

Appendix A.25

Earthquake Lesson – Non GIS Version

BALDWIN—SAN FRANCISCO'S MARINA DISTRICT



EXPLORING HUMAN RESPONSE TO NATURAL HAZARDS

Using the Internet and Real- Time Earthquake Data

Names of team members:

Learning objectives:

- 1) How many medium-to-large earthquakes occur each day?
- 2) What conclusions can you draw about earthquake patterns based on geographic data?
- 3) Where is the pattern of human settlement in relation to earthquake patterns?
- 4) What is the pattern of economic development in relation to earthquakes, and what implications does this have on the local and global economy?
- 5) At what cost (risk) does physical geography begin to impair human development or enhance human development?
- 6) What other natural disasters are associated with earthquakes?
- 7) How can the Internet assist in analyzing earthquakes and human responses?

Let's analyze data to explore the relationship between natural disasters and human responses. Why do people live where dangerous events could happen to them? Would you jeopardize your safety to live somewhere? We are going to use data from the Internet and organize the data graphically to help us draw some conclusions. Follow the directions step by step and you will make some discoveries about disasters and human responses to them.

Imagine you are coming to school. It could be August or January or May or any time in between. What are the threats you encounter in that 15 minutes each morning? List below and place a star by the ones that are caused by natural disasters:

Let's pull up some earthquake data to see what people elsewhere face each day.

First, you will download information about earthquakes from the USGS National Earthquake Information Center that have occurred over the last several days. After you have the data, you will map these earthquake epicenters as point data. Before putting the data into your GIS, you will need to edit the epicenters file.

Follow these directions closely:

- 1) Click on Netscape and find the line to put in an address for the computer to search.
- 2) Go to the USGS National Earthquake Information Center by typing in this address:

<http://wwwneic.cr.usgs.gov/neis/bulletin/bulletin.html>

- 3) Print this WWW page with all of the earthquake data. The data that you should print should look like this:

DATE- (UTC) -TIME	LAT	LON	DEP	MAG	Q	COMMENTS
97/04/21 07:38:46	35.02N	116.82W	5.0	3.4Ml	A	CENTRAL CALIFORNIA
97/04/21 09:16:20	36.97N	71.90E	155.0	4.9Mb	B	AFGHANISTAN
97/04/21 12:02:25	12.47S	166.21E	33.0	7.9Ms	B	SANTA CRUZ ISLANDS
97/04/21 12:11:28	13.11S	166.24E	33.0	6.1Mb	C	VANUATU ISLANDS
97/04/21 12:28:27	13.00S	166.00E	33.0	5.4Mb		SANTA CRUZ ISLANDS
97/04/21 12:39:11	13.00S	166.00E	33.0	5.1Mb		SANTA CRUZ ISLANDS
97/04/21 14:01:24	7.10S	125.59E	432.0	5.7Mb	C	BANDA SEA
97/04/21 15:26:14	52.47N	172.24E	33.0	4.2Mb	B	NEAR ISLANDS, ALE
97/04/21 20:35:04	13.51S	165.89E	33.0	5.3Mb	C	VANUATU ISLANDS
97/04/21 21:02:14	36.43S	96.93W	10.0	4.9Mb	B	WEST CHILE RISE
97/04/21 21:23:53	13.07S	166.19E	33.0	5.5Ms	B	VANUATU ISLANDS
97/04/21 22:41:24	49.01S	75.35W	33.0	5.0Mb	B	SOUTHERN CHILE
97/04/22 01:15:36	61.48N	150.45W	47.7	4.1Ml		SOUTHERN ALASKA

- 4) Plot the location of each epicenter on your map.

Now you are ready to analyze the data you have mapped and draw some conclusions about it.

- 5) Examine the pattern of earthquakes.

What are three noticeable characteristics of your pattern of earthquakes?

- 6) Look at the plate boundaries on your map. These are the boundaries of the crustal plates.

What is the pattern of earthquakes related to plate boundaries?

Look at the **magnitude** of earthquakes related to plate boundaries. Is there a relationship? Why or why not?

Look at the **depth** of earthquakes related to plate boundaries. Is there a relationship? Why or why not?

7) Look at cities on your map.

What is the pattern of earthquakes related to cities? Are most cities near earthquake epicenters?

8) Examine population density on your map. What is the pattern of earthquakes related to population density? What implications does this have?

9) Examine Gross National Product (GNP) by country on your map.

10) How is economic development impacted by earthquakes, and what implications does this have on the local and global economy?

11) What other natural disasters are associated with earthquakes? How does this affect your answer to question 10?

12) At what cost (risk) does physical geography begin to impair human development or enhance human development?

13) Which day witnessed the most earthquakes? Is there a pattern? Why or why not?

14) Add the following to your map: 1997 Earthquakes.

15) Repeat this entire exercise with another natural hazard. Map the hazard by plotting the locations for the new data.

16) What is the pattern of this additional hazard? in relationship to physical features on the map? Why?

17) What is the pattern of this additional hazard in relationship to cities? Why?

18) What is the pattern of this additional hazard in relationship to earthquakes? Why?

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