Analysis of Wrinkle Ridges to Determine Distribution and Depth of Blind Thrust Faults in Mare Imbrium

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Introduction

Purpose:
We chose to study wrinkle ridges to expand the limited amount of research available on them and also to determine information about structures in the basin itself. We used wrinkle ridges to determine any relationships between their characteristics and the basin thickness in Mare Imbrium are present.

Mare Imbrium:

Mare Imbrium is located in Imbrium Basin, which is an impact basin located on the near side of the moon centered at 33°N, 16°W. The impact basin is about 1.3-4 billion years old, 1,100 km in diameter, and the mare contained within the basin are estimated to be about 2 km in depth. Based on analysis of thickness measurements from impact craters that penetrate the mare, it also is part of the Procellarum KREEP Terrane, which includes most mare basins on the moon.

Structure:

Wrinkle ridges are low sinuous ridges found on volcanic materials that fill the great impact basins on the Moon. Some can be hundreds of kilometers long.

Statistic:

Since we collected a multitude of data, our data is displayed graphically. We wanted to explore as many relationships as possible between the depth and the location of the fault. We then analyzed the data using Excel for the entire process.

Data Analysis:

Through this graph one can see that the deepest part of the fault in the wrinkle ridge is found in the middle. This relationship is typical of terrestrial faults, thus confirming our interpretations and assumptions. This graph was made necessary in order to make a better visual as to where we are seeing it above or at the moon.

This is a graph the previous one that relates the distance along strike for all of the wrinkle ridges less than 50 km long. As you can see, the faults are deepest close to the center. We then examined the distance along strike for all of the faults in the wrinkle ridge. The faults, which appear in two separate maximum depths, the distance along strike for all of the wrinkle ridges greater than 50 km long. The peaks main ridges are assumed from being crowded. The deepest point measured, as shown in the red line, is approximately 4 km.

Conclusion:

We had hoped that our data would show some relationships. We thought that length might be proportional to the depth of faults, and that there would be a very weak relationship. We had also thought that there might be a relationship between the depth of faults and the distance from the rim of the mare Imbrium, but there appears to be no correlation, though there is a possible indication of a ring structure. Also, previous work has concluded that the basin in Mare Imbrium is thought to be about two kilometers deep. However, our data show that there are faults that are over six kilometers deep. This could mean either that the faults extend through the basalt layer to the pre-impact surface beneath, or that the basalt layer is deeper than previously thought.

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