Streamlined Islands
Introduction:

**Question:** What’s the relationship of distance and elevation between Streamlined Islands?

**Importance of out Question:** Streamlined Islands gives us an idea on how the elevation affected the distance among each other as the elevation increased or decreased. This also gives us more knowledge on Mars in a way where we can determine where there could be past water flow on Mars.
Main Hypothesis: As the elevation increases, the distance between Streamlined Islands decreases.

Explanation of MH: If the Islands have a higher elevation, there was more water around them, indicating more Streamlined Islands closer together.

Alternate Hypothesis: As the elevation decreases, the distance between Streamlined Islands stays the same.
Background Information:

Definitions of Streamlined Islands

- Thought to be associated with the past flow of water around a feature such as a crater.
- Often found in outflow channels where large amounts of water flowed.
- Also called teardrop islands.
Streamlined Islands near Valles Marineris.

• How these streamlined Islands were formed:
The water that carved the channels to the North and East of the Valles Marineris canyon system had tremendous erosive power. One consequence of this erosion was the formation of streamlined islands where the water encountered obstacles along its path. This image shows two streamlined islands that formed as the water was diverted by two 8-10 kilometer (5-6 mile) diameter craters lying near the mouth of Ares Vallis in Chryse Planitia. The water flowed from south to north (bottom to top of the image). The height of the scarp surrounding the upper island is about 400 meters (1,300 feet), while the scarp surrounding the southern island is about 600 meters (2,000 feet) high.

solarviews.com/cap/mars/islands.  
(Image Credit: Calvin J. Hamilton; Caption: LPI)
Specific Knowledge

- Wet ocean sediments carry more water down the mantle at the subduction zones.
- Teardrop-shaped islands on Mars could have formed deep underwater.
- Streamlined islands are where the water encountered obstacles along its path that get eroded away from water flow.

Hypotheses from another scientist

- “Based on the analogy, I am humbly suggesting that teardrop-shaped islands on Mars formed underwater in a relatively deep ocean.” said Geologist Lorena Moscardelli. (Hamilton)
OUTFLOW CHANNELS:
-Huge channels formed by a catastrophic flood
-May have streamlined islands
How Streamlined Islands are Formed:

- On Mars, Streamlined Islands are thought to be formed by past water flow moving across the surface.
- Streamlined islands are formed the same way on Mars and Earth. They are formed by water pushing at a surface creating a teardrop shape.

Photo http://msip.asu.edu/curriculum.html
Our group focused on this area
What Streamlined Islands Look Like On Mars:
Experimental Design

What we focused on: Our group focused on Streamlined Islands.

Equipment and Software:
- MOLA 128 ppd elevation
- Jmars THEMIS stamps

Materials:
- Computer
- Internet
- Paper
- Pencil
- Power Point
- Email
- JMARS
- Mars Odyssey
- Microsoft Excel
- Calculator
- Notes
- Themis Images
Procedures:

1. Open JMARS (if not downloaded go to jmars.asu.edu)
2. Click add new layer
3. Scroll over map by instrument
4. Then scroll down to find MOLA
5. Scroll over and click MOLA 128 PPD Elevation
6. Then once again click add new layer
7. Scroll over and find stamps
8. Then scroll over and click THEMIS stamps
9. Type in the Longitude box 300
10. Next type in the Latitude box 17
11. Then under image type select vis.
12. To find the stamps zoom out to about 2
13. Then once you find it scroll over the area, right click and select zoom and re center 32
14. Adjust the area so that it’s in the desired zone
15. Go to the layer menu and change the stamp opacity to zero
16. Find two streamlined that are near each other
Procedures (continued):

17. Turn the stamp layer’s opacity back to 100%
18. Find as many THEMIS stamps as necessary that are above the streamlined island
19. Right click on the THEMIS stamps you have chosen
20. Select the first option, the next first option, and then click render ABR
21. If necessary, zoom in to about 256 to get a better view of your THEMIS image
22. Move the MOLA 128 PPD Elevation layer above all the other layers
23. Click to the side of one island and move it across the island.
24. Double click to turn the line red
25. Go to the layer menu and select the MOLA 128 PPD Elevation tab
26. Measure the highest and lowest point, then subtract the two.
27. Add to data table
28. To find the islands distance apart, go to the Lat/Lon tab
29. Next go to the edge of the first island
30. Click and hold
Procedures (continued):

31. Drag to the other edge of the other island
32. Look on the bottom of the screen and you’ll see the distance.
33. Add information to data table
34. Repeat steps 16-33 nine more times
## Relationship between Distance and Elevation of Streamlined Islands

<table>
<thead>
<tr>
<th>Image Name 1</th>
<th>Image Name 2</th>
<th>Lat. Of Island 1 (Degrees North)</th>
<th>Long. Of Island 1 (Degrees East)</th>
<th>Lat. Of Island 2 (Degrees North)</th>
<th>Long. Of Island 2 (Degrees East)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>15.453</td>
<td>328.953</td>
<td>15.891</td>
<td>329.906</td>
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<tr>
<td>C</td>
<td>D</td>
<td>16.109</td>
<td>329.988</td>
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<td>329.656</td>
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<tr>
<td>E</td>
<td>F</td>
<td>17.297</td>
<td>323.219</td>
<td>17.687</td>
<td>305.730</td>
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<tr>
<td>G</td>
<td>H</td>
<td>27.125</td>
<td>308.111</td>
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<tr>
<td>I</td>
<td>J</td>
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<td>305.297</td>
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<tr>
<td>K</td>
<td>L</td>
<td>18.992</td>
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<tr>
<td>M</td>
<td>N</td>
<td>20.406</td>
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<td>O</td>
<td>P</td>
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</table>
### Relationship Between Distance and Elevation of Streamlined Islands

<table>
<thead>
<tr>
<th>Elevation (m) Of Image 1</th>
<th>Elevation (m) Of Image 2</th>
<th>Average Elevation of the two islands</th>
<th>Distance between Streamlined Islands (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-531</td>
<td>-538</td>
<td>-534.5</td>
<td>35</td>
</tr>
<tr>
<td>-293</td>
<td>-455</td>
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<tr>
<td>-493</td>
<td>-493</td>
<td>-493</td>
<td>35.6</td>
</tr>
</tbody>
</table>
Relationship Between Distance and Elevation of Streamlined Islands
**Discussion:**

- **Relationship:** As the elevation of the island increases, the distance is not affected.

- **Correlation:** No correlation.

- **Sources of error:** While measuring could have been measured from wrong spot, selected islands that were too far away from each other, point measuring on JMARS was incorrect, some islands were not in right area, and we limited our search area.

- **Analysis:** If the elevation of a streamlined island is increased the distance will vary because it depends on where the object that caused the island to be formed was placed.
Conclusion:

What is the relationship of distance and elevation between Streamlined Islands? As the elevation increases, the distance between Streamlined Islands will decrease. Based on our research, this hypothesis is not supported. Our data is all over the place. Islands “K” and “L” averaged an elevation of 311, and “A” and “B” averaged 534.5. K and L are the smaller islands. The smaller islands were closer together than the larger islands, going against our hypothesis.
Conclusion (Continued):

Further work should expanding our search area to see the other effects Streamlined Islands have on Mars. We feel we deserve to go to ASU because we have worked super hard inside and outside of class, to make this presentation the best of the day. Our hypothesis may not be supported, but we feel the information given has shed light on the subject of streamlined islands for this group of four young individuals. Also, giving us more information on Mars.
Websites We Used:


Websites We Used (continued)

