



# International GeoScience Education Organisation

April 2020 Newsletter <http://www.igeosced.org/>


## While we are interrupted:


Due to the Covid-19 pandemic, IGEO plans for training field IUGS-COGE/IGEO Geoscience Education Field Officers at the EGU Annual Meeting and the 2020 IESO have been cancelled. However, A number of remote or distance learning projects continue to be available to help interest and train the next generation of geoscientists and their teachers. This issue will focus on some of these programs, together with 2019 reports from IGEO Council members around the world.





## Insight@Home


■ En ces temps de déplacements limités, nous vous proposons de suivre la [mission spatiale InSight \(NASA, CNES\)](#) sur la planète Mars depuis chez vous. Depuis cette page, participez à l'aventure de la mission InSight avec des jeux, des quizz et toutes les données scientifiques mises à votre disposition par l'équipe InSight Education.

 We offer you to follow the [InSight \(NASA, CNES\) space mission](#) to Mars from your home. From this web page, take part in the adventure of the InSight mission with games, quizzes and all the scientific data released for you by the InSight Education team.

 In diesen Zeiten der begrenzten Reisemöglichkeiten bieten wir dir an, die Raumfahrtmission InSight (NASA, CNES) zum Mars von zu Hause aus zu verfolgen. Nimm von dieser Seite aus an dem Abenteuer der InSight-Mission mit Spielen und Quizfragen teil. Dazu stellt dir das InSight Education-Team alle wissenschaftlichen Daten zur Verfügung.

 Pour les KIDS (Primaire), rendez vous avec la mascotte 'Marsty' pour de nouvelles aventures avec les planètes. Pour les TEENS (collégiens), participez à notre quiz journalier ... une question par jour et une énigme à résoudre chaque jeudi !. Pour les STUDENTS (Lycéens), accédez aux données scientifiques de la mission, et explorez la structure interne de la planète Mars en étroite collaboration avec les chercheurs...

 For the KIDS, meet up with mascot 'Marsty' for new adventures with the planets. For TEENS, participate in our daily quiz... one question a day and one enigma every thursday. For the STUDENTS, access the scientific data of the mission, and explore the internal structure of Mars in close collaboration with the researchers...

 Das Maskottchen "Marsty" wird die KIDS (Primarstufe) während der neuen Abenteuer mit den Planeten begleiten. Die TEENS, können an unserem täglichen Quiz teilnehmen ... eine Frage pro Tag und jeden Donnerstag ein neues Rätsel zu lösen !... Die STUDENTEN haben Zugang zu den wissenschaftlichen Daten der Mission und erforschen die interne Struktur des Mars in enger Zusammenarbeit mit den Forschern...

**<http://insight-home.eu/>**

**GSA Online Education Resource Guide**

**AMNH Online resources**

**PRI Educational Resources Webinar**

**NESTA Online Resources**

**[AMNH Online resources](#)**

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Workshop activities in action from the Earthlearningidea photo gallery at:  
[https://www.earthlearningidea.com/home/Photo\\_gallery.html](https://www.earthlearningidea.com/home/Photo_gallery.html)



Rock cycle workshop



Volcano



River in a gutter



Himalayas (folded mountains)

## Cancellations and Alterations

### **IESO2020**

With great sadness, we regret to announce that IESO 2020 has been cancelled. Although we explored the possibility of a virtual competition, it was decided that no online alternative could replace the benefits of the in-person experiences and interactions among student participants. We are continuing to plan for IESO 2021.

### **EGU2020**

The European Geoscience Union (EGU) General Assembly in Vienna, Austria will be held as a virtual meeting. **EGU2020: Sharing Geoscience Online (#shareEGU20)** brings part of the activities of the EGU General Assembly 2020 online. We hope that authors and conveners will join us in sharing their research and discussing with colleagues. [From 4 to 8 May 2020 \(CEST\) everyone can join us online](#) for their favourite sessions.

<https://www.egu2020.eu/>

### **36<sup>th</sup> International Geological Congress, rescheduled [36 igc.org](https://www.igc.org)**



### **POSTPONEMENT OF 34<sup>th</sup> International Geographical Congress 2021 İSTANBUL**

Following the spread of the coronavirus pandemic and its current trajectory, it has become clear that it will not be possible to hold the 34<sup>th</sup> International Geographical Congress in İstanbul in August this year as originally planned. Today, the Local Organising Committee and the IGU Executive Committee have taken the decision that **the IGU Congress in İstanbul is postponed for one year**. We are aware that this decision has many consequences, but the very real health risks and the capacity to travel for the Congress participants leave us with no other alternative.

The İstanbul congress will now take place from August 16<sup>th</sup> to 20<sup>th</sup> 2021. **All registration fees received, abstracts accepted, travel grants awarded, and the conference programme already developed for this year will be carried over to 2021.** Any delegate who has already paid the registration fee may use that fee to participate in the Congress in August 2021 and, if desired, submit a new paper for the August 2021 Congress.

<https://www.igc2020.org/en/>



## 2019 Reports from IGEO Country Councilors

### Argentina

José Sellés-Martínez (Argentina) [pepe@gl.fcen.uba.ar](mailto:pepe@gl.fcen.uba.ar)

*\* Please notice that for the sake of better understanding, the titles of contributions and events have been translated into English.*

#### Events

Probably the most important events to which Argentinian geosciences educators have been related this year are:

a) **X Iberoamerican Congress on Scientific Education (CIEDUC)**. Montevideo, Uruguay. March 25-28, organized by UNESCO in Montevideo (Uruguay) in which the book *“Geosciences, in primary and secondary education: reality and opportunities in Latin America and the Caribbean”*. Argentina has contributed to it with the chapter written by Sellés-Martínez, J. and M. Bazán, entitled “Argentina... almost to be done” (pgs. 27-32).

b) **1<sup>st</sup> Argentina Conference on Geotourism**. April 19-20. Sierras Bayas (Olavarría). In this meeting the relevance of tourism for education of general public on Earth Sciences has been stressed along with the proposal for the creation of a Global UNESCO Geopark in the area and its bearing in formal and non-formal education at all levels. This meeting was sponsored by the Montevideo Office of UNESCO among others.

c) **IV Workshop on Teaching Geosciences**. Organized by research groups from the University of Buenos Aires and the University of Campinas. (Buenos Aires, Argentina). September 26-27. In this meeting participants successfully exchanged experiences, ideas and results of their research activities.

d) **II Workshop for aspiring Geoparks**. October 21-25 (Manizales, Colombia). In this meeting the relevance of educational strategies to be carried out in the natural environment has been underlined.

e) **Celebration of the 70 years of the UNESCO delegation in Montevideo**. (Montevideo, Uruguay). December 2-3. Earth Sciences have been recognized as a very important component of education in formal and non-formal environments.

f) A series of virtual meetings organized by **LAIGEO**, which fostered many interchanges of emails between the members.

**Regarding my personal involvement I should stress:**

- a) Participation in the events quoted above, in most cases as organizer, contributor and participant.
- b) Preparation of a booklet on *"Geology and Chemistry of Hydrocarbons"* (about 90 pgs.). Written in cooperation with Dr. L. Galagovsky.
- c) Teaching of workshops, giving conferences and guiding geological urban tours.
- d) Producing materials and articles for newspapers on Earth Science subjects.
- e) Organization of the *"Geocultural Journey to Naples and Rome"* and *"International Field Course: Teaching Earth Sciences in a contextualized and interdisciplinary perspective"*.

#### 2020 PROJECTS

##### **36<sup>th</sup> International Geological Congress.**

- Organizer and Convener of Symposium 1.5 GEOSCIENCES, ART AND HERITAGE
- Contributor to the Symp. 1.10 GEOPARKS, GEOHERITAGE AND GEOTURISME IN LOW INCOME COUNTRIES
- Contributor to the Symp. 1.1 GEOSCIENCES EDUCATION

***"Geocultural Journey to Naples and Rome" and "International Field Course: Teaching Earth Sciences in a contextualized and interdisciplinary perspective"***. Organizer, developer of didactic materials and activities. Leader of journey and field work.

***"Sierras Bayas WORLD UNESCO GEOPARK Project"***. Leading role and active participation in the organization.

Organizer, developer of didactic materials and activities. Leader of journey and field work.

José Sellés-Martínez, December 10, 2019.

## Chile

Maria Jesus Bravo Perez, [mbravop@unab.cl](mailto:mbravop@unab.cl)

IGEO Council members annual report CHILE This year's activities were carried out in collaboration with the Andrés Bello University where I worked as Geology's Director.

- 1st Meeting of Women in Science and Technology of the Biobío Region: There were talks of different women who work in areas linked to Natural Sciences and Technology. In parallel, workshops were held in different areas of science (geology, mining, metallurgy, construction and chemistry) for secondary school girls. Around 200 girls accompanied by their teachers participated.
- 1st Geotour and Geoscience Education Workshop, Paraguay: 22 students from the Andrés Bello University, 2 teachers from the same university and 1 from the Universidad del Desarrollo, participated in the activity, where we were able to know an overview of the geology of Paraguay visiting various places, including the Itaipú binational dam and Iguazu falls. In addition, we participated in the Workshop on Education in Geosciences where different educational initiatives were announced. The activity allowed the collaboration between students and teachers of both countries, as a result 2 Chilean students will make an exchange at the National University of Asunción in 2020.
- Workshops for school students: We develop activities for children and adolescents from various schools with the aim of promoting geological sciences.
- Workshop for high school teachers: We developed a geological risk workshop for high school teachers



## China

Shao Yanxiu, [shaoyx@geoidea.org](mailto:shaoyx@geoidea.org)

There is no better way than to teach earth science in the field. The Geotourism, exploring myth of nature world by traveling with experts, is becoming popular in China. The Ministry of Education of the People's Republic of China encourage students to attend such activities. The China Tourism Association also set up a branch involving the Geotourism. The Geotourism is forming an industry in China.

The Scieau Outdoor is a nonprofit organization to promote Geoscience education in China. It has held several outdoor activities related to themes of desert, hydrology and glacier. It is a good try to combine geoscientists with common people especially young students to conduct wonderful achievement.

We will continue such activities next year, and also hold more seminars about landscape and tectonics for middle school students.

There are some photos of activities below:



Activity poster



Scientist from Chinese Academy of Sciences introduced field observational station of glacier in Qilian Shan, China



Scientist showed how to measure water quality to middle school students



Setting up camp is an important exercise

## Denmark Norway

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I serve as a Council Member for Denmark and as joint Council Members for Norway, together with Merethe Frøyland and Kari Beate Remmen.

I am currently employed to do geoscience education research at university. I therefore cannot accurately inform you on what happens at other levels.

So my report will mainly be that we have started a National Centre for Integrated Earth Science Education in Norway to improve Earth Science education. You can see more on: <https://iearth.no/en/about-iearth/about-iearth-2/>

On the 12th of December we might be upgraded into a Centre for Excellence in Education, <https://diku.no/en/programmes/centres-for-excellence-in-education-sfu>  
Then we will have many research and development activities for geoscience education.

## Egypt

Kholoud Mohamed, [kholoud.mohamedali@gmail.com](mailto:kholoud.mohamedali@gmail.com)

- Training 60 school students on the principles of geology (age 6 -7)
- Trip to the geologic museum in Egypt for 25 school students.
- Train 4 graduate students (geology department) how to teach geology to kids.

## Finland

Kultti Seija, [seija.kultti@helsinki.fi](mailto:seija.kultti@helsinki.fi) and Kotilainen Mia, [mia.kotilainen@helsinki.fi](mailto:mia.kotilainen@helsinki.fi)

The IGEO activities in Finland are organized through the Education Working Group, launched by the Geological Society of Finland in 2018. The group includes participants from universities, Geoparks (institutes that are focused on popularization of geosciences and public outreach), Geological Survey of Finland, as well as teachers from upper secondary schools. The most challenging point within Geoscience education in Finland is the fact that geology and or geophysics is not a school subject at all. Therefore, potential new students are not aware for the whole discipline and do not fully understand the possibilities for studying the geosciences.

IGEO activities aim to raise awareness of higher education in geosciences among high school students. The IESO Olympiad is a large part of this. Last spring over a hundred high school students participated in a national geoscience exam. The number of students taking the exam was a positive surprise. The top 16 students were invited to the 4 days training camp where the team was selected. Next year, the exam is going to be a national geoscience competition for all high school students.

Team Finland attended the Olympiad for the second time, and the participation of our team was funded by K.H. Renlund's Foundation (15 k€). Team Finland performed outstandingly: all the students won bronze medals in the individual competitions. The international team of Olli Palmu won gold and the team of Aino Luttinen placed third in the poster presentation based group project. Aino's team also won gold in the oral presentation based on the field investigation project.

Beside the IESO activities we have published a special volume of Geologi-publication of the Society of Finland that has delivered for over 400 high schools in Finland.

The role of the IGEO activities was introduced for broader audience during the Finnish Geological Colloquium in May 2019.

We have also organized (not so many but few) visits of geoscience students to high schools.

Ongoing project is to organize an open digital learning material bank (in Finnish) that may be used in upper secondary school teaching and as well to arise awareness of Geosciences within public.

## France

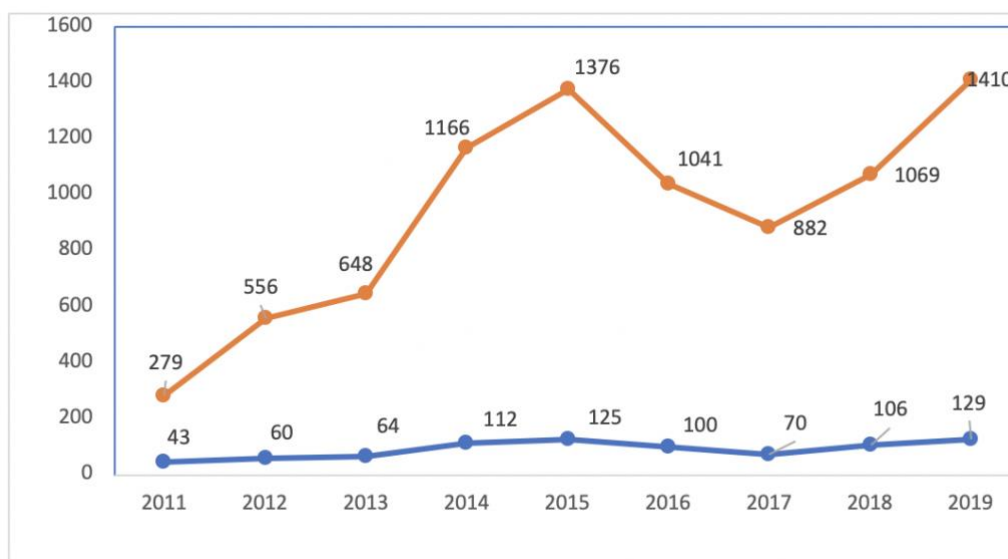
Jean-Luc Berenguer, [jean-luc.berenguer@geoazur.unice.fr](mailto:jean-luc.berenguer@geoazur.unice.fr)

### International Geoscience Olympiads (IESO)

France has been participating in IESO since 2011. To be selected, students must compete in the National

Earth Science Olympiads, follow the preparation online for the International Olympiads, and finally pass a national selection test designed by members of the scientific committee of the French preparation and selection for the IESO.

- Eight students are selected after the first step of this selection. Students selected complete a 4-day seminar at Ecole Normale Supérieure in Lyon. At the end of a 4-day workshop, mainly focused on practical work, the French team is constituted with its four representatives.
- The IESOs are supported by the "Science à l'Ecole" organisation, which steers, coordinates and finances the preparation and travel of the French delegation.
- This year, enrolment in the IESOs has increased by 31%; the students enrolled in 129 schools. This year, 23 new schools participated in this adventure.



*Students participating for IESO national test (in orange), highschools involved (in blue)*

The table below gives the performance of the French delegations since 2011.

Year	IESO location	Gold medal	Silver medal	Bronze medal
2011	Modena, Italy		2	2
2012	Olavarria, Argentina		1	3
2013	Mysore, India		1	2
2014	Santander, Spain		2	2
2015	Poços de Caldas, Brazil		2	1
2016	Mie, Japan		1	1
2017	Valbonne, France		3	1
2018	Kanchanaburi, Thailand		2	
2019	Daegu, Republic of Korea			4

- The students have also won several awards in the team challenges (ITFI and ESP).

#### EGU/IGEO Chapter

- The promotion of geosciences in France also consists in the organization of training for teachers and projects to provide resources for teaching.
- In 2019, with the support of the EGU and IGEO, some initiatives have been launched:
- The appointment of an EGU field officer in France to share resources for geoscience education in training courses.
- -The gathering of professional associations of natural science teachers from various European countries (Italy, Spain, Portugal, UK, France) to work together for the promotion of geosciences in Europe.
- -A dozen French teachers participated in the different workshops organized by the EGU (GIFT EGU in Vienna, CRL school in Corynth, InsegnaciEtna in Sicily).
- Other national or international educational programs could be cited. The list would certainly be long and not exhaustive.
- Each program, initiated by researcher centres in partnership with the Ministry of Education, aims to bring students closer to the geosciences, particularly on societal aspects: geohazards, sustainable development, natural hazards, etc.



## Germany

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Prof. Dr. Dirk Felzmann, E-Mail: [felzmann@uni-landau.de](mailto:felzmann@uni-landau.de)

FS Geodidaktik und Öffentlichkeitsarbeit der GeoUnion/AWS (DGGV/HGD) Stand Dezember 2019  
Geosciences are not a regular subject in German schools and thus there is no adjacent institutionalized infrastructure for geoscience education (teacher training, research) in Germany. How did this situation evolve?

- Around 1870 physical geography was founded at universities in order to enable teachers to teach the natural science aspects of geosciences.
- Around 1970 in Germany physical geography is still responsible to teach the natural science aspects of Earth in schools but scientists are concerned about the quality, because physical geography has lost contact to the respective geosciences (Hard 1975)

- 1996: Leipziger Declaration. German Geoscience and Geography Associations which are together in the roof Organisation called GeoUnion/AWS together express their concern about the lack of geoscience education in German schools (Leipziger Erklärung 1996).

- 2000-2005: Project „Research Dialog: System Earth“. Within project „System Earth“ geoscientists, science and geography educators as well as science and geography teachers together develop a conception and teaching materials for biology, chemistry, geography and physics classes in the upper secondary school education and for primary schools (Forschungsdialog: system Erde, IPN 2005).
  - o Conception and teaching material were made available all over Germany.
  - o Some out of the 16 German states established „System Earth“ within the curricula for applied science Wahlpflichtkurse (compulsory but optional).
  - o The last event of the project group was the Geoscience-conference in 2006 (Bayreuth).

- 2004: Section for Geoscience Education and Outreach of the GeoUnion/AWS. Geoscience and Geography Associations associated together in the roof organisation called GeoUnion/AWS found the section and associate it with the largest geology association (DGGV) and the geography educators (HGD) in order to connect recent geoscience research with geography educators. Geologists (DGGV) and geography educators (HGD) each appoint a speaker (DGGV: Dr. Sylke Hlawatsch (since 2004), HGD: Prof. Ingrid Hemmer ♦ Prof. Gabrielle Obermaier ♦ Prof Dirk Felzmann (since September 2019). This section is basically a branch/national chapter of IGEO.

- 2019: situation at schools
  - o Bavaria, generally offers geology as a subject in upper secondary education even before 2000. However no data is available about the actual number of classes established due to able/motivated teachers. Since around 2018 one university offers a postgraduate geoscience teacher training course for biology, chemistry, geography and physics teacher.
  - o Hamburg: One school wrote an application (before 2000) and received the permission from the local ministry to offer geology as a upper secondary course and offers this course ever since.
  - o Schleswig-Holstein: One school wrote an application (before 2015) and received the permission from the local ministry to offer geoscience as optional compulsory course (Wahlpflichtkurs I) from year 7 to 10 and offers this course ever since.
- 2019: German Geoscience and Geography associations met in order to develop another declaration for more geoscience education in German schools, since the situation is unchanged bad. This is still under progress. Section for Geoscience Education and Outreach of the GeoUnion/AWS Today there is still no institutionalised infrastructure for geoscience education in Germany. We rely on Geography Education Professors, which only extremely rarely

choose geoscience as major field of work. Until today physical geography covers only fragments of geoscience education. The sections activities:

- From 2006 – 2018 the officers of the German section (Sylke and Gaby) participated as senior officers in IGEO activities.
- Since 2012 the section (Sylke) coordinates the German national team for the International Earth Science Olympiad (IESO) and trains the students. The DGGV helps with financial support.
- In 2019 actions increased:
  - o Geography educators (HGD) nominated Dirk Felzmann as their speaker for the section FS Geodidaktik und Öffentlichkeitsarbeit der GeoUnion/AWS (DGGV/HGD) Stand Dezember 2019
  - o Geoscientists (DGGV) acknowledge the importance of geoscience education and reinforce „their“ speaker Sylke Hlawatsch.
  - o EGU nominates Wolfgang Gerber as field officers in order to train German teachers
  - o We started to (re)activate members and convince new members in order to start a bottom up approach for more geoscience in German schools in order to find out „What do we already have in Germany?“ „What do we know about geoscience education?“, „What needs to be done?“
  - o The short term goal is
    - ♣ to find more teacher/schools that establish geology/geoscience courses by providing teaching material and ideas and thus also
    - ♣ increase the participation in the selection for the German IESO National Team.

## Greece

Georgia Fermeli, [f.georgia@gmail.com](mailto:f.georgia@gmail.com)

In Greece, Geology does not exist as a separate subject in Primary school. It is included indirectly, through other subjects such as the subject “Study the Environment” (1<sup>st</sup>-4<sup>th</sup> grades), “Geography” (5<sup>th</sup>-6<sup>th</sup> grades) as well as in crosscurricular activities like “Flexible zone” (1<sup>st</sup>-4<sup>th</sup> grades).

- In Lower High School there is the subject “Geology-Geography” for 1h hour per week in 1<sup>st</sup> grade and 2 hours per week in 2<sup>nd</sup> grade. In 1<sup>st</sup> grade of Upper Secondary School exists the optional subject “Geology and Natural Resource Management”.
- During current school year, a new course in science (physics, chemistry, biology, geology) was proposed for the 2nd grade of Upper High School, but without success.
- Positions and views on the Curricula (including Earth sciences) were discussed at a conference organized by the Institute of Education Policy in April 2019.
- Educational programs and research by third parties such as universities, museums, research institutes and NGOs dealing with Earth sciences issues have been approved by the Institute for Educational Policy according their scientific and pedagogical values and implemented either inside or outside of schools. Many of these projects refer to issues of earthquakes and natural disasters.

**2020 plans:** A new national project on curricula and teachers’ training is accepted for the next three years. In this context, it is expected that the teaching hours of the natural sciences, including Earth sciences, will be expanded, as well as is expected the development of educational material for teachers training in Primary and Secondary schools and the development of new school textbooks on Earth sciences.

Dr Georgia Fermeli

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(Natural Sciences, Technology and Mathematics - Humanities and Literature-Social Sciences-Arts - Technical and Vocational Education)

## India

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Please find below activities undertaken by me during this year to promote Earth System Science.

1. Video talk (TV): World Environment Day 2019: Beat Air Pollution, Panel Discussion on 3rd June 2019, Electronic Media Production Centre (EMPC), Indira Gandhi National Open University, New Delhi.
2. Popular article: Geological Survey of India proposes an introduction to school geology course to 'catch them young and attract talent', IGEO April 2019 Newsletter (p.13)

### 3. Training for IESO:

Conducted International Earth Science Olympiad Test for School students in Hisar on behalf of the Geological Society of India on Jan 19th 2019, as part of the outreach program.

Training In charge of the training program for the National Earth Science Olympiad program, Anna University, Chennai from 15th May to 7th June 2019.

### Lectures delivered:

- a. Training program for the National Earth Science Olympiad program, Anna University, Geosphere-Biosphere Interactions, 18.05.2019.
- b. Training program for the National Earth Science Olympiad program, Anna University, Global Environmental Issues, 24.05.2019.
- c. Training program for the National Earth Science Olympiad program, Anna University, Relative age determination, 25.05.2019.
- d. Training program for the National Earth Science Olympiad program, Anna University, Locating the Epicentre and estimating the origin time of the Earthquakes, 25.05.2019.
- e. Training program for the National Earth Science Olympiad program, Anna University, Air Pollution, 31.05.2019.

### Workshops organized:

1. Organized a Workshop on “Population and Environment”, 11th July 2109.
2. Organized Water Conservation poster and slogan competition, 22nd July 2019.
3. Organized GIFT (Geoscience Information for Teachers) Workshop in Hisar, 2nd September 2019.

R. Shankar, [rshankargeo@gmail.com](mailto:rshankargeo@gmail.com)

#### 1) Geoscience Education at the 36<sup>th</sup> International Geological Congress (IGC)

Preparations are in full swing for the 36<sup>th</sup> IGC, Delhi, March 2-8, 2020. [Note: See p. 2 for announcement of postponement until 2021.] Theme 1 on “Geoscience for Society” has symposia on Geoscience education, and Geoscience communication and Outreach. Several other symposia in this theme are of interest to IUGS-COGE. Overall, a large number of abstracts have been received for all these symposia. We hope that the cause of earth science education and communication would be well served at the 36<sup>th</sup> IGC. Theme 1 co-ordinators are: R. Shankar, Chris King and Anish K Warriar. Several workshops dealing with Earth science education/ communication will be organised. One of them is the Geoscience Information For Teachers (GIFT) Workshop for high school teachers that will be organised by Chris King and R Baskar through the European Geosciences Union. Keynote speakers at the Congress include Roberto Greco, Chris King, and Lola Pereira.

R. Shankar is a member, Organising Committee, and has contributed, and is still contributing, to the planning of the Congress. He is also Chair, GeoHost Committee that provides support to deserving geoscientists from around the world – 1000 registration fee waivers, 1000 airfares, and 1000 local hospitality – thanks to the munificence of the Government of India.

#### 2) International Earth Science Olympiad (IESO)

The IESO is a flagship activity of the International Geoscience Education Organisation (IGEO). It is a competition for high school students from across the globe. R. Shankar, while being the Chair, IGEO, contributed to profoundly modifying the testing pattern and philosophy of IESO in order to bring IESO back to its intended trajectory of enhancing earth science education in schools: Questions that are of excellent quality, of High school not university standard, analytical and thinking skills-based not memory-based, Earth System-based not individual subsystem (sphere)-centered. He also established the Examination Board comprising earth science educationists and/ or school teachers to ensure high standards. He continues to contribute to both IGEO’s goals and IESO’s improvement.

The Geological Society of India is the nodal organisation that selects and deposes the Indian Team to IESO. A national level entrance test is conducted to select about 20 high school students who will be trained for 3-4 weeks. R Baskar has contributed to the conduct of the entrance test and the training camp by way of lectures and training. The students who excel in the Indian National Earth Science Olympiad will constitute the Indian Team to IESO. Until 2013, R. Shankar was the National Co-ordinator and led the Indian Team to IESO. The entire Earth Science Olympiad program is funded by the Ministry of Earth Sciences, Government of India.

3) Meeting in Coimbra, Portugal, April 2019, R. Shankar attended the meeting and contributed to the various items of agenda, including revision of statutes for IESO and the formation of the European Chapter of IGEO.

#### 4) Field Officer from India

Dr R Baskar was selected as a Field Officer by EGU/IGEO to carry out Geoscience Information For Teachers (GIFT) workshops to help high school teachers teach their students better using hands-on activities. Dr Baskar already conducted a GIFT workshop on September 2, 2019 in Hissar.

#### 5) Earth Science Education in Indian schools: A review

Earth science is not a separate subject of study in high schools; related-topics are incorporated in Geography, General Science and Social Studies. Besides, earth science topics are taught by teachers with either science or arts background. Teaching methodology is archaic. Efforts are on to make earth science a separate subject of study (See Popular article: Geological Survey of India proposes an introduction to school geology course to 'catch them young and attract talent'. P. 13, IGEO Newsletter April 2019 Issue). To improve teaching practices, a number of teacher training workshops have been conducted (see below).

#### 6) Teacher Training Workshops

To enhance the quality of earth science education, these workshops, as opposed to talkshops (!), involved hands-on activities and field visits to demonstrate various earth science principles, processes and phenomena. A modest beginning was made in 2013 with a teacher training workshop conducted by Nir Orion during the 7<sup>th</sup> GeoSciEd conference, Hyderabad. Three similar but more extensive workshops were conducted by Chris King and Nir Orion in Goa, Mangaluru and Bengaluru in 2015. Nir Orion conducted another in Bengaluru in December 2019 on environmental and social issues. One more will take place in Pune before the 36<sup>th</sup> IGC for high school teachers – to be conducted by Nir Orion and Chris King. As mentioned above, a GIFT Workshop at the 36<sup>th</sup> IGC in Delhi will involve more than 30 teachers from India. Besides, Chris King and R Shankar will be giving invited presentations on Earth science education at the Indian Science Congress in early January 2020.

#### 7) Public understanding of Earth Science

A number of activities were carried out to create awareness of earth sciences among common people. For example, "Geoscience Week 2019" organized in Pune had numerous activities: Exhibition, Talks, Photo contest, Debate contest, Geo-trail etc. R Baskar participated in a Panel Discussion on "Beat air pollution" on the TV on the World Environment Day. He also organized a workshop on "Population and environment" and organized poster and slogan competitions on "Water conservation". Arundeeep Ahluwalia has been active, delivering a number of talks to school and college students and the general public. Earth Science exhibitions were carried out at several places in the country to bring to the knowledge of common people the importance of earth science in our daily lives and the career opportunities they offer to the young.

#### 8) General

There may have been other activities and several more of the activities listed above conducted. It has not been possible to track all of them due to the sheer size of the country.

## Indonesia

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### Earth science teaching system in Indonesian schools

In the whole pre-college education (starting from year four at Elementary School, Junior High School and Senior High School), earth science is not given as a special subject but included into geography subject. Basically, the subject is a combination between physical geography (introduction to earth & planetary science) and human/social geography. In the 1st - 3rd grade of Elementary School, earth science is a part of "nature science" subject, mixed together with the teaching of basic knowledge on physics, biology and chemistry. Students are introduced to the form and position of earth, sun & moon.

In the 4th – 6th year of Elementary school, the subject geography is given. The physical geography chapters of this subject are basically discussed the form of earth (surface), rocks and soil, atmosphere. In the Junior High Schools (7th – 9th grade), students are learning about maps, earth surface and interior, endogene and exogene processes, rocks and soil, atmosphere, hydrosphere, geo-resources.

Same subjects are learned by the 10th grade students (first year of Senior High School). As before, the earth science subjects are given together with social/human geography. However, in the 11th & 12th grade (second and third year of Senior High School), students are separated into 2 classes (nature science or social science class). For nature science class, the geography subject is concentrated on physical geography, which including maps, formation of earth, earth surface and interior, plate tectonics, atmosphere, hydrosphere, geo-resources and natural hazard.

There is geography text book for each level of education, but the problem faced is that geography teaching is not accompanied with exercises or practical activities. Some deficiencies on geography teaching are as follows:

1. some topics are introduced too early and in too much in the elementary school. Too much detailed information (but without real examples) make it difficult to understand.
2. Some information concerning basic earth science knowledge such as rock or soil formation and classification, processes on earth, plate tectonics, etc are not correctly introduced to students. This is mostly because the geography teachers have only limited knowledge on earth science. It is also understandable because they should teach a very broad range of subject, from physical to human and social geography.
3. Each chapter of physical geography (therefore earth science) are discussed as separate topic. It makes an impression that there is no relationship between each topic. Earth is also discussed only as "a space", but not as "an evolving space". This results in the lack of understanding of the interrelationship between all processes on earth and the understanding of earth as dynamic system.
4. Lack of real and attractive examples, such as rock samples, slides, CD, video, field visit (mostly caused by lack of fund) make this subject is not interesting and rather difficult to understand.

All of the above deficiency results in relatively poor knowledge, poor understanding and poor appreciation of earth science.



## **Competency improvement of earth science education in Indonesia**

To provide the baseline standards of education, the government has established standard curriculum for the whole school levels. Several times the curriculum are changed or modified. Attention on improving the method of teaching and the student creativity seems to be overlooked in each curriculum modification. In the past, students only act as object of teaching processes. The teachers gave all the subject without any involvement of students in the learning processes. The implication of this teaching system is that the students know a lot of information but those information are meaningless for their daily life.

In past several years, Ministry of Education and Culture established “Competence Based Curriculum” to improve the quality of education in schools. The main idea of this curriculum is positioning the students as the subject of teaching and learning process. Teachers basically act as facilitator and motivator. Students are conditioned to be more active to learn something (student centred learning process).

In case of earth science education (part of geography subject) in junior and senior high schools, the expected competency is that the students understand processes (exogene & endogene) that occurred on earth (comprehensively) dynamic of the earth (including plate tectonic) and the impacts (geo-resources & geo-hazard) environmental consideration (sustainability & vulnerability). Concept of earth as a dynamic system is enriched nowadays the earth science lecture given in all level of education. Students are motivated to learn not only in class but also directly on the field most of all by observing and learning from their environment. However, lack of teachers who can manage all subjects and lack of educational funding especially for laboratory equipment exacerbate the education problems.

## **National Science Olympiad**

To support the implementation of competency based curriculum, and to boost the interest of student to study earth science, a structured activity is needed. One effective way is to make a competition where student can compete and show their ability.

National Science Olympiad (NSO) is an annual science competition for students in Indonesia held by The Directorate General of Primary and Secondary Education of The Ministry of Education and Culture. NSO has been conducted since 2000 for Primary and Secondary Schools level. For high school level, since NSO 2008 earth science is included into the competition following previous competed subjects (physics, biology, mathematics, chemistry, informatics, astronomy and economy).

Student selection for NSO is started from school level in March every year. School representation then participate in the city/regency level selection, which usually conducted in April. Winners of the selection are then competed in province level in June. Those who are passed the province level will be selected for national level competition. The final competition of national level (NSO) is held in July or August, where about 70-90 students are invited to 3 days competition. Winners with other students within top 30 of NSO will be trained and selected as the Indonesian delegates for the following international olympiads in the coming year.

The inclusion of earth science in the NSO shows the attention from the government on the earth science education in high school level. This activity is also an effective way to promote earth science to all over

Indonesia since students may have interest to join the earth science competition in NSO, which accordingly will increase the effort of students to study earth science. The syllabus of earth science competition in NSO is basically following the IESO syllabus. The concept of the Earth Science is found nowadays more frequently under the Earth Systems approach. This approach refers to planet Earth as a whole where man is an integral part of Earth's natural systems, which are tightly combined and include the geosphere, hydrosphere, atmosphere and biosphere.

In 2019 about 1000 students were involved in selection for national level (that means about 3000 students were joining the previous stages of selection). The final round was conducted in Manado, North Sulawesi on July 1-5, 2019. Seventy-six (76) high school students from all over Indonesia were invited to join this activity. Top 30 students were appreciated with gold, silver and bronze medals by the Ministry. They will be invited again to join the selection for Indonesian delegates in the IESO in the 2020.

### **Other Activitiy**

To improve teacher competency on earth science, the Ministry of Education and Culture and local Provincial Education and Culture Agency were conducting several workshop in several provinces in Indonesia. In the workshop, teachers are discussing the earth science related material. Facilitators of this workshop were university lecturers. Unfortunately, at this moment this activity is not yet well structured since it is held in provincial level. Not every province conducted it due to financial limitations.

## Israel

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Earth Science education activities and situation in 2019 in Israel. The Israeli team works to promote Earth science education only in the school level. This is our daily work 6 days a week. We mainly work in the development and implementation of the earth science curriculum for the high school level, but also within the junior high and the elementary levels. All of us are also involved with teachers' education through higher education courses but mainly through modeling.

We also invest energy in the establishment of a geoscientist lobby that will help ask to convince the Minister of Education to elevate the low status and profile of the earth sciences in schools.

At the international level, we try to spread our earth systems approach among teachers worldwide. This year we have conducted workshops for earth science teachers in Portugal, China, India and Ethiopia.

We also established in the Weizmann Institute of Science, the Israeli world center for geoscience education. This center will host, starting 2020 groups of teachers for all over the world for Earth science teaching workshops that will include fieldwork across Israel.

We also participate the IESO each year, but this is just a subsidiary part of our activities. We do not prepare our students for the IESO, they come with the knowledge and mainly thinking skills that they acquired through their high school learning.





## Italy

Occhipinti, Susanna, [s.occhipinti@mail.scuole.vda.it](mailto:s.occhipinti@mail.scuole.vda.it)

The National Earth Sciences Olympiads are promoted and organized in Italy, under the high patronage of the Ministry of Education, by ANISN, the National Association of Natural Science Teachers, an association that has a thousand members and is 40 years old.

Italy has participated in the IESO international phase since 2009, but only since 2011 it has organized a national selection to identify the members of the national team. The selection procedure, now well tested, has been activated also this year: the selection took place first in schools, at local level, mainly scientific high schools and applied sciences high schools, but two years ago the national official regulation was modified to open a ranking reserved for students of the first two years of technical institutes, to promote the interest towards sciences also in this typology of schools .

A regional selection is then organized, with proofs being processed centrally; this year 686 schools in all Italian regions participated in the selections, which include both the Earth Science and Biology Olympiads. Finally, the national phase took place in Pavia, on 11 May 2019, and involved 120 students, who performed a theoretical test and a practical test. It is my responsibility to produce part of the theoretical questions and to handle the practical test entirely.

The winners of the biennium, students of 15 and 16 years, are selected to participate in the Earth Sciences Olympiads. Students aged 16-18 years were, instead, divided into two categories for Biology and Earth sciences, with the aim to identify the two other members of the team that will participate in the international phase of IESO.

The first ten students winners of the two categories concerned in Earth Sciences, then, take part in a learning week, which I organize in Aosta in July, where they attended lectures by professors and experts, and carried out practical activities and field visits.

To promote teachers' interest and skills in the Earth Sciences, I organized in September, again in Aosta, the ANISN National Congress to celebrate the 40th anniversary of the foundation. The focus was "Natural hazards and man: environment and cultural heritage" which saw the participation of many secondary school teachers, experts and university professors, who proposed reports and insights on the various risks, seismic, volcanic, marine, hydrogeological and the phenomena linked to global warming, practical laboratories , promoting effective, practical and investigative approaches and field visits.

ANISN also participates in numerous national and international projects on issues related to the theme of geosciences, such as ESERO, Ocean Climate Change and is a partner of the EGU-IGEO European Chapter. Many laboratory activities are being promoted in schools, given the need to sensitize students and the public towards a theme that touches our country deeply in all its aspects. The Geological Magazine, *GeologicaMente* , of whose editorial board I am a member, is currently going to be published, with the aim to disseminate the culture of geosciences and teaching in our schools.

Numerous articles have been produced and published on the subject, such as <https://www.intechopen.com/books/educational-psychology-between-certitudes-and->



uncertainties/educational-tools-and-methodological-approaches-to-enhance-interest-and-to-grow-skills-in-the-teachi or <https://www.mdpi.com/2076-3263/9/7/283>

Obviously, ANISN intends to continue to promote geosciences as well as, subject to the availability of funds made available by the ministry, participation in IESO.

Then, I will be involved again next year in the same way both nationally and in IESO and I will participate in the 36th IGC in Delhi in March

Eleonora Paris [eleonora.paris@unicam.it](mailto:eleonora.paris@unicam.it)

Others activities:

- Teachers Summer school 2019 " Geoscience, what a passion!" - Camerino July 2019
- Congress: Convegno nazionale delle societa' SGI-SIMP - Parma 2019, scientific session: "Le Geoscienze a scuola 2019"
- Italian Earth Science week Terra 2019
- Project GEOQUEST - Hawaii, 5 italian school will play online together, October 2019
- Third volume of Rendiconti Online della Societa' Geologica Italiana dedicated to the geoscience education Vol. 49/novembre 2019
- 35° PhD call, 2019-20, Geoscience education research theme, reserved for school teachers, Camerino University.

## Japan

熊野善介 [kumano.yoshisuke@shizuoka.ac.jp](mailto:kumano.yoshisuke@shizuoka.ac.jp)

### Overview:

The Earth Science Week Japan have been finished in successfully October 19 and 20.

### 1. Organization

#### Co-organizer:

Committee for Earth Science Week Japan (Member list is shown in appendix 1)

Museum of Natural and Environmental History, Shizuoka

Shizuoka University

Izu Peninsula Geopark

Japan Geoscience Union (JpGU)

Japan Society of Earth Science Education

Shizuoka Earth Science Association

### Cooperation

Geogashi®

### 2. Date: Oct. 19 (Sat.) and 20 (Sun.), 2019

(Some of exhibitions in the Museum of Natural and Environmental History, Shizuoka were exhibited between Oct. 13 and 20.)

### 3. Activities

#### 3-1. Events

Venue: Museum of Natural and Environmental History, Shizuoka

#### 3-1-1. Contents

##### A. Special Talk

Target: General public (100 person)

Mission of Asteroid explore Hayabusa 2



Speaker: Makoto Yoshikawa (Associate professor, JAXA)



#### B. Workshop

Target: Students, Teachers, Educators, General public (100 persons)

Three speakers made presentations about their research for earth science and education.

Speakers: Rouzou Saitoh, Kunio Shiosaka and Kunio Kato.

#### C. Poster session for high school students

Target: High school students and teachers, Educators, General Public (100 persons)

High school student groups made poster presentation for audience.

#### D. Earth Family Meeting

Target: General public (100 persons)

Speaker: GAIAGuide Tom and STEMy Shoko



E. Special exhibition of 1/1 model of Hayabusa2 and meteorite Target





#### 4. Website

URL: <https://www.earthsciweekjp.org>

: General publis (unspecified)



#### F. Geogashi® cooking lesson

Target: Kids and family, general public (20 persons x 2 sessions)

Geogashi® made cooking lesson and VR izu region tour for kids with talk of geological history.  
Participates seemed to enjoy cooking and geological talks.

URL: <https://www.earthsciweekjp.org>

## 5. Twitter

Before Oct. 7	less than 10/day	
Oct. 7 (Mon.)	114 /Day	Twitter Open
Oct. 8 (Tue.)-Oct. 16 (Wed.)	19~146/day	
Oct. 17 (Thr.)	708/ day	
Oct. 18 (Fri.)	181/ day	
Oct. 19 (Sat.)	1,415/ day	
Oct. 20 (sun.)	5,616/ day	
Oct. 21 (Mon.)	1,462/ day	
Oct. 22 (Tue.)	883/ day	
Oct. 23 (Wed.)	0/ day	(internet accident?)
Oct. 24 (Thr.)	385/ day	
Oct. 25 (Fri.)	383/ day	
Oct. 26 (Sat.)	243/ day	

Movies and photos were updated on Oct. 19 and 20. Many of people may be interested in the live report of ESWJ.

## 6. Suggestion for next year

- Website should be opened by early September.
- Movie is important tools for general public to be interested in.



## Korea

### The 13th International Earth Science Olympiad

Young-Shin Park (Chosun University), [parkyoungshin1968@gmail.com](mailto:parkyoungshin1968@gmail.com)



This IESO 2019 was held in Daegu city, Korea, hosted by Korean Earth Science Olympiad and International Earth Science Olympiad from the date of August 26<sup>th</sup> (Monday) to September 3<sup>rd</sup> (Tuesday). The theme of IESO 2019 was “Passion for Earth Science...Continued”. For this, almost 450 participants from 43 countries attended IESO 2019 including 84 mentors and 163 students. The test consisted of written test, practical test, ITFI (International Team Field Investigation) and ESP (Earth system Project) in Korea.



The first two tests aimed for checking individual students' competencies of understanding the earth system and its relations, defining the problems and solving it through collaboration, which is very unique point among all kinds of international Olympiads. Students built network from the beginning of IESO 2019 welcoming to the end of closing ceremony. During their stay, students became to know each other's earth science education including their culture. Participating students shared their information and research area which interested them as a group during this Olympiad. More than anything else, it is very critical for young learners to realize what kinds of global issues they face and what kinds of solution they can create to save the Earth



Mentors in front of Daegu National Science Museum

Surely, all mentors and educators from participating countries had great chance to discuss and develop more appropriate syllabus fitting to the purpose of 4<sup>th</sup> industrial revolution era. All mentors struggled to develop better system for IESO in the future. All discussion is still shared among all earth science educators now. All gains from all pains! All efforts taken from all mentors and educators were very impressive to develop IESO professional Olympiad system. We have mother association for IESO activities, which is called IGEO (International Geoscience Education Organization), and there is strong connection between IGEO and IESO also. Since IESO activity is very essential annual event, IGEO also supports IESO and all board members including the current president of IGEO make efforts to develop reasonable relationship between these two.

After IESO 2019, 33 gold medals, 17 silver, and 60 bronze medals went to selected students who demonstrated good talents in the tests. No matter who got the medals, IESO itself is special event where all students and mentors could enjoy their friendship and share all issues they face for the better world on the earth. I as a member of organizing committee of IESO 2019 spent 10 days with participants in Daegu city. The period was overlapped with the first week of new semester in Korea but all organizing committee enjoyed welcoming people from all of the world and enjoyed all events with them. It was meaning for Korean earth science educators to bring back IESO 2019 to the birth place of IESO, Korea. I felt proud myself to attend the first IESO 2007 and this time IESO 2019. I myself can see the big jump in its development and promotion in

IESO. I thank all who prepared IESO 2019 with me, I also thank all related people in Daegu city for the platform for us to play on, and lastly I thank all participants who came and enjoyed our culture including food, places, and people of Korea. See you all in Russia next year!!





## Kuwait

Mona Al-Ansari

The General Technical Supervision for Science, Ministry of Education, State of Kuwait

### First) Science curricula in the State of Kuwait

There is a huge development in Science curricula in Kuwait from the first grade till the twelfth grade. The books were written so that there is integration and sequence between the scientific disciplines in the different academic stages.

All science curricula from the first till the ninth grade contain the four scientific disciplines (physics, chemistry, biology, and geology); so the learner reaches high school and has a large amount of scientific information; therefore he will be qualified for further study.

Regarding earth science subject, the student learns it at the eleventh grade via two academic periods through two separate books.

The following table shows the topics in Earth science curricula which are taught by our student at each grade:

#### From (1<sup>st</sup> to 5<sup>th</sup>) grades:

Universe & solar system.

Earth movement.

Earth Resources.

Air around me? How Do You Reduce Air Pollution?

What are land forms, rocks and Soils characteristics in my country?

Oil My Countries Fortune& Searching for and Extracting Oil?

Earth layers & what are the earth's surface form?

What are the types of rocks?

Volcanoes and earthquakes.

The Negative effect of earth quakes, floods and volcanoes.

Wind and water changes earth.

What are the properties of atmospheric layers?

How ozone protects us?

#### From (6<sup>th</sup> to 9<sup>th</sup>) grades :

Origin of the solar system.

Moon houses.

The air around us.

Environmental problems around us.

Acid rain.

Global warming.

Soil

How the surface .of the earth changes? (weathering)

Oil in Kuwait.

Minerals & Gemstones.

### Geology Curriculum of the 11<sup>th</sup> grade contains:

The Earth & Universe.  
 Earth Material (minerals, rocks).  
 Mass Wasting.  
 Continental Drift & Geological Movements.  
 The Evolution of Earth through the Ages.  
 Geological Maps.  
 Economic Geology of Kuwait.

### **Second) Scientific competitions:**

Annually, the papers of any scientific competition are sent by the General Technical Supervision for Science in The Ministry of Education, to all of the six educational districts all over the State of Kuwait. Then sent to each scientific discipline for all grades (Elementary, Intermediate, and Secondary) whether it is a scientific research or science project.

The geologic competition for the eleventh grade in this year is (Solving a geological or environmental problem through new and innovative ways), then Students are evaluated for this competition through a specialized committee at the end of the academic year. This is done every academic year.

### **Third) National and International Earth Science Olympics:**

At the beginning of every new academic year, on September, the papers of IESO competition are distributed to all schools' geology teachers in all State of Kuwait residential areas. Then the students who desire to participate in IESO are gathered in two schools, one for girls and another for boys. There they receive a training course for two days per week, from some appointed geology teachers by the technical supervisors. Then each educational district performs a test to the students, theoretical and practical. After that, the test papers are corrected and the grades are recorded. Then the best ten grades are sent to the General Technical Supervision for Science from the districts.

First exam is held to get 60 students (10 from each educational district).

Second exam is held to get (5 gold, 5 silver, 5 bronze medals).

Then there is intensive training within three months by specialists in Astronomy, Meteorology, and Earth Science before travelling to the country that the Olympiad is held.

Then the best six grades are chosen by a technical committee.

This is our journey every academic year.

Kuwait eleventh year students contributed six times in IESO, and at the last IESO-2019 South Korea gained four medals (2 silver and 2 bronze).

### **Fourth) Cooperation with scientific institutions:**

GLOBE Team with NASA:

Joining the Globe project with NASA which works on training the students how to take weather readings and its effect on changes in soil, air and water.

An international scientific forum was held in Kuwait, and many of the students' projects and achievements were presented.

### **Fifth) Teachers Training:**

Teachers are given intensive courses in geology and methods of teaching during the academic year.

## LAIGEO (Latin America Chapter)

Sandra Villacorta, [sandra.villacorta-chambi@cdu.edu.au](mailto:sandra.villacorta-chambi@cdu.edu.au), LAIGEO secretary

### **ResearchGate Project**

A project in the platform **ResearchGate**, linked to LAIGEO, has been opened: <https://www.researchgate.net/project/Geoeducation-in-Latin-America> to call the joining of educators in this scientific network and share relevant articles.

We also recalled other Latin American members of IGEO to join the LAIGEO groups and pages created in professional networks such as: LinkedIn, Twitter, Instagram, Facebook to continue sharing and discussing our next actions.

### **Last events**

In *Panama*, has been opened the calling to enrolment in **Volcamp**, a geoscientific camp to students whose goal is to teach young people to be interested in the study of Earth Sciences especially in volcanoes. We share the flyer of the event.

In *Brazil* was developed between 21 to 27 October the **National Week of Science and Technology** in whose framework the Seismological Museum of the University of Brasilia exposed the video "**Journey to the centre of the Earth**". Look at the video on our YouTube channel (below).

In *Cuba*, as an initiative of the Cuban Society of Geology (SCG), a **Circle of interest in Geology** was created where students of each Cuban province are encouraged to participate in, with the aim to support the teaching program of Earth Sciences. More information on the Facebook page of SCG: <https://www.facebook.com/sociedadcubanadegeologia/>. We share a picture about that.

In *Bolivia*, the school of Geology of the Universidad Mayor de San Andrés (UMSA) and the Bolivian Geologists College (CGB) will participate in **FIPAZ**, a national exhibition that will take place in the city of La Paz, between December 11-22. This event is open to the general public and UMSA-CGB will show in the exhibition topics of general Geology to the population.

FIPAZ Facebook page: <https://www.facebook.com/feriafipaz/>. We share the flyer of the event.

In *Peru*, **MinerLima2019** was held 24-26 October in Lima, which year by year has become a significant moment for the Peruvian geoscience community to promote Geosciences dissemination and to increase the awareness about the importance of the geological knowledge and education in Geosciences. The event included this year an exhibition on minerals, short courses, lectures and workshops to children and the general public. It is organized annually by the Peruvian section of International Association for Promoting Geosciences (IAPG) with support of LAIGEO, Peruvian universities and other national organizations. We share some pictures of the event.

### **YouTube channel**

LAIGEO channel has been created and it has begun sharing the first videos about education in Geosciences by Hector Lacreu from Argentina and Anete Oliveira from Brazil. We call other members to share their audio-visual material about Geosciences in this platform, which is one of the best ways to capture the attention of the student audience worldwide. **LAIGEO YouTube channel:** <https://www.youtube.com/channel/UCGsqkzgXVE-mBYKrADdCGQg>

## Malawi

The report has been prepared by Malawi council members namely; Ms Elyvin Chawinga Nkhonjera, Dr. Zuze Dulanya and Ms. Yvonne Mwalwenje, [yvonnechasukwa@gmail.com](mailto:yvonnechasukwa@gmail.com)



### Malawi at a Glance

Malawi is a small landlocked country found in central Africa with a total population of 18 million persons (Population Reference Bureau, 2019)

The main activity carried by IGEO council members in Malawi is the participation of secondary school students in IESO. Malawi was the first African country to participate in International Earth Sciences Olympiad in 2011 in Italy and has since then been participating in subsequent IESOs. In 2013, Malawi participated at the 7<sup>th</sup> IESO in Mysore, in 2015 in Brazil, 2016 in Japan, in 2018 in Thailand and 2019 in South Korea.

### 2019 Updates

Career talks were held in a number of secondary schools to sensitize the youths on challenges and opportunities available in Earth sciences in Malawi and the world in general. This involved visitation to secondary schools and/or school clubs visiting the public universities where information on geosciences was shared through interactive sessions.

At Bwaila Secondary School where Yvonne Mwalwenje is teaching, a vibrant Earth Sciences club was formed. Raising public awareness of geosciences among secondary school-going age students. Of particular interests, the club is dealing with climate change issues and natural hazards such as floods, earthquakes and droughts which are negatively impacting Malawi. Thus, through the clubs, learners are helped to understand how to tackle the natural hazards thereby improving their experience of the planet earth.



Part of the Earth Science Club at Bwaila Secondary School and their teacher, Yvonne Mwalwenje

Bwila secondary school is also facilitating a rain water harvesting initiative at the School to enable the school to water sstrees during the dry season.

Because the school has a vibrant earth science club, some members participated at a video conference on climate dialogue with a sister school in Switzerland. The discussions were centered around climate change which is a common phenomenon in Malawi and across the globe.

The country also participated in the 13<sup>th</sup> IESO in South Korea where one student, by the name of Wangisa Ngala from Kamuzu Academy represented Malawi. The boy got a Bronze medal for the Olympiad and a silver medal for the Earth Space Project. This was the first time that Malawian student get a silver medal at the Olympiad since it started its participation. This only shows that students are becoming committed to the activity each passing day. In addition, for the first time, one parent volunteered to pay airfare for its award. However, the South Korean budget was very tight hence it was not possible to waive the registration fee. The gesture by this particular parent shows that people in Malawi have started to understand how crucial Earth Science is to their awards.



**Wangisa Ngala, Malawi participant to the 13<sup>th</sup> IESO in South Korea**

IGEO council members have future plans such as increase participation of IESO membership by lobbying more sponsors to fund the activity. Malawi also plans to host debates in Earth from neighboring schools thereby increase awareness of earth sciences as a subject in Malawi.

Malawi also plan for frequent excursion to Nature Sanctuary. Every year Malawi, through the Department of Forestry under ministry of Natural Resources , advocate for national tree planting season as a way of bringing awareness on the need for trees in the country.

Tree planting exercise can mitigate the natural disasters thereby improving rainfall pattern and reduce drought.

Apart from teaching and research in various areas of geosciences, the students in the universities have been active in Open Street Mapping (OSM) through the formation of Student Chapters who learn and update geo-information data on the web using Malawi Spatial Data Portal.

### Challenges

The uptake of geosciences education in Malawi is still very low. There is need for more sensitization of the youths in the geosciences as most of them only become aware of it at tertiary level. This calls for collaboration among key players in the sector to initiate more school clubs but also engagement with various partners working in geosciences. This will cultivate interest among the students who will see geosciences as an important career.

The current funding levels to the education sector in Malawi are generally very low and most schools lack the basic teaching facilities. For the geosciences education, this is even worse. Capacity building initiatives for both the secondary and tertiary geosciences sector would help alleviate these problems.

There is lack of proper coordination and planning of carious activities of IGEO in Malawi with various institutions carrying out their own activities. This is complicated by lack of dedicated funding and institutions to take the lead in IGEO activities. The current membership is based on voluntary membership. For a vibrant IGEO in Malawi, there is need for dedicated membership to the IGEO with structures and positions. This will help formulate Malawi's IGEO activities from time to time for the short and medium term.

## Malaysia

Jasmi Hafiz Bin Abdul Aziz, [jasmihafiz@um.edu.my](mailto:jasmihafiz@um.edu.my)

### Introduction MyESO and ArdentEdu

Malaysian Earth Science Olympiad (MyESO) is a national olympiad competition that was held annually, inviting the secondary school and pre-university students in Malaysia who are between 13 to 18 years old. This olympiad helps to introduce earth science knowledge among students in Malaysia, despite choosing the top four students to represent Malaysia to the International Earth Science Olympiad (IESO). It's an opportunity for students to expand their horizons, extend their knowledge in geoscience and earth science subjects beyond those that are taught in text book. It also opens up the opportunity to meet with people from various backgrounds, cultures and countries.

MyESO was organized by Ardent Educational Consultants Sdn. Bhd. (ArdentEdu). Ardent Educational Consultants Sdn. Bhd. (ArdentEdu) is a highly experienced education service provider with 11 years of experience providing innovative educational modules to educational institutions in Malaysia. ArdentEdu specializes in the development of modules and training programs for STEM subjects, focusing on the two contemporary educational trends, namely Higher Order Thinking Skills (HOTS) and Computational Thinking (CT). Currently, ArdentEdu is organizing 11 olympiads in Malaysia annually and sending potential students to the international olympiads to represent Malaysia, and IESO is one of them.

Although MyESO is still new in Malaysia and 2019 is the second year of our participation in IESO, but Malaysia's team is progressing well each year. Expertise coming from various universities in different backgrounds of earth science knowledge helped to train and organized a structured program and syllabus to prepare the students for the IESO competition.

A special website (<https://myeso.com.my/>) and Facebook page (<https://www.facebook.com/malaysianearthscienceolympiad/>) also has been developed by ArdentEdu to prepare the students for the upcoming International Earth Science Olympiad each year, besides sharing the news and latest update about IESO and MyESO from time to time. As such, the syllabus covered in MyESO is comprehensive and useful for the students to prepare themselves for the competition.

The International Earth Science Olympiad (IESO) is an annual Earth Science educational event for secondary school students. The principal objectives of IESO are to promote international co-operation and forge bridges of friendship among young, talented students across the world. This is one of the effort done by the International Geoscience Education Organization (IGEO) to promote earth science education in schools. Thus, IESO has founded as one of the annual activities of IGEO on a big scale.



### **MyESO in Malaysia.**

MyESO is endorsed by the Ministry of Education Malaysia, which enables the participants to collect co-curriculum points for every participation in different stages. MyESO competition comprises four levels for the selection of the four best students, which are;

- Preliminary Round
- Final Round
- National Training Camps
- IESO

For the preliminary round, an invitation letter has been distributed to all secondary schools and universities in Malaysia, specially to invite teachers and lecturers to encourage their students to take part in the MyESO competition. Teachers have to register their students who are interested in joining the competition through the online application system before the closing date. The questions covered five main components of the earth science, which are oceanography, geology, astronomy, meteorology and geophysics. The questions have been prepared by experts from different fields of geoscience knowledge before posted to the school or institutions. The test is conducted simultaneously at their own venues, monitored by the teachers and observers. Schools will enforce the regulations of the competition and have to send back the answer sheets to the secretariat. The preliminary round of MyESO 2019 took place on 8th August 2018. Students have to answer 50 objectives and three subjective questions within 2 hours 30 minutes. A total of 901 students from all over Malaysia have participated in the MyESO 2018 and 68 students were selected to participate in MyESO 2019 Final Round.

The Final Round of MyESO 2019 was held in the Department of Geology, Faculty of Science, University of Malaya, on 26th January 2019. All students who managed to get Certificate of Distinction in the MyESO Preliminary Round 2019 will be competing with each other to represent Malaysia in the International Earth Science Olympiad 2019 in Daegu, Korea on 26 th August-3 rd September 2019.

Top 10 students will be selected and awarded with a Certificate of Distinction from MyESO Final Round. They have to attend several training camps at the Geological Department, University of Malaya as planned by the coaching team. The IESO National Training Camp was held at Geology Department, Faculty of Science, University of Malaya, on 1-5 May 2019. During the camp, students were trained by a few mentors in more details on the theoretical and practical part of the earth science fields such as astronomy, geology, geophysics, meteorology and hydrosphere. They were also assigned several group tasks to foster their teamwork and friendship; plus, they will be evaluated from their performance in the assignments, tests, teamwork and communication during the camp. From those activities and tests, four best students will be chosen to undergo further training for the IESO 2019.

The selected four students have to undergo comprehensive training for ten days, including theory, practical and fieldwork, before departing to Daegu, South Korea. The team has to attend 10 days of final camp in the Department of Geology, University of Malaya. The camp is divided into five days of theory class, covered all the IESO syllabus with the practical class, especially involving rocks, minerals and fossils for the geology subject while another four days of camp are for the series of fieldwork. The field trip starting from the Center Belt of Peninsular and ended at the Eastern Belt of Peninsular Malaysia, covering the geological

and morphological features of Selangor and Pahang states. During the field trip, students are supplied with the geological compass and hammer, sedimentology grain size card, hardhat and safety vest to expose them to the real experience as a geologist and to expose them with the actual circumstance that they will experience during IESO competition. From the field trip, students managed to learn to identify different types of rocks, fossil hunting, structural and sedimentology studies, besides developed a field mapping of the outcrops. The students are excited and very focus in the field, as this is their first outdoor trip to learn about geoscience and handling the geological tools in the field.

On 26 th August until 3 rd September 2019, the delegates from Malaysia traveled to Daegu for the IESO 2019 competition. The delegates representing Malaysia to the IESO 2019 are as listed below:

#### **Mentor**

1. Dr Jasmi Hafiz bin Abdul Aziz (Universiti Malaya)
2. Nur Nadwa Syahirah binti Ai Zamruddin (Universiti Malaya)

#### **Students**

1. Ooi Chun Keat (Han Chiang High School, Penang)
2. Muhammad Solihin bin Malek Rizal (MRSM Gemencheh, Negeri Sembilan)
3. Arif Ismail bin Ruslan (SBP Integrasi Tun Abdul Razak, Pahang)
4. Khoo Yun Meng (Han Chiang High School, Penang)

#### **IESO 2019**

For the International Earth Science Olympiad (IESO), the contest consists of two sections, which are individual evaluation and international group evaluation. The individual component includes written and practical examinations, while the practical test composed of tasks that are designed to assess the participants' abilities to carry out scientific investigations as part of Earth System Science inquiries. During IESO 2019, four main elements are chosen as the themes of the question, which are air, water, fire and soil.

The practical examination include the experimental and field tasks, which have to be conducted in an international mixed teams of eight to ten students. The two practical examination are known as the International Team Field Investigation (ITFI) and Earth System Project (ESP). Each ITFI team will be assigned a site to investigate. The students have to apply their knowledge of Earth Science as well as their collaborative skills to find answer/s to a research problem and present their findings in PowerPoint presentation. For IESO 2019, the ITFI tasks are related with the finding and interpretation of the trace fossils of dinosaurs on the limestone and sedimentary bed in Jinju, South Korea while for the ESP project, students have to relate the climate change and the tropical storms in East Asia.

Even though IESO 2019 is the second year of Malaysia's participation in IESO, but Malaysia delegates manage to get some medals and group work achievements during the competition.

The result for Malaysia team are listed below:

**INDIVIDUAL CATEGORY**

Ooi Chun Keat (Silver Medal)

Khoo Yun Meng (Bronze Medal)

Muhammad Solihin bin Malek Rizal (Bronze Medal)

Arif Ismail bin Ruslan (Bronze Medal)

**EARTH SCIENCE PROJECT**

Ooi Chun Keat (Team 10, Gold Medal)

Muhammad Solihin bin Malek Rizal (Team 9, Gold Medal)

Khoo Yun Meng (Team 4, Silver Medal)

Arif Ismail bin Ruslan (Team 3, Bronze Medal)

**INTERNATIONAL TEAM FIELD INVESTIGATION**

Arif Ismail bin Ruslan (Team 3, Gold Medal)

Khoo Yun Meng (Team 4, Silver Medal)

Both IESO and MyESO are not just a matter of competition among students. Still, it is more onto developing interest and promoting the earth science education in schools apart from enhancing the Earth Science learning of high school students worldwide. This kind of relationship also helps to promote international cooperation, exchanging ideas and materials about Earth Science and Earth Science education and build friendly relationships among young learners, teachers and scientists from different countries for the next generations. IESO 2019 was very successful to motive young learners to feel challenged from those issues and to feel responsibilities for the solutions as the unit of group, as the unit of community, and as the unit of international groups during all kinds of tests given to them.



Figure 1: Faces of students during the Preliminary and Final Round of MyESO 2018.





Figure 2: Students are preparing themselves for the competition, during the final camp before depart to Daegu, South Korea.



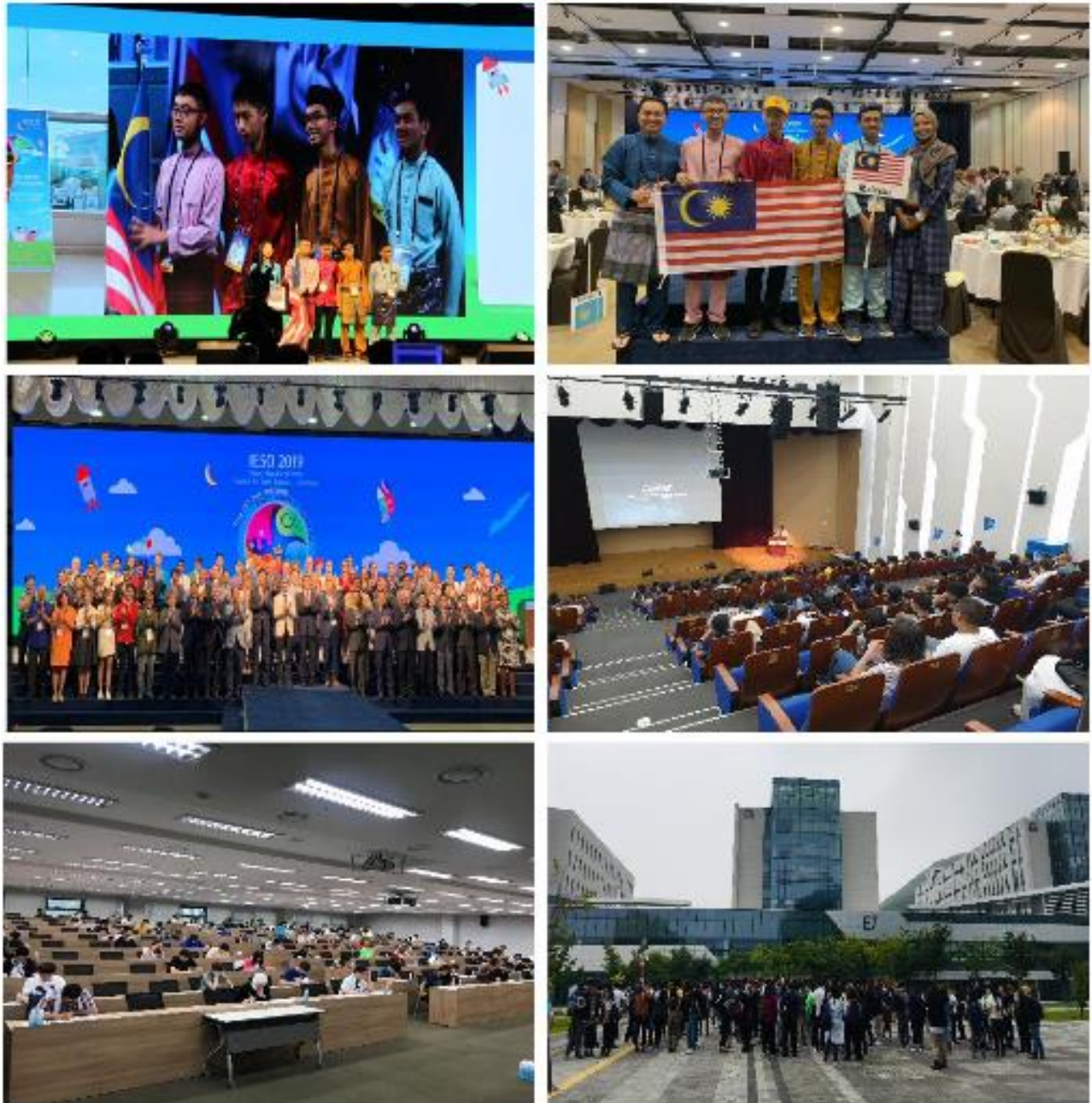


Figure 3: The images of delegates from Malaysia during opening ceremony and test being carried out in Dagu, South Korea.



## Morocco

Ezzoura Errami, [erramiezzoura@yahoo.fr](mailto:erramiezzoura@yahoo.fr)

What I am doing related to Earth Sciences Education? I am coordinating, in my department, a Bachelor degree in Earth Sciences and a master degree on Georesources and geo-mapping. Also, the educative system in the Moroccan universities is being changed by september 2020 and we are working on the new bachelor that it consists of 4 years instead of 3 years with more languages and cultural modules (Module de langue et d'ouverture).

I also initiated the celebration of the Day of Earth Sciences in Africa and Middle-East in Morocco since 2013. This year, it was organized by lecturers and master degree students from the polydisciplinary faculty of Safi in a school in a poor rural area where the oldest human remains were found. More than 400 scholars participated to this event. The activity consists of an exposition of different geological samples accompanied by adapted explanations.

During the 10th International Conference of the African Association of Women in Geosciences on Earth Sciences and Sustainable Development in Africa (Luanda, Angola from July 27 – 31, 2020), we proposed a theme dedicated to Earth Sciences Education and Public Communication, Geoethics, Geosciences History.

During the fourth International Conference on Geoparks in Africa and Middle East in Beirut (Lebanon) that it is being organized in 2020, by the African Geoparks Network (AGN) in collaboration with the Association for Community & Environment (ACE), we proposed a theme on Geoheritage, Geoeducation and Public Communication.

We would propose in collaboration with IGEO a session during the CAG28 that will be held in Morocco in 2020. IGEO could be a partner in the above session as we are the organisers of both conferences and we are a partner of the CAG28. If you agree plz send me a short description that I will complete and adapt and send it to you again for approval. In 2018, during one of our congresses Prof. Chris King organized a very successful workshop.

## Namibia



A number of geoscience outreach activities were done in Namibia by the Geological Survey of Namibia geoscientists. These include:

- 30 October – 2 November 2019 – Reaching out to the public at the **Tsumeb Copper Festival** under the theme of 'Copper brings Namibia together' in northern Namibia.
- 14 – 18 October 2019 – geoscience outreach at the **Science Week 2019** (theme Humboldt & the Web of Life) organised in collaboration with the Goethe Institute and local science partners at a local primary school, Dr Frans Aupa Indongo, in Windhoek. School children and the public were the target audience. Apart from a number of hands on science activities, science films (part of the Goethe Institute's Science Film Festival) were screened at the Goethe institute, the Namibian Scientific Society in Windhoek and Scientific Society in Swakopmund, the films focused on sustainability, climate change and environmental issues.
- 16 – 22 September 2019 – Several primary schools took part in the national **Heritage Week** art competition hosted by the National Earth Science Museum. Heritage Week is an annual national celebration that held across Namibia annually. During this week various institutions museums across the country including the National Earth Science Museum, galleries and others celebrate Namibia's diverse cultures, history, art, music as well as anything and everything relating to heritage, including our beautiful landscapes, fauna and flora. Art materials were provided and several school children painted artwork based on the following themes - 'Geology (rocks, gems, minerals and mountains) and You' and 'Geology (rocks, gems, minerals and mountains) and Music'.

## Paraguay

The Faculty of Natural and Precise Sciences (Facultad de Ciencias Exactas y Naturales – FACEN) of the National University of Asuncion (UNA) and the Departments of Geology and Teacher Development held a First Workshop on Education and the Geosciences from August 19 to 23, 2019, with the support of IGEO-LAIGEO and its president Dr. Roberto Greco. Workshop participants included students and professors of the FACEN-UNA and special invitees of the Andres Bello University of Concepcion, Chile, led by Professor Maria de Jesus Bravo.

On the first day, Workshop participants toured part of the Paraguay's Parana Basin to observe the outbreaks of the Pre-Cambrian, Ordovician, Silurian and Cretaceous epochs. They also visited the Rift Valley of Asuncion to observe notable deposits of sandstones from the Patiño Formation as well as those of Ypacarai Lake.

On the second day Dr. Roberto Greco led a demonstration of practical teaching exercises for the geosciences for grade schools.

Professor Maria de Jesus Bravo then gave a talk on the Geoscience Olympics in Chile.

Professor Dr Ana Maria Castillo Clerici presented a talk about the geology of the Parana Basin in Paraguay with a focus on the Rift of Asuncion.

Subsequently Professor MsC Narciso Cubas spoke about the Pre-Cambrian period. Professor MsC Sonia Molinas explained hydro-geology and Professor Lic. Ana Godoy talked about fossil findings in Paraguay.

On the third day the group visited the headquarters of the Binational Itaipu Dam in the city of Hernandarias, Paraguay. They toured the dam led by an experienced guide who explained the dam's installations and operations.

The group spent that evening at the Itaipu nature reserve, Tati Yupi, where they were able to observe a variety of wild animals that frequent the guest house grounds and the shores of Lake Itaipu.

On the Workshop's fourth day, the group visited the Yguazu Falls in Brazil. The main achievement of the Workshop for the students and professors of the two participating universities was the sharing of techniques and practice of teaching of geoscience. It was a very beneficial experience.

In the following week we celebrated the science week and we received and realized activities with teachers and school students.

## Peru

Sandra Villacorta, [sandra.villacorta-chambi@cdu.edu.au](mailto:sandra.villacorta-chambi@cdu.edu.au)

### 1. Introduction

During the VIII international conference of the International Geoscience Education Organisation (IGEO), I have been invited to participate and to join efforts with other Latin American members of IGEO to create the Latin American chapter of IGEO: LAIGEO. Since the creation of LAIGEO, I have organized the Peruvian chapter because of my leading of the Peruvian section of IAPG. Our activities started in 2018 under the policy, mission and objectives of IGEO and we have focused our actions on promoting at a national level the objectives of IGEO, mainly the improvement of Geosciences education in schools and universities and also awareness of educators about the usefulness and application of Geosciences; as well as to promote actions in changing Geoscience education in Peru. By the agreement between IAPG and GEO, Peruvian chapter will organize the 1st Geosciences Olympiads in Peru and it is spreading the participation from Peruvian experts in IGEO.

2. IGEO Peru Members National Coordination: Sandra Villacorta Carlos Toledo: Scientific Coordinator Luis Araujo Emilio Lacho Daniel Peña Ciro Bedia Marko Castañeda Carmen Juli Sucapuca Gregorio Villacorta Jose Macharé, Luz Marina Tejada

### 3. Activities carried out by Peruvian chapter

3.1 Teacher training 3.1.1 Short course about scientific communication as part of MinerLima2019 by Carlos Toledo in October 2019 3.1.2 Online training. I have conducted tutorial classes about geological hazard modelling to geologist and Peruvian professionals in March 2019. I have created a blog to share information about research projects on Geosciences: <https://peligrosgeologicosenelperu.blogspot.com/>

#### 3.2 Earth science education activities at school level

3.2.1 Ongoing the Organization of national Olympiads on Geosciences. By the agreement between IAPG and LAIGEO, Peruvian section has been giving first steps in organizing the 1st Geosciences Olympiads in Peru. The main support is with San Marcos national University.

#### 3.3 Outreach activities, etc.

3.3.1 MinerLima2019. 5th International Mineral Exhibition of Lima (Peru) in National University of San Marcos (Lima-Peru). Space used to spread the mineralogical heritage of Peru, through a rock and mineral exhibition, short courses, conferences and workshops (for children and general public), geological excursions and more.

#### 3.3.2 Spread of IGEO in Peruvian entities

3.3.3 Peruvian institutions mainly universities such as San Marcos University have started supporting events from LAIGEO at a national level.

3.3.4 More Peruvian members in IGEO. Since the launched of LAIGEO, there are new Peruvian members in IGEO because of the spread of IGEO links in our social networks. Nowadays LAIGEO links allow public space to the dissemination of IGEO for all the Latin America community. There is a constant communication with IAPG Peruvian members through: LinkedIn: <https://www.linkedin.com/groups?gid=8236258> Facebook: <https://www.facebook.com/groups/778954858826999/>

Google+: <https://plus.google.com/u/1/104548835351822645009>

YouTube Channel: <https://www.youtube.com/channel/UCS6l35pU8nVEjQcitEWmUBQ>

3.3.5 Relations with students associations. We have improved their relationship with the student networks (YES Network, Amautas Mineros and others). IAPG Peru advises to Peruvian chapter of YES Network on the development of their activities and coordinates with them the Children Workshops in MinerLima.

#### 4. Activities planned out by Peruvian chapter for 2020

4.1 Participation in IGC, March 2020. I have been awarded with a grant to participate in the IGC because my articles on Geoethics in Peru and on Creation of the Latin American chapter of IGEO were accepted.

4.2 1st Geosciences Olympiads in Peru, August 2020

4.3 MinerLima2020, November 2020

4.4 Symposia of young earth scientist December 2020 Finally, I would like to confirm my interest in continuing to serve as an IGEO council member of my country for the following year. I am also currently the General Secretary of LAIGEO. It has given me opportunities to work with other worldwide academics to develop the next stage in the educational process in Latin America. Last meetings have given a very positive response to promote the inclusion of Geosciences in the scholar curriculum in South American countries. I also participate in IAPG, an International organisation for creating awareness about problems of Ethics applied to the Geosciences and I was the founder of the Peruvian Chapter of YES network. These networks have given me opportunities to build strategic relationships in worldwide to help to improve awareness about geoscientist knowledge in my country.

Finally, I would like to confirm my interest in continuing to serve as an IGEO council member of my country for the following year. I am also currently the General Secretary of LAIGEO. It has given me opportunities to work with other worldwide academics to develop the next stage in the educational process in Latin America. Last meetings have given a very positive response to promote the inclusion of Geosciences in the scholar curriculum in South American countries. I also participate in IAPG, an International organisation for creating awareness about problems of Ethics applied to the Geosciences and I was the founder of the Peruvian Chapter of YES network. These networks have given me opportunities to build strategic relationships in worldwide to help to improve awareness about geoscientist knowledge in my country.

## Portugal

Clara Vasconcelos, [csvascon@fc.up.pt](mailto:csvascon@fc.up.pt)

Educational Resources on-line:

Vasconcelos, C., Ribeiro, T. & Lima, A. (2019). *Can we dare say modern society does not need mineral raw materials?*.

Calheiros, C., Orion, N. & Vasconcelos, C. (2019). *Earth system nexus human interaction: a Geoethical perspective*.

Geoethics Outcomes and Awareness Learning: Project website coordinator – <http://www.goal-erasmus.eu>

International Association for Promoting Geoethics – Portuguese National Section: Coordinator - <http://www.fc.up.pt/iapg-pns/>

### Books Publication:

Santos, A. L., Rola, A., Morais, C., **Vasconcelos, C.**, Gomes, E., Rodrigues, I. T., Azevedo, J. & Rodrigues, S. (Eds.) (2019). *História da Ciência no Ensino. Revisitando Abordagens, Inovando Saberes*. Coimbra: Universidade de Coimbra. ISBN: 978-989-704-371-0

**Vasconcelos, C.** & Ribeiro, T. (2019) (Eds.). *Workshop Sistemas Terrestres: O ciclo das rochas e os sistemas terrestres* (dinamizado pelo Prof. Nir Orion do Weizman Institute of Science-Israel). Porto: Universidade do Porto. ISBN: 978-989-746-196-5

### Scientific Reports Publication:

**Vasconcelos, C.** & Ribeiro, T. (2019). *Geoethics' Syllabus and Geoethics in Georesources and Geopark – 2nd GOAL Workshop Report*. Projeto apoiado pela Comissão Europeia, Erasmus+ Project, reference 2017-1-PT01-KA203-035967.

**Vasconcelos, C.**, Faria, J. & Calafate, L. (2016). *Ecosystem Services, Geoethics and Biodiversity. Report of Output II of Wise Project Erasmus+*, reference 2015-1-PL01-KA203-016621.

### Abstract or Proceedings Books Publication:

**Vasconcelos, C.**, Ferreira, R., Calheiros, C., Cardoso, A. & Ribeiro, T. (Eds.). (2019). *Livro de Resumos do XVIII ENEC / III ISSE - Educação em Ciências: cruzar caminhos, unir saberes*. Porto: U. Porto Edições. ISBN: 978-989-746-198-9 (eBook). doi: [10.24840/978-989-746-198-9](https://doi.org/10.24840/978-989-746-198-9)

**Vasconcelos, C.**, Lima, A., Brilha, J., Calheiros, C., Ribeiro, T. & Cardoso, A. (Eds.). (2019). *Abstract Book: Geoethics' Syllabus and Geoethics in Georesources and Geoparks*. Porto: Universidade do Porto. ISBN: 978-989-746-195-8.

### Book Chapter Publication:

Calheiros, C., Calafate, L., Vasconcelos, M. L., Cardoso, A. & **Vasconcelos, C.** (2019). Education for sustainability through conceptual modelling: green roofs as a way of integrating buildings and nature. In Roberta Nata (Ed.). *Progress in Education* (pp.135-168). New York: Nova Science Publisher. ISBN: 978-1-53614-799-5.

### Articles Publication:

Činčera, J., Mikusiński, G., Binka, B., Calafate, L., Calheiros, C., Cardoso, A., Hedblom, M., Jones, M., Koutsouris, A., **Vasconcelos, C.**, Iwińska, K. (2019). Managing Diversity: The Challenges of Inter-University Cooperation in Sustainability Education. *Sustainability*, 11(20): 5610. doi: [10.3390/su11205610](https://doi.org/10.3390/su11205610)



Cardoso, A., Ribeiro, T., Monteiro, L., & **Vasconcelos, C.** (2019, *in press*). Geologia no dia-a-dia: quando educação ao longo da vida é ainda necessária. *Comunicações Geológicas*. ISSN: 0873-948X; e-ISSN: 1647-581X. Disponível aqui

Ribeiro, M., Cardoso, A., & **Vasconcelos, C.** (2019, *in press*). Falhas e dobras: um estudo quasi-experimental com o ensino baseado em modelos. *Comunicações Geológicas*. ISSN: 0873-948X; e-ISSN: 1647-581X. Disponível aqui

**Vasconcelos, C.** & Paixão, F. (2019). XVIII ENEC - Encontro Nacional De Educação Em Ciências & III ISSE - International Seminar Of Science Education Educação Em Ciências: cruzar caminhos, unir saberes. *Boletim da AIA-CTS, setembro, 10*, (pp.10-13).

#### Proceedings Publication:

Vasconcelos, C., Ribeiro, T., Vasconcelos, M. & Cardoso, A. (2019). Educating for Geoethics: raising students' awareness and public engagement. In M. Carmo (Ed.), *Education and New Developments 2019, Volume I*, (pp.355-357). Porto: InScience Press. ISSN:2184-044X. ISBN:978-989-54312-5-0.

Ribeiro, T., Lima, D., Imbernon, R., Pereira, C., & Vasconcelos, C. (2019). Model-based learning: an inquiry approach to teach science. In M. Carmo (Ed.), *Education and New Developments 2019, Volume II*, (pp.139-143). Porto: InScience Press. ISSN:2184-044X. ISBN:978-989-54312-6-7.

Ribeiro, T., Trindade, R & Vasconcelos, C. (2019). Do ensino não-formal à ciência cidadã: um projeto de investigação no âmbito do ensino e comunicação em geociências. In *Livro de Atas IX Congresso Jovens Investigadores em Geociências, LEG*. Estremoz: Universidade de Évora. Disponível aqui

Cardoso, A. & Vasconcelos, C. (2019). A Geoética no Ensino Superior: propostas de recursos educativos. In *Livro de Atas IX Congresso Jovens Investigadores em Geociências, LEG*. Estremoz: Universidade de Évora. Disponível aqui

#### Abstract Publications:

Mendonça, M. J., Calafate, L., Costa, R. & **Vasconcelos, C.** (2019) . Uma visão global sobre a história dos *pacemakers* cardíacos: ensino baseado em casos no 9º ano de escolaridade. In *1st International Congress on the History of Science in Education*. Portugal: Vila Real.

**Vasconcelos, C.** (2019). Uso de modelos históricos e para o ensino das Ciências: o caso particular do ensino da Geologia. In *1st International Congress on the History of Science in Education*. Portugal: Vila Real.

**Vasconcelos, C.**, Lima, A., Orion, N. & Ribeiro, T. (2019). The emergence of a Geoethics' Syllabus for Teaching in Higher Education and Citizen Awareness. *Geophysical Research Abstracts*, 21, EGU2019-12712. Viena: Austria.

**Vasconcelos, C.**, Orion, N., Ribeiro, T., Ben-Shalon, R. & Cardoso, A. (2019). Geoethics syllabus: elaborating a theoretical education framework. In Clara Vasconcelos et al. (ed.) (2019), *Geoethics' Syllabus and Geoethics in Georesources and Geoparks*. Portugal: Porto.

**Vasconcelos, C.**, Orion, N., Ribeiro, T., Ben-Shalon, R. & Cardoso, A. (2019). Geoethics syllabus: revisiting Social Constructivism in the classroom. In Clara Vasconcelos et al. (ed.) (2019), *Geoethics' Syllabus and Geoethics in Georesources and Geoparks*. Portugal: Porto.

**Vasconcelos, C.,** Orion, N., Ribeiro, T., Ben-Shalon, R. & Cardoso, A. (2019). Geoethics syllabus: concepts and template. In Clara Vasconcelos et al. (ed.) (2019), *Geoethics' Syllabus and Geoethics in Georesources and Geoparks*. Portugal: Porto. ISBN: 978-989-746-195-8.

### Projects

**Title:** Partnership for Sustainable Development and Social Innovation (PASSION)  
**Partner countries:** Poland, Portugal, Iceland, United Kingdom, Sweden, Greece.  
**Reference:** PPI/APM/2019/1/00096/DEC/01  
**Position:** Clara Vasconcelos, National Coordinator  
**Budget:** 342.034,32 €  
**Duration:** 24 months (out 2019 – set 2021)  
**Financial Support Entity:** NAWA - *The Polish National Agency for Academic Exchange*

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**Partner countries:** Poland, Portugal, Iceland, United Kingdom, Sweden, Greece.  
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**Duration:** 24 months (out 2019 – set 2021)  
**Financial Support Entity:** NAWA - *The Polish National Agency for Academic Exchange*

**Title:** Partnerships for pathways to Higher Education and science engagement in Regional Clusters of Open Schooling (PHERECLOS)  
**Partner countries:** Portugal, Austria, Polónia, Holanda, Dinamarca, Turquia, Filândia, Itália, Colômbia, Roménia e Reino Unido.  
**Reference:** Grant agreement ID: 824630  
**Position:** Clara Vasconcelos, Researcher  
**Budget:** 235.625,00 €  
**Duration:** 36 months (out 2019 – out 2021)  
**Financial Support Entity:** *Horizon 2020*

**Title:** Geoethics Outcomes and Awareness Learning (GOAL)  
**Reference:** 2017-1-PT01-KA203-035790  
**Partner Countries:** Portugal, Espanha, Itália, Israel, Austria e Lituânia.  
**Position:** Clara Vasconcelos, Full Coordinator  
**Budget:** 240.373,00 €  
**Duration:** 32 meses (dez 2017 – ago 2020)  
**Financial Support Entity:** *Erasmus Plus*

### Editorial Board:

(2019–) Edições “EACH, Editora da Escola de Artes, Ciências e Humanidades da Universidade de São Paulo”.  
 (2017–) “*European Geologist Journal*”.  
 (2016–) “*Enseñanza de las Ciencias de la Tierra*”.

**(2014–)** “*EPISODES International Journal of Geological Sciences*” da International Union of Geological Sciences (SCOPUS journal).

**(2012–)** “Journal of Education and Learning”.

**(2014–)** “*ENCITEC - Revista de Ensino de Ciência e Tecnologia*”, revista eletrónica do Programa de Ensino Científico e Tecnológico (PPGenCT).

**(2018–2019)** “*Terræ Didactica*”, revista eletrónica de acesso livre (*open access*) mantida pelo IG-Unicamp.

**(2012–)** Educational and Scientific reviewer of Projeto “*Casa das Ciências*” (portal da Fundação Gulbenkian para professores).

### **Organizing Commission of Conferences:**

**(2019) President of the Organizing Commission of XVIII Encontro Nacional de Educação em Ciências (XVIII ENEC) & III Seminário Internacional de Educação em Ciências (III ISSE)**, in Faculdade de Ciências da Universidade do Porto, entre 5 a 7 de setembro de 2019.

**(2019) Member of the Organizing Commission of 1º Congresso Internacional de História para a Ciência no Ensino (1CIHCE)**, sob organização conjunta da Universidade de Trás-os-Montes e Alto Douro (UTAD), Universidade do Porto (UP), Universidade de Coimbra (UC) e Universidade de S. Paulo (USP), durante os dias 30 e 31 de maio e 1 de junho de 2019, no Polo 1 da Escola das Ciências Humanas e Sociais da UTAD.

**(2019) Presidente of the Organizing Commission of the 2nd GOAL Workshop**, intitulado “*Geoethics Syllabus and Geoethics in Georesources and Geoparks*”, que decorreu na Faculdade de Ciências da Universidade do Porto, de 14 a 18 de janeiro de 2019, no âmbito do Projeto GOAL (*Geoethics Outcomes and Awareness Learning*), financiado pelo programa *Erasmus+* (2017-1-PT01-KA203-035790).

**(2019) Presidente of the Organizing Commission of the Workshop Earth Systems**, ministrado pelo Professor Nir Orion (*Department of Science Teaching, Weizmann Institute of Science, Israel*), que decorreu nos dias 21 e 23 de janeiro de 2019, na Faculdade de Ciências da Universidade do Porto (Supported by Bolsa Reitoria UP/Santander Universities).

### **Member of Scientific Commission of Conferences :**

(2019) IX Congresso Jovens Investigadores em Geociências.

(2019) “Inovação no Ensino da Matemática e das Ciências”.

(2019) Academic Committee of the Education in Europe (ATEE) Winter Conference 2019.

(2019) XVIII Encontro Nacional de Educação em Ciências (XVIII ENEC) & III International Seminar of Science Education (III ISSE).

(2019) 1º Congresso Internacional de História para a Ciência no Ensino (1CIHCE) .

### **Supervision:**

(finished on 2019) 1 PhD Student and 6 master students.

(2019-) 7 PhD students.

(2019-) 6 Master Students.

## South Africa

Tanja Reinhardt, [Reinhardt2@ukzn.ac.za](mailto:Reinhardt2@ukzn.ac.za)

We had over 2500 learners visiting the Science Centre and the Geology Education Museum (which is incorporated in the Science Centre). Apart from the visit we had the following specialised geoscience related school activities:

From the 6-12 March 2019, Tanja presented 7 “The wandering continents” workshops at SciFest Africa in Grahamstown. In this workshop the participants physically move continents through time from Pangea to the current position and investigate the tools scientists use to develop the theory of plate tectonics. At this event she received an award for “Best workshop presentation” for her workshop.



*Learners participating in the wandering continents workshop*

May: Effingham Secondary School (KZN Rock box workshop, visit to glacial pavement on campus, Earthquake workshop)

June: Science Awareness event (displaying KZN rocks); Volunteer training Durban Natural Science Museum (Plate tectonics workshop); Be a scientist for a week (geology career talk and geology workshop)

July: Crawford College (visit to the glacial pavement, talk on KZN geology, Plate tectonics workshop)

In August we supplied the Eastern Cape Geography Subject Advisor in the Port Elizabeth Education District with 30 KZN rock boxes for their Geography teachers. Plans are to conduct a rock box workshop for the teachers at the beginning of next year.

In September we participated in the Umjikelezo We-Science outreach project and had geology related busking activities, such as a digital microscope with sand samples, heavy mineral display and KZN rocks. During these days we reached over 1600 learners.



*Busking activity in Richards Bay shopping mall*



*Table at one of the schools*

September: visit from the University of Limpopo chemical society (talk on KZN geology)

October: Home schooling group (KZN Rock box workshop); Home schooling group (KZN Rock box workshop, Make your own fossil workshop, Volcano Science show)

#### Future work

In collaboration with the Discipline of Geology and the Council for Geoscience (KZN) we are currently busy with the revamping of the Geology of EThekwni (Durban) brochure. Once the brochure is out, we want to establish a Geology trail around EThekwni , including a website on the Geology of EThekwni.

Plans are also to assist with layout and proof reading of the Exploring Geoscience across the Globe companion volume next year.

## Spain

Our country is represented at IGEO Council by two members of the Spanish Earth Science Teachers Association: **Amelia Calonge** and **Xavier Juan**. This is our joint annual report for IGEO.

Our organization (AEPECT):

- has been responsible for dozens of courses and field trips across our country with a wide geographical distribution. They have been organized by our Field Officers.
- organized a meeting of our territorial network in the Alto Tajo Geopark in May 2019.
- Is preparing our next biannual conference to take place in the Guadix Geopark in July 2020.
- keeps updated our website ([www.aepect.org](http://www.aepect.org)) and makes diffusion of all types of geoscience education through the social networks.
- publishes every four months our magazine "*Enseñanza de las Ciencias de la Tierra*" (Teaching Earth Science), a reference in Spanish in the field for Geosciences teachers.
- organized a geological field trip to Kazakhstan in August 2019

### **Amelia Calonge:**

- is the responsible for the organization of the Spanish Geology Olympiad, an annual event that engages more than 3,000 secondary students across the country. This year it took place in Caceres and next year (2020) it will take place in Cuenca in April 2020.

### **Xavier Juan:**

- was appointed EGU Field Officer for Spain during the General Assembly of the EGU in Vienna in May 2019.
- has run a series of EGU workshops for Spanish teachers with the help of **Amelia Calonge** and **Anna Anglisano** (another member of AEPECT) across the country, and has programmed several more for the first months of 2020.
- Is one of the mentors (together with **Anna Anglisano**) of the Spanish Olympic team for the IESO that participated in Daegu (Korea) in August 2019.

### **Both of us (Amelia Calonge and Xavier Juan):**

- participated in April 2019 in Coimbra in the founding of the European Chapter of the IGEO, representing AEPECT together with representatives of APPBG (Portugal), APBG (France, ESTA (UK) and observers from Belgium and Germany.
- **Teach yourself to teach Earth science – through the first Earthlearningidea online workshop**
-

- The first Earthlearningidea professional development workshop, 'The dynamic rock cycle' is now online at: [https://www.earthlearningidea.com/home/Teaching\\_videos\\_workshops.html](https://www.earthlearningidea.com/home/Teaching_videos_workshops.html)
- 
- The PowerPoint leads you through the activities, all based on short videos. Begin by interacting with the starter before accessing the activities which all build up into 'The dynamic rock cycle', its products and processes. Then see the plenary activities designed to consolidate learning.
- 
- This Earthlearningidea workshop has developed from the original Earth Science Education Unit (ESEU) workshop of the same name. This is one of the ESEU workshops presented to more than 40,000 teachers and trainee (pre-service) teachers across the UK and now being presented across Europe by the EGU Field Officers, and across the world by IGEO/IUGS Field Officers. ESEU research has shown that these workshops change teaching in school, by monitoring Scheme of Work developments following workshop presentations. Post-workshop evaluations are also highly positive.
- 
- It is not possible to replicate the interactivity, discussion and participant presentation aspects of the original workshop in an online version – and so this development has been closely linked to Cognitive Acceleration through Science Education (CASE) attributes, to encourage the development of critical thinking skills in teachers and students alike. Each activity is accompanied by a question script which highlights the aspects which develop thinking.
- 
- The 90 minutes-worth of videos will not only help you to teach Earth science in an interactive way which engages and enthuses students, but will enable you to build your own knowledge and understanding of Earth science, whilst developing the thinking skills of your students. In the jargon of today, 'What's not to like?'



## Sri Lanka

Ashvin Wickramasooriya, [awickramasooriya@gmail.com](mailto:awickramasooriya@gmail.com)

- Earth Science is still not included as a main subject in Sri Lankan school curriculum. However, few topics like solar system, minerals, rocks, soil profile, has been included as an introductory level in grade 6 (12 years) to grade 9 (15 years) science and geography curriculum since 2012 and these syllabuses did not revised in 2019.
- Two topics i.e. the nature of the Earth system and the major physical characterizes of the Earth are in the grade 10 (16 years) geography curriculum since 2012 and it has not revised in 2019 and therefore, the above two topics exist without change.
- The Advance Level i.e. grade 12 (18 years) and grade 13 (19 years) Geography curriculum contains few main topics related to Earth Science. These topics include introduction to geosystems (lithosphere, atmosphere, hydrosphere, and biosphere), structure and composition of the earth (internal structure, mineral resources, and soil), formation and types of rocks, types and processes of landform formation (plate tectonics, earthquakes, volcanism, mass movement, wind, glaciation, groundwater, etc.), Surface and groundwater resources, Natural hazards. Therefore, Advance Level geography curriculum contains a considerable topics related to Earth Science. These topics are also unchanged during 2019.
- Undergraduate level Geology related courses are opened for students who sit for Advance Level examination in Bio Science and Physical Science streams those who follow Physics, Chemistry with Biology (for Bio Science stream) or Combined Mathematics (for Physical Science stream). However, Earth Science related topics do not introduced in these two streams. As a result of this students found Geology as a new subject when they enter to the University. However, six out of fifteen state Universities offer Geology as a subject and only Geology special degree offers at the University of Peradeniya.
- Admission for undergraduate geology degree is remain unchanged during 2019 as it is offer only at the University of Peradeniya and its intake if fixed to 50 students per year.
- Earth science education in the Sri Lanka is supported by the Geological Society of Sri Lanka (GSSL) and the Department of Geology, University of Peradeniya. Each year GSSL in collaboration with the Department of Geology conduct three to four “Earth Science for schools” teacher training workshops in different parts of the country. About eighty to hundred teachers (majority them are geography teachers) participate these workshops. In 2019 two “Earth Science for schools” workshops were organized. Apart from these workshops, occasionally the Association of Geography Teachers Sri Lanka organizes workshops and few Earth Science topics like Rocks and minerals, surface and groundwater resources, etc. included in these workshops. In October 2019 one such workshop was organized at the University of Peradeniya.
- The Geography teachers’ supplementary guide book had revised by the Educational Publication Department Sri Lanka in 2019 and will be published in 2020. In this guide book, two geology related chapters i.e. “Earth’s structure and Composition” and “Mineral resources, Rocks and soil in Sri Lanka” are authored by Mr. Ashvin Wickramasooriya.
- Other than teacher training programmes, two Earth Science related Olympiad competitions are popular among school students. Those are Sri Lankan Earth Science Olympiad competition (introduced in 2009) and National Geography Olympiad competition (introduced in 2017). Best four students who performed at the Sri Lankan Earth Science Olympiad competition in 2019 had

participated at the International Earth Science Olympiad competition in Korea. In 2019 there are 9,745 students participated at the National Geography Olympiad competition.

- Also four young Earth Scientists participated and presented their research outcomes at the Young Earth Scientists Congress which was held from 9-13, September in Berlin, Germany.
- *Ashvin Wickramasooriya.*
- *Commissioner – IUGS- COGE*

## Turkey

Prof. Dr. Nizamettin Kazancı, [Nizamettin.Kazanci@ankara.edu.tr](mailto:Nizamettin.Kazanci@ankara.edu.tr) and Assoc. Prof. Dr. Alper Gürbüz,

As it was described in the E-Book of IGEO 2016 (*Earth Science Education – Global Perspectives*, Eds: Roberto Greco and Leslie Almberg), formal geosciences education in secondary schools in Turkey have been realized mainly within schedules of geography courses. Beyond discussing the quality and quantity of geoscience information in geography courses, the main problem is that geography is elective for a lot of secondary schools specialized in areas like sports, arts, musics, technical, etc. On the other hand, authorities and families are complaining from education load on children insisting on decreasing course hours and thus there is no chance for new geography and geology courses. Therefore, an important part of population is being unaware of even elementary geoscientific knowledge; however Turkey suffers continually from earthquakes and various natural disasters (i.e. floods, landslides, aridity etc). What is more, because of continent-size land surface and bridge position of the country within Asia, Europe and Africa, physical geography and geology of Turkey have to be known primarily by its own citizens since the current policies of the country have been mainly diverted to international tourism and trade. In front of the reality aforementioned, efforts of the IGEO have to be focussed on public awareness. The relevant activities and successes are as follows;

- 1- A national working group (**Geosciences Education Working Group of Turkey**) has been formed by 12 experienced academicians in different topics of geosciences. Prof. Dr. Hükmü Orhan ([hukmu.orhan@gmail.com](mailto:hukmu.orhan@gmail.com)) who is a sedimentologist in Konya Technical University is leading the group. He said that webpage and road map of the group will be seen in early 2020.
- 2- National Geoethic Guides had been published with collaboration of Chamber of Geological Engineers in Official Journal of Turkey after a good deal of discussion by different institutions. This is a big achievement for IGEO works as it may provide public awareness on nature and nature conservation. In addition, two IGEO friends, Prof. Dr. Yüksel Örgün and Dündar Çağlan nominated national representative at IAPG by our reference.
- 3- IGEO representatives have participated in a lot of social and geoscientific activities mostly tour guiding in aspiring geoparks. This is important for our ideas as geotourism is growing in the country by official supports. In order to enlarge such geotourism activities, we have agreed with the Turkish Association for the Conservation of the Geological Heritage-JEMIRKO in next years.

### Representatives

Prof. Dr. Nizamettin Kazancı

Assoc. Prof. Dr. Alper Gürbüz

## UK

Chris King, [chrisjhking36@gmail.com](mailto:chrisjhking36@gmail.com)

- The English national curriculum is unchanged. It has significant Earth science in the primary curriculum, but only the rock cycle in the secondary science curriculum and plate tectonics in the secondary geography curriculum. Most schools do not have to follow the national curriculum and the Earth science is not assessed.
- The Scottish national curriculum is unchanged and contains significant earth science in the primary curriculum, but it is not assessed
- The Welsh national curriculum contains little Earth science and is currently being modified.
- The Northern Ireland national curriculum is unchanged contains some Earth science in the primary curriculum, which is not assessed
- Entry for the optional geology GCSE exam (for 16 year olds) has dropped by half (to 502) since 2014, due to government changes in GCSE weightings in the formula by which schools are judged
- Entry for the optional geology A-level exam (for 18 year olds) has fallen by half since 2014 (to 1268) due to changes in the government funding for A-levels
- Entry for undergraduate geoscience degrees is falling
- Earth science education in the UK is supported by the Earth Science Teachers' Association (ESTA), the education committee of the Geological Society and two Exam Boards.
- The government has not trained any geology teachers since 2016/17; nine geology teachers were trained through a Summer School thanks to industry/charity bursary funding in 2019.
- Workshops were offered to c600 trainee teachers on the teaching of Earth science, by ESTA in 2018/19.
- GeoWeek is a nine-day week in May when members of the public are introduced to Earth science; in May 2019 involvement more than doubled to more than 70 events and more than 2000 participants.
- A LinkedIn group of geoscience educational researchers is being set up by colleagues based at Keele University.

## USA

Mary Dowse, [dowsem@live.com](mailto:dowsem@live.com), Sharon Locke, Steven Anderson

In the United States organizations like the National Association of Geoscience Teachers (NAGT) and the National Earth Science Teachers Association (NESTA) have raised the visibility of geoscience education over the past decade. The Geological Society of America (GSA) and the American Geophysical Union (AGU) also have education divisions and dedicated professionals whose focus is geoscience education. Many of the other professional organizations place an emphasis on outreach to teachers for their members. NAGT, GSA and the American Association of Petroleum Geologists (AAPG) also support awards recognizing teachers and their impacts.

The number of sessions on geoscience education at professional meetings has increased dramatically in the past few years, for example at the recent AGU meeting in San Francisco there were more than 50 sessions devoted to education. The Steven Anderson, Sharon Locke and Mary Dowse facilitated a session on International Education at the GSA Meeting in Phoenix in September. The session attracted a full slate of papers on a range of topics related to international geoscience education. Michael Passow with Sharon Locke and Steven Anderson chaired a session at the AGU meeting in San Francisco in December.