

CMPT 733 Big Data Programming – Final Project

Call for Proposal

Title of the Proposal: A prototype Canadian Natural Hazards Database

Description:

The challenge is to develop a prototype online, open access, Canadian Natural Hazards geospatial database for eventual use by both the scientific community (academic and government), industry and the public.

The database should be able to integrate diverse static and dynamic data sources (e.g., spatial and temporal), provide a central repository of baseline data and be able to receive high-frequency time-series (e.g., environmental, video, seismic, etc.) data. Critically, the database will facilitate access, exchange and interrogation (in part via a web GIS interface) of disparate data from local and cloud-based repositories. The final product will act as an archive to preserve research data and be operational for regular monitoring or in the event of a distinct natural hazard crisis.

Initially, the focus will be on volcanic and landslide hazards in Western Canada, however, the database should be sufficiently flexible to allow for expansion to other natural hazard data sets (e.g., flooding, snow avalanches, etc.).

Datasets

A database schema/structure has already been developed by WOVOdat (www.wovodat.org/doc/) to facilitate international collaboration amongst Volcano observatories; this could be built upon and optimized for the Canadian context and other hazards. Ideally, the volcano-related data should be exportable to the WOVOdat initiative. Basic data (e.g., location, eruptive history, composition) for Canadian volcanoes is available.

Given the geographical restrictions of the Canada, many of the primary data sets will come from remote sensing platforms. Existing data (both digital and hard copy) can be collected from government (e.g., www.nrcan.gc.ca/hazards/resources/data/10663, www.nrcan.gc.ca/hazards/resources/tools-applications), university and commercial sources with new data (some in near real time) eventually submitted online by collaborating government, scientific and citizen scientists. Some data would be sourced from organizations with a global coverage (e.g., www.emdat.be, www.ngdc.noaa.gov/hazard/, modis.higp.hawaii.edu, earthdata.nasa.gov, earthref.org, www.icsu-wds.org). For this project, Google Earth Engine would be an interesting resource to investigate.

Contact person:

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Your Profile or/and Your Organization's Profile:

Glyn has been in the Department of Earth Sciences since 2003 and is co-Director of the Centre for Natural Hazards Research (www.sfu.ca/cnhr). Since 2012, he has also acted as Volcanic Situations Duty Officer, for the Canadian Hazards Information Service, Natural Resources Canada.

Glyn is a physical volcanologist whose multidisciplinary research involves geochemical and geophysical modelling in conjunction with remote sensing to investigate the processes responsible for triggering volcanic eruptions as well those controlling persistently active volcanism. The principal focus of this research is the investigation of the interaction between the intruding magma and that already residing in the reservoir along with their precursory signals.