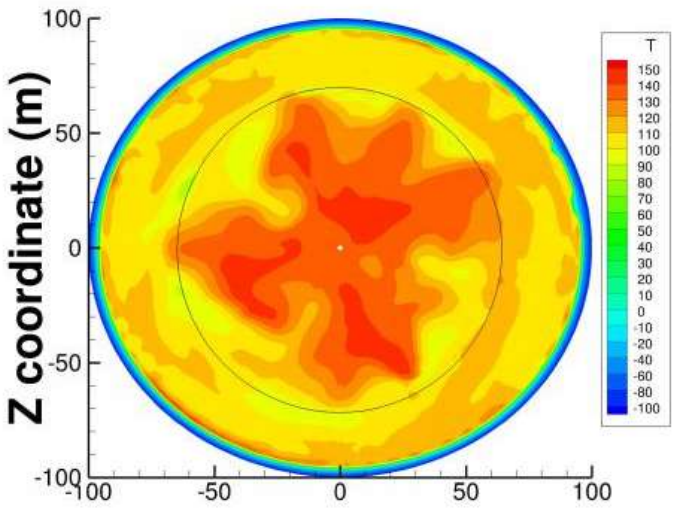
Planets like earth may have had muddy origins

July 14, 2017



These images show temperature maps as simulated by MAGHNUM as a result of mud convection, in a medium sized asteroid (above) and a large asteroid (below). Temperatures are shown in degrees Celcius. Credit: Planetary Science Institute

Scientists have long held the belief that planets – including Earth – were built from rocky asteroids, but new research challenges that view.

Published in *Science Advances*, the research suggests that many of the original planetary building blocks in our solar system may actually have started life, not as rocky asteroids, but as gigantic balls of warm mud.

Phil Bland, Curtin University planetary scientist, undertook the research to try and get a better insight into how smaller planets, the precursors to the larger terrestrial planets we know today, may have come about.

Planetary Science Institute Senior Scientist Bryan Travis is a co-author on the paper "Giant convecting mud balls of the early Solar System" that appears in *Science Advances*.

"The assumption has been that hydrothermal alteration was occurring in certain classes of rocky asteroids with material properties similar to meteorites," Travis said. "However, these bodies would have accreted as a high-porosity aggregate of igneous clasts and fine-grained primordial dust, with ice filling much of the pore space. Mud would have formed when the ice melted from heat released from decay of radioactive isotopes, and the resulting water mixed with fine-grained dust."

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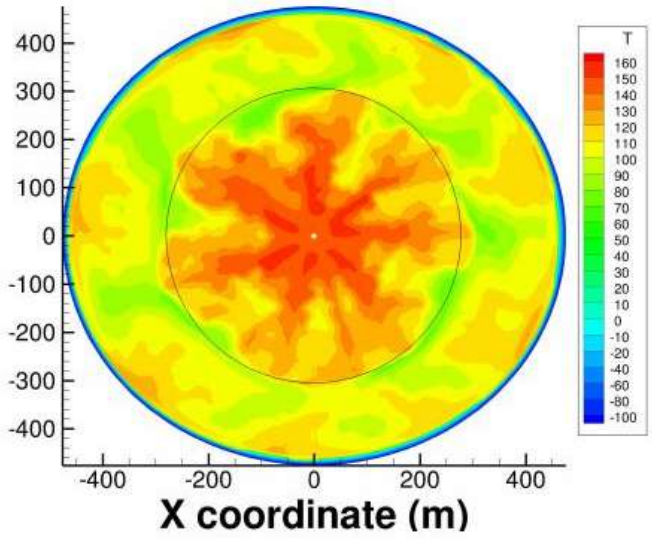

These images show temperature maps as simulated by MAGHNUM as a result of mud convection, in a medium sized asteroid (above) and a large asteroid (below). Temperatures are shown in degrees Celcius. Credit: Planetary Science Institute

Travis used his Mars and Asteroids Global Hydrology Numerical Model (MAGHNUM) to carry out computer simulations, adapting MAGHNUM to be able to simulate movement of a distribution of rock grain sizes and flow of mud in carbonaceous chondrite asteroids.

The results showed that many of the first asteroids, those that delivered water and organic material to the terrestrial planets, may have started out as giant convecting mud balls and not as consolidated rock.

The findings could provide a new scientific approach for further research into the evolution of water and organic material in our solar system, and generate new approaches to how and where we continue our search for other habitable planets.

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More information: Giant convecting mud balls of the early solar system, *Science Advances* 14 Jul 2017: Vol. 3, no. 7, e1602514, **DOI: 10.1126/sciadv.1602514** , http://advances.sciencemag.org/content/3/7/e1602514

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Steelwolf not rated yet Jul 15, 2017

Muddy-body planetisimals might well be an even better starting place for life, and likely much more numerous, than planetary surfaces would be.

Dingbone not rated yet 15 hours ago

I think that first planets condensed from dust and interstellar clouds in larger extent, than the planetesimal theory considers (a similar conceptual shift from "merger mania" we can perceive in "top-to-bottom" theories of galactic formation by now). This is an example of general shift to time-reversed "bottom-up" paradigm in physics, which we can also observe in quantum mechanics (retrocausality), solid state physics (Dirac fermion materials) and general relativity theories (dark matter). IMO it's not accidental, that the time-reversed models gain credit together just in the current epoch of reality understanding.

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