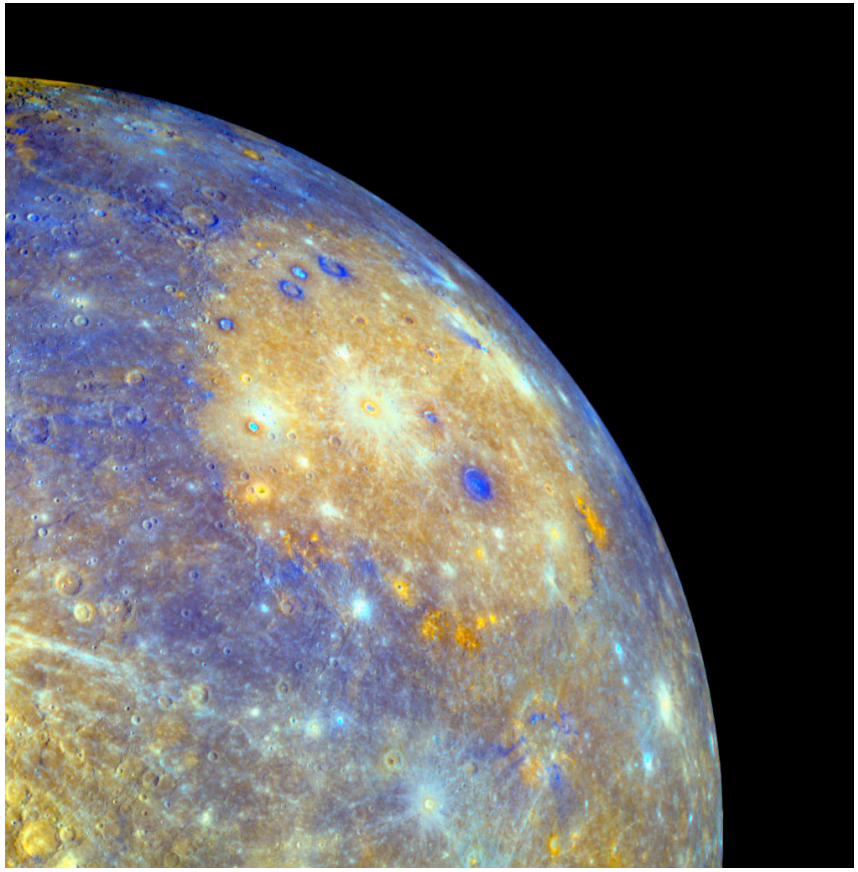
Volcanoes on Mercury

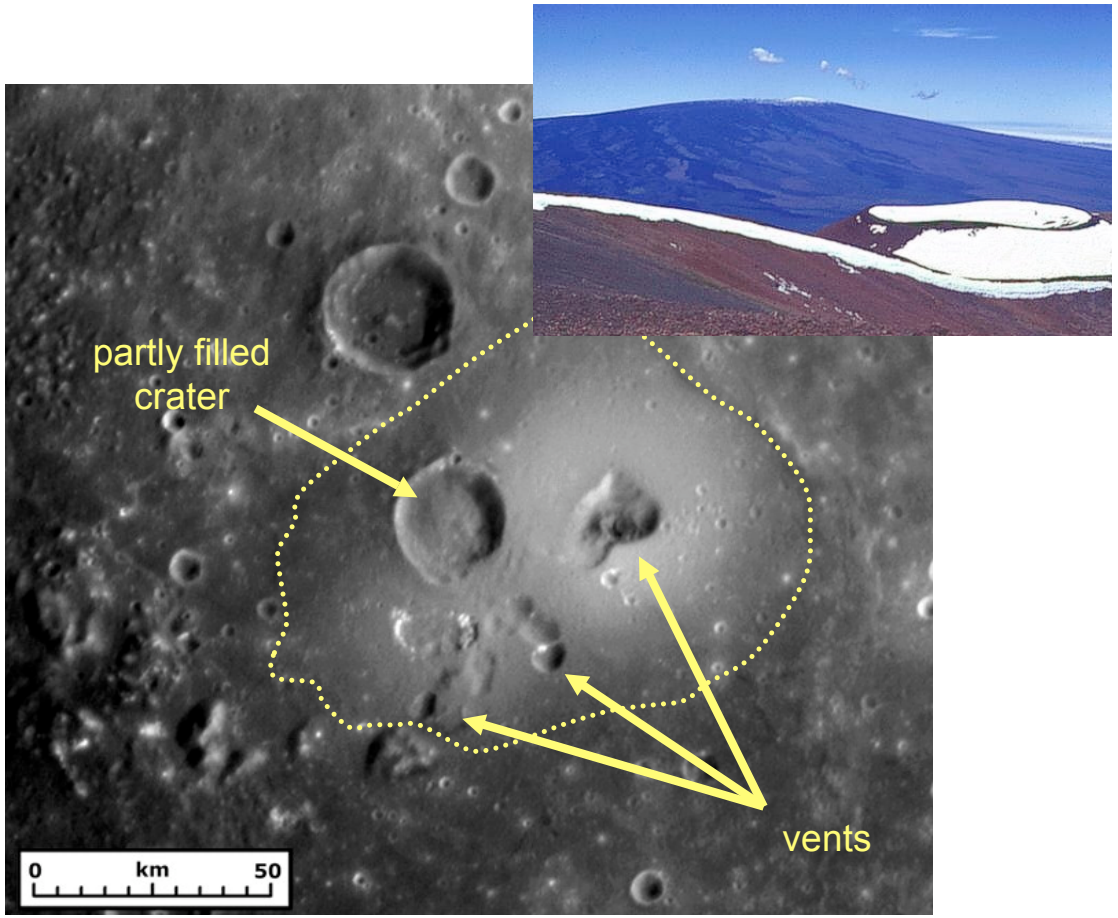
- Mercury appears to be geologically dead and is heavily cratered. There are no large volcanoes like Mars' Olympus Mons, but there are many smooth, flat plains with few craters
- Scientists have debated whether these ancient plains were formed by erupting volcanoes driven by internal heat, or simple melting associated with impact processes
- The latest closeup images by NASA's MESSENGER support the volcano theory



MESSENGER false color image of Caloris impact basin (light orange is the basin interior). Extinct volcanoes were imaged in several of the bright orange regions just inside the southern crater rim.

Direct & Indirect Evidence for Volcanoes

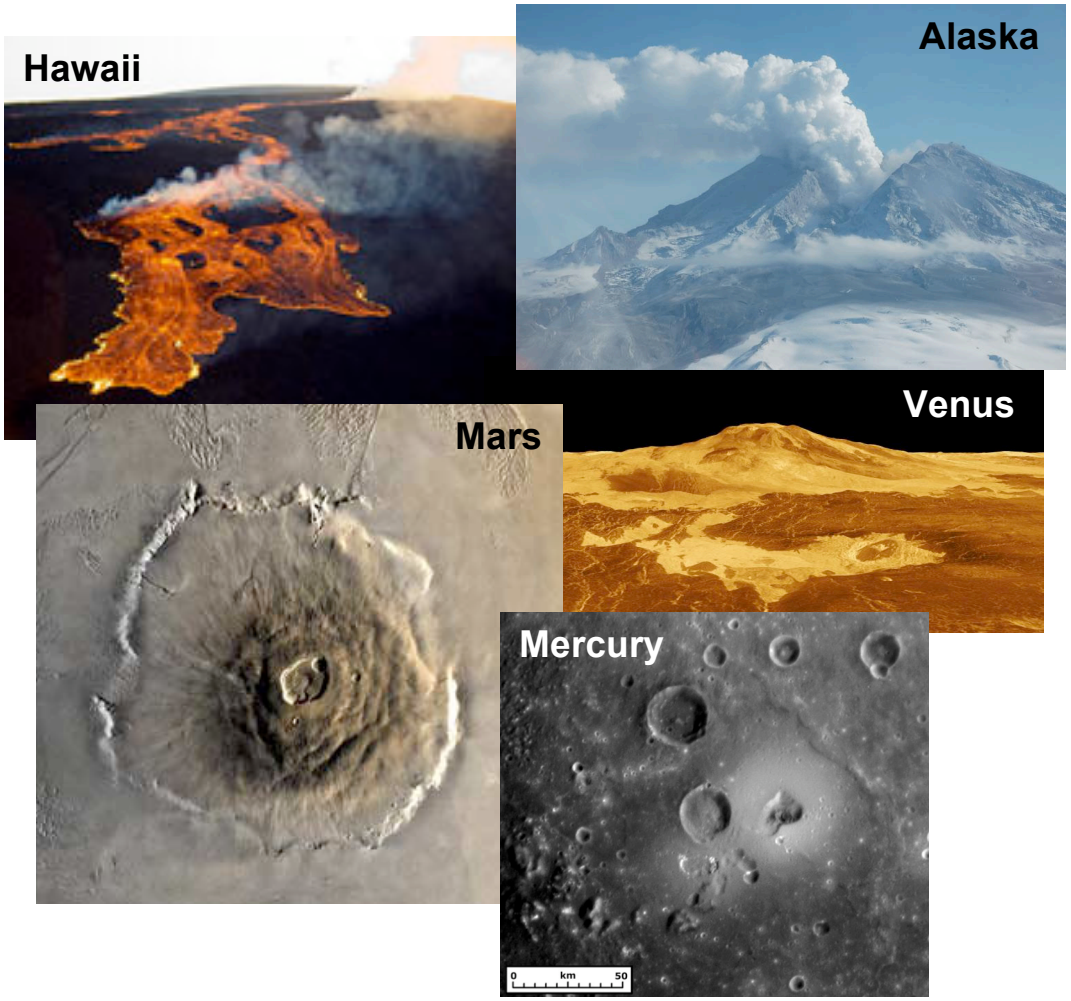
- MESSENGER has found shield volcanoes and vents suggesting explosive volcanism inside the large Caloris basin
- The Mercury volcanoes may be similar to the Hawaiian Islands or Olympus Mons on Mars
- Lava appears to have partly filled impact craters both inside and far from Caloris basin (not shown)



MESSENGER image (left) of a shield-like volcanic dome, multiple vents and associated bright deposits, and partially buried nearby features. Shield volcanism formed the island of Hawaii (right).

The Big Picture

- Volcanism appears to be responsible for formation of Mercury's widespread plains
- Mercury's ancient plains-forming, crater-filling volcanic style was more similar to the Moon than Mars or Earth
- MESSENGER will enter orbit around Mercury in 2011, offering abundant opportunity to image volcanic features and place Mercury's volcanism in a solar system context



Volcanic features in the inner solar system

For more information…

Press Releases

- space.com - 7/3/08 - “Volcanoes on Mercury Solve 30-year Mystery”
  http://www.space.com/scienceastronomy/080703-mercury-messenger.html

Images

- Global view of Caloris basin and Mercury shield volcano courtesy of *Science* / AAAS
  http://messenger.jhuapl.edu/gallery/sciencePhotos/pics/caloris_color_MB.jpg
  http://messenger.jhuapl.edu/gallery/sciencePhotos/pics/Head_Fig1.jpg
- Aerial view of Hawaii courtesy of NASA/JSC STS61A
  http://tinyurl.com/maunaloashieldvolcano
- Aerial view of erupting Mauna Loa in Hawaii courtesy of HVO/USGS
  http://hvo.wr.usgs.gov/
- Image of Alaska’s Redoubt Volcano courtesy of AVO/USGS, taken by Heather Bleick
  http://www.avo.alaska.edu/image.php?id=17872
- Image of Olympus Mons on Mars and Maat Mon on Venus courtesy of NASA/JPL
  http://pds.jpl.nasa.gov/planets/captions/mars/olympus.htm
  http://photojournal.jpl.nasa.gov/catalog/PIA00106

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- Head et al., ‘Volcanism on Mercury: Evidence from the First MESSENGER Flyby’, *Science*, **321**(5885), p. 69, DOI: 10.1126/science.1159256, 2008.
  http://www.sciencemag.org/cgi/content/abstract/321/5885/69

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