International Union of Geological Sciences
IUGS E-Bulletin No. 112 — September 2015

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IUGS "EMILE ARGAND AWARD"

A prize to be called the Steno Award was created and agreed by the IUGS Executive Committee (EC) and Council during the 34th International Geological Congress (IGC) in Brisbane, 2012, to be awarded for the first time during the 35th IGC Opening Ceremony in Cape Town in 2016. Due to the fact that the Danish Geological Society traditionally distributes a Steno prize, it is necessary to rename the IUGS award as the IUGS Émile Argand Award. This is intended to honour an active senior geoscientist of high international recognition and an outstanding scientific record.

Nominations can be made by anyone in the IUGS community and should be forwarded to the Executive Committee not later than 3 months after the call. Accordingly, deadline for nominations is December 15, 2015 at the latest. The awarding procedure and allocation of the IUGS Émile Argand prize are described in the Bylaws posted on the IUGS website a couple of weeks ago. IUGS bodies are encouraged to submit nominations in order to highlight the role played by Earth Sciences.

Émile Argand (1879–1940) was born in Eaux-Vives near Geneva, Switzerland. He started working as a draftsman, then began studies in medicine but was soon attracted by geology under the influence of Prof. Maurice Lugeon at the University of Lausanne. Émile Argand quickly developed an understanding Alpine tectonics. In 1911, he secured a geology professorship at the University of Neuchâtel and published a memoir on the structure of Western Alps. His studies enabled him to improve knowledge of structural geology, as well as metamorphism and stratigraphy, of this key reference region in central Europe. Later, Émile Argand advanced from regional problems in Europe to geology on the planetary scale by accepting the challenge to prepare a geological map of Eurasia. The resulting map became famous leading to Argand receiving the Spendiaroff Prize in 1913. After the publication by Alfred Wegener of his fundamental paper on continental drift in 1915, Émile Argand became a resolute supporter of that hypothesis. He used it as a framework to explain Eurasian structural development in his inaugural address to the Brussels International Geological Congress in 1922. In 1924, Émile Argand finished his masterpiece entitled "La Tectonique de l'Asie" in which he clearly developed modern ideas about tectonics following Alfred Wegener's theory. Thus, the geologist Émile Argand was a key scientist in promoting new explanations of the folded and buckled strata of the Alps as well as undertaking the pioneering application of modern tectonics to the vast continent of Asia.

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SHORT REPORT ON CURRENT DISASTERS IN JAPAN

Since the 1995 Kobe Earthquake (M 7.3), many natural disasters, including earthquakes, tsunami, volcanoes, landslides, subsidence and floods have occurred repeatedly in Japan. Some researchers have claimed that these are mutually related to the Earth's interior activities or effects of global climatological change. To date we do not know the exact cause and effective relationships but, here, I simply summarize the current occurrences of these phenomena to emphasise the necessity of further research and exchange of knowledge. This is not an official report but a personal one, mostly based on common information through HP, TV and newspapers.

1. Relationship between earthquakes and volcanism

These two activities, earthquakes and volcanic, are thought to be mutually related in the context of tectonics related to convergent plate boundaries. Yet this has not been verified in detail. In Indonesia, clearly both events are strongly related, but the scientists there have not yet clarified the causes. Stress and its release are major phenomena linked to both activities. Release of accumulated stress at asperities is due to breaking (faulting) for earthquakes must accommodate the changes of stress, strain and pore-fluid pressure. During these processes magma pressure and fracture distribution might also change leading to magma intrusion and volcanism. As is experimentally well known, fluid seeping and pressure changes accelerate fracturing and further strain propagation. As for the 1995 Kobe earthquake, it might or might not be coincidental that the day of the earthquake was also the day that Unzen volcanic activity ceased (although they are 500 km apart). However, similar coeval occurrences of earthquake and volcanism are known from historical records.

Figure 1: Aso volcano eruption on Sept. 14, 2015. Air flights were cancelled following this event in Iceland. Photo from Mainichi Shinbun.

Stress concentration and release during the 2011 Tohoku earthquake was similar as, just before and after the Tohoku event, many island arc volcanoes became very active, e.g. from north to south, Tokachi and Usu volcanoes in Hokkaido, Zao and Azumayama volcanoes in Tohoku, and Asama and Hakone volcanoes in Kanto. Particularly, Ontake volcano, in 2014, after some thousand years of rest, killed 63 hikers on its summit. In Kyushu, Shinmoedake volcano and in 2015 Kuchinoerabu, Sakurajima and Aso (Fig. 1) erupted rather violently, suddenly, and without any clear expression of crustal movement, except at Sakurajima. Therefore many people living on the flanks of these volcanoes merely survived by urgent rescue by either cars, boats or helicopters. Luckily, very few people lost their lives except at Ontake. These eruptions were not foreseen, although some changes of inclination and slope angle were detected.

2. Landslide, slope collapse and flood

In those years, mostly due to extreme heavy rain in a short period (> 500 mm/day), landslides, slope collapse (failure) and floods occurred in “not-so-well protected” areas elsewhere in Japan. At Hiroshima, in 2014, 75 people who lived on steep slopes were displaced in their houses and lost their lives at night. The steep slopes were old (and still active) fans just below mountains. The City authorities had not listed these places as very dangerous). Floods became more common, and once in one hundred years recurrence periods of rain now might occur once in only ten years. Existing protection by means of dams or banks against slope failure or flood has been proved useless, because they are not high and strong enough. However, the idea of “super-dams” does not allow for better protection or any absolute solution. Rather, higher dams and banks made people living nearby feel relieved and, believing in less hazardous conditions, do not escaping quickly enough (normalcy bias) (Fig. 2, Kinu River flood). Banks of large rivers have allowed infilling of river channels with detritus from upstream, raising the floor level above the populated flood plain. Therefore, once the banks collapse or are cut by high flood waters widespread flooding is inevitable. People should evacuate before the danger level on these reinforcement structures is reached. A similar scenario also holds for the 2011 Tohoku tsunami where, based on experience from the highest levels of tsunamis in the last 100 years, a 10 m high bank/dam had been constructed along the coast. Unfortunately the 2011 tsunami averaged 15 m, and was enhanced to reach 30 m or more near areas where people lived. The lesson from this regarding the ultimate effective countermeasure for possible future disasters is “We do not know”.

Figure 2: Mechanism of bank collapse due to water pressure effect demonstrated in a newspaper for the Kinu River flood, Sept. 2015 (by Prof. S. Kanae). Photo from Yomiuri Shinbun. Note that the style of erosion and rapid flow-in is very similar to that of the Tohoku tsunami, 2011.

In addition some social or technical (not technological) problems are evident. For example, the warning level is not always conveyed to the people who should evacuate, partly because the water level might rise too rapidly or, mostly because the announcements by the government or local city authorities are delayed.

In September 2015, the Kinu River caused flooding by cutting and overflowing several banks due to unusual heavy rain. Heavy rain continued upstream due to two (twin) typhoons with more than 500 mm/day precipitation. The flood covered the rice fields just before harvesting. 4000 people were rescued by helicopters and boats but some fatalities occurred. More than 12,000, houses and wide fields were totally damaged. Meteorologists and climatologists claim that in recent years the weather mode definitely changed, from temperate to semi-tropical, becoming much more violent.

This disaster however dates back to 17th century large constructions by the Tokugawa Shogun. He was effective and successful in making economical activities flourish. The Shogun changed the river drainage system, cutting the major river courses by constructing channels. He had the Capital Edo (presently Tokyo) built intending to avoid flooding, and sought better transportation of goods. The change of the natural drainage system in the 17th century led to the large scale flooding in the 21st century (Fig. 3). While engineers and scientists know that human actions can lead to mechanisms and processes that cause unusual natural phenomena, but society (government and local committees) do not expect or anticipate such events or that some disasters are partly man made.

Figure 3: Kinu river flood on Sept. 10, 2015 in the next village to the author's. Photo from Yomiuri Shinbun. Note that the river flows from the bottom (north) to the top (south). It overflowed and cut the left bank not at the undercut slope of the meander but in the straight part. Possibly the narrow man-made channel downstream caused higher water levels upstream with consequent overflowing.

3. Social topics and natural science

People have noticed that despite developing civilization and technology disasters tend to become larger. This is chiefly due to increasing human activity and larger concentrations of populations. The amount of loss (people and material), therefore is larger than before. In addition the concentration of people in "convenient" flat and fertile areas, which in Japan are flood plains (mostly on active faults) or along the coasts (vulnerable to tsunamis) is another factor for increasing losses. Some people try considering two factors: convenience and risk, but many ignore that these areas

are potentially very risky, rather than very convenient. In respect of rare disasters, they fail to integrate present knowledge. Hazards, risks, and disasters are mutually related through scientific, technological and societal factors, and the decision how to act in the future is a burden of society.

Communicated by Yujiro Ogawa, IUGS Councillor (fyogawa45@yahoo.co.jp)

IUGS AND HSTG AT THE "GEOHERITAGE INVENTORIES" CONFERENCE, TOULOUSE (SEPT. 22–26)

IUGS was among the patrons of a conference on "Geoheritage Inventories: Challenges, Achievements and Perspectives" that took place in Toulouse (France), September 22–26, 2015. The IUGS President made an introductory presentation on the importance of Geology and Geological Resources in preserving Geoheritage and its relationship to Geoparks, which was the main subject of the conference. Representatives of UNESCO and IUCN had a major role, explaining the new application rules for evaluating new sites. The importance of this meeting, where IUGS, IUCN (International Union for Conservation of Nature), and UNESCO joined efforts to spread the message of the importance of Geology in the preservation of geological, natural and cultural heritage should be highlighted.

The Heritage Stone Task Group (HSTG) was represented at the conference by Lola Pereira who presented the invited contribution: "Global Heritage Stone Resources: Their value in preserving our geological and cultural heritage". It was the first occasion to acknowledge in public the kind support for IGC Project 637 to specifically include in the Task Groups activities young researchers, women and researchers from developing countries.

More on the conference and the program can be found here.
Communicated by Lola Pereira

Patrick McKeever (UNESCO representative), Tim Badman (IUCN representative), and Roland Oberhänsli (IUGS President) in Toulouse

Participation at the "GEO INV 2015", an international congress on Geoheritage Inventories in Toulouse was of great scientific interest but also essential since it brought together representatives of IUCN, UNESCO and IUGS. This was important in the light of the restructuration in UNESCO that hopefully will be accepted by the UNESCO Council in November. With this new structure, the link between IUGS and

Geoparks as well as World Heritage has to be seen in a new light. The three organizations agreed to cooperate on eye level with respect to ensure highest geoscientific professionalism regarding Earth Science aspects be it in Geoparks or World Heritage sites.

Besides, it was a pleasure to see cooperation of two highly performing IUGS Task Groups, namely Geoheritage and Heritage Stone.

My thanks go to the organizers of this meeting Patrick De Wever (Museum National d'Histoire Naturelle, Paris), Francis Duranthon (Museum d'Histoire Naturelle, Toulouse) and Arnault Lalanne (Ministère de l'Ecologie).

Communicated by Roland Oberhänsli, IUGS President

EFG AND IAGETH SIGN A MEMORANDUM OF UNDERSTANDING

A Memorandum of Understanding (MoU) between the European Federation of Geologists (EFG) and the International Association of Geoethics (IAGETH) was signed on the September 16, 2015 by the Presidents of the two organizations, Dr. Vítor Correia (EFG) and Prof. Jesús Martínez-Frías (IAGETH).

The cooperation between IAGETH and EFG will allow the creation of new professional and institutional synergies on geology and geosciences and enhance their respective activities.

The objective of the MoU is to bring the two IUGS-affiliated organizations (IAGETH and EFG) together to focus attention on the conjunction of geoethical aspects and best practices in the context of geosciences, through joint actions, including professional and institutional cooperation on different subjects and the production of training material, roadmaps and protocols at different levels.

EPISODES: SEPTEMBER AND DECEMBER ISSUES

September's issue of *Episodes* contains, as usual, a diverse set of papers reflecting the wide range of interests of the IUGS community. Attention is drawn particularly to important papers on Upper Cambrian to Lower Ordovician stratigraphy and investigations of the Moho beneath central Tibet as well as Global Geoparks applications. Hydrogeological and hydrological interests are served by papers on responses to extreme rainfall events in the Himalayas and behaviour of springs in central Europe. Other papers deal with seismicity in Iran and soft sediment deformation structures in northern India. The history of geology is served by a paper on the 25th IGC, which was held in Australia in 1976. We also have reports on IGC/SIDA Project 598 and IGC Project 624. The "Forum" section has been reintroduced. This is intended to reflect the author's opinions and be provocative. Responses will of course be welcomed, as would other short opinion pieces.

We take this opportunity to announce the December issue, which will be a special issue on ophiolites.

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The full contents of the September issue are:

NOTES

• If you require notices, information on publications, etc. to be considered for inclusion in forthcoming IUGS e-bulletins, please mailto:Amaury@geo.uni-potsdam.de
• Please check the IUGS Calendar of Events for upcoming scientific meetings this coming month. If you require information on international conferences, meetings, etc. to be considered for inclusion in this Calendar please mailto:pbobrows@NRCan.gc.ca.
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