

# GEOL 308L Natural Hazards Lab

## Country Project

Half of your grade in Geology 308L is based on your presentation and written summary of your Country Project, specifically on how you incorporate ArcGIS into your research project. So, in GEOL 308 and GEOL 308L you will do a written report and an in-class presentation. Presentations will be the last two Wednesdays of the semester – April 26 and May 3. Your Presentation should be about 10 minutes in length (no more than 12!!). This means about 10 – 15 slides maximum. You should practice your presentation to make sure you are at 10 minutes, and that you are comfortable with the material. Make graphics large, and void slides filled with text!

- 1) Background information about your country (2 points)
  - Location
  - Demographics - population, poverty, life expectancy etc., cities
  - Political situation – how does it impact your country's ability to handle natural disasters?
  - economy - industry & agriculture
  - Type of building construction
- 2) Hazards overview (5 points + 1 point for incorporating your ArcMaps)
  - geologic (plate tectonic) setting
  - Vulnerability, planning, and response.
  - Seismic Hazards (GIS maps of seismicity)
  - Tsunami Hazards (GIS map of historic tsunamigenic earthquakes, if any)
  - Volcanic Hazards (GIS map of volcanoes, if any)
  - Weather-related hazards (if any). Know what the impact of recent strong El Niños were.
  - Summary of Risk (what hazards your country is exposed to and which are the most problematic in terms of frequency and/or potential exposure, where are populations centers located relative to hazards).
- 3) One or two significant historic natural disasters that have impacted your region/country (2 points)
  - Where and when the event occurred.
  - What happened?
  - What were the short and long term impacts?
  - Was the event unique or is it likely to occur again in the future?
  - What has been done (if anything) to reduce the impact of future similar events?
- 4) Mitigation (3 points)
  - How does your country deal with its natural hazards?
  - What mitigation efforts have been institutionalized?
  - What are barriers to mitigation?
  - What do you think could be done in your region/country to improve mitigation efforts?
- 5) Similarities and differences between your region/country and the west coast of the US in terms of risk and mitigation issues. (1 point)
  - Overall quality of presentation – clear, within time limits, slides readable, referenced your figures (3 points)
  - One page summary and reference list (3 points) See attached example

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#### The Kuril Islands: A summary of a Power Point Presentation (2003)

The Kuril Islands are a volcanic island arc chain located in the northwest Pacific offshore of the Eurasian continent. The 56 islands stretch 750 miles from the Kamchatka peninsula to the northern islands of Japan. They are held by the Russian Federation as a provincial territory administered as part of the Sakhalin Oblast (administrative district). The total population is around 20,000 people with the most major towns located on the islands of Iturup and Shikotan in the south and Paramushir in the north. Formed by the subduction of the Pacific tectonic plate below an arm of the North American Plate, the area is dominated by all of the hazards associated with a convergent margin of this type. These hazards include frequent moderate and occasional major earthquakes, numerous volcanoes (many active), and a serious tsunami hazard. The area is also prone to fairly severe weather conditions.

Moderate to large earthquakes are relatively common in the region, with several very large quakes occurring in the last few decades. Many of these larger "subduction" type earthquakes generate tsunamis of varying size. Tsunami run-ups have been reported to reach as high as 15 meters (1974). A very recent tsunami in 1994 had a run-up of 5-7 meters and caused 11 fatalities following a very large quake. Historically, the largest tsunami ever recorded was in 1737 and had a reported run-up of 64 meters. Formed as a part of the subduction zone, the numerous volcanoes in the Kurils pose a significant hazard to the local populations. Over 100 volcanoes are found in the region, at least 35 of which are still considered active. Volcanic hazards posed here include landslides, falling volcanic debris and volcanically generated tsunamis.

Weather in the region is quite harsh, with the islands receiving 30-40" of precipitation annually. Winters are long, cold and snowy while summers are cool wet and very foggy. Heavy seas and winter storms are common, but in general do not pose a significant hazard to the population as they are well prepared for such a common hazard.

The most recent significant disaster to strike the Kurils occurred with the October 4th, 1994 earthquake. The magnitude 8.1 Ms quake caused significant damage to the population on Shikotan Island, with strong ground shaking, surface rupture and ground failure damaging many structures. A significant tsunami was generated causing damage on Shikotan, Iturup and Kunashir, with numerous bridges and buildings swept away by the 5-7 meter run-up. The entire island of Shikotan subsided 60cm during the event.

In summary the population of the Kurils is subject to a very high risk of earthquakes and tsunamis, with a significant but infrequent risk from volcanic activity. Severe weather is a common but well understood risk. Mitigation efforts in the Kurils primarily center on computer modeling of potential tsunami run-ups. With such a broad territory and a relatively small and diffuse population, there is little interest or money available from the Russian government for mitigation efforts.

The Kuril Islands share some similarities with the Pacific North West of the United States. It is located in a subduction zone setting and has risks due to large earthquakes, tsunamis, and volcanic eruptions. The climate regime is different – it is much less at risk of flooding events and more at risk of extreme cold. Russia uses the same tsunami hazard assessment as the United States but relies on US institutions for volcanic monitoring. The Kuril Islands have even more extreme issues with remoteness than California's North Coast and the primary mitigation efforts applied locally are the result of centuries of cultural adaptation to the climate and the hazards of its geologic setting.

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#### References:

##### Photos from:

The IKIP homepage- <http://artedi.fish.washington.edu/ikip/home.html>  
Webshots Photos- <http://www.webshots.com/>  
NGDC Photo Library [http://ngdc.noaa.gov/products/ngdc\\_slides.html](http://ngdc.noaa.gov/products/ngdc_slides.html)  
Volcano World- <http://volcano.und.nodak.edu/>

##### Maps from:

Theodora World Maps- <http://www.theodora.com>  
National Geographic Maps- <http://www.nationalgeographic.com/mapmachine/>

##### ArcView Map Data from:

NGDC Hazards Database- [http://ngdc.noaa.gov/seg/hazard/vol\\_srch.shtml](http://ngdc.noaa.gov/seg/hazard/vol_srch.shtml)  
UC Berkeley Seismo Lab <http://quake.geo.berkeley.edu/cnss/catalog-search.html>

##### General Info from:

Encarta Online Encyclopedia <http://encarta.msn.com/>  
Britannica.com <http://www.britannica.com>

##### Hazards Reports and News from:

Natural Hazards Center <http://www.colorado.edu/IBS/hazards/>