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Communicating Earth Science to the Public:
Report on a Special Session at GeoCanada 2010

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CONFERENCE REPORT

Communicating Earth Science to the Public: Report on a Special Session at GeoCanada 2010

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When the geoscientists of Canada assembled in Calgary in mid-May 2010, two groups co-operated to create an unconventional session that proved to be an unqualified success. They were the Canadian Geoscience Education Network and the Communicating Environmental Geosciences working group of the IUGS commission, Geoscience for Environmental Management. As co-chairs of the session, we decided that if we were indeed to bring the issue of communication to the forefront, then the traditional scientific approach of a series of structured presentations would not be sufficient on its own. Instead, we combined posters and a series of conventional presentations with a keynote speaker, a panel discussion and a workshop. The organizing committee for GeoCanada 2010 is thanked for their assistance in facilitating this approach, as well as for highlighting the session as part of the outreach activities of the meeting. The session was also made possible through funding from the IUGS working group, the Canadian Geological Foundation and *Let's Talk Science*.

We could not have had a better introduction to the session, as the previous two days had seen an important geoscience outreach effort, through the *Earth Science for Society* activities, in which numerous professional and educational organizations combined to bring geoscience to 2000 Calgary school children and teachers. We were even more fortunate in following Godfrey Nowlan's inspiring plenary lecture on Earth Science Literacy and Planetary Citizenship.

This lecture was an ideal lead-in to our session's keynote speaker, Iain Stewart. Iain holds the unusual and possibly unique position of Professor of Geoscience Communication at Plymouth University in the UK, and is a member of the Communicating Environmental Geoscience working group management committee. He jokes that he might be better termed 'Professor of TV Geology', as Iain is probably the most visible geoscientist in the UK, well known as the presenter of numerous BBC television series and specials,

Figure 1. Keynote speaker Iain Stewart, and University of Alberta student Madeeha Ahmed, who was inspired by his television programs to switch from pre-med to earth science.

over the last six years. His work has also been aired on the Discovery and National Geographic channels in North America. His influence clearly has extended into Canada, as the first member of the audience in the room was Madeeha Ahmed, a University of Alberta earth science student, who told Iain she had been inspired to switch from a medical degree after seeing his television programs.

We had expected Iain to give us useful pointers on how to present earth science in the mass media and he did this, but he also went far beyond, with an entertaining, superbly illustrated and ultimately thought-provoking

presentation. Iain outlined the basic, and perhaps more conventional approaches to presenting geoscience: 'Geo Wonder', which simply shows the spectacular and spellbinding features of the planet; and 'Geo Porn', which shows the death and destruction caused by natural hazards. He was, along the way, brave enough to make the statement, "*rocks are boring*" (described by himself as blasphemous in this company!). Although both approaches have merits and can produce great television, he went on to outline his own approach, which focuses on how geology has shaped civilization and how "*abrupt geological changes reveal how society works"*. This stems from his research on earthquakes in the Mediterranean area.

It was unfortunate that Iain's talk was scheduled at the same time as another important session discussing the future of the geosciences in Canada, as his final point was particularly pertinent to that discussion as well. He concluded by emphasizing that geosciences have always been interwoven with society, and that, as geoscientists, we need to be fully aware and understand the broader implications of our work. He asked why geoscience teaching and research rarely includes social science and policy, traditional geography departments perhaps being the exception. Iain suggested that as geoscientists "*we hand over after identifying the problem*" while in fact "*the key issues are how society relates to what we have identified*", something he spoke of as 'the human planet'. He proposed that it would be in all of our interests to "*connect with social scientists*" and "*foster a geological culture*", communicating to the public both what we are about, and what the planet is about. He went on to discuss the present schizophrenic nature of modern geoscience. Referring to Godfrey Nowlan's plenary lecture, he suggested that geoscientists should work toward portraying themselves as playing a vital role in the stewardship of the planet, as it is we who try to understand the processes and mechanisms of the science of the earth. We try to make the point that geology underpins everything, yet a large part of our scientific endeavours are related to discovery and exploitation of the resources of the earth; although modern society is dependent on these resources, there is a price to pay in terms of the health of the planet. Iain posed the question as to whether we can have it both ways. He concluded by proposing that in the future, geoscience must be better integrated with society, and that this integration must come from the geoscientists.

The keynote presentation had attracted a big crowd, and most returned after coffee to hear a distinguished panel discussing communication issues and some best practices. The five panellists were given five minutes each to discuss roadblocks and issues in communicating earth science to various publics, and what approaches work best.

Karen Brawley Rogers, geophysicist and president of Amulet Exploration, provided a perspective from the petroleum industry. She noted that while it is vital for each of us to be individual ambassadors for our science, we also need to improve our organizational commitments to communicating geoscience. Perhaps her strongest message came while discussing the role of hydrocarbon geoscientists in the field of climate science. There is a loud call for sustainable resource development and this call must be met by the petroleum industry, one of the largest contributors both to the economy and to carbon dioxide production. Karen indicated that geoscientists had a responsibility to understand the science behind climate change; they also need to acknowledge that anthropogenic global warming is not a matter of belief, but is clearly established by scientific research. By making this effort, scientists working in the petroleum industry enhance their credibility, and are able to then communicate other related issues with a far greater chance of their views being heard.

Don James, Chief Geologist of the Canada–Nunavut Geoscience Office, representing government surveys, emphasized the importance of engaging with communities, particularly in the north, and gave examples of how the Canada–Nunavut Geoscience Office involves local communities in their work. He noted that it is "*essential to earn our social licences to practice*" and suggested that this should be done by communicating to the public what we are doing, as well as how, and why. Don discussed the example of planned seismic and other geoscience studies in the Lancaster Sound area, which at the time of the conference was in the media "*almost every day*". He noted that it is important to explain the impact of the surveys being done as well as the public relevance of the data.

Bill Pearson, President of Castillian Resources, represented the mining community, and talked about the troubling divide between public perception of mining (the Avatar 'evil mining company' view), and modern mining practices. He emphasized that communication is vital to overcome preconceived notions of what mining entails. A message that he felt is not coming out clearly involves the benefits that mining can bring to communities in developing countries, and the efforts most Canadian mining companies were making to be good world citizens. He also noted the huge disconnect in public understanding between the mining industry and all of the things we use in our everyday lives that are the products of mined resources. He particularly applauded the efforts of PDAC Mining Matters and similar organizations that communicate this message so effectively to school children.

Carolyn Relf, Director of the Yukon Geological Survey, discussed aboriginal community relations, based on her experience in NWT and Yukon, and emphasized the importance of developing relationships and trust. She stated that communication with aboriginal communities should be as with any other audience – clear, visual, showing the relevance of our work, perhaps introducing our tools (maps, satellite images, airphotos) as a way of engagement, and identifying common points of interest. She reinforced what Bill Mercer had discussed in a previous talk during the conference, that we must do our research to understand the perspective of our aboriginal neighbours and to "*find out their stories*".

Iain Stewart had the last word and he based his comments around message, mode and medium, noting that "*the planet does all the hard work*" and that "*contemporary interest in the planet has*

never been higher". He made a strong case that we should train our own undergraduates to communicate our science and hoped that they would see that "*the communication of our subject is equally important as the greatest research*". Concerning the media to be employed, he proposed that we focus our communication efforts where "*ordinary people go for their information*", primarily through the internet and television. The panel responded to questions from the audience, and some interesting discussion ensued, curtailed by the constraints of the conference schedule. It was clear that our experiment with the panel was a definite success, and one that should be repeated at future meetings with an extended period for audience-driven questions and discussion.

The afternoon session brought more innovation in the form of a *Let's Talk Science* workshop. This national group has had great success in providing the training and resources to bring young scientists – mostly graduate students – into elementary and high school classrooms as interpreters of science, role models and mentors. The *Let's Talk Science* CEO Bonnie Schmidt kicked off the afternoon with an address that underscored many of the points made by Godfrey Nowlan in the morning plenary lecture. Schmidt's key message was that public and youth engagement in science is increasingly important, because global challenges, policy frameworks, and emerging jobs require a greater understanding and participation in science. She emphasized that it is up to the scientific community to take the lead on this, building education and outreach into their core activities.

Following her comments, about 20 participants remained for the hands-on, two-hour workshop *Science with Impact*, which provides outreach training. *Let's Talk Science* had been asked to specifically tailor the workshop to provide earth science content, with interesting consequences, as Ms. Schmidt noted that it made her see the need to integrate more earth science programing into *Let's Talk Science* activities. The workshop's goal was to help participants actively engage our next generation of stewards, citizens and innovators. As Ms. Schmidt summed up, "*Earth scientists are powerful role models who can educate our youth to manage our earth's resources sustainably by actively engaging them in hands-on, minds-on earth science activities*."

Figure 2. At the *Let's Talk Science* workshop (funded in part by the Canadian Geological Foundation), earth sciences blended with visual arts, theatre and music, in activities that could be done in a classroom setting. This group turned the rock cycle into a rap song.

The conventional conference approach of 20-minute presentations was an important part of the session, and we were fortunate in having a series of excellent presentations highlighting diverse approaches to communicating to various sectors of the public. Stella Heenan combined presentation with hands-on demonstration as, helped by a number of EdGEO volunteers, she introduced the new '*Bringing Earth Science to Life*' educational resource, which EdGEO has just developed as an online manual. The goal of the innovative and interactive classroom lesson plans contained in this manual is to integrate earth science content into the core curricula of physics, chemistry and biology (the PCBs), as well as mathematics.

Beth McLarty-Halfkenny described another innovative approach for reaching a broad public, by providing interpretation in places where the public routinely goes. During, 'Explore Geoheritage Day', which is held during National Science and Technology Week, Ottawa-area geoscientists are stationed at significant outcrops in easily accessible places to promote the geoheritage of the area. The event, which has now been held twice, is promoted via a number of media, and provides expert interpretation of these geological features. The central idea of this low-cost and successful initiative is to showcase important geological sites; the goal is to raise public awareness of their value and beauty, and the impor-

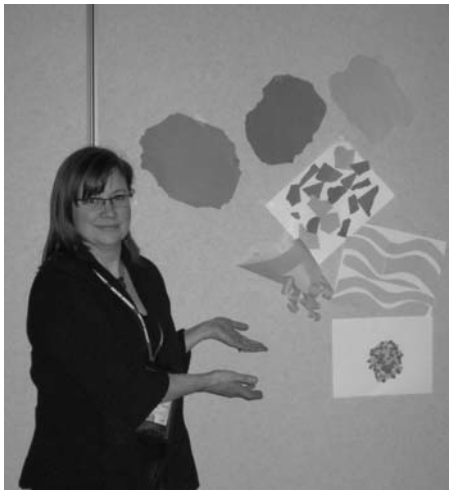

Figure 3. At the *Let's Talk Science* workshop, Beth McClarty Halfkenny demonstrates the artistic rendition of the rock cycle, with the three boulders breaking down, to be acted upon by wind and water, and turned into sedimentary rock.

tance of protecting and preserving these sites from development. Beth, on behalf of Allan Donaldson, also described a number of successful geoheritage collaborative initiatives in which members of the Ottawa–Gatineau Geoheritage Project work with existing museums to develop activities that showcase the geoheritage of these sites. Examples include the Metcalfe Geoheritage Park in Almonte, the Mill of Kintail and Matheson House museums, the Citivan Court rock display in Perth, and the tremendous potential of canoeing, rafting and kayaking tourism to showcase geoheritage through developing brochures and signage to complement these museums, venues and activities.

Katherine Boggs outlined a locally developed Pilot High School Geology Course that will be offered at several Calgary schools in September 2010. The goal, and the assistance that will be provided to the teachers involved, is to increase student and public awareness of geoscience in view of the overwhelming dominance of PCBs in the senior high school curriculum.

Jean-Philibert Moutenet discussed the public outreach and acceptance associated with CCS [CO_2 Capture and Storage]: with an example from the province of Québec. He outlined results of a survey conducted to assess public perception and attitudes regarding CO_2 capture and geological storage, and discussed the potential strategies for reaching public acceptance. This was an excellent example of a project that had incorporated community bridge-building into its earliest planning stages.

Marianne Mader described an innovative program for high school students (linked to the Ontario Grade 9 Earth and Space Science unit) called 'Exploring Other Worlds by Exploring Our Own'. The program brings together scientists and engineers to engage students in highly interactive, hands-on experiences that draw links between terrestrial systems and other planetary bodies such as Mars and the Moon.

In her talk entitled 'Challenges of Reaching Broad Audiences with Popular Publishing', Eileen Van der Flier-Keller, based on her experience with the 'Field Guide to the Identification of Pebbles', highlighted the importance of knowing your audience and meeting their needs through good visuals, stories, relevance, connections, and aesthetics. Potential sources of funding, opportunities and networks for marketing and distribution, finding a publisher, and suggestions for 'talking up' the product were also discussed.

Scott Swinden, President of the Canadian Geological Foundation, took the opportunity of a cancellation in the program to outline the funding opportunities available through CGF (www.canadiangeologicalfoundation.org). The CGF is a registered charity, generously endowed by its benefactors, that funds many activities focusing on education and outreach. Scott encouraged those with ideas in this area to apply for grant support, and noted that the opportunity now exists for larger grants than in the past.

Lucien Lyness gave an impassioned and energetic presentation, emphasizing the importance of understanding the nature of the communication process. He first reiterated the recurring theme of the session, that many important issues facing the public are underpinned by geoscience, and went on to discuss the challenges geoscientists face in communicating their input effectively.

The final speaker was the 2010 E.R.Ward Neale medallist, Jane Wynne, who addressed the challenges of changing peoples' behavior through knowledge of geohazards. She outlined the relationship between geoscience and public safety, and with the help of three case studies demonstrated how understanding the process of geohazard communication can greatly increase the effectiveness of scientific communication.

The session was well-attended, despite some strong competition from other events at the conference, and we look forward to learning from this experience and attempting similar multi-facetted events at future national geoscience conferences.