New hypothesis on crater debris

September 27 2011

A team of researchers partnered with the NASA Lunar Science Institute (NLSI) has developed a new hypothesis for the origin of crater ejecta—debris that is launched out of a crater during meteorite impacts.

These findings may help scientists target samples for extraction during future missions to asteroids and terrestrial bodies such as Mercury, Venus, the moon and Mars. The results are published in the Sept. 21, 2011, issue of the Elsevier journal, *Earth and Planetary Science Letters*.

The science team, led by professor Gordon Osinski at The University of Western Ontario, London, Ontario, compared observations of ejecta from all terrestrial planets. The observations showed that ejecta deposits all contained more than one layer.

"Understanding ejecta is critical for understanding the context of samples collected by humans and robots during previous missions and may aid in targeting future sample return missions to the moon, Mars and beyond," said Osinski.

Craters formed on the surfaces of planetary bodies, including the Earth, by high-speed impacts, are a basic landform on all the solid planets in the solar system. In prevailing models, a continuous sheet of ejected material forms during the excavation stage of cratering. Osinski and his team suggest that this stage is followed by a second major episode of ejecta emplacement during the final moments of crater formation – something that has not been taken into account in any previous models of crater formation. This second episode takes the form of flows of

material molten by the impact event, which originates from deeper below the surface, potentially offering a unique window into planetary interiors. A more thorough understanding of the composition of planetary interiors reveals important insights into the history of how our solar system formed.

“It is rewarding to see that our international collaborations within the NASA Lunar Science Institute continue to make an impact on current theories and challenge fundamental principles in the field of lunar science,” said NLSI Director Yvonne Pendleton.

Provided by JPL/NASA

Citation: New hypothesis on crater debris (2011, September 27) retrieved 25 April 2024 from https://phys.org/news/2011-09-hypothesis-crater-debris.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.