

Quiz navigation

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

Finish review

Started on	Tuesday, July 12, 2022, 10:55 PM
State	Finished
Completed on	Wednesday, July 13, 2022, 12:51 AM
Time taken	1 hour 55 mins
Marks	40.13/44.00
Grade	91.21 out of 100.00

Question 1

Correct

0.83 points out of 1.00

Flag question

IRIS DMC Tutorial: IRIS Earthquake Browser

In this assignment you will explore a global catalog of earthquakes using the IRIS Earthquake Browser (IEB). It is located at <https://ds.iris.edu/ieb> . This tool is meant to help you browse through a large catalog of earthquakes efficiently, so it has a number of options for limiting which earthquakes are shown in the map display. You are encouraged to play around with this interface and try looking at different earthquake sequences around the world. To help you understand how it works, you will want to review the Help page for the IEB.

What are the different earthquake parameter ranges that can be adjusted to affect what is shown in the map view?

Select one or more:

☒ a. Depth ✓ 1 of 6 correct answers

☒ b. Source catalog ✓ 1 of 6 correct answers

☐ c. Focal mechanism

☒ d. Magnitude ✓ 1 of 6 correct answers

☒ e. Date and Time ✓ 1 of 6 correct answers

☒ f. Location ✓ 1 of 6 correct answers

☒ g. Number of earthquakes ✓ 1 of 6 correct answers

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.83/1.00.

Question 2

Correct

1.00 points out of 1.00

Flag question

For this question, we simply want you to explore an area of interest using the IRIS Earthquake Browser. Zoom in and play around with the parameter ranges to learn about your area of interest. Then write a few sentences about when, where, and how big the earthquakes have been in your area of interest.

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 3

Correct

0.67 points out of 1.00

Flag question

The rest of this assignment will focus on investigating the rate of earthquakes in different parts of the world. The first region we will look at is centered on California in the Western United States. The web address for the IRIS Earthquake Browser can take earthquake parameter inputs in the link, so I will use this to steer you to a specific view of earthquakes in this area: <https://ds.iris.edu/ieb/index.html?format=text&nodata=404&starttime=1970-01-01&endtime=2019-12-31¢er=31&zoom=4&minmag=1&depth=0&minlat=-42.000&minlon=-114.100&minmag=124.600&lat=1&lon=1&zoom=4¢er>

Take a minute to click on the parameter options to review what they are set to. Which of these parameter ranges is what I have chosen for you in this region?

Select one or more:

☒ a. Maximum earthquakes is 5000 ✓ 1 of 4 correct answers

☒ b. Magnitudes from 4 to 10 ✓ 1 of 4 correct answers

☐ c. Depths from 0 to 33 km

☐ d. From Earliest Available to Latest Available

☐ e. All Magnitudes

☐ f. Maximum earthquakes is 1000

☒ g. All Depths ✓ 1 of 4 correct answers

☒ h. 50 years from 1970 to 2019 ✓ 1 of 4 correct answers

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 4

Correct

1.00 points out of 1.00

Flag question

Set the **Show plate boundaries** option to **On**. What is the main type of plate boundary featured in this region, or if there is no nearby plate boundary line, what tectonic setting is featured in this region?

Select one:

☐ a. continental collision

☐ b. hot spot volcano

☐ c. mid-ocean ridge or continental rift

☐ d. intraplate - not near a plate boundary or a hot spot volcano

☐ e. subduction zone

☒ f. transform fault ✓ Transform faults are typically characterized by a moderate amount of seismicity (more than divergent, less than convergent), with most earthquakes occurring above 33 km depth. They can occur with or without oceanic plates involved.

Check

Correct

Marks for this submission: 1.00/1.00.

Question 5

Correct

0.67 points out of 1.00

Flag question

The San Andreas Fault zone is the only major fault trace in this plot to run all the way from the northwestern end of the plot to the southeastern end of the plot. Because this is the most infamous fault in the United States, many people assume that all earthquakes in southern California occur on this fault. Using the IEB plot, which of the following statements are correct?

Select one or more:

☒ a. Many earthquakes occur off of the San Andreas Fault ✓

☐ b. Nearly all earthquakes occur on the San Andreas Fault

☐ c. Earthquakes have not occurred along the San Andreas fault over this time frame

☒ d. Earthquakes only occur on some areas of the fault ✓

☐ e. Earthquakes occur on all areas of the fault

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 6

Correct

1.00 points out of 1.00

Flag question

Note that in the middle of the menu on the right side of the screen, it indicates how many earthquakes meet the location, time, and magnitude criteria I set for this region. How many magnitude 4 and larger earthquakes occurred over the 50 year time frame I chose?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 7

Correct

1.00 points out of 1.00

Flag question

To help understand the rate of earthquakes and probability of large earthquakes in a given region, seismologists analyze the frequency-magnitude distribution. You will get a chance to do this by making a plot of the frequency-magnitude distribution for this region. To do this, you need to collect the number of earthquakes over the 50 year time frame (to estimate frequency) at several different magnitude levels. Fortunately, the IEB has a feature that can show you these values for your current parameters. Click on Earthquake Stats in the right-side menu (you might need to scroll down in this menu to see it). This feature does not show the cumulative distribution of events (number above a particular magnitude), but instead shows them divided into bins of equal magnitude ranges. What is the default bin size for the Earthquake Stats option?

Select one:

☐ a. 0.2

☐ b. 0.1

☒ c. 1 ✓

☐ d. 0.5

☐ e. 2

Check

Correct

Marks for this submission: 1.00/1.00.

Question 8

Correct

1.00 points out of 1.00

Flag question

To help make sure you are able to retrieve the number of earthquakes in each magnitude bin, I will check whether you have the correct values. How many earthquakes between magnitude 4 and 5 occurred over that 50 year time frame in this region?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 9

Correct

0.67 points out of 1.00

Flag question

Please note that the previous question asked you for the number of magnitude 4-5 earthquakes over 50 years, and now you will need to know the number of earthquakes per year. To help make sure you can make this calculation, what is the rate of magnitude 4 to 5 earthquakes per year?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 10

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 5 to 6 earthquakes per year in this region?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 11

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 6 to 7 earthquakes per year in this region?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 12

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 7 to 8 earthquakes per year in this region?

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 13

Correct

1.00 points out of 1.00

Flag question

You are going to plot these values to see the trend of the frequency for different magnitudes, in order to estimate the expected frequency (probability) of larger magnitude earthquakes. To help with this, you will make a file that has these values stored in them. Once you are logged into your OSL desktop, you should create a directory called ieb to put your files in. Remember to use `mkdir` and `cd` to create and enter the directory. Once inside this directory, which command would you use to create a new text file and type these values into it?

Select one:

☐ a. more

☐ b. mkdir

☐ c. ls

☐ d. make

☐ e. cat

☒ f. gedit ✓

Check

Correct

Marks for this submission: 1.00/1.00.

Question 14

Correct

1.00 points out of 1.00

Flag question

I would suggest you use this command from the previous question to create a file called `call.xy` and I recommend the first column be the value for the lower magnitude limit (e.g., 4 for the 4-5 magnitude bin) and the second column for the rate of earthquakes per year for that magnitude bin. In a text file like this, the columns are just separated by a space. Once you enter the data, how many lines of data will the file have in it for the California region? Note that you should only have a line for each magnitude bin with at least 1 earthquake.

Answer:

Check

Correct

Marks for this submission: 1.00/1.00.

Question 15

Correct

0.71 points out of 1.00

Flag question

Once you have entered the magnitudes and rates per year from the previous questions into the `call.xy`, I would like you to use them to make a logarithmic frequency-magnitude plot with GMT. This plot should have magnitude on the x-axis and frequency (earthquakes/year) on the y-axis. Magnitude is already in logarithmic units, but frequency is not, so we will need to tell GMT to plot the y-axis logarithmically by adding an "f" flag (lowercase L) to the frame options. You should make sure to include a border to be able to see the axes.

Up until now, we have only plotted major tick marks. For example, if we want a plot with an X-axis labeled **Depth (km)** on the bottom of our plot showing a tick every 100 units, and we would like a Y-axis labeled **Magnitude** on the left hand side of our plot with a tick every 2 units, we would use this option: `-B100:Depth (km):/2:"Magnitude".SW` (review [Q16 in Tutorial 8: GMT XY Plot for more on plotting border specifications](#)). There is also the option to plot minor tick marks as well. Minor tick marks are tick marks without a number next to them. For this, you can use `>` and `:` to denote the spacing between major and minor tick marks, respectively. For the example above, let's say we instead want the X-axis to have a major tick every 100 units but also have a minor tick every 20 units and the Y-axis to have a major tick every 2 units but also have a minor tick every 0.5 units - this is how we would set the border option: `-Ba100/20:Depth (km):/2/0.5:"Magnitude".SW`

Since we are plotting the Y-axis (Frequency) in logarithmic units, there are certain numbers to use for the ticks. Ticks must be 1, 2, or 3. Ticks will then occur at 1, 1-2-5, or 1,2,3,4,...9, respectively, for each magnitude range. For the frequency-magnitude plot in this question, we want an X-axis labeled **Magnitude** showing a major tick every 1 unit with a minor tick every 0.2 units, and we want a Y-axis labeled **Frequency of Earthquakes** with a tick every 1 unit of magnitude with a minor tick every 0.1 times powers of 10 (i.e., 1,2,3,4,...9).

Which of the following pieces of a GMT command would be needed to successfully create a plot of this file?

Select one or more:

☐ a. -O

☒ b. >1 ✓ 1 of 7 correct answers

☒ c. call.ps ✓ 1 of 7 correct answers

☐ d. -K

☒ e. gmt psxy ✓ 1 of 7 correct answers

☒ f. call.xy ✓ 1 of 7 correct answers

☐ g. -R,1/50/4/7

☐ h. plot

☒ i. -Ba10.2:"Magnitude"/a1/3:"Frequency of Earthquakes": ✓ 1 of 7 correct answers

☒ j. -R3/8/.005/500 ✓ 1 of 7 correct answers

☐ k. >>

☐ l. -JX3/8

☒ m. -JX6/6i ✓ 1 of 7 correct answers. Remember this is a lowercase L.

Check

Great! Now you should run the full command with each of these components together: `gmt psxy call.xy -R3/8/.005/500 -JX6/6i -Ba10.2:"Magnitude"/a1/3:"Frequency of Earthquakes":>1 call.ps`

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.71/1.00.

Question 16

Correct

1.00 points out of 1.00

Flag question

If you visualize projecting the trajectory of the line you plotted further on your plot, what is the expected rate of a magnitude 8 earthquake per year period?

Answer: 0.01

Check

Correct

Marks for this submission: 1.00/1.00.

Question 17

Correct

1.00 points out of 1.00

Flag question

There were no magnitude 8 earthquakes during the 50 year time period this plot analyzes. Is this consistent with the rate of magnitude 8 earthquakes per year you estimated?

Select one:

- ☒ a. Yes, the estimated rate of magnitude 8 earthquakes per year is less than 1 per 50 years
- ☐ b. No, the estimated rate of magnitude 8 earthquakes per year is equal to 1 per 50 years
- ☐ c. No, the estimated rate of magnitude 8 earthquakes per year is less than 1 per 50 years
- ☐ d. Yes, the estimated rate of magnitude 8 earthquakes per year is equal to 1 per 50 years
- ☐ e. No, the estimated rate of magnitude 8 earthquakes per year is more than 1 per 50 years
- ☐ f. Yes, the estimated rate of magnitude 8 earthquakes per year is more than 1 per 50 years

Check

Correct

Marks for this submission: 1.00/1.00.

Question 18

Correct

1.00 points out of 1.00

Flag question

The next region we will look at is centered on Mexico. The web address for the specific view of earthquakes in this area is: <https://ds.iris.edu/leib/index.html?%20starttime=1970-01-01&endtime=2019-12-31&minmag=4&maxmag=10&orderby=time-desc&src=iris&limit=20000&maxlat=23.000&minlat=12.500&maxlon=-92.500&minlon=-105.500&sb1=1&name=Mexico&mt=ter>

Take a minute to click on the parameter options to review what they are set to. Which of these parameter ranges is what I have chosen for you in this region?

Select one or more:

- ☒ a. Magnitudes from 4 to 10
- ☐ b. All Magnitudes
- ☒ c. All Depths
- ☐ d. Depths from 0 to 33 km
- ☐ e. Maximum earthquakes is 5000
- ☒ f. 50 years from 1970 to 2019
- ☒ g. Maximum earthquakes is 20000
- ☐ h. From Earliest Available to Latest Available

Check

Correct

Marks for this submission: 1.00/1.00.

Question 19

Correct

0.67 points out of 1.00

Flag question

How deep are the earthquakes in this region? Hint: You should be able to use the color coding of the earthquake circles to help you to see the depths of the earthquakes.

Select one:

- ☐ a. Over 90% of the earthquakes are shallower than 33 km
- ☒ b. Many of the earthquakes extend below 70 km, but only a few are deeper than 300 km (only a few exceptions)
- ☐ c. Many of the earthquakes extend below 500 km
- ☐ d. Many of the earthquakes extend below 33 km, but only a few are deeper than 70 km
- ☐ e. Nearly 100% of the earthquakes are shallower than 33 km (only a few exceptions)

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 20

Correct

1.00 points out of 1.00

Flag question

Set the **Show plate boundaries** option to **On**. You may need to zoom in to see the plate boundary line. What is the main type of plate boundary featured in this region, or if there is no nearby plate boundary line, what tectonic setting is featured in this region?

Select one:

- ☐ a. mid-ocean ridge or continental rift
- ☐ b. hot spot volcano
- ☐ c. intraplate - not near a plate boundary or a hot spot volcano
- ☐ d. transform fault
- ☐ e. continental collision
- ☒ f. subduction zone

Subduction zones are typically characterized by a large amount of seismicity and dipping plane of seismicity that goes several hundred kilometers below the surface. An oceanic plate would be involved.

Check

Correct

Marks for this submission: 1.00/1.00.

Question 21

Correct

0.33 points out of 1.00

Flag question

Mexico City is the 5th most populous city in the world and has had extensive damage from earthquakes over the past few decades. Part of the reason for this is that it is built on an ancient lake bed with heavily saturated clay that can amplify ground shaking and increase liquefaction during earthquakes. To better understand where the earthquakes are that cause damage in Mexico City, use the magnitude range to limit earthquakes to 7 and larger. Be sure to click the Apply button. Where do these earthquakes occur?

Select one or more:

- ☐ a. Within Mexico City
- ☒ b. At the coastline
- ☐ c. At the trench
- ☒ d. More than 100 km inland

Check

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.33/1.00.

Question 22

Correct

1.00 points out of 1.00

Flag question

Click on the magnitude 7 and larger earthquake closest to Mexico City. This brings up a table of earthquakes in the current view listed in order of distance from the event you clicked on. Note the day the closest earthquake occurred on and use this to do a web search about this earthquake. Where did this earthquake occur tectonically?

Select one:

- ☐ a. Along the megathrust plate boundary
- ☐ b. Within the continental plate
- ☒ c. Within the subducting plate
- ☐ d. On a transform fault dividing the coastal region from the inland region
- ☐ e. At a volcano due to subduction

Check

Correct

Marks for this submission: 1.00/1.00.

Question 23

Correct

1.00 points out of 1.00

Flag question

Now use the magnitude range to limit earthquakes to 4 and larger. Be sure to click the Apply button. Next you should click on the Earthquake Stats and calculate the earthquakes per year for each of the magnitude bins. What is the rate of magnitude 4 to 5 earthquakes per year?

Answer: 519.8

Check

Correct

Marks for this submission: 1.00/1.00.

Question 24

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 5 to 6 earthquakes per year in this region?

Answer: 17.8

Check

Correct

Marks for this submission: 1.00/1.00.

Question 25

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 6 to 7 earthquakes per year in this region?

Answer: 1.6

Check

Correct

Marks for this submission: 1.00/1.00.

Question 26

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 7 to 8 earthquakes per year in this region?

Answer: 0.32

Check

Correct

Marks for this submission: 1.00/1.00.

Question 27

Correct

1.00 points out of 1.00

Flag question

What is the rate of magnitude 8 to 9 earthquakes per year in this region?

Answer: 0.04

Check

Correct

Marks for this submission: 1.00/1.00.

Question 28

Correct

1.00 points out of 1.00

Flag question

How does this value compare to the expected rate of magnitude 8 to 9 earthquakes per year in California?

Select one:

- ☐ a. The Mexico region has the same number of earthquakes as the California region.
- ☐ b. The California region has 4 times as many earthquakes as the Mexico region.
- ☐ c. The Mexico region has 4 times as many earthquakes as the California region.
- ☐ d. The California region has 2 times as many earthquakes as the Mexico region.
- ☒ e. The Mexico region has 4 times as many earthquakes as the California region.

Check

Correct

Marks for this submission: 1.00/1.00.

Question 29

Correct

0.75 points out of 1.00

Flag question

The next region we will look at is centered on Hawaii. The web address for the specific view of earthquakes in this area is: <https://ds.iris.edu/leib/index.html?format=text&nodata=404&starttime=1970-01-01&endtime=2019-12-31&minmag=3&maxmag=10&orderby=time-desc&src=iris&limit=5000&maxlat=25.500&minlat=16.000&maxlon=-152.000&minlon=-162.500&sb1=1&name=Hawaii&zm=6&mt=ter>

Take a minute to click on the parameter options to review what they are set to. Which of these parameter ranges is what I have chosen for you in this region?

Select one or more:

- ☒ a. Maximum earthquakes is 5000
- ☐ b. All Magnitudes
- ☐ c. From Earliest Available to Latest Available
- ☐ d. Maximum earthquakes is 1000
- ☐ e. Depths from 0 to 33 km
- ☒ f. 50 years from 1970 to 2019
- ☒ g. Magnitudes from 3 to 10
- ☒ h. All Depths

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.75/1.00.

Question 30

Correct

1.00 points out of 1.00

Flag question

How deep are the earthquakes in this region? Hint: You should be able to use the color coding of the earthquake circles to help you to see the depths of the earthquakes.

Select one:

- ☐ a. Nearly 100% of the earthquakes are shallower than 33 km (only 1 or 2 exceptions)
- ☐ b. Many of the earthquakes extend below 70 km, but most are shallower than 300 km
- ☐ c. Many of the earthquakes extend below 500 km
- ☒ d. Many of the earthquakes extend below 33 km, but most are shallower than 70 km

Check

Correct

Marks for this submission: 1.00/1.00.

Question 31

Correct

1.00 points out of 1.00

Flag question

Set the **Show plate boundaries** option to **On**. You may need to zoom in to see the plate boundary line. What is the main type of plate boundary featured in this region, or if there is no nearby plate boundary line, what tectonic setting is featured in this region?

Select one:

- ☐ a. subduction zone
- ☒ b. hot spot volcano
- ☐ c. transform fault
- ☐ d. intraplate - not near a plate boundary or a hot spot volcano
- ☐ e. mid-ocean ridge or continental rift
- ☐ f. continental collision

Check

Correct

Marks for this submission: 1.00/1.00.

Question 32

Correct

1.00 points out of 1.00

Flag question

Next you should click on the Earthquake Stats and calculate the earthquakes per year for each of the magnitude bins. You should do these calculations for the 3-4, 4-5, 5-6, and 6-7 magnitude bins, but to check and make sure you are having success with these calculations, what is the rate of magnitude 6 to 7 earthquakes per year?

Answer: 0.14

Check

Correct

Marks for this submission: 1.00/1.00.

Question 33

Correct

1.00 points out of 1.00

Flag question

As you have done for the previous regions, you are going to plot these values to see the trend of the frequency for different magnitudes, in order to estimate the expected frequency (probability) of larger magnitude earthquakes. As you have done in previous questions, create a file called hawaii.xy and I recommend the first column be the value for the lower magnitude limit (e.g., 4 for the 4-5 magnitude bin) and the second column for the rate of earthquakes per year for that magnitude bin. In a text file like this, the columns are just separated by a space. Once you enter the data, how many lines of data will the file have in it for this region?

Answer: 4

Check

Correct

Marks for this submission: 1.00/1.00.

Question 34

Correct

1.00 points out of 1.00

Flag question

Once you have entered the magnitudes and rates per year from the previous questions into the hawaii.xy, I would like you to use them to make a logarithmic frequency-magnitude plot with GMT similar to how you did in a previous question for California. Which of the following pieces of a GMT command would be needed to successfully create a plot of this file?

Select one or more:

☐ a. -O

☒ b. -JX6/6l ✓ 1 of 7 correct answers

☐ c. >>

☒ d. gmt psxy ✓ 1 of 7 correct answers

☐ e. -JX3/8

☐ f. -R 01/50/3/6

☒ g. hawaii.xy ✓ 1 of 7 correct answers

☒ h. -Ba10.2:"Magnitude":a1f3:"Frequency of Earthquakes": ✓ 1 of 7 correct answers

☒ i. -R3/8/.001/100 ✓ 1 of 7 correct answers

☒ j. hawaii.ps ✓ 1 of 7 correct answers

☐ k. plot

☐ l. -K

☒ m. >l ✓ 1 of 7 correct answers

Check

Great! Now you should run the full command with each of these components together: gmt psxy hawaii.xy -R3/8/.001/100 -JX6/6l -Ba10.2:"Magnitude":a1f3:"Frequency of Earthquakes": >l hawaii.ps

Correct

Marks for this submission: 1.00/1.00.

Question 35

Correct

0.50 points out of 1.00

Flag question

If you visualize projecting the trajectory of the line you plotted further on your plot, what is the expected rate of a magnitude 8 earthquake per year period?

Answer: 0.002

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.50/1.00.

Question 36

Correct

1.00 points out of 1.00

Flag question

How does this value compare to the expected rate of magnitude 8 to 9 earthquakes per year in California?

Select one:

☐ a. The California region has 2 times as many earthquakes as the Hawaii region.

☒ b. The California region has 5 times as many earthquakes as the Hawaii region. ✓ The Hawaii region has a rate of 0.002 earthquakes/year, which the California region has a rate of 0.01 earthquakes/year

☐ c. The Hawaii region has 5 times as many earthquakes as the California region.

☐ d. The Hawaii region has the same number of earthquakes as the California region.

☐ e. The Hawaii region has 2 times as many earthquakes as the California region.

Check

Correct

Marks for this submission: 1.00/1.00.

Question 37

Correct

1.00 points out of 1.00

Flag question

The next region we will look at is centered on the Red Sea. The web address for the specific view of earthquakes in this area is: <https://ds.iris.edu/leh/index.html?format=text&nodata=404&starttime=1970-01-01&endtime=2019-12-31&minmag=3&maxmag=10&orderby=time-desc&src=iris&limit=10000&maxlat=20.500&minlat=9.500&maxlon=49.000&minlon=37.000&sl=1&name=Red%20Sea&zmr=6&mt=ter> Take a minute to click on the parameter options to review what they are set to. Which of these parameter ranges is what I have chosen for you in this region?

Select one or more:

☒ a. Magnitudes from 3 to 10 ✓ 1 of 4 correct answers

☒ b. 50 years from 1970 to 2019 ✓ 1 of 4 correct answers

☒ c. All Depths ✓ 1 of 4 correct answers

☐ d. Maximum earthquakes is 1000

☐ e. Depths from 0 to 33 km

☐ f. From Earliest Available to Latest Available

☐ g. All Magnitudes

☒ h. Maximum earthquakes is 10000 ✓ 1 of 4 correct answers

Check

Correct

Marks for this submission: 1.00/1.00.

Question 38

Correct

1.00 points out of 1.00

Flag question

How deep are the earthquakes in this region? Hint: You should be able to use the color coding of the earthquake circles to help you to see the depths of the earthquakes.

Select one:

☐ a. Nearly 100% of the earthquakes are shallower than 33 km (only 1 or 2 exceptions)

☐ b. Many (>10%) of the earthquakes extend below 70 km, but most are shallower than 300 km

☐ c. Many (>10%) of the earthquakes extend below 500 km

☐ d. Many (>10%) of the earthquakes extend below 33 km, but most are shallower than 70 km

☒ e. Over 90% of the earthquakes are shallower than 33 km ✓

Check

Correct

Marks for this submission: 1.00/1.00.

Question 39

Correct

1.00 points out of 1.00

Flag question

Set the **Show plate boundaries** option to **On**. You may need to zoom in to see the plate boundary line. What is the main type of plate boundary featured in this region, or if there is no nearby plate boundary line, what tectonic setting is featured in this region?

Select one:

☐ a. intraplate - not near a plate boundary or a hot spot volcano

☐ b. subduction zone

☒ c. mid-ocean ridge or continental rift ✓ Mid-ocean ridges and continental rifts are typically characterized by a relatively small amount of seismicity, with very few earthquakes below 33 km. Two oceanic plates need to be involved in a mid-ocean ridge, but continental rifts typically have very little oceanic plate involved.

☐ d. transform fault

☐ e. hot spot volcano

☐ f. continental collision

Check

Correct

Marks for this submission: 1.00/1.00.

Question 40

Correct

1.00 points out of 1.00

Flag question

Next you should click on the Earthquake Stats and calculate the earthquakes per year for each of the magnitude bins. You should do these calculations for the 3-4, 4-5, 5-6, and 6-7 magnitude bins, but to check and make sure you are having success with these calculations, what is the rate of magnitude 6 to 7 earthquakes per year?

Answer: 0.18

Check

Correct

Marks for this submission: 1.00/1.00.

Question 41

Correct

1.00 points out of 1.00

Flag question

As you have done for the previous regions, you are going to plot these values to see the trend of the frequency for different magnitudes, in order to estimate the expected frequency (probability) of larger magnitude earthquakes. As you have done in previous questions, create a file called redsea.xy and I recommend the first column be the value for the lower magnitude limit (e.g., 4 for the 4-5 magnitude bin) and the second column for the rate of earthquakes per year for that magnitude bin. In a text file like this, the columns are just separated by a space. Once you enter the data, how many lines of data will the file have in it for this region?

Answer: 4

Check

Correct

Marks for this submission: 1.00/1.00.

Question 42

Correct

1.00 points out of 1.00

Flag question

Once you have entered the magnitudes and rates per year from the previous questions into the redsea.xy, I would like you to use them to make a logarithmic frequency-magnitude plot with GMT similar to how you did in a previous question for California. Which of the following pieces of a GMT command would be needed to successfully create a plot of this file?

Select one or more:

☒ a. -Ba10.2:"Magnitude":a1f3:"Frequency of Earthquakes": ✓ 1 of 7 correct answers

☒ b. -R3/8/.001/100 ✓ 1 of 7 correct answers

☒ c. >l ✓ 1 of 7 correct answers

☐ d. plot

☐ e. -JX3/8

☐ f. -R 1/50/4/7

☒ g. -JX6/6l ✓ 1 of 7 correct answers

☒ h. gmt psxy ✓ 1 of 7 correct answers

☒ i. redsea.xy ✓ 1 of 7 correct answers

☐ j. -O

☐ k. >>

☒ l. redsea.ps ✓ 1 of 7 correct answers

☐ m. -K

Check

Great! Now you should run the full command with each of these components together: gmt psxy redsea.xy -R3/8/.001/100 -JX6/6l -Ba10.2:"Magnitude":a1f3:"Frequency of Earthquakes": >l redsea.ps

Correct

Marks for this submission: 1.00/1.00.

Question 43

Correct

0.67 points out of 1.00

Flag question

If you visualize projecting the trajectory of the line you plotted further on your plot, what is the expected rate of a magnitude 8 earthquake per year period?

Answer: 0.002

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 44

Correct

0.67 points out of 1.00

Flag question

How does this value compare to the expected rate of magnitude 8 to 9 earthquakes per year in California?

Select one:

☐ a. The Red Sea region has about the same number of earthquakes as the California region.

☒ b. The California region has about 3 times as many earthquakes as the Red Sea region. ✓

☐ c. The Red Sea region has about 3 times as many earthquakes as the California region.

☐ d. The Red Sea region has about 20 times as many earthquakes as the California region.

☐ e. The California region has about 20 times as many earthquakes as the Red Sea region.

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Finish review