

# Earth Hazards Consortium: a unique approach to student-centered learning

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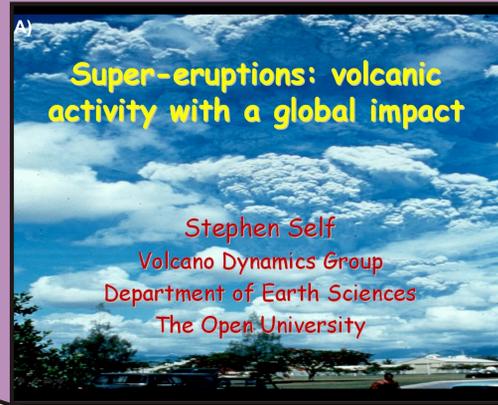
1) Universidad de Colima, Observatorio Vulcanológico, Colima, México; 2) Department of Geological and Mining Engineering and Sciences, Michigan Technological University, USA; 3) Universidad Nacional Autónoma de México, Departamento de Vulcanología, Instituto de Geofísica, Ciudad Universitaria, Mexico City, Mexico; 4) Earth and Planetary Sciences, McGill University, Montréal, Canada

The Earth Hazards (EHaz) consortium consists of six research-based universities in the United States (Michigan Technological University, University at Buffalo), Canada (McGill University, Simon Fraser University) and Mexico (Universidad Nacional Autónoma de México, Universidad de Colima) funded by the U.S. Department of Education, Human Resources and Skills Development Canada, and the Secretaria de Educación Pública of Mexico, as part of the North American Free Trade Agreement. The objective of the consortium is to expose students to a wide variety of scientific and cultural perspectives in the mitigation of geological natural hazards in North America. This four year program is multi-faceted, including student exchanges (Figure 1), graduate level courses in volcanology (Figure 2 and Figure 2.1), and intensive group field trips (Figure 3). The focus for 2006 was Supervolcanoes and large silicic eruptions. The course and field trip foci for the next two years are: Volcanic Edifice Failure/Cascades and Western Canada (2007) and Convergent Plate Boundary Volcanism/Mexican Volcanic Belt (2008). **We are accepting applications for 2007. For more information: <http://www.geo.mtu.edu/EHaz/index.htm>**

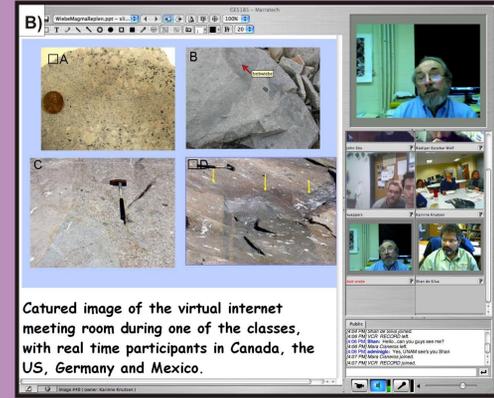
## Figure 2) Supervolcanoes - a multi-University course

Taking advantage of modern web technology, the class was taught through virtual meeting sessions. Each participating group communicated through a video-microphone-speakers set, over the internet, in real time. Weekly, one speaker from a pool of world-renown experts in the different aspects of volcanology, would participate in an online discussion with the class. To maximize the discussion time, an article, selected by the guest speaker and supporting PowerPoint presentation, was available to the class the week prior. The interactive style, allowing both lecturers and students to upload electronic format documents (e. g. PowerPoint presentations, to write or draw on the electronic whiteboard and post figures and pictures, greatly enhanced the communication capacity between lecturers and students, improving the teaching learning experience (Figure A). The approach of having web based lectures facilitated a select but wide range of world expert's scientists to give the lectures, and a diverse and geographically dispersed group of students to attend these lectures. This class would have been much more difficult and costly to organize if taught in a single place, bringing both lecturers and students together (Figure B).

A) Powerpoint presentation, Super-eruptions: volcanic activity with a global impact, presented by Dr. Stephen Self.



B) Virtual discussion lead by Dr. Robert Weibe. Dr. Weibe is showing the class rock textures in real. Note the class includes participants from Germany, as well as Canada, the United States and Mexico.

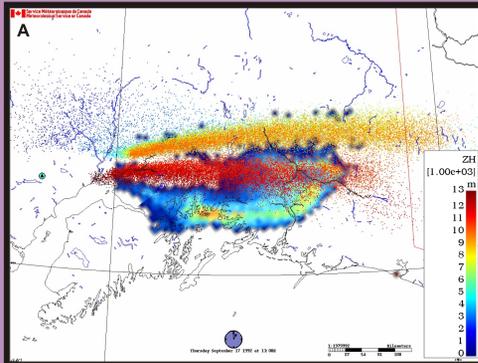


Captured image of the virtual internet meeting room during one of the classes, with real time participants in Canada, the US, Germany and Mexico.

## Figure 1) Student exchange

These exchanges promote interdisciplinary collaboration, study and research, and improve intercultural understanding; an essential preparation as the forefront of scientific discovery evolves towards the interface between specific disciplines.

For Winter semester 2006, Adam Durant (MTU) joined the Earth and Planetary Sciences Department at McGill University, Montreal, Canada. During his exchange, Adam completed a course on Weather Radars and Satellites in the Atmospheric and Oceanic Sciences department, and worked with scientists at the Canadian Meteorological Centre using a newly-developed model and interface to investigate volcanic cloud dispersal.



A) Volcanic ash dispersal model output superimposed on a satellite retrieval of the September 1992 spurr cloud.



B) Stephanie Palmer (McGill) joined the volcanology group at UNAM for the summer of 2006. Stephanie is at the Michoacan Guanajuato Volcanic field with Isaac Abimelec Farraz from the Instituto de Vulcanologia at UNAM. They are using the LI-COR (an infrared CO<sub>2</sub> analyzer with an accumulation chamber) to measure flux of CO<sub>2</sub> from the soil around the volcanic field.

Mexican Student exchange here!

"Las lecturas asignadas durante el curso fueron un acierto, debido a que se procuró involucrar investigación de gran actualidad, y el hecho de poder discutirlos con los autores principales, enriquece el interés por adentrarse en esos temas" Javier Agustin F. (UNAM student).

## Figure 2.1) Curso Internacional de Capacitación en Cartografía de Amenazas o Peligros Volcánicos

This course, held in Mexico City, October 2005, aimed to train people in hazard map development. Distinguished lecturers from Mexico, the United States, Costa Rica, Argentina and Chile, explained the various techniques used for the construction of hazard maps, including volcanic process modeling (e. g. ash fall, pyroclastic flows, lahars, etc.) using computer programs, the gathering and input of the information retrieved in the field and the building of the models. Through the EHaz program, 8 students from Michigan Technological University were supported to participate in the course and share experiences with the other participants.

A) As part of the mapping course students when on an excursion to Popocatepetel volcano, October 2005



B) Participants modeling volcanic hazards during the course.



## Student Objectives

- 1) Interaction with cutting edge scientists
- 2) Gain hands-on field experience
- 3) Gain cultural perspectives
- 4) Learn a new language
- 5) Develop skills to work in diverse groups

## Figure 3) Field Trip

June 2006: Yellowstone and Long Valley super-volcanoes, western USA.

During two weeks in early June 2006, 18 students from 4 participating universities (McGill, Michigan Tech, UNAM, Colima) spent 5 to 6 days at Yellowstone caldera and 2 to 6 days at the Long Valley caldera, visiting key localities in regard to volcanic processes and their implication for future volcanism. The field trip leaders (Guillaume Girard, PhD student at McGill, for Yellowstone, and John Stix for Long Valley) picked localities that broached issues discussed in the video conferencing course, thus trying to link the theoretical with the field.

A) Field trip participants, bothering a 300 year-old obsidian block from the Inyo Craters, Long Valley; B) Penelope Burniaux and Crystal Mann examining pyroclastic deposits, Long Valley Caldera.



## Student quote

### The Future

For 2007 the course and field trip focus is: Volcanic Edifice Failure/Cascades and Western Canada (2007) The video conferencing classes begin in Jan 2007 and the field trip. will take place 6 to 19 August 2007. Guest speakers this year include XXXXXXXXXXXXXXXXXXXXX.

In 2008 the course and field trip focus is Convergent Plate Boundary Volcanism/Mexican Volcanic Belt.

### Acknowledgements

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