

Preston Hudlow

GEOG 419

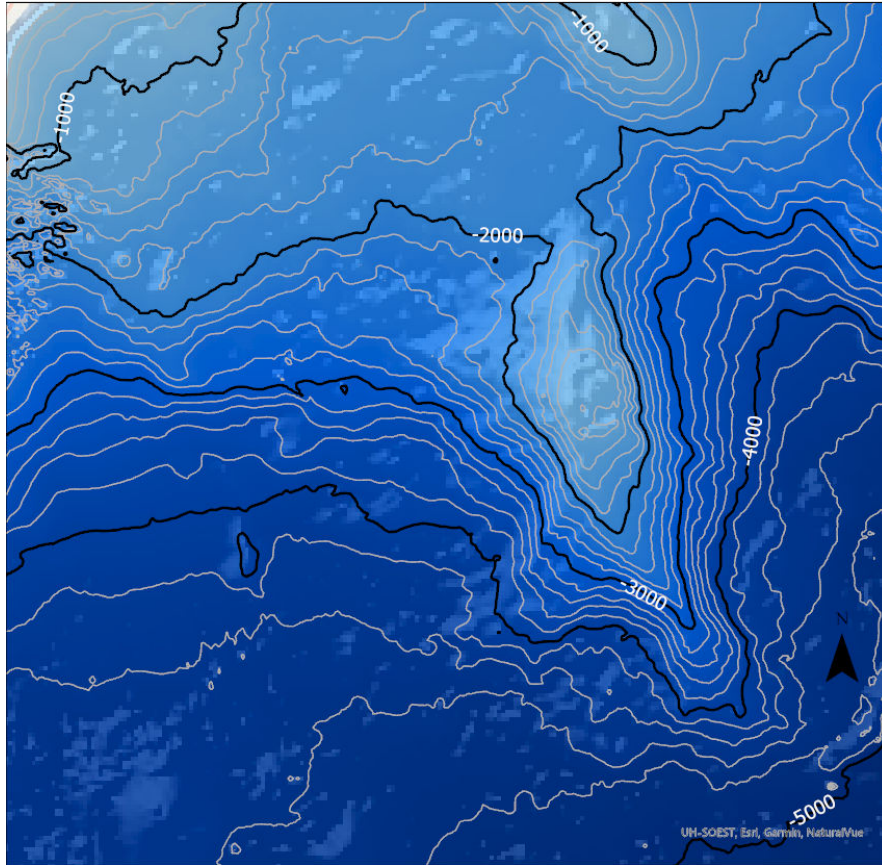
Tom Allen

Lab 6

Q1: Approximately how many multibeam cruise datasets are available? Describe (in your own words) the characteristics of the data (coverage, density, detail.) What is the depth and geologic origin of Loihi? Briefly describe this after reviewing the two websites below.

When viewing the map there are about 18 completed multibeam cruise datasets covering the area of Loihi Seamount. The surveys coverage of this dataset ranges in area from 12 to 293 square kilometers. The surveys use 12 multibeam and 2 LIDAR coniguous bathymetric DTMs into one data set that covers much of the eastern long island. Its purpose is to release a 4-m grid of the combined datasets generated from the surveys. The depth reaches over 3000 meters. The map Ranges from -1000 to -3400. The volcano is around 80-100 million years old and was created 6000 km away on the undersea volcanic mountain chain know as the East Pacific rise.

Q2: Include your map in your answer document (e.g., screenshot and paste or export the map to JPG and insert.) NOTE: You need not replicate the NOAA cartographic design. Feel free to use your experience or exploration here to apply any reasonable or standard symbology for marine maps or charts.



Loihi Seamount Bathymetry

0 2.05 4.1 8.2 Kilometers

Legend



use regular/rounded increments for scale bar

Sources: Lab 6, NOAA National Geophysical Data Center, by Preston Hudlow

Q3: What types of data acquisition are combined in this data?

The eliscomb bathymetry dataset combines multibeam sonar bathymetry and airborne LIDAR bathymetry.

Q4: What is the resolution of the grid? Why is this a rationale choice for mapping purposes? What type of features would the USGS be seeking to map?

The grid uses a resolution of 4-m and “This resolution is adequate for seafloor-feature and process interpretation, but small enough to be queried and manipulated with standard GIS programs and to allow for future growth. Natural features visible in the grid include exposed

bedrock outcrops, boulder lag deposits of submerged moraines, sand-wave fields, and scour depressions that reflect the strength of the oscillating tidal currents.”.

Q5: What are the features and at what depth they at map coordinates 738,470mE, 4,569,804mN? Are they natural glacial landforms or anthropogenic? Based on the orientation of the features, can you infer the direction of travel of the ice sheet?

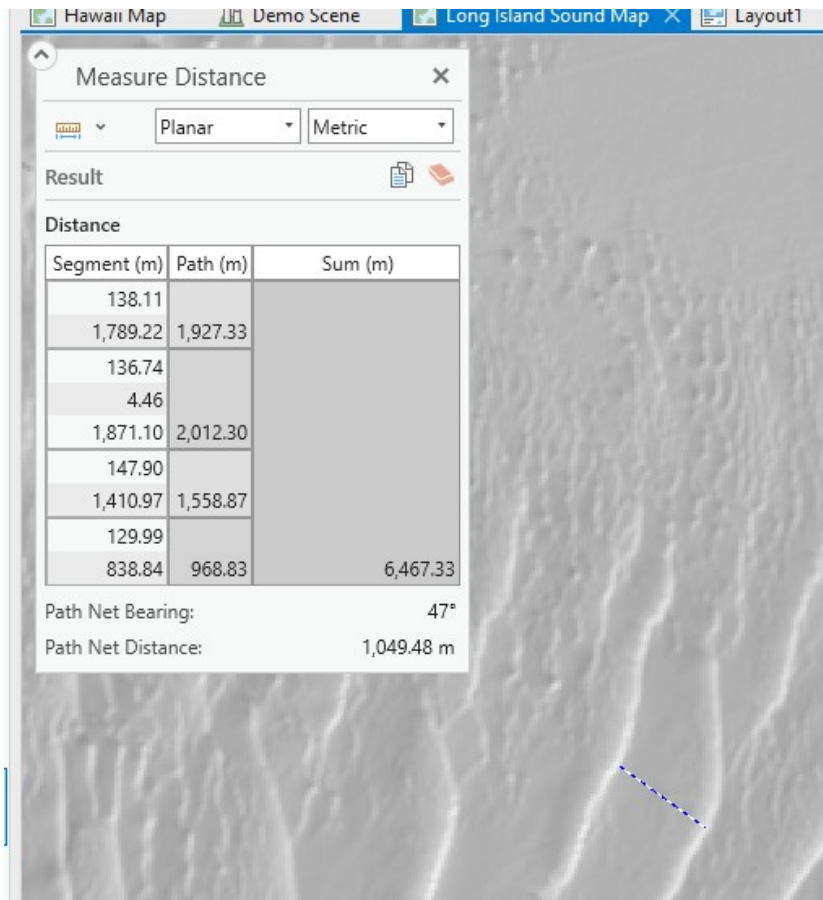
At the location there are features like glacial landforms and elongated ridges. There is also sand wave produced by the current just west of the glacial landform. The depth ranges from -35 to -109. From the sand waves and depth I would say its moving from NW to SE.

Q6: What is a representative depth of the large depression of scour northwest of The Race?

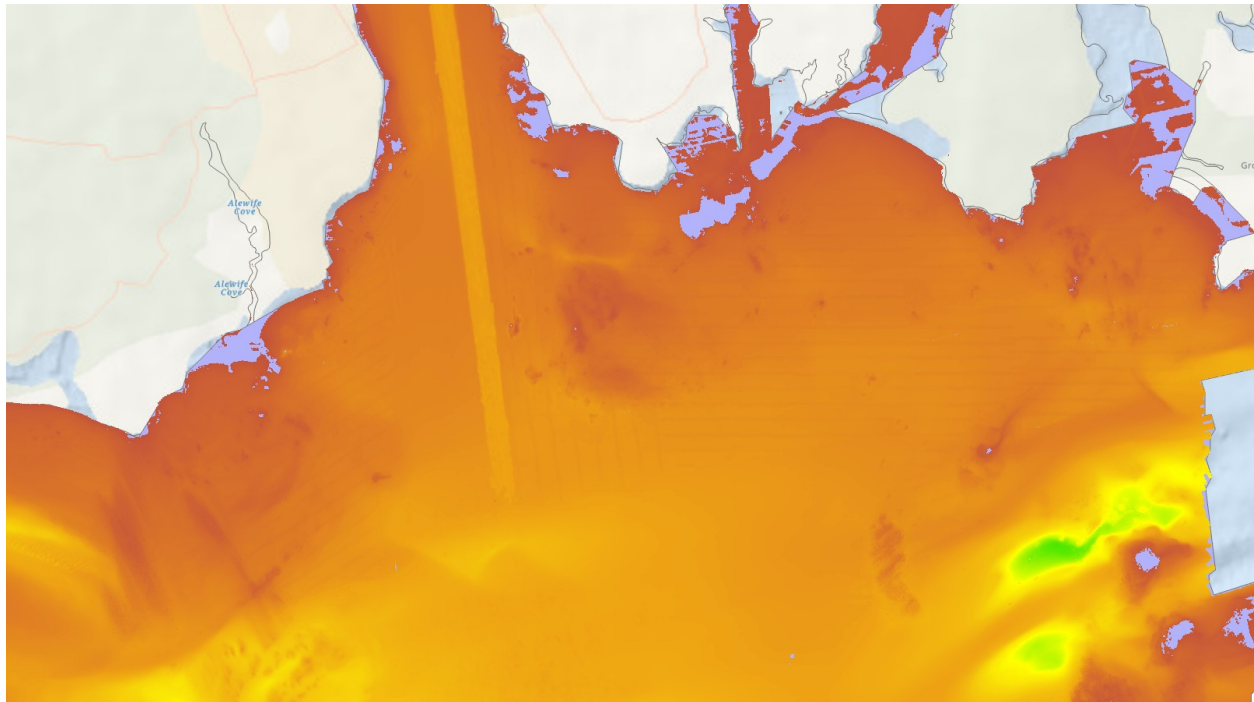
55-60 meters.

Q7: Use the Measure tool to estimate a representative crest to crest (i.e., wavelength) distance. ___ meters. Include a screenshot of the specific features measured.

130 meters.



Q8: Make a screenshot map, identifying the features above. If you can identify any other features (depth-offset data artifacts, bedrock outcrops, etc.), do so. The USGS report is very helpful for this interpretation.



In this view you can see dredging lines going into the North port. Around this there are also sand deposits from there dredging.

Q9: Are there identifiable trawl marks in the area of interest? Explain and provide a screenshot map and interpretation.

Yes, there are identifiable trawl marks in this location. They appear as long, narrow, parallel linear striations mostly in the upper central and right-central portions, running roughly north-south to northeast-southwest. These marks are lighter linear streaks against a darker background, characteristic of bottom trawling activity where fishing gear drags along the seafloor, disturbing sediments and leaving elongated impressions.

Q10: The noisy sidescan sonogram provided has evident bias from track to track. How does applying a low pass filter assist the interpretation? How does the low pass filter work? Would any other type of filter be more advantageous?

A low pass filter smooths out high-frequency noise and track-to-track inconsistencies in the sonar. It works by averaging out the pixel values within a defined neighborhood which reduces local variance. If you use a high pass filter it could complement this image by enhancing the edges of a wreck.

Q11: Is there evidence of possible dredging in the area? Explain your interpretation and any indications of dredge spoil deposits. Hint: If you find dredging, you may find some spatial coincidence of spoil deposits.

Yes, in the upper central part of the scan there is a defined rectangular depression which coincides with dredging. To help back this up in the southeast of the scan you can see lighter mounded objects which could be the pile that is dumped from the dredging.

