Alternative Mars volcanism theory offered

6 August 2007

German scientists have offered an alternative theory involving Martian volcanism.

Sandra Schumacher of the Institute for Planetology at the University of Munster and Doris Breuer of the Institute of Planet Research in Berlin note high-resolution images of Martian volcanoes reveal areas of lava flow.

The youngest flows are about 2 million years old, as evidenced by the lack of impact craters on the flows, and are confined to older volcanoes exhibiting a thickened crust compared with surrounding areas.

Previous studies explained the recent volcanics by hypothesizing strong mantle plumes arising from the core-mantle boundary fueled the melts.

Schumacher and Breuer propose a different hypothesis, whereby the crust insulates the mantle, causing it to cool more slowly than previously expected. Through model simulations, they determined a locally thickened crust with a reduced thermal conductivity and enriched in radioactive heat sources in comparison to the mantle could generate temperature variations in the upper mantle.

Such variations could form partial melts below the crustal lid, which, being more buoyant than surrounding material, could ooze onto the Martian surface.

The theory is detailed in the current issue of the journal Geophysical Research Letters.