

# Upper Darby High School

Period 5

# The Big Question

- Are dust devils and other wind features causing the Martian environment to warm?

# Significant Points

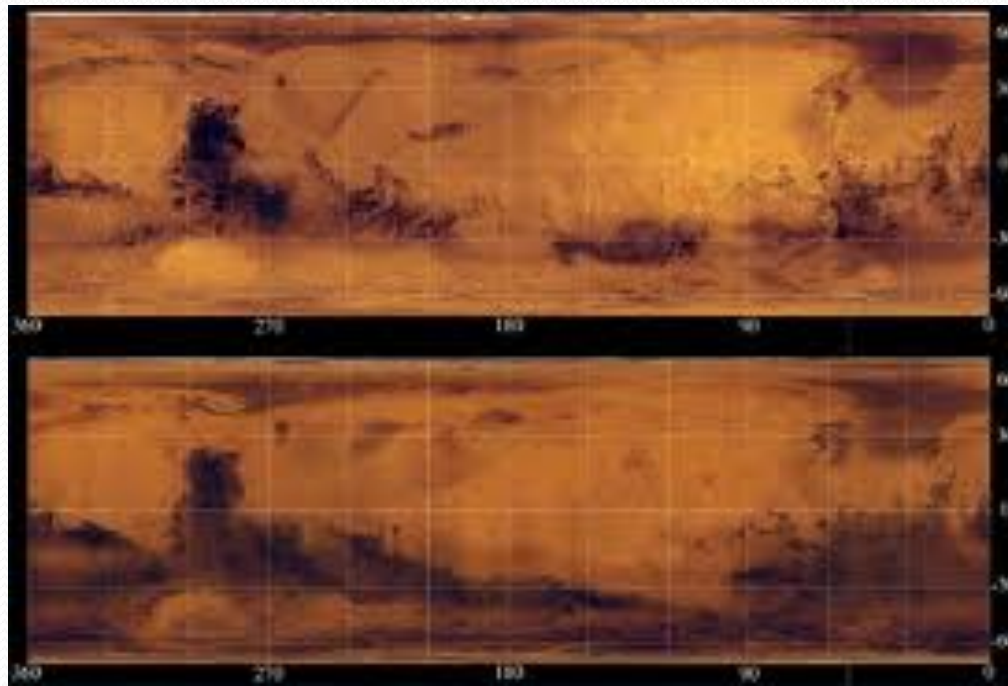
- Global warming is happening on several other planets and moons in our solar system including Mars, Jupiter, Venus, Pluto, Neptune and its moon Triton.
- If there is global warming on Mars, there is a chance that Earth's global warming is not solely caused by humans.


# Possible Hypotheses

- The Sun might be producing more energy
- The Sun's magnetic field could be getting stronger or weaker
- Our Hypothesis: The wind erosion might be causing global warming by creating darker surfaces which in turn attract more heat.

# Background Information

Dust storms are thought to be one major cause of Global Warming on Mars.  
The dust storms rearrange the dust on the ground, and cause the planet Mars to absorb more sunlight.

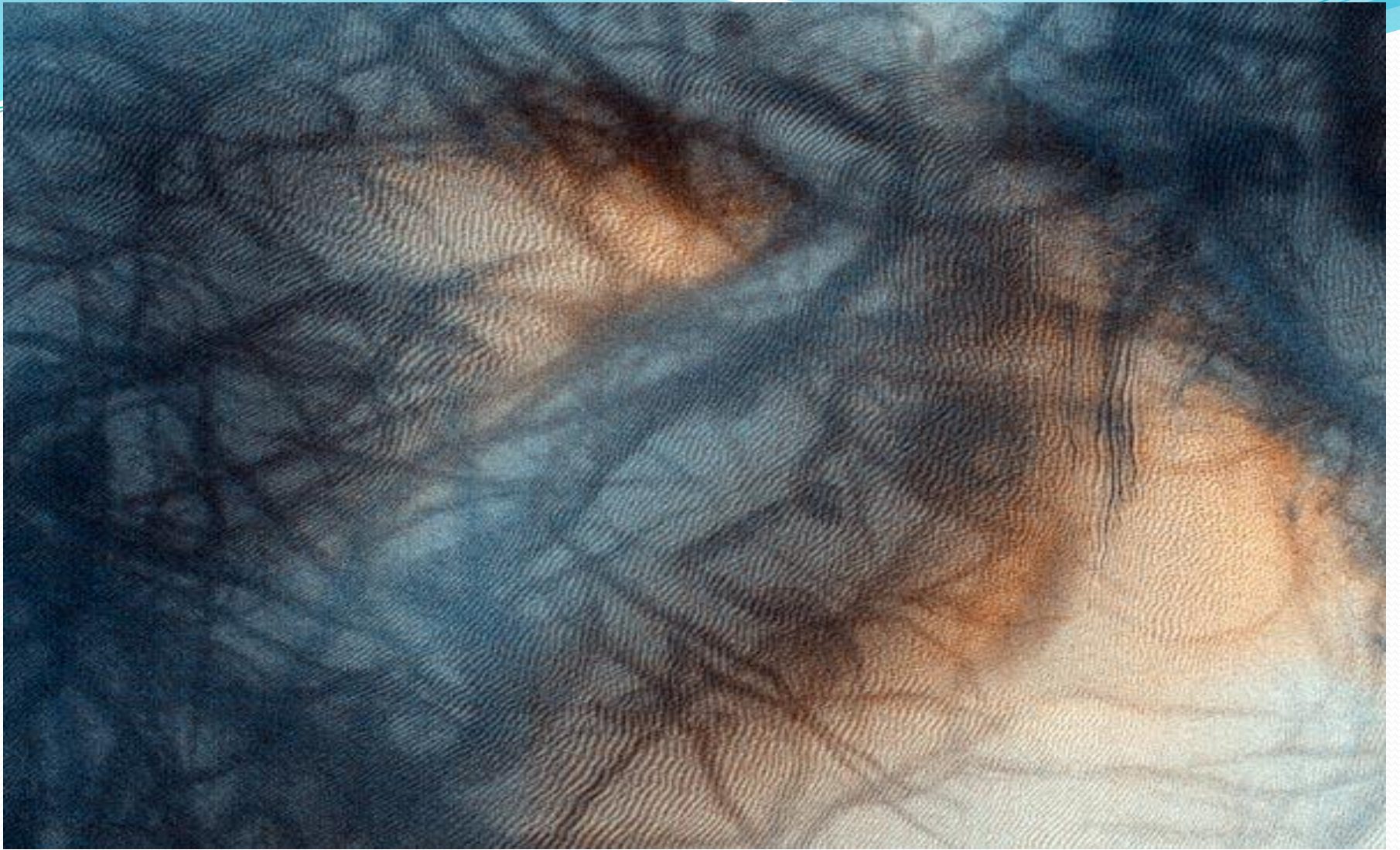




“The darkened surfaces warm up, heating up the air just above the surface. This encourages formation of dust devils, which sweep up dust and [further] darken the surface,”

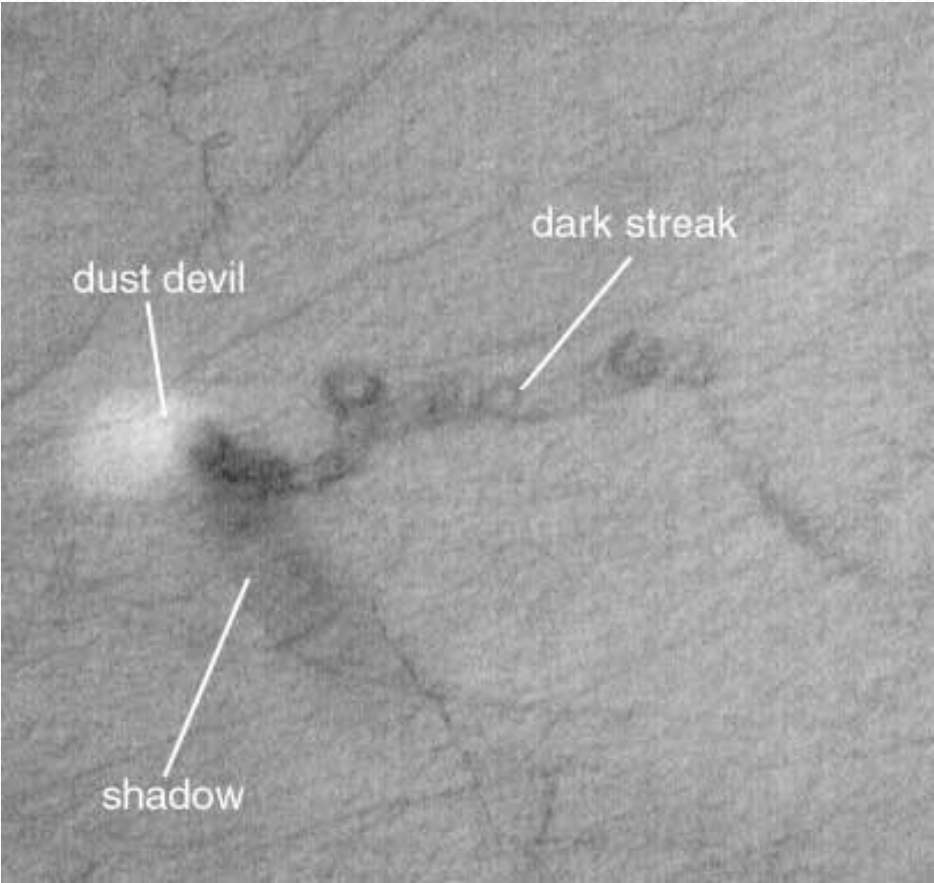
- Lori Fenton





Dust Devil tracks on Mars' surface





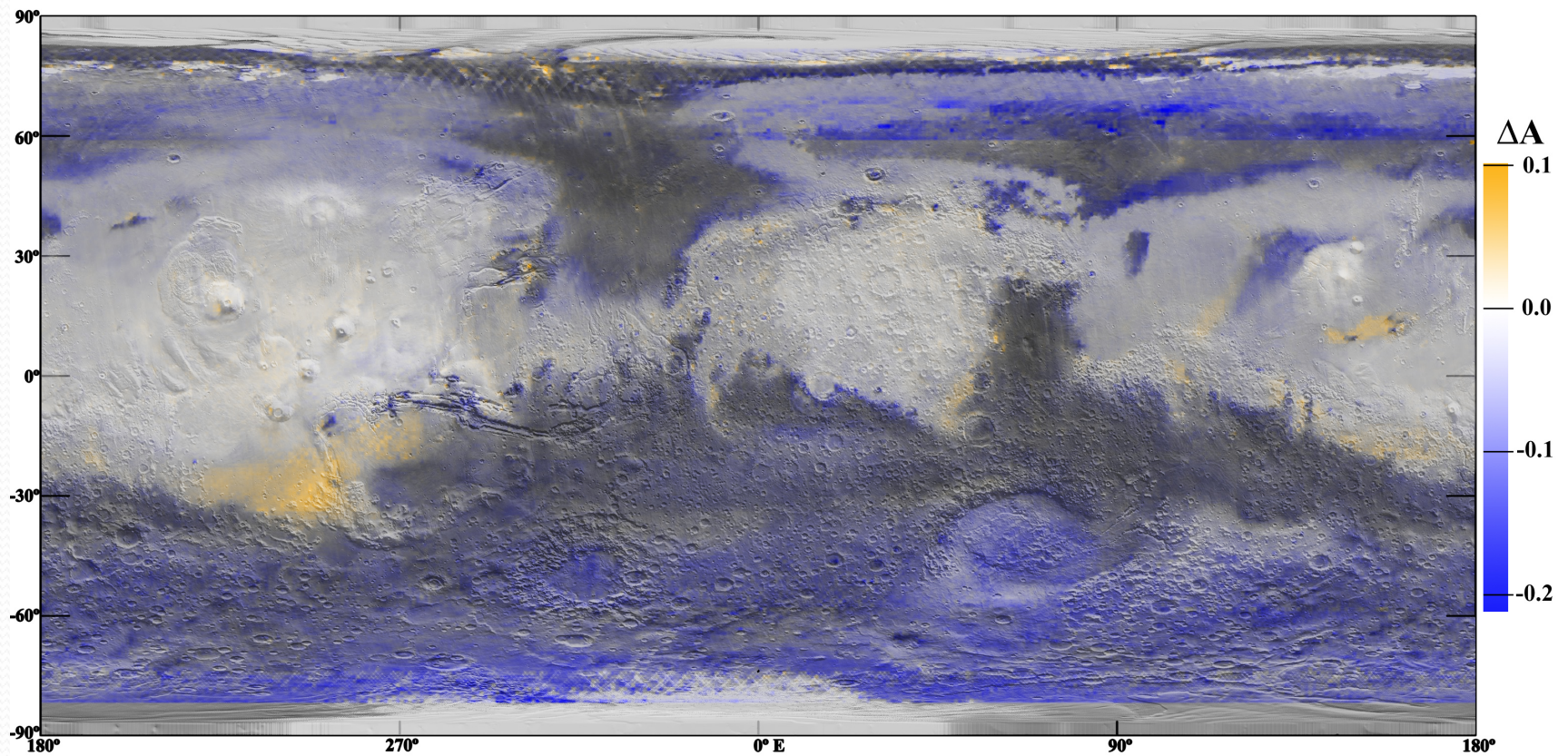
Global warming has caused Mars' South Polar cap to shrink and become less stable.



# Experimental Design

- We will use the TES Albedo Maps, the THEMIS Night IR images.
- We will focus on areas with varying albedo values due to dust devils tracks and other wind features.
- One area in particular we will focus on is Syrtis Major Planum.
- To find areas with maximum changes in surface albedo, we will use research by Lori Fenton, including the following map of change in surface albedo.





[http://www.nasa.gov/centers/ames/images/content/176470main\\_marsglobalwarming-hires.jpg](http://www.nasa.gov/centers/ames/images/content/176470main_marsglobalwarming-hires.jpg)



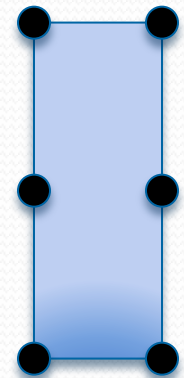


We will analyze 30 THEMIS images taken between the hours of 1.0 and 2.0 during a consistent season

- 10 from an area that has consistently low albedo readings
- 10 from an area that has consistently high albedo readings
- 10 from an area that has decreasing albedo readings

For each THEMIS image we will record

- Image ID
- Minimum Surface Temperature
- Maximum Surface Temperature
- An average 6 Albedo readings (one from each corner of image and one from the midpoint of each side)
- Year
- Location



# Analysis Plan

# Our Table

Image ID	Max. Surface Temp.	Min. Surface Temp.	Albedo Level	Year	Location



# Scatter Plot Layout

We will have two scatter plots plotting Temperature versus Albedo and Temperature versus Year



# Conclusion

- The purpose for our research is to determine if Mars is getting warmer and if so then why.
- Our hypothesis is that Mars is slowly getting warmer due to the wind erosion decreasing the Albedo factor.
- Most scientists believe global warming on Earth is caused by humans. Lori Fenton is clear that her research does not disprove humans being the cause of global warming on Earth. However, it is interesting that global warming is occurring on uninhabited planets.

# References

Ravilious, Kate. N.p.. Web. 22 Oct 2012. <<http://news.nationalgeographic.com/news/2007/04/070404-mars-warming.html>>.

<http://jmars.asu.edu>

<http://www.realclimate.org/index.php/archives/2005/10/global-warming-on-mars>

. "Pluto is undergoing global warming, researchers find." <http://web.mit.edu>. Massachusetts Institute of Technology, 9 2002. Web. 23 Oct 2012. <<http://web.mit.edu/newsoffice/2002/pluto.html>>.

Gunter, Lorne. "Warming On Jupiter, Mars, Pluto, Neptune's Moon & Earth Linked to Increased Solar Activity, Scientists Say." <http://epw.senate.gov>. National Post, 12 2007. Web. 23 Oct 2012. <[http://epw.senate.gov/public/index.cfm?FuseAction=PressRoom.Blogs&ContentRecord\\_id=469DD8F9-802A-23AD-4459-CC5C23C24651](http://epw.senate.gov/public/index.cfm?FuseAction=PressRoom.Blogs&ContentRecord_id=469DD8F9-802A-23AD-4459-CC5C23C24651)>.