

International GeoScience Education Organisation

November 2019 Newsletter

http://www.igeoscied.org/

2018 – 2022 IGEO Executive Committee

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In this issue:

An invitation to contribute activity suggestions and consolidation questions to the Companion Volume of the IGEO's 'Exploring geoscience' textbook

IGEO's '*Exploring Geoscience*' textbook has been published to reflect and support the IGEO International Geoscience Syllabus (found at: <u>http://www.igeoscied.org/activities/international-geoscience-syllabus/</u>). Both syllabus and textbook cover all the geoscience knowledge and understanding that we believe an able 16 year old student should be expected to know.

The textbook is available as a free pdf download at: <u>http://www.igeoscied.org/wp-content/uploads/2019/03/Exploring-geoscience-across-the-globe-Q.pdf</u>

A companion volume is under preparation keyed into the section headings of the '*Exploring geoscience*' textbook. The Companion provides a range of interactive teaching activities to enhance learning and a series of questions to consolidate understanding, for each textbook section. All the activities included so far are published on the Earthlearningidea website at: <u>https://www.earthlearningidea.com/</u>

Each Earthlearningidea which is included is referenced by its title, a brief description of the topic it covers and two photographs or diagrams taken from the Earthlearningidea with a web reference, as shown in Figure 1 below.

Figure 1. The 'Metamorphic processes' activity section of the '*Exploring Geoscience*' compani

Activities					
ELI title	Торіс	Images			
Metamorphism	A demonstration				
 – that's Greek 	of the formation				
for change of	of two common				
shape, isn't it?:	textures seen in				
when rocks are	metamorphic				
put under great	rocks				
pressure					
https://www.earthlearningidea.com/PDF/43 Metamorphism.pdf					

4.1.2.4. Metamorphic processes

Squeezed out of shape: detecting the distortion after rocks have been affected by Earth movements	A carefully made mould of a shell is deliberately distorted before a plaster cast is made, producing an artificial 'fossil'	Aaster Of Par			
https://www.earthlearningidea.com/PDF/51 Squeezed out of shape.pdf					
Metamorphic	Modelling with				
aureole in a tin:	hot water and				
what controls	sand in a tin the				
the changes in	factors affecting				
temperature	temperature				
around an	changes around	TITOT			
intrusion?	an igneous				
	intrusion				
https://www.earthlearningidea.com/PDF/252_Metamorphic_aureole.pdf					
The deep rock	A model to				
cycle explained	show how, as				
by plate	continents to		mountain chain		
tectonics:	move towards				
deformation and	one another, the		-		
metamorphism:	rocks are		mountain root		
a model of	deformed into				
mountains and	mountain chains				
roots	with roots				
https://www.earthlearningidea.com/PDF/318 Rock cycle plates def met.pdf					

The consolidation questions are also keyed into the '*Exploring Geoscience*' sections, and usually include a first question that can be answered by reading the text carefully and further questions to test and deepen understanding, as shown in Figure 2. Answers are provided for all the questions in a 'Some answers' volume to be published separately for restricted teacher access.

Figure 2. The 'Surface processes' Questions/discussions section of the '*Exploring Geoscience*' companion.

4.1.2.1. Surface processes

Questions/Discussions

- 1. What is the difference between weathering and erosion?
- 2. Most weathering processes depend on water; it has been found that even weathering by heating and cooling acts at a faster rate if the rock has some water in the cracks. How is water involved in other weathering processes?
- 3. Explain how storms can affect erosion rates.
- 4. How can the shape of the land (the landscape) in the area where you live be explained?

Any readers of this newsletter are most welcome to contribute more activities or questions to the Companion Volume and their contributions will be fully credited to them and to their original source.

To contribute:

- access the 'Exploring geoscience' contents page at: <u>http://www.igeoscied.org/wp-content/uploads/2019/03/Exploring-geoscience-across-the-globe-Q.pdf</u>
- for activity contributions:
 - choose the section heading most suitable for the activity;
 - o ensure that the activity is already available online;
 - provide a brief heading and a 'topic' description, like those shown in Figure 1;
 - add two photographs or diagrams;
 - $\circ\;\;$ give the reference where it can be found on the internet.
- for question contributions:
 - \circ choose the section heading most suitable for the activity;
 - \circ provide the question, written succinctly, like those shown in Figure 2;
 - o provide a written answer again, succinctly written.
- send your contributions to: <u>chris@earthlearningidea.com</u>

Contributions may be edited before inclusion.

All contributions will be most welcome, since the more wide-ranging the companion volume is, the more valuable it will be to both teachers and their students. So, please contribute now.

Chris King.



The International Union of Geological Sciences Commission on Geoscience Education (IUGS-COGE) and the International Geoscience Education Organisation (IGEO) jointly are seeking to appoint IUGS/IGEO Geoscience Education Field Officers in countries beyond Europe with the major role of providing professional development to school teachers, who have elements of geoscience in their teaching curriculum, through interactive workshops. Priority will be given to those countries where the work of such Field Officers is likely to have most effect.

The two-day training programme for successful applicants will take place in Vienna in May 2020 combined with the training for European Geosciences Union (EGU) Field Officers.

Two IUGS/IGEO Field Officers were appointed last year (in India and Morocco), four new posts in non-European countries apart from India and Morocco, are available this year.

These positions are unpaid, but funding may be available as follows:

- a bid has been submitted to the IUGS to fund the costs of travel and accommodation in Vienna for the training of the individuals alongside the training of European Geosciences Union (EGU) Geoscience Education Field Officers;
- a second bid has been submitted to IUGS for the funding of workshop apparatus and materials;

If these bids are unsuccessful, Field Officers will receive no funding for training or for providing workshops, but nevertheless, training is a compulsory part of the appointment. If both bids to the IUGS are successful, Field Officers will receive some of the funding available to their EGU counterparts.

Individuals appointed will ideally:

- be willing to represent IUGS and IGEO amongst geoscience teachers and educators in their own country;
- be willing to liaise with a small group of IUGS/IGEO-recognised supporters in their own country;
- be fully available for work, and so are unlikely to have a full-time position;
- hold a university degree containing at least 40% broad geoscience;
- have wide experience of teaching geology, science or geography;
- be willing to respond to new teaching ideas and approaches;
- be willing to seek out and travel to conferences of school teachers of geography, science or primaryage pupils in their country and region in order to present (in their own language) interactive workshops to the conference participants;
- be willing to present training to people working in informal geoscience education, such as in geoparks, aspiring geoparks, the museum sector and other similar institutions, when funded by the institutions;
- be willing to undertake a two-day training programme in presenting interactive workshops; training will be by experienced trainers with expertise in presenting curriculum-focussed interactive professional development workshops in many countries the training is linked with the EGU General Assembly in Vienna, Austria in May 2020;
- be willing, with guidance, to formulate interactive workshops appropriate for the curriculum in their own countries (with or without translation from English);
- be willing (if funded) to attend an annual meeting of Geoscience Education Field Officers linked with the EGU General Assembly, to provide a brief report on their activities;
- be willing to purchase locally all the apparatus and materials needed to support and maintain the workshops (expenses may be reclaimable);
- be willing to collect evaluation data from each workshop presented and to provide simple analyses of the data;
- be willing to provide information on the background and progress of geoscience education in their own countries, when prompted.

Application is by sending a motivation letter (occupying no more than a single A4 page) and a curriculum vitae (CV) to the Chair of the IUGS Commission on Geoscience Education, Chris King, at: <u>chris@earthlearningidea.com</u>

The motivation letter should refer to the motivation of the individual applying, the state of geoscience education in their country, and how the provision of interactive workshops is likely to have impact.

Applications will close on **Monday 20th January 2020**.

limestone, the dolomite and the clays present in the area to produce lime, cement, roofing and paving tiles, bricks, dimensional stone, etc.

The main objective of the Geopark is to provide information and formation about the local geology, how and when the local hills have formed and how the natural resources are mined, manufactured and commercialized. Visits to quarries, cement and lime production facilities and also to bricks and tiles factories (all together in a small area), bring an unique opportunity to visit the outcrops, see the extraction of rock in different quarries, learn about its manufacturing in different facilities and see how the raw material are processed to obtain the final products that go to the market.

Special educational projects directed to the general public, schools, universities and also for teacher formation, are to be developed and they will associate with the many cultural, archeological, architectural, ethnic and folkloric attractions of the area, providing a fantastic opportunity for learning and enjoying about nature and society.

GEOCULTURAL JOURNEY TO ITALY

A second edition for the Geocultural Journey to Naples and Rome is being organized for 2020. The journey, lasting 14 days, offers a transversal-multidisciplinary approach, linking geosciences, art and history, highlighting how the geological processes have built the present day landscape and how they have controlled in the past, and continue conditioning social development.

Volcanism and hydrogeology (processes and products) are the main geological subjects to be undertaken along with the rock types and provenance of building and sculpting materials. The cities and neighborhoods of Naples and Rome are outstanding scenes where to learn about archeology, history, art, culture in general and link all these knowledge to Earth Sciences. The program can be easily followed by persons with no geosciences background, but may also be specially interesting for those educators who wish to improve

not only their knowledge in geosciences, but also aim to bring back a fantastic portfolio of examples and teaching materials to use in their classes.

The journey is being organized by Dr. José Sellés-Martínez (member of IGEO) and additional information may be requested to pepe@gl.fcen.uba.ar.

important steps in developing an international network to foster co-operation among geoscience educators in South and Central America. Members of the Brazilian Society successful, the initiative will be extended to more European countries in future years and may be opened to other countries globally.

UK annual report for IGEO, November 2019

- 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.

Chris King.

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GEO report for South Africa by Tanja Reinhardt

Science and Technology Education Centre, University of KwaZulu-Natal, South Africa

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

OTHER OPPORTUNITIES OF INTEREST TO IGEO MEMBERS AND OTHER TEACHERS

Latin American Chapter of IGEO: LAIGEO

During the VIII GeoSciEd conference a Latin American Chapter of IGEO was created. Se The aims of regionals chapters is to create local network and to involve new countries and colleagues in IGEO.

For more information contact the Coordinator Geral, Prof. Ana Clerici of Universidad Nacional de Asunción (UNA), Paraguay <u>ana.clerici@gmail.com</u>

UPCOMING CONFERENCES

American Geophysical Union Fall Meeting, 9 -13 December 2019, San Francisco, CA, USA https://www.agu.org/Fall-Meeting

European Geoscience Union General Assembly – May 3 - 8, 2020 Wien, Austria <u>https://egu2020.eu/about_and_support/general_information.html</u>

36thInternationalGeologicalCongress--March2-8,2020Delhi,India,http://www.36igc.org

he 36IGC GIFT workshop will take place over two and a half days during the 36th International Geological Congress. The workshop will explore the theme of '**Mountains**, water and the environment', through topical presentations from scientists at the cuttingedge of research, together with hands-on teaching activities. The 36IGC GIFT will take place from Wednesday 4th to Friday 6th March 2020 at the India Expo Centre & Mart Convention Centre in the National Capital Region of New Delhi, India. Teachers and educators from the Indian subcontinent and around the world can apply to participate in GIFT until the application closing date of **Friday 31st January** by completing an online application form. Successful teachers will receive a stipend which will cover their travel and accommodation costs partially or completely (depending on distance of travel), and will be notified of the results of their application by **mid-February 2020**.

The successful teachers will not only have the opportunity of taking part in a world-class geoscience educational experience of cutting edge research and innovative classroom activities, but will also be able to network with a range of teachers from different backgrounds and experience an international scientific conference in a major convention centre with its exhibition, presentations and poster opportunities. Thanks to the IGC organisers, all registration fees have been waived for GIFT teachers to attend the Congress from Monday 2nd March onwards.

Stipends are available to support teachers to participate in the 36IGC Geosciences Information for Teachers (GIFT) Symposium 2020 at the International Geological Congress, New Delhi, India.

Participating teachers will be selected, based on their teaching experience and a supporting statement from their school administration. Selected teachers are expected to attend the entire workshop, complete an evaluation form and submit a statement within one year following the workshop on their impressions of the workshop and how they plan to use this experience in their future teaching activities and collaboration with colleagues.

https://www.egu.eu/forms/36IGC-GIFT-Workshop-2020/

European Meteorological Society Annual Meeting, 07–11 Sep 2020, University of Economics, Bratislava: Call-for-Session-Proposals until 20 Dec 2019 https://www.ems2020.eu/venue_and_travel/

IGEO Report for Demark/Norway

We have started a National Centre for Integrated Earth Science Education in Norway to improve Earth Science education. You can see more on: <u>https://iearth.no/en/about-iearth/about-iearth/about-iearth-2/</u>

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

All the best, Rie

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International Geoscience Education Session at GSA

A topical session at the 2019 Geological Society of America annual meeting in Phoenix was convened by the US IGEO Councilors, <u>Mary E. Dowse</u>, <u>Steven W. Anderson</u> (University of Northern Colorado) and <u>Sharon M. Locke</u> (Southern Illinois University Edwardsville) on Sunday, 22 September 2019 in Phoenix, AZ. Following opening remarks, the first three speakers described programs and activities of IGEO, with the goal of raising awareness of the organization and encouraging new memberships.

Mary Dowse presented a paper co-written with Roberto Greco, IGEO President, entitled "<u>International Geoscience Education Organization (IGEO), An Overview of the Last 20 Years</u>," highlighting the early beginnings of IGEO and its succession of meetings, beginning with the Southampton, UK in 1993.

This was followed by descriptions of "<u>Connecting Geoscience Educators around the Globe with</u> <u>the IGEO Newsletter</u>" by your editor, Michael J. Passow, and "<u>A Free-To-Download Geoscience</u> <u>Textbook for Pre-University to Introductory University Students in Your Region</u>" by Chris King and Steve Anderson. An attractive feature of the textbook, as noted by the presenter, is the ability for an instructor to customize by location.

Next, Cory Forbes of the School of Natural Resources, University of Nebraska, Lincoln, Nebraska, described his study of the PISA international dataset on student performance in science, which he completed in cooperation with German collaborators. He emphasized that PISA is a rich dataset to look for similarities and differences across countries, and that the information obtained through PISA has been underutilized in science education research.

The remainder of the session focused on designing international learning experiences at the high school, undergraduate, and professional level. Jeanne Lambert Sumrall presented her experiences with a high school study program that embeds a community service component in "<u>A Landscape</u>

<u>View of Ireland: An Example of Project-Based Learning Using GIS Story Map as a Reporting</u> <u>Tool</u>." Her "lessons learned" resonated with other presenters and attendees, including, for example, the inconsistency of internet access during the course. Geoscience education strategies used by scientists and educators aboard the scientific drilling ship *JOIDES Resolution* were explained by Michael Passow in "<u>Sharing Scientific Ocean Drilling to a Worldwide Audience Of Students</u>, <u>Teachers, and the Public</u>." This longstanding program has an impressive reach across the world, bringing the excitement of oceanography to a variety of audiences.

Following a break, Becca Walker of Mt. St. Antonio College in Walnut, CA, described an innovative, multi-institutional program that enables community college students to complete a geoscience laboratory requirement internationally in "Incorporating Geoscience Curriculum into a Study Abroad Program for Community College Students: A Report From Seville, Spain." Christopher Atchinson of the University of Cincinnati and Executive Director of the International association for Geoscience Diversity (<u>https://theiagd.org/</u>) was an invited speaker, reporting on progress for "Inclusive Learning Communities iIn International Field Experiences." Dr. Atchinson summarized his research on best practices for ensuring accessibility of field learning for persons with disabilities, addressing issues such as recruitment, selection, and the social dimensions of fieldwork.

The session ended with three examples of partnerships for professional development being implemented on different continents: "The Rewards and Challenges of Collaborative Works with a Top-Tier University in Africa" by <u>K. Solomon Isiorho</u> of Purdue University Fort Wayne, who spent a semester at the College of Engineering in Nigeria; "International Educational Partnership: Lessons and Reflections of Teaching a Short-Course on Glacial Sedimentology in Perú" from Rodrigo A. Narro Perez, John C. Maclachlan, and Rebecca E. Lee of McMaster University in Hamilton, Ontario, Canada; and finally, Stefania Gerbaudo Laronga of Schlumberger in Houston, Texas, and Didav Gese Jarque of Schlumberger in Oslo, Norway, who described programs for "Training the Next Generation of Professionals." These final presentations highlighted the need for ongoing professional learning among geoscientists throughout their career and the benefits of international partnerships to meet this need.

Common themes emerged during the session, including challenges such as technology availability, securing classroom space, customs/shipping, logistics for field trips, and language barriers. Nevertheless, speakers consistently identified compelling benefits of international experiences for geoscience learners, including exposure to international perspectives of the discipline The session concluded with an open discussion among participants, and the consensus to host similar programs at future GSA, AGU, and other conferences where those interested in such programs naturally gather.

Links to this sessions and all abstracts are available at https://gsa.confex.com/gsa/2019AM/meetingapp.cgi/Session/47468.