the map to the OneGeology portal.

Uruguay

The 1:5 000 000 geological map of Uruguay was completed, in accordance with the previous agreement between OneGeology and CPRM, in order to encourage the Geological Survey Organisations (GSOs) in South and Central America to become data providers to OneGeology. CPRM has actively participated in the process of merging data and information for the geological map of Uruguay.

The map was developed by the Dirección Nacional de Minería y Geología (DINAMIGE), the Geological Survey of Uruguay. The head of the CPRM geoprocessing division and his team have trained the DINAMIGE geologists to harmonise the map, which comprises simple lithology and age vocabulary maps. The DINAMIGE team has already developed both maps based on the GeoSciMI harmonisation vocabulary and sent them to the CPRM team to review.

Although some geological features at the border areas between the two countries do not yet show good cross-border consistency, due to different geological interpretations at distinct scales or different level of knowledge, the maps are quite good according to the terminologies used in the legend (simple lithology and age). Currently Brazilian and Uruguay IT teams are in contact with the OneGeology support in order to add the maps to the OneGeology portal and also hope to be awarded with the category five stars for these map datasets.

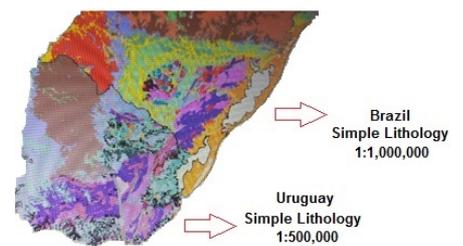


Figure 3a: Uruguay simple lithology

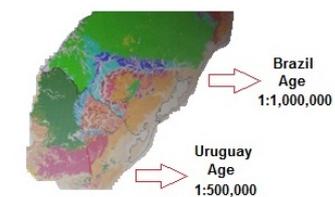


Figure 3b: Uruguay age

Harmonised geology maps of the Brazil–Uruguay border.

Oceania

Author: James Johnson, CEO Geoscience Australia and current Chair of the OneGeology Board and the operations group

GNS New Zealand and Geoscience Australia continue to provide GeoSciML-standard, national-scale geological datasets to OneGeology. GNS Science's New Zealand OneGeology web service received five-star accreditation in April 2018. The service provides layers for the 1:1 000 000 geological map of New Zealand

and 1:250 000 geological map of southern Victoria Range, Antarctica.

The GNS Science-led project compiling 'best available' geological map data for Antarctica, supported by the Scientific Committee for Antarctic Research, involving Geoscience Australia and many other geological surveys from around the world, has made excellent progress. The compilation has been completed at its first pass for many regions of Antarctica, with a data structure aligned to the GeoSciML geology data model utilising CGI-IUGS vocabularies. Options for delivering the dataset are being explored; one possibility is that they will be exposed as web service layers including to the OneGeology portal if there are no intellectual property and copyright issues. Delivery should occur before June 2019.

Geoscience Australia, the Geological Survey of Western Australia and the Geological Survey of NSW participated in the LOOP kick-off meeting in Bermagui in late November; see the [article by Boyan Brodaric and Carina Kemp](#).

Technical updates

OneGeology portal statistics

Nicola Mauroy, BRGM

Why is it useful to have statistics?

Providing geoscience data globally has been part of our identity for more than ten years now. In an effort to always improve the OneGeology portal, we decided last year that it would be useful to better know our users and especially to better understand their behavior on the portal.

Knowing our users can help us to understand their expectations and their needs. We also want to make sure the content is easily accessible to let users find the content they are looking for during a visit to the portal.



Map of visitors to OneGeology website, by country.

How are we doing it?

We are using a free and open source web analytics library that is well known and respects users' privacy. If users don't want to be tracked, they are not. This library allows us to retrieve technical statistics on navigation such as a user's country, browser used etc., but it also allows us to customize the information we are recording to be able to track specific actions.

What's next?

Trying to figure out a user's actions by tracking and analysing them don't seem to be enough to be sure the portal is matching user needs. In the next version of the portal we will deliver a short survey to let users send us their opinions and feelings about the user experience we are trying to deliver. It's very important for us to be as close as possible to their expectation. We don't know yet how long this survey will be online for, but it will probably be as long as it takes to capture relevant information.

Some key numbers

Here are some relevant statistics we were able to record during 2018.

- Average visit duration for a returning visitor: 3min 33s
- Number of returning visits: 9314 (30 per cent of people return to the portal)
- The portal has been visited about 310 000 times from 162 different countries
- The top five visitor countries are:
 - United States: 3645 visits
 - Russia: 2545 visits
 - United Kingdom: 1962 visits
 - China: 1751 visits
 - France: 1526 visits
- Accessing the portal:
 - Direct entries: 12 144 (40 per cent of visits)
 - Search engines: 5917 (19 per cent of visits)
 - From website links: 12 574 (41 per cent of visits)
- Action log: by tracking user actions we are able to record when users come, device characteristics, time spent on the website, order of tracked actions and data layers consulted

Sunday, December 30, 2018 - 12:05:10

Direct Entry



5 Actions - 8 min 46s

- 2 OneGeology Portal
<portal.onegeology.org/OnegeologyGlobal/>
- 3 → manageAddLayer - AFR BRGM 1:10M Bedrock Age - SIGAfrique - AFR_BRGM_10M_BedrockAge
- 4 → manageAddLayer - AFR BRGM 1:10M Faults - SIGAfrique - AFR_BRGM_10M_Faults
- 5 OneGeology Portal
<portal.onegeology.org/OnegeologyGlobal/>

Tracking OneGeology website visits.

Improving OneGeology support for data and service providers

Authors: [OneGeology technical support team](#) at the BGS

Supporting the technical side of setting up OneGeology services involves the following:

- 'cookbook' documentation on how to set up different kinds of service with particular software packages
- a 'OneGeology profile' with some best practices for useful, well-documented services
- a process for registering services with the OneGeology portal
- a helpdesk support email (onegeologyhelp@bgs.ac.uk)
- a buddy system for data providers who don't have the infrastructure to set up their own services

There have been incremental changes to some of these over the lifetime of the project but they have gradually drifted behind the needs and possibilities of a modern system. There are a few drivers for making more changes, including the following:

- The documentation had become a rather heterogeneous collection of different parts added at different times.
- The process of registering a service is time consuming, involving a back-and-forth set of emails between service providers and the OneGeology helpdesk. This isn't scalable for adding large numbers of services.
- The number of data providers setting up services for their own non-OneGeology purposes has increased and it would be good to make it easy to register some of these with OneGeology without having too great a barrier of OneGeology-specific requirements.
- We have had a number of participants who are keen to contribute to the project and, although we have used, for example, cookbook content from different participants in the past, we would like to make it easier for participants to get involved.

In order to make participation easier we are trialling the use of a [OneGeology GitHub site](#). We are hoping this may become a platform where documentation and perhaps software can be developed and host discussions for both user queries and change proposals.

There are just a few preliminary skeleton repository ideas on the site now but one area where we would encourage participants to get involved immediately is the [technical discussion issues board](#). We have put a few initial questions on there for which we would like participant feedback but you could also put anything else you think needs discussing on service provision: the OneGeology profile, the OneGeology portal, catalogue, etc. Any decisions on changes will still be made by the Technical Implementation Group formed by formal OneGeology consortium members ('Principal, Associate and Corporate Subscribing Members') but this will be an open forum for suggestions and comments. This will also be the place where ideas for other content for the site can be suggested.

At this early stage we want to hear as soon as possible any thoughts you have about using the GitHub platform for this purpose. The helpdesk email will continue to remain as the place to register new services and will continue to be available for assistance in setting up those services.

The documentation has evolved in a piecemeal fashion as extra cookbooks have been added over time to cover different service types and updates made for updated versions of software and standards. Recently we have been working on updating the service provider documentation by consolidating the various different cookbooks into a single set of web pages that cover all the different service types that OneGeology currently deals with and, for each supported software package, covers how to set up each of the service types that they support. The new set of pages can be found by following the 'Technical -> Providing services' menu link on the front page of the website or going to http://onegeology.org/service_provision/home.html.

One of the changes in the documentation is to highlight more strongly the possibility of setting up simple feature WFS (e.g. [ESRI](#), [MapServer](#) and [GeoServer](#)) and how to actually use such services in the common desktop GIS clients ([QGIS](#) and [ESRI arcmap](#)).

A common question we get asked by OneGeology users is how to download the data for the maps they can see in the portal. Setting up a complex feature GeoSciML or ERML service is a considerable effort but, if a data provider has already set up a WMS and is happy to allow the data to be downloaded as well, then it is very simple to enable a simple feature WFS that gives access to the data underlying the WMS. Simple feature WFSs with a higher degree of interoperability are also available and encouraged through setting up GeoSciML-Lite and ERML-Lite standards-based WMS and underlying WFS ([Lite schemas](#)).

The older cookbook PDF documents are still available and, although they are no longer linked to, web pages from the earlier WMS cookbook have not been removed so as not to break any external references. If you find any errors or wish to make any suggestions for changes or additions you could create an issue on the above GitHub forum or simply email onegeologyhelp@bgs.ac.uk. The former would be preferable if it is something that could benefit from input from other participants.

The OneGeology profile, which defines naming conventions and service and layer/feature/coverage metadata that should be used for services to be registered with OneGeology, has two functions. One is to enable the functioning of the OneGeology portal to do things like list layers under the correct geographical location. The other is to establish some best practice metadata standards to make the data discoverable and usable for end users. This has always been a fairly time-consuming part of the process, usually involving several iterations between service providers and the OneGeology helpdesk as new services are manually checked for compliance. As mentioned in the [CCOP annual session report](#), the GSi initiative has created hundreds of WMS map layers. These have been created following OneGeology data service documentation but not actively checking compliance with the profile. We would like to have these layers registered in the OneGeology global portal as well but need to consider how we can scale the process of checking them to deal with such large numbers. In the longer term this may mean setting up some form of automated or semi-automated validation checker that providers can use to check their services before submitting for registration. In the shorter term we invite discussion on the GitHub forum or by direct email on which parts of the profile are important and which burdensome. For example, although we recommend following a service URL naming convention to make it easy to identify services from listings of their URLs, this is not really so important when we have catalogues of services and so we don't make this a requirement. Also, although at the start of OneGeology we could safely assume that participants would be setting up services purely for OneGeology, these days it is more common for data providers to be setting up services anyway for their own use or other initiatives so we have to consider how much OneGeology specific tailoring it is reasonable to require. Please contribute your thoughts.

New administration and data service providers support website — and new portal client!

Authors: [OneGeology technical support team](#) at the BGS

Since the last newsletter onegeologyhelp@bgs.ac.uk have completely refreshed the administration website — see the [participation page](#), [organisation](#) and [getting involved](#) — and more significant updates are planned in 2019. Alongside this there has been a significant refresh and logical reorganisation of the vital data service providers' [technical support documentation](#) and enhancements for supporting ESRI software service production and client use and new standards such as OGC GeoSciML 4.1 and ERML and ERML-Lite, as described in other articles.

In parallel with this work the BRGM portal support team have been doing significant upgrades to the client portal and a new version will be released soon after you receive this newsletter. The new portal will feature a Cesium globe view as well as the standard planar view of the current portal. Service providers should ensure their services support CRS:84 on their WMS 1.3.0 services, and also EPSG:3857 as well (as the default EPSG:4326) to ensure that they will be visible in both the globe and planar views.

All the old functionality will be retained in the new portal. As well as the globe view, the new portal will offer a selection of back drops (Blue Marble, Bing Aerial and OpenStreetMap variants) and a measure tool. Restyling of ERML-Lite services on commodity, mineral occurrence type and mine operating status will follow in an additional release.

Following all these recent upgrades to the OneGeology technology and techniques we will be writing to all current data web service providers (and some geological surveys who have often talked of providing services but had not gotten round to it yet!) in 2019 encouraging them to:

- check their existing services are fully working according to the standards and populated with appropriate metadata
- provide more services based on their existing service infrastructures, possibly of larger scale data (OneGeology has long moved on from being just 1:1 million scale data)

In particular they will be encouraged to provide many more new dataset service layers from the (200+) geoscience thematic data types described in the OneGeology [keyword dictionary picklist](#) and welcomed in the OneGeology portal. Be aware that users are coming to the portal hoping to find such datasets here and in 2019 we are in particular encouraging mineral resource datasets, ideally following the ERML-Lite standard. We will be encouraging such an expansion of web data services to be available ready for IGC36 (Delhi) in March 2020.

To communicate the considerable achievements of the last ten years, we aligned the OneGeology meetings with the [Resources for Future Generations](#) conference, which was being held at the Vancouver Convention Centre. Carina Kemp (GeoScience Australia), Matt Harrison (BGS) and François Robida (BRGM) presented and ran the discussion session about the OneGeology project (session 4: 'The changing roles of geological surveys'). They described how big data is managed within the international geological survey community and explored how exciting new technological directions, such as the application of artificial intelligence, will affect next generation geoscience and the geological survey organisation of the future.



Carina Kemp presenting at RFG conference in Vancouver, Canada, June 2018.



OneGeology Board meeting in full swing at Geological Survey of Canada offices in Vancouver, Canada, June 2018.

Report of the 54th CCOP annual session in Busan, Korea

Author: Masahiko Makino — assistant director general, Geological Survey of Japan

The 54th CCOP annual session was held at Haeundae Grand Hotel, Busan, Korea from 28 October to 2 November 2018. The event was attended by around 130 participants from 22 countries (Cambodia, China, Indonesia, Japan, Korea, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, Mongolia, Canada, Denmark, Finland, France, Germany, Netherlands, Norway, UK and USA) with 14 delegates from Japan and three from the United Kingdom.

Thematic session (13.30–18.00, 30 October 2018)

One of the UK delegates, Marcus Sen, gave a presentation about the OneGeology-related activities in the thematic session of the Annual Session. Dr Shinji Takarada and Dr Joel Bandibas also presented papers in the thematic session.

Sub-theme I: geoinformation and geoheritage, status and future

1. OneGeology progress and standards in 2018 (Marcus Sen et al.)
2. CCOP geoinformation sharing infrastructure for East and South-east Asia (GSI) project: towards a comprehensive Asian geoscience database (Takarada, Bandibas)
3. The G-EVER mobile application for sharing geological hazard information using Open Geospatial Consortium standards (OGC) and spatial data infrastructure (SDI) (Bandibas and Takarada)

Sub-theme II: geohazard mitigation and response: active fault, earthquake, tsunami, volcano and landslide

4. Recent development of the Asia Pacific region earthquake and volcanic hazard information system and G-EVER volcanic hazard assessment support system (Takarada, Ishikawa, Bandibas and G-EVER promotion team)

A side meeting for the CCOP geoinformation sharing infrastructure for East and South-east Asia (GSI) project was organised during the CCOP annual session from 19:00 to 21:00 on 30 October 2019. About 20 participants from nine countries (Cambodia, Indonesia, Japan, Lao PDR, Philippines, Thailand, Vietnam and the United Kingdom) attended the meeting. Presentations about the current status of the project and activities during the GSI international workshop in Malaysia in September 2018, and a demonstration on how to use the officially released GSI portal and related sites, were given. These were followed by discussions about the future plan on how to make the GSI system a comprehensive geological data sharing system in East Asia.

There are currently around 570 maps and 60 map catalogues available in the system (<https://ccop-gsi.org/main/>). Furthermore, more than 15 GSI-generated customised portal sites are made available to the public.

Dr Saro Lee from KIGAM proposed a new project to develop a geoscience data repository (GDR) platform in CCOP. He is planning to make a repository system of rocks, minerals, soils, water, borehole, fossils and geochemical data for the next 10 years.



CCOP annual session opening ceremony.



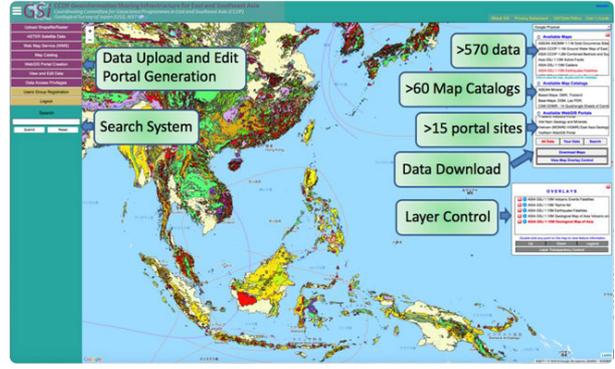
Delegates of the 54th CCOP annual session.



Joel Bandibas presenting at the CCOP thematic session.



Participants of the CCOP GSI project side meeting.



CCOP GSI project website.

American Geophysical Union (AGU) Fall Meeting report, Washington DC, USA, December 2018

Author: Carina Kemp on behalf of GeoScience Australia

OneGeology was well represented at the AGU Fall Meeting in the earth and space science informatics session entitled 'Integrating data and services in the earth, space and environmental sciences across community, national and international boundaries'.

Dr Carina Kemp presented 'OneGeology: a mechanism for collaboration on global platforms and initiatives for interoperable subsurface data', co-authored by Matt Harrison, Boyan Brodaric and Fran Robida. This was followed later in the program by a poster session where OneGeology was represented in two poster presentations: 'OGC Standards working groups for geoscience', presented by Matt Harrison and co-authored by M Beaufils, Carina Kemp, Boyan Brodaric, E Boisvert and S Grellet, and 'EarthResourceML/Inspire mineral resources data models and ERM Lite: data standards to deliver mineral resources data EU and globally', presented by Jouni Vuollo and co-authored by C Cassard, Oliver Raymond, M Sexton, M Rattenbury and James Passmore.



Jouni Vuollo from the Geological Survey of Finland. Photo courtesy of Carina Kemp.



Matt Harrison, BGS, and Fran Robida, BRGM, discuss the OGC geoscience domain working group. Photo courtesy of Carina Kemp.

Useful links

- OneGeology website: <http://www.onegeology.org>
- OneGeology portal: <http://portal.onegeology.org>
- OneGeology Brighton Accord: http://www.onegeology.org/what_is/accord.html
- Consortium agreement: <http://www.onegeology.org/docs/OneGeology-Consortium-Agreement-2019-Final.pdf>
- OneGeology help: onegeologyhelp@bgs.ac.uk General questions: onegeology@bgs.ac.uk
- Twitter: [@OneGeology](https://twitter.com/OneGeology) | [#onegeology](https://twitter.com/onegeology)

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