Science and Public Engagement Within the Columbia Hills Landing Ellipse

Mars 2020 4th Landing Site Workshop, October 16th, 2012



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Thank You For A Wonderful Journey!

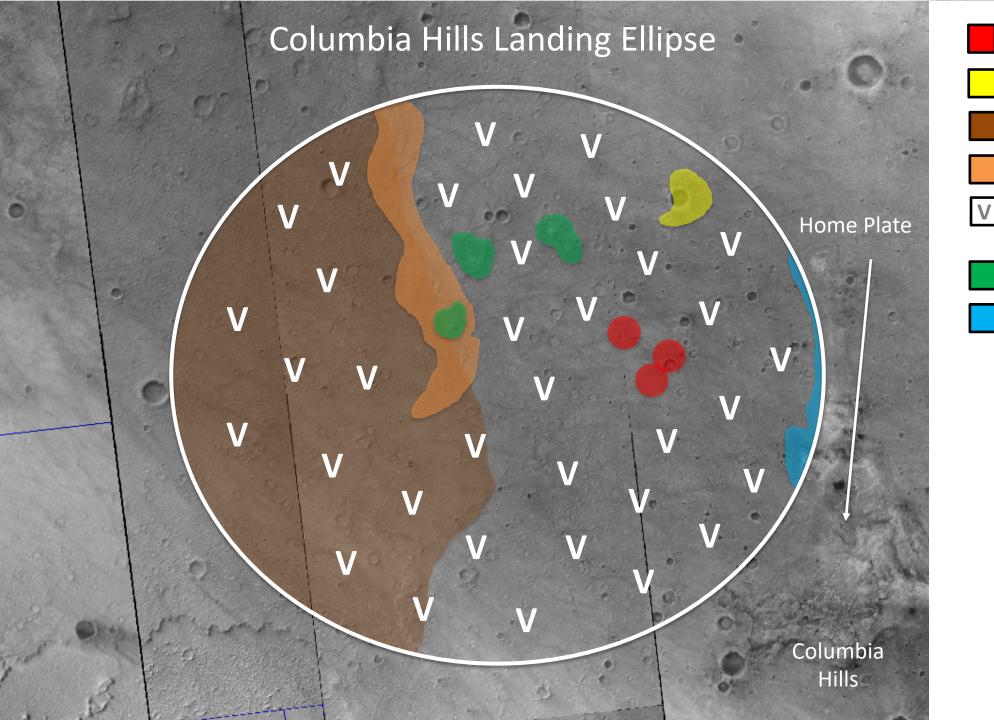


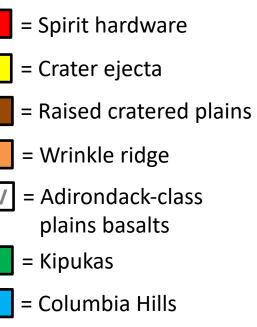
Motivation for In-Ellipse Science

At the "Columbia Hills Site," we can explore the Hills... and what else?



- From the 2nd Announcement: Presentations focusing on **unique/new science content** (...) are encouraged
- From MEPAG: (A high) weight should be applied to targets **close to** (or inside) **the landing ellipse**.





Alteration of Adirondack Plains Basalts

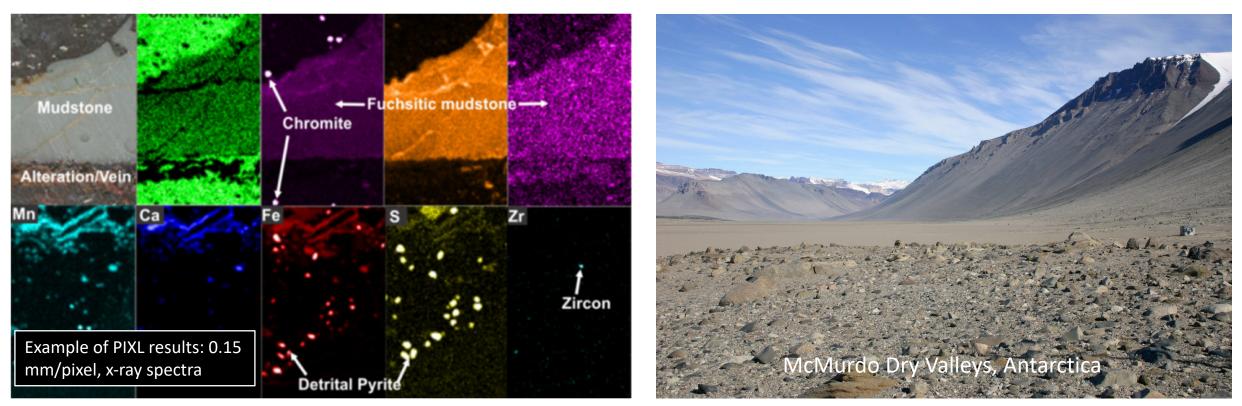
An opportunity to investigate in detail veins in basalt on Mar



Alteration of Plains Basalts

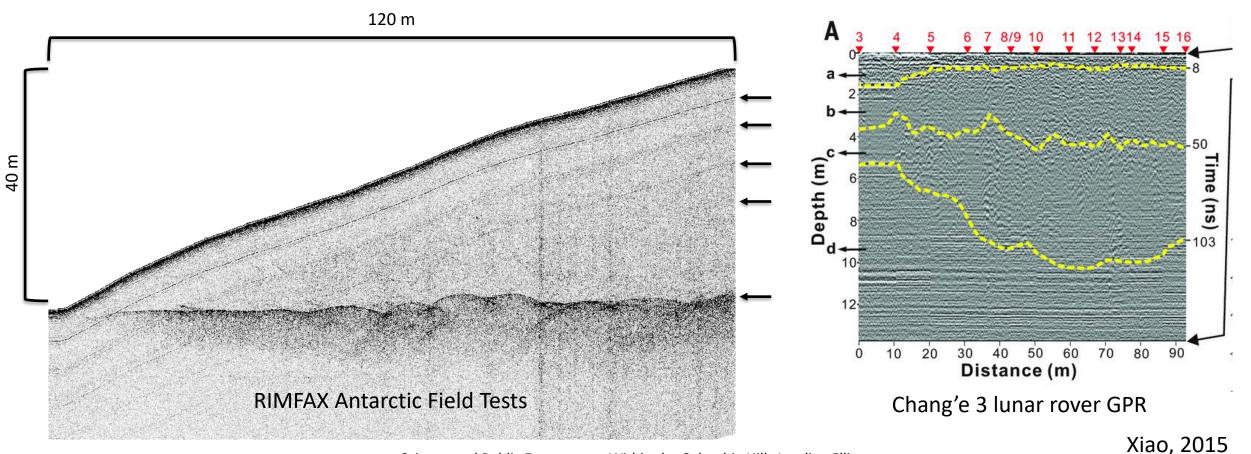
Remaining Questions:

- How long/often were the plains basalts altered? (Alteration at deposition? Condensation from the atmosphere? Transient surface water?) (Haskin et al., 2005)
 - Implications for long-term habitability



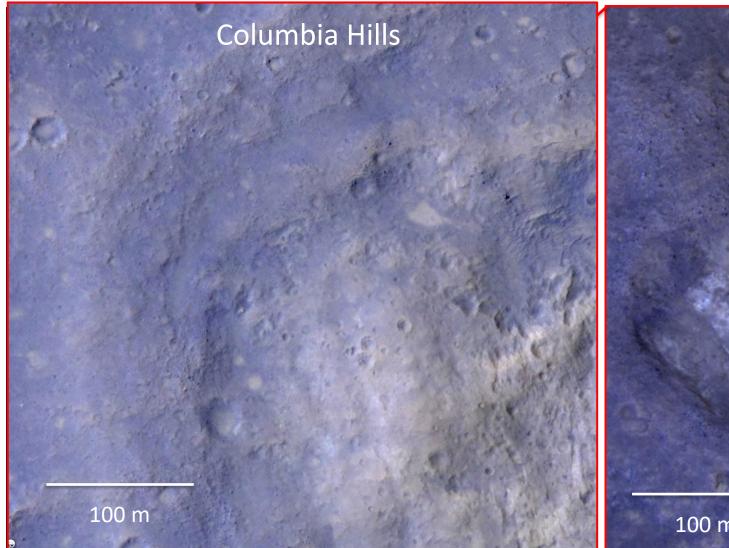
What Can RIMFAX Tell Us About Layering on the Plains?

- How thick is the regolith?
- Is there evidence for multiple lava flows?
- RIMFAX should be able to see potential flow layers below the surface regolith down to 10-30 meters

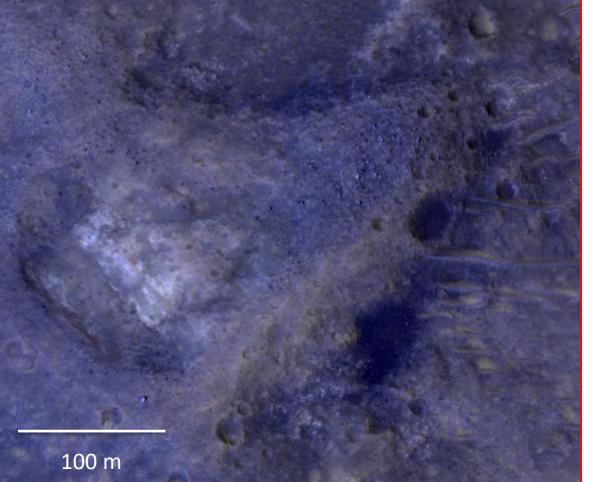


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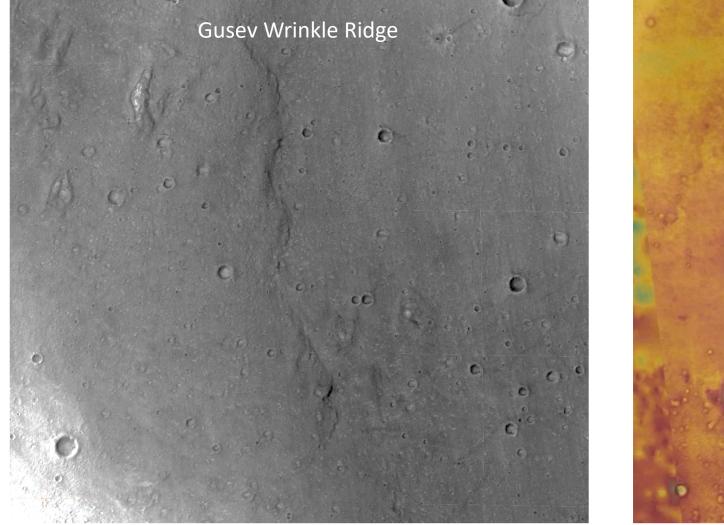
Scouting Unexplored Kipukas in the Ellipse

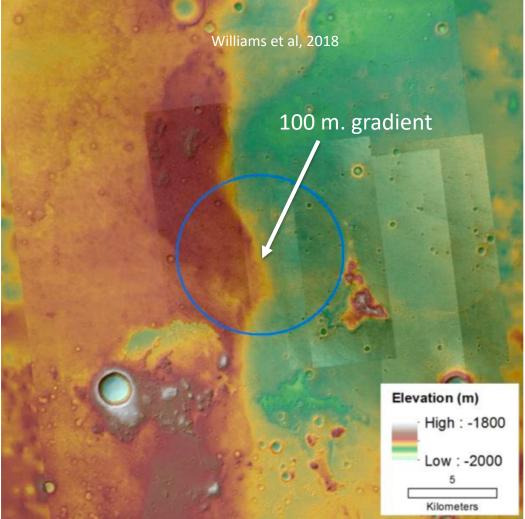


Gusev Plains Kipuka



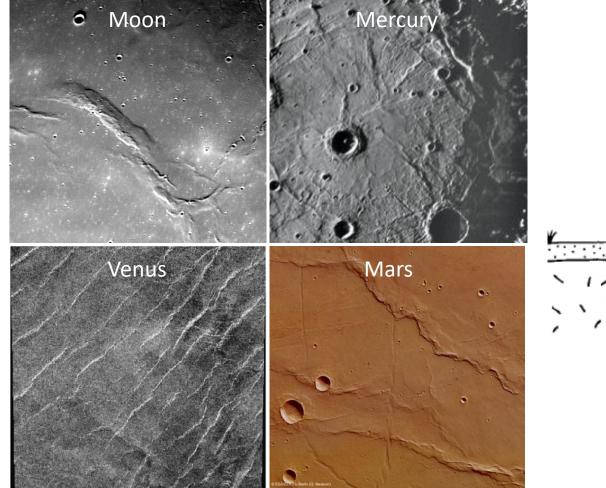
Evidence of Tectonics at a Wrinkle Ridge

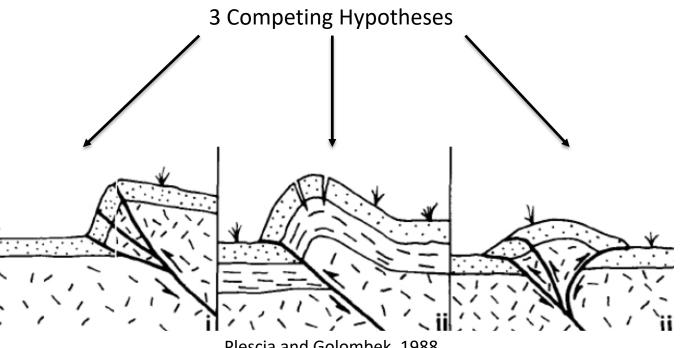




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Evidence of Tectonics at a Wrinkle Ridge

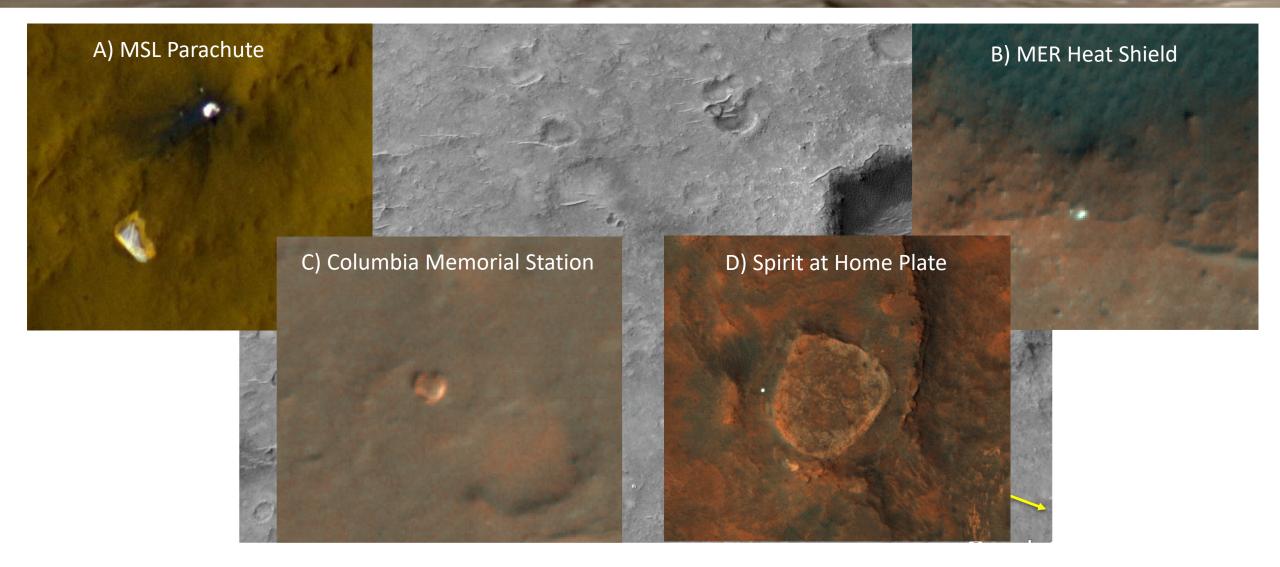




Plescia and Golombek, 1988

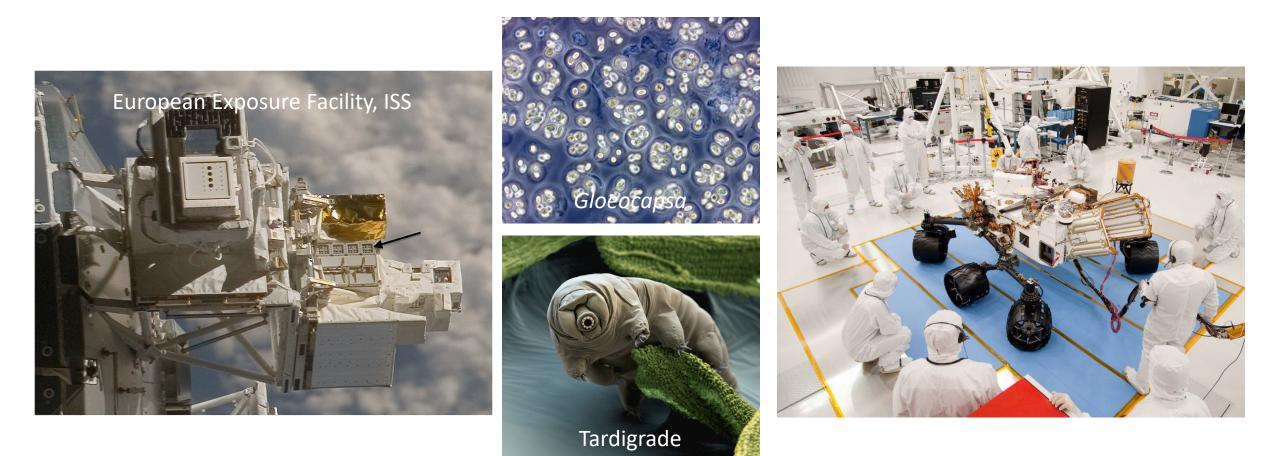
Potentially resolvable with RIMFAX

Inspecting Spirit Hardware



Microbes on Spirit?

With SuperCam, finding Earth organics on Spirit would be a major discovery, astrobiologically and philosophically
Ultimate test for life in extreme environments



Conclusion

• The Columbia Hills ellipse offers numerous "bonus" targets of opportunity which offer so much more to explore



- Scientific targets that can be addressed in the Columbia Hills ellipse, but not at the other sites:
 - A wrinkle ridge
 - Diverse Noachian terrain with low-T fluid-altered rocks
 - Spacecraft hardware which informs human exploration and planetary protection
 - Beloved MER Spirit for outstanding public relations potential

