

GEOL 1410 Natural Disasters and Global Change

INSTRUCTOR:

William M. Last (office: 228 Wallace Building; office hours: 12:30-1:30 M, W, F or by appointment; Office telephone: (204) 474-8361; Fax: 7623; Email: WM_Last@Umanitoba.ca)

LECTURES:

Monday, Wednesday, Friday: 1:30 pm in Room 217 Wallace Building (note: this course is also offered **online** via University of Manitoba Continuing Education).

Course Content/Description:

Discuss how and when natural disasters occur, how to identify and recognize them, and explore the Earth processes that lead to natural disasters and global change. All students are welcome; a science background is unnecessary. Not to be held with the former GEOL 1360 (007.136).

Outline:

- *Week 1:* Hazards, Disasters & Catastrophes and the Geologic Cycle
- *Weeks 2 & 3:* The Shaking Earth: Earthquake processes, hazards, perception, prediction & mitigation.
- *Weeks 4 & 5:* The Explosive Earth: Volcanic processes, hazards, prediction & mitigation.
- *Weeks 6 & 7:* Water, water, water everywhere; and not a drop to drink: Floods & flood hazards; riverine processes, flood analysis, prediction, mitigation.
- *Week 8:* Slipping and sliding: Mass wasting, mass movements & landslides, causes, & prevention.
- *Weeks 9:* Sinking, soluble & swelling ground: Subsidence & karst hazards; swelling soils.
- *Weeks 10:* When water meets land: Coastal hazards; coastal processes; minimizing effects of coastal hazards.
- *Week 11:* Impacts from space.
- *Weeks 12 & 13:* Global change: a major paradigm shift in the geological sciences; major processes and geological history of changes; important linkages with geological hazards and disasters.

Textbook: Keller, E. A., and Blodgett, R. H., 2006. Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, Pearson PrenticeHall, 395 pp.

Grading: Final Examination: 40%
Mid-Term Test: 30%
Two 'mini-projects': 30%

The course is designed to fulfill the University's 'written English' (W) requirement through the submission and evaluation of written work.

Mini-Project ONE (15%)

Objectives and Format

The objectives of this mini-project are to research the particular hazard/disaster topic you choose based mainly on existing library and web-based resources and to compose a reasonably complete written review/summary of the topic. The topics from which you can choose are listed below. Your review/summary should be well organized, well referenced with a complete list of source materials, and about 5-6 pages long (typed, double spaced). Take care to proofread your paper in order to correct any faulty grammar and punctuation. Marking will be based on scientific merit/content, style, and organization.

Due Date: At the START of class, February Y, 200X

Topics (choose either 1 or 2)

1. The 1991 eruption of Mt. Pinatubo in the Philippines. This large eruption had a severe impact both locally and to some extent globally. The following aspects of this hazard event should be covered:
 - (i) What was the principal type of eruption and what kind(s) of deposits were formed?
 - (ii) What were the precursor activities/events?
 - (iii) What were the main impacts on local communities at the time of the eruption? Subdivide your discussion into 'primary' and 'secondary' impacts.
 - (iv) What was the geographic extent of the impacts? How does this compare to the Winnipeg/southern Manitoba/western Canada areas?
 - (v) How does the 1991 Pinatubo eruption compare in size and potential effect with Cascades eruptions (e.g., the 1980 Mt. St. Helens, or the 8800 yrs. B.P. Mazama eruptions)?
 - (vi) What is the situation in the vicinity of Pinatubo today? Are there continuing effects that persist to the present and what is the outlook for the future?
 - (vii) What was done 'immediately' and in the longer-term to lessen the impact of the 1991 Pinatubo eruption? How effective were these measures in terms of saving lives and/or property? In retrospect, what else could have been done to minimize effects?

2. Describe a particular volcanic event from the list in Table 3.2 of your textbook. Do NOT pick the 1991 Mount Pinatubo, Philippines eruption (see #1 above) and discuss the following:
 - Introduction and location (supply a map!)
 - Plate tectonic setting
 - Prior/current eruptive activity at the volcano and related nearby activity, if any
 - Predominant types of eruptions/events and potential recurrences
 - Volcanic hazards to the local region (or beyond)
 - Describe monitoring efforts and plans to mitigate volcanic hazards
 - Related web links and literature

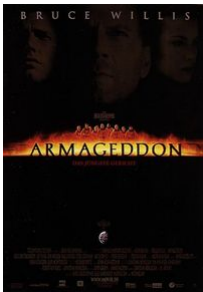
Mini-Project TWO (15%)

Objectives and Format

The objectives of this mini-project are to watch a 'popular' Hollywood-style feature movie that deals with the topic of natural disasters/hazards and write a review/summary of the scientific merit of the movie. The movies from which you can choose are listed below, or feel free to find your own that is not on the list. However, if you do choose a movie that is not on the list, please check with me BEFORE you start your project. Your review/summary should be well organized and devoted mainly to the quality of the science, the validity of presentation of the hazard/disaster, and the feasibility of the repercussions illustrated/suggested in the movie. You may also want to comment on any special effects (or lack thereof). Your mini-project should be about 5-6 pages long (typed, double-spaced). Take care to proofread your paper in order to correct any faulty grammar and punctuation. Marking will be based on scientific merit/content, style, and organization. The following points may help you compose an organized and complete review:

- Note the geological significance, interesting geological features on location, a geological topic or subplots you notice in the film.
- There are movie official pages on the web, which often provide details about filming locations and situations.
- Note any geological (or in the case of Krakatoa, East of Java, geographical) or scientific errors you observe, or which have been observed by others (always give proper credit)
- Cite all internet URLs or print sources.
- Obviously, do not copy any previous reviews.

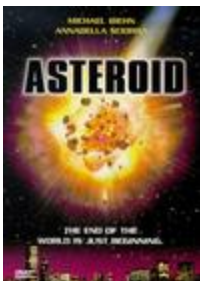
Due Date: At the START of class on the last day of lectures.



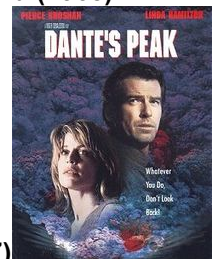
Armageddon (1998)



Crack in the World (1965)

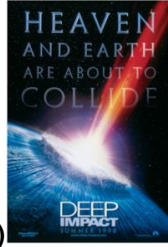


Asteroid (1997)



Dante's Peak (1997)

Deep Impact (1998)



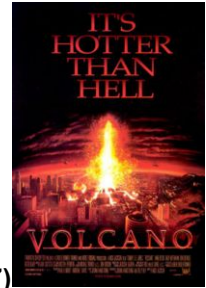
The Day After Tomorrow (2004)



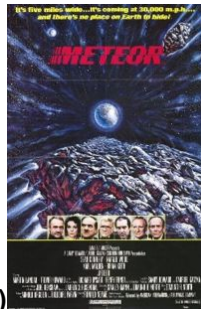
Krakatoa, E of Java (1969)



Volcano (1997)



Meteor (1979)



When Time Ran Out (1980)



The Core (2003)

