GEOL 308 Natural Hazards
Activity 2: Weather and Flooding

- DUE Tuesday February 7
- Note: You will need to complete Part I by February 3!

Part I: Weather

Visit http://www.weather.gov

This is the National Weather Service site. It includes a quick overview of national weather conditions and links to regional weather forecast offices.

A smaller regional box should come up showing the current conditions in the area. If there are any watches, warnings, or advisories in place, they will show up with a colored legend to the right of the map. The image to the right shows the conditions in Maine on January 24. At the time I took this screen shot, there were eight alerts in effect – a Winter Storm Warning, Storm Warning, Gale Warning, Winter Weather Advisory, Coastal Flood Advisory, Wind Advisory, Coastal Flood Statement, and Hazardous Weather Outlook. The alerts are always listed with the most serious or severe at the top.

**Question 1:** Of the four conditions included (Warning, Advisory, Watch, Outlook), which is the least imminent (furthest out in time)?

Now click on the region that includes where you were born. Note – if you were not born in the U.S., choose the Eureka – Arcata area.

*Questions: Note the date that you looked at this site:

**Question 2:** What is the first item listed in this table? If nothing is listed, click the Zoom Out box. Give the name of the Alert.

**Question 3:** What does this alert level mean (hint – the glossary on the home page may help you)? What area is affected?

Visit the Eureka NWS Home Page http://www.wrh.noaa.gov/eka/ and pull down the “Forecast by city” menu above the map. Select Arcata. This will bring up the forecasts for Arcata for the next week. Look at the Forecast for Saturday, February 4. Note – you must look at this by February 3! You don’t need to turn anything in by then, but make sure you write down the answers to the questions below on the answer sheet before then.

**Question 4:** What is the forecast for February 4?

**Question 5:** What is the likely high temperature?

**Question 6:** What is the chance of rain Saturday evening?
GEOL 308 Natural Hazards
Activity 2: Weather and Flooding

To get a bigger picture of the weather in the western US, look at the NWS weather loops or infrared imagery:

- http://www.cnrfc.noaa.gov/satellite/epac_wv_loop.php
- http://www.cnrfc.noaa.gov/satellite/epac_enhanced_ir_loop.php

**Question 7:** In what direction do the storm systems appear to rotate?

**Question 8:** Why is the storm moving in this way (you may want to look at your text)?

**Part II: Storms, hurricanes and extreme weather in your country.**

Visit http://www.emdat.be/country-profile

This is the same page we visited for activity 01 to determine the worst historic disasters in terms of lives lost, numbers affected, and economic losses. This time we will look at specific weather disaster types. Put in the name of your country and scroll down the page to the table titled “Summarized Table of Natural Disasters in Your countryname from 1900 to 2016” below the three summary tables. Weather events include: drought, extreme temperature (hot or cold), flood, storm, and landslide.

**Question 9:** What type of weather event has been the most frequent in your country? Note the number. You will need to total up the number of events in the subsets. For example, extreme weather includes Cold Wave, Heat Wave and Severe Winter Conditions.

**Question 10:** Find out one way in which your country tries to manage this type of disaster. It will take some sleuthing on your part. Try googling “yourcountry name” “disaster type” disaster management. For example, when I search France flood disaster management, I come up with a number of links to European and French flood prevention and response efforts. List the management idea, the agency responsible, and the web site.

**III: Floods**

- Visit http://cdec.water.ca.gov/guidance_plots/
- This webpage provides information for emergency managers and the public on potential flood hazards in California. Select the Klamath River near Klamath (KNK) station. See attached sheet on how to read hydrographs.

*Questions: Note the date that you looked at this site:

**Question 11:** What is the largest stage actually recorded in the past 5 days?

**Question 12:** What is the largest stage expected in the next 5 days?

**Question 13:** What is the lag between peak rainfall and peak stage (estimate to the nearest quarter day)?

- Visit the previous page and select the Mad River near Arcata (ARC) station.

**Question 14:** What is the largest stage expected in the next 5 days?

**Question 15:** What is the lag between peak rainfall and peak stage (estimate to the nearest quarter day)?
GEOL 308 Natural Hazards
Activity 2: Weather and Flooding

Question 16: What accounts for the difference between the Mad River and the Klamath?

- Now look at the historic flood history of the Klamath River as measured at the KNK Klamath station. Visit http://waterdata.usgs.gov/nwis/nwisman/?site_no=11530500 and select the Peak streamflow link.

Question 17: How many flood events have exceeded 400,000 cfs on the Klamath River? What was the size and year of the largest flood event? (click on the “Table” link if you have a hard time reading the year)

PART IV: El Niño and La Niña

- El Niño and La Niña are shorter climate variations that fluctuate on a scale of years. We are always typically in one or the other. Most El Niños and La Niñas are mild and don’t cause many unusual effects but every few decades, these perturbations can be particularly strong and cause global impacts.
- Visit http://www.pmel.noaa.gov/elnino/
- This is NOAA’s forecast page for El Niño and La Niña conditions. Click the “El Niño Today” button. Scroll down to the Comparison with Previous El Niños and La Niñas section. Click on the “Compare current & historical events with the Oceanic Niño Index (ONI).”

Question 18: What do red areas on the graph represent? When were the two strongest El Niños of the past 60 years?

- Return to the “El Niño Today” page and below the ONI link, click on the “El Niño strength index” link.
- Look at the top graph. You can click on it to enlarge the graph. The Multivariate ENSO Index (MEI) includes a number of variables measured near the equatorial Pacific – temperature, pressure, cloudiness, and wind speed - and represents the results in terms of standard deviation from “normal” – the long term average properties.

Question 19: What is the current ENSO status – El Niño, La Niña, nearly normal (less than ± 1 deviation)?

- This shows NOAAs predictions for Jun – Aug 2017.

Question 20: What conditions are likely to occur in the Eureka, Seattle, or Anchorage areas in this time period? Will they by wetter or dryer than normal? Will they be warmer or colder than normal?
GEOL 308 Natural Hazards
Activity 2: Weather and Flooding

- How to read hydrographs: [http://cdec.water.ca.gov/guidance_plots/](http://cdec.water.ca.gov/guidance_plots/)

Smith River at Jedediah Smith
Datum 0 = 79.26' NGVD
River Stage Definitions: Monitor stage 25.0' Flood stage 29.0'
Peak Stage of Record 48.5' on 12/22/1964

Discharge & Rain Forecast [http://cdec.water.ca.gov/guidance_plots/](http://cdec.water.ca.gov/guidance_plots/)

- Peak stage (past 5 days): 8.8' or 3,660 cfs
- Highest stage (next 5 days): 5.9' or 655 cfs

Peak Rainfall (past 5 days)
Peak Discharge (past 5 days)
Lag Time (e.g. about 1/2 day)

Annual Peak Discharge [http://nwis.waterdata.usgs.gov/usa/nwis/peak/?site_no=11532500](http://nwis.waterdata.usgs.gov/usa/nwis/peak/?site_no=11532500)

Click on link “Table” to show output data in a table format.
E.g. 12/22/1964: stage (48.50’) discharge (228 k cfs)
GEOL 308 Natural Hazards
Activity 2: Weather and Flooding

Answer Sheet
Name (last, First): _________________________________ Grade: ______

I. Weather
Date of web site visit: _________________________________

1) Which is the least imminent? (circle) warning advisory watch outlook

2) First alert bulletin: _________________________________

3) What does this alert level mean? ____________________________________________________________
________________________________________________________________________________________

What is the area affected? _________________________________________________________________

4) What is the Arcata forecast for January 28? _________________________________________________

5) What is the likely temperature? ______________ 6) What is the chance of rain? ________________

7) What best describes the storm movement? (circle) clockwise-rotation counterclockwise-rotation
linear east to west linear west to east linear north to south

8) Why is the storm moving in this way? ______________________________________________________
________________________________________________________________________________________

II. Weather disasters of your country
Name of country ____________________________________________

9) Most frequent type of weather event: ______________ Number since 1900 __________

10) Managing this type of disaster – method ______________________________________________________
Agency _____________________________ Web site _________________________________________________

III. Floods
Date of web site visit: _________________________________

11) Highest stage at KNK in past 5 days: __________________

12) Largest stage at KNK expected in the next 5 days: ______________________________

13) Lag between peak rainfall and peak stage at KNK: ______________________________

14) Largest stage at ARC expected in the next 5 days: ______________________________

15) Lag between peak rainfall and peak stage at ARC: ______________________________

16) Why are the expected stages and lags different between KNK and ARC? ___________________________
________________________________________________________________________________________
________________________________________________________________________________________

17) KNK flood events > 400,000 cfs? _________ Largest flood (cfs) __________ Year __________

18) Red areas mean __________________ Two strongest El Niños (years) __________ __________

19) Current status (circle) El Niño La Niña nearly normal

20) Expected conditions in: (circle)

<table>
<thead>
<tr>
<th>City</th>
<th>Temperature (circle)</th>
<th>Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eureka</td>
<td>warmer colder normal</td>
<td>wetter dryer normal</td>
</tr>
<tr>
<td>Seattle</td>
<td>warmer colder normal</td>
<td>wetter dryer normal</td>
</tr>
<tr>
<td>Anchorage</td>
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