

Communication of Earth Science to Teachers, Students and the General Public at Teacher and Geological Conferences

F. M. Haidl*
Saskatchewan Ministry of Energy and Resources
fran.haidl@gov.sk.ca

and

Laura A. Clinton
Prospectors and Developers Association of Canada Mining Matters
lclinton@pdac.ca

Summary

Teacher and geological conferences offer excellent opportunities to communicate Earth Science to teachers, students and the general public. Examples of workshops, oral presentations, and exhibits are provided to showcase a few successful initiatives across Canada.

Teacher conferences present an ideal and important forum to reach educators with information and resources. Interactive workshops and oral presentations provide valuable professional development and offer an opportunity to equip teachers with tools needed to deliver Earth Science curriculum. Reaching teachers, and through them their students, will equip youth with the Earth Science knowledge required to make informed decisions about the environment, resource development and the mitigation of natural hazards.

Geological conferences have tremendous potential to reach a broad audience because they bring together industry, government and university expertise. The three most common outreach events at these conferences are programs that use geoscience experts to engage teachers and students in learning by using exhibits, teacher workshops, and public lectures.

Introduction

Knowledge of Earth Science and of the importance of natural resources in our everyday lives is essential to making wise decisions regarding use of mineral and energy resources, the maintenance and remediation of the environment, and response to geological hazards. Teacher and geological conferences offer excellent opportunities to communicate Earth Science to teachers, students and the general public. This can be done through workshops, oral presentations, and exhibits. The examples provided here represent just a sampling of the efforts of the many organizations and individuals across Canada who have a strong commitment to Earth Science outreach and education.

Teacher Conferences

Teacher conferences bring many teachers together in one place and thus are ideal venues for Earth Science workshops and oral presentations. A few examples of past workshops are provided below. Feedback from all the workshops was very positive. Teachers particularly appreciated the wealth of classroom resources that they received and the hands-on activities that were part of every workshop.

- 1) PDAC Mining Matters (www.pdac.ca/miningmatters) delivers workshops related to rocks, minerals, mineral exploration and mining during the annual conferences of the Science Teachers' Association of Ontario, the Ontario Association of Geographic and Environmental Educators, and the Ontario Society of Environmental Education. Workshops are tied to the provincial curriculum and are inquiry-based and interactive

with practical hands-on activities to help teachers move from theory into practice. Participating teachers receive a package of resource materials for use in the classroom.

- 2) The Geological Survey of Canada – Québec participates in the annual meeting of the *Association pour l'enseignement des sciences au Québec* where they showcase Web-based educational resources produced by Natural Resources Canada and promote a historical and geological field trip for teachers in Old Québec.
- 3) During the BC Science Teachers Conference *Catalyst 2008*, the Pacific Section of the GAC hosted a one hour workshop focusing on the Earth Science portion of the BC Grade 10 science curriculum. This hands-on session focused on rocks and how we use them to tell about Earth history, fossils and their story of life on Earth and paleoenvironments, geological time, plate tectonics and the Pacific Northwest. A total of 65 teachers attended the session, with each teacher participant taking back to the class a wealth of resources including learning activities, maps, posters, rock and fossil kits, and colour transparencies.
- 4) The Alberta Teachers' Association Science Council often invites geoscientists to deliver one-to-two hour Earth Science workshops or keynote addresses at their annual conference held in different parts of the province. Geoscientists also present workshops at city and rural conventions, especially when cross-curricular links can be made to Social Studies and other parts of the curriculum. A particularly successful workshop that focused on water resources was attended by 120 teachers.
- 5) *Saskatchewan Showcase 2008*: This once-in-a decade conference, split into two two-day events in Saskatoon and Regina, brought together almost all teachers in the province. A total of 254 teachers attended one or more of the nine two-hour Earth Science workshops offered at the conference. All workshops featured hands-on activities linked to the Saskatchewan curriculum, and teachers received a resource package that included posters, maps, rock samples, and a binder with activities and background information. Partners from industry, government, school divisions, universities, professional associations, EdGEO (www.edgeo.org) and *PDAC Mining Matters* were instrumental to the success of this workshop.

Geological Conferences

Geological conferences have tremendous potential to reach a broad audience because they bring together industry, government and university expertise and a wide range of exhibitors. The three most common outreach events at these conferences are teacher workshops, public lectures and programs that utilize the exhibit area. Geological conferences also offer an opportunity to encourage more geoscientists to engage in outreach and education initiatives.

- 1) **Exhibit area:** All of the events described below utilize the exhibits floor at a conference; some focus on both students and the public, whereas others target only students.
 - i. The *Mining in Society Show* (www.mininginsociety.com) is an educational and interactive show themed around the mineral exploration and mining industries. Its mandate is to help the general public and students to appreciate and understand the mineral exploration and mining industries, their benefits to society, and the career opportunities they offer. Since 2005, the Canadian Institute of Mining, Metallurgy and Petroleum has hosted the *Mining in Society Show* concurrently with their annual conference and exhibition. *PDAC Mining Matters* delivers hands-on learning activities that complement the show's pavilion themes, which include exploration, mining, processing, sustainability, products and fabrication, education, and new frontiers. Exhibitors engage visitors with displays and

demonstrations. Visitors are also encouraged to complete the *Amazing Mine Challenge*, an information scavenger hunt.

- ii. During the *Mineral Exploration Roundup*, western Canada's major mineral exploration conference, the *Mineral Resources Education Program of BC* (MREPBC) (www.bcminerals.ca) works with conference hosts, the *Association for Mineral Exploration BC* (AME BC), to integrate teachers and students into this event. Over three days, the MREPBC offers learning experiences for junior, intermediate and senior students as well as professional development for teachers. Young learners experience a fun, hands-on mini-conference delivered by dozens of volunteers at *Roundup* that include: an exploration geologist presentation, a *Stump the Geologist* station, examining superb rock, mineral and fossil collections, panning for gold with *Yukon Dan*, and a guided *Treasure Hunt* through the exhibits. Senior students explore the mineral exploration industry with a focus on the array of career opportunities available. Student guests also present their own geology projects to convention delegates.
- iii. At the *PDAC International Convention and Trade Show*, *PDAC Mining Matters* introduces teachers and over 150 students to the world of mineral exploration, enhancing their knowledge of both Earth Science and the modern resource industry. Participating as *PDAC Mining Matters'* special guests, teachers receive extensive curriculum-linked classroom resources and learn from engaging speakers involved in the mineral exploration industry. Students participate in hands-on workshops about geoscience. Teachers and students also have the rare opportunity to tour the trade show floor to experience the modern technology being applied to the discovery of mineral resources, explore the wealth of career opportunities available, and learn about the industry's social responsibilities to the environment and communities.
- iv. The *Kids in Science Program* (KISP) has become an annual event at the joint CSPG/CSEG convention in Calgary. In 2009, 170 Grade 8 and 9 students, accompanied by 29 volunteer guides, visited 25 booths on the exhibit floor. Each exhibitor provided a short presentation and helped the kids answer questions on their worksheets. Following the tour of the exhibits, students were treated to lunch and a fun game of "Geo-Pardy" which tested their knowledge of Earth Science. An important component of KISP happens before the convention when volunteers present informal, interactive presentations in the students' schools. Popular activities in 2009 included Burgess Shale fossils and an interactive "seismograph".
- v. The Geological Survey of Canada – Québec has conducted historical and geological field trips for teachers in Old Québec during major geoscience conferences held in Québec City, including New England Intercollegiate Geological Conference (2008); GAC-MAC-SEG-SGA conference (2008); and the 8th International Symposium on Applied Isotope Geochemistry (2009). The GSC – Québec was also present as an exhibitor at these conferences to promote the education resources of the department.
- vi. The Québec Department of Natural Resources (MRNFQ) has included an Open House component for teachers and the general public within its annual conference. The MRNFQ, Laval University, GSC and AEMQ are involved in the organizing committee.
- vii. *Earth Science for Society* (ESfS) at GeoCanada 2010: This event is modelled after the *Mining in Society* and KISP programs described above. ESfS will feature

hands-on, interactive exhibits that show the role that the Earth Sciences play in today's world. The target audience is 2,000 junior high school students plus other youth groups, the general public, the media, and conference delegates (www.geocanada2010.ca/index.php?page=earth-science-for-society).

- 2) **Teacher workshops and public lectures:** Teacher workshops and public lectures have been associated with GAC/MAC conferences for several years, including the upcoming GeoCanada 2010 and those held in the last five years.
- i. The conference in Halifax in 2005 featured a workshop attended by 20 teachers, and a public address by Dr. A. Lalonde entitled "Close Encounters with Minerals".
 - ii. In Montreal in 2006, 32 teachers participated in a workshop and field trip that focused on the geology of the Quebec Appalachians.
 - iii. GAC/MAC moved "north of 60" for the first time in 2007 when Yellowknife hosted the conference. A very successful Outreach session, *Geoscience Skills for Canadian Communities*, which included talks by elementary and secondary teachers, was followed by a workshop and field trip that were attended by more than thirty geoscientists and educators (Nowlan and Schreiner, 2007).
 - iv. In 2008 in Quebec City, gold was the focus of the public lecture delivered by Dr. A. Lalonde: "Une histoire en or: de la prospection a la haute technology".
 - v. GAC and MAC partnered with AGU in 2009 to host the Joint Assembly in Toronto. About 35 educators and geoscientists from Canada and the United States participated in a workshop held at the University of Toronto, and in a field trip to the Royal Ontario Museum.
 - vi. GEOCANADA 2010 will offer the first-ever workshop for high school teachers that will focus on integrating Earth Science content into Biology, Chemistry, Physics and Mathematics curricula. A field trip for teachers and geoscientists to the Royal Tyrrell Museum is also planned (<http://www.geocanada2010.ca/geocanada/teacher-workshop-and-field-trip.html>).

The Importance of Outreach

The primary reason that the majority of the initiatives described here are focused on teachers and their K-12 students is recognition that young people, as the future custodians of our Earth, will require Earth Science knowledge and an understanding of the importance of Earth resources in their everyday lives if they are to make wise decisions regarding the environment, resource development and mitigation of natural hazards. In addition, industry, government, universities and professional associations recognize the need to encourage students to pursue careers in Earth Science. It is imperative that geoscientists continue to be active in Earth Science outreach and education.

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