Course Description

This seminar aims to illustrate the power and limitations of science to improve our lives through the worldview of the seismometer and other geophysical sensors. Seismology is a particular strength of the Earth Sciences department in Dornsife College at USC, and Los Angeles is the epicenter of the ~$6B average annual earthquake risk in the US.

We’ll discuss examples of specific earthquake and volcano hazards, with discoveries, denial, alarmism, and lobbying to legislators for necessary state and federal funds. Earthquake and volcano prophecies remain fodder for social media false proclamations of “breakthroughs” and conspiracies involving the deep state. Short-term earthquake prediction does not yet work, but still there is hope at the cutting edge of current research. The more general issue of clarifying contentious science, sometimes against entrenched interests, also requires addressing.

More generally, the seismometer has enabled assessment of long-term risk from earthquakes, massive recovery of oil from deep in the ground (starting in LA), fairly good prediction of volcanic eruptions, minutes of warning of incoming tsunami, arbitrated treaties to limit nuclear weapon development, submarine tracking, and even the incredible recent detection of gravity waves. We will, for example, learn about the history and usefulness of the ShakeAlert smartphone app Mayor Garcetti rolled out last year.

We will also similarly address other geophysical disasters; landslides, flooding, hurricanes, and wildfires.

The audience is those who wish to more deeply understand the enabling of scientific technology through research, activism, legislation, and enforcement of improvements.

Half the course content is lecture-style learning of the background geophysics - the science and history of earthquakes, volcanoes, tsunamis, landslides, flooding, hurricanes, wildfires, exploration for oil, and nuclear test treaty monitoring. The other half will be understanding case studies of individual disasters and actions to avert disasters in these topics.

The objective is a greater understanding and case-history knowledge of how we fight natural disasters.

Prerequisite(s): none
Co-Requisite(s): none
Concurrent Enrollment: none
Recommended Preparation: perusing the two required books would be helpful but not necessary.
Course Notes
Standard letter grades. Copies of lecture slides and assignments will be posted on Blackboard.

Technological Proficiency and Hardware/Software Required
Use of computers or smartphones to access internet-based reading material.

Required Readings and Supplementary Materials
The Big Ones by Lucy Jones
- Sold by: Random House LLC
- ASIN: B07465FXBP - Kindle
- ISBN-10: 0525434283 - Paperback

Natural Hazards and Disaster by Donald Hyndman and David Hyndman
Either the 4th or 5th edition is fine.
- Publisher: Brooks Cole; 5 edition (2016)
- ISBN-10: 1305581695
- Publisher: Cengage Learning; 5 edition (2016)
- ASIN: B019EB9TDE
- Publisher: Brooks Cole; 4 edition (2013)
- ISBN-10: 1133590810
- Publisher: Cengage Learning; 4 edition (2013)
- ASIN: B00B7JUEHW

The rest of the readings will be freely available on the web.

Description and Assessment of Assignments
What kind of work is to be done and how should it be completed, i.e. how the learning outcome will be assessed. Include any assessment and grading rubrics to be used.

There are four kinds of assignments:
1. Presentation of two 3- to 5-minute reviews of a case study in a Thursday class during the quarter.
2. Each week that a specific topic is covered, write a one-page summary and assessment of each of the case studies heard, both from the students and the professor.
3. Present a term project on a case study at the end of the quarter.
4. Hand in a written report on the presented case study at the end of the quarter.

The quizzes and final will cover mostly the science and a little of the case studies. The students will hand in summaries and commentaries on the case studies presented in
class, and do a term project, presented at the end, concentrating on the mitigation process and lessons learned from the disasters.

**Grading Breakdown**
Including the above detailed assignments, how will students be graded overall? Participation should be no more than 15%, unless justified for a higher amount. All must total 100%.

- 20% weekly case study summaries
- 15 + 20% midterm, final exam
- 10% short class PowerPoint
- 15% final report PowerPoint
- 20% written report (5% based on progress report)

**Grading Scale (Example)**
A curve will be applied, aiming for the normal grade distribution in Core courses.

**Assignment Submission Policy**
Weekly assignments will be given in class most Thursdays and posted on Blackboard. They will be due by class time the following Thursday.

**Grading Timeline**
Grades and feedback will generally be by the following Monday.

**Additional Policies**
Late assignments lose 10% of the score each week, no more than 1 missed class without notifying me ahead of time.