Astronomy 19

Tidal Report

Overview (Part 1)

[Quantitatively understanding the statistical significance of scientific results requires us to perform a mathematical assessment of evidence from experiments. This small group project will teach us

1) How to model a scientific experiment that includes an underlying relationship with both intrinsic randomness and experimental uncertainty.

2) Determine the significance of a measurement that deviates from the intrinsic randomness expected from an experiment.

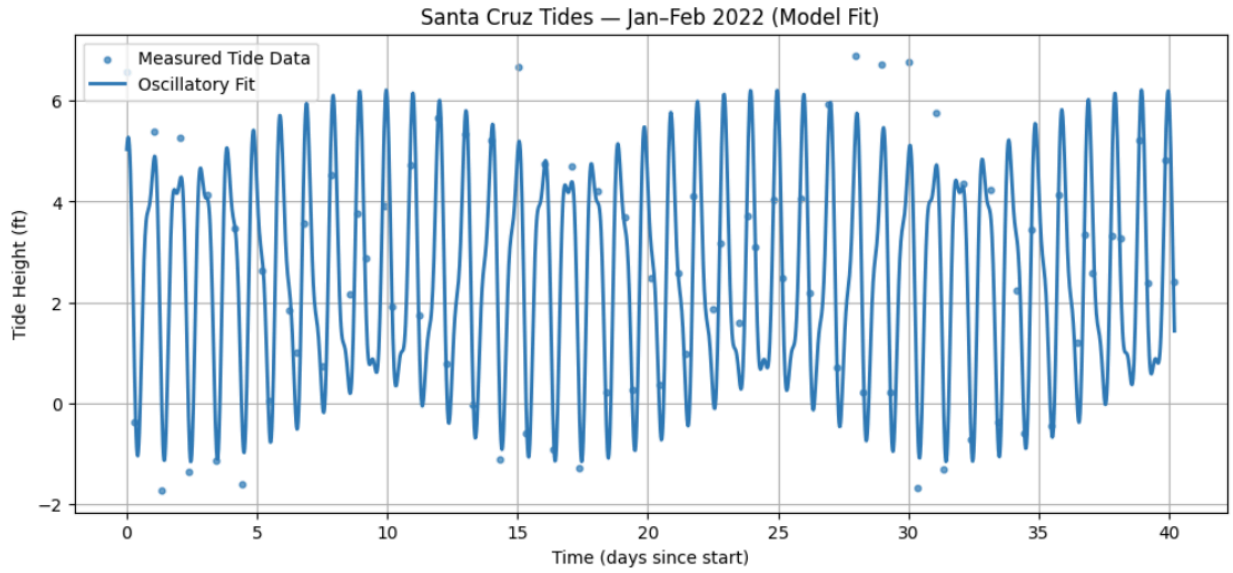
3) Program Python functions to compute mathematical models and simulate experimental noise.

4) Plot models and data on the same graph using a Jupyter notebook, and provide a graphical representation of the statistical significance of an experimental event.

5) Develop code collaboratively using a standard development platform (GitHub).]

GitHub URL:	**https://github.com/nnfrazer-jpg/astr-19-group-project-c2/tree/main**

Plotting the Curve (Part II)



Analysis

Clearly articulate how big the Tsunami deviation is in relation to the typical tidal pattern? Consider the standard deviations of the distribution of normal tides from the model? What did you observe?

The regular tides scatter are equal to 0.88ft, the tsunami outlier equal to 2fth above the model prediction and the significance is 2.28 - 2.38. To find how big the tsunami deviation compared to the normal tidal pattern we compared the size of the tsunami height change with the normal statistical pattern of the tides. The typical tidal pattern of normal height is 0.88 ft and when measured error 0.25 is removed the variability is 0.84ft. Revealing the tidal fluctuates by less than a foot though the tsunami is about 2 ft from the water level. To find out how many santander deviations is two feet we divide 2ft by the normal typical tidal scatter which is 0.84 and 0.88 we get 2.38 and 2.28 showing us that the tsunami deviation is 2 standard deviations bigger than that typical tidal.

Our observations:

Normal tides don't really exceed a foot from the best fit model and the outlier are above the usual residual distribution which are evident in the scatter plot and histogram. Moreover the tsunami deviation is bigger than what a normal tide makes. This makes it statistically significant and that of deviation can be noticed in comparison to the normal tide due to its 2 deviations larger.