Submitted to EGU April 2016

Title: The Geology of Pluto and Charon as Revealed by New Horizons

Authors: Jeffrey M. Moore (1), John R. Spencer (2), William B. McKinnon (3), S. Alan Stern (2), Leslie A. Young (2), Harold A. Weaver (4), Cathy B. Olkin (2), Kim Ennico (1), New Horizons GGI Team (2,4)

(1) NASA Ames Research Center, Moffett Field, CA 94035, United States (jeff.moore@nasa.gov), (2) Southwest Research Institute,1050 Walnut St. Suite 300, Boulder, CO 80302, USA, (3) Dept. Earth and Planetary Sciences, Washington University, St. Louis, MO 63130, USA, (4) Johns Hopkins University Applied Physics Laboratory, Laurel, MD 20723, USA

NASA's New Horizons spacecraft has revealed that Pluto and Charon exhibit strikingly different surface appearances, despite their similar densities and presumed bulk compositions. Much of Pluto's surface can be attributed to surface-atmosphere interactions and the mobilization of volatile ices by insolation. Many valley systems appear to be the consequence of glaciation involving nitrogen ice. Other geological activity requires or required internal heating. The convection and advection of volatile ices in Sputnik Planum can be powered by present-day radiogenic heat loss. On the other hand, the prominent mountains at the western margin of Sputnik Planum, and the strange, multi-km-high mound features to the south, probably composed of H_2O, are young geologically as inferred by light cratering and superposition relationships. Their origin, and what drove their formation so late in Solar System history, is under investigation. The dynamic remolding of landscapes by volatile transport seen on Pluto is not unambiguously evident on Charon. Charon does, however, display a large resurfaced plain and globally engirdling extensional tectonic network attesting to its early endogenic vigor.