Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PPS05-02 会場:106 時間:5 月 27 日 14:30-14:50

MARS PLATE-TECTONIC-BASEMENT
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Dohm James[1*] ; 丸山 茂徳 [2] ; 宮本 英昭 [1] ; 新原 隆史 [1]
DOHM, James[1*] ; MARUYAMA, Shigenori[2] ; MIYAMOTO, Hideaki[1] ; NIIHARA, Takafumi[1]

[1] 東京大学　総合研究博物館, [2] 東工大
[1]UMUT, [2]TiTech

Introduction: The Hadean-age-equivalent (>4.0 Ga) Martian basement complex has heretofore been difficult to characterize. This is due to extensive modification by the Late Heavy Bombardment and subsequent impacts, as well as chemical alteration of the primary rocks (including weathering rinds, clay minerals, Al/Fe oxides/hydroxides, sulfates, and evaporite deposits). Obscuration of a felsic basement includes erosion of the terrain predominantly through wind and water activity, as well pervasive mantling by wind- (e.g., aeolian), water- (e.g., fluvial, alluvial, colluvial, glacial, periglacial), and volcanic- (airfall deposits, lava flows materials, fine-grained volcanic spherules transported by wind) related materials.

Yet, unlike the Hadean rocks that have been obliterated on Earth, the Hadean-age-equivalent ancient Martian basement is still preserved. This is because an Earth-like phase of Mars, including an active dynamo and hypothesized plate tectonism, terminated sufficiently early in its evolutional stage to archive early Mars rocks, early solar system history, and possibly evidence of early life. New evidence for plate tectonism includes a systematic, spatial arrangement of landforms, referred to as the Claritas subduction zone region that is strikingly similar to the plate-tectonic-modified landscapes of the western US that resulted from plate migration and subduction, including the subduction of the denser mafic Farallon Plate beneath the lighter felsic North American Plate. We will present this finding and additional evidence for a Hadean-age-equivalent phase of plate tectonism on Mars and its implications. For greater details see [1].

[1] Dohm, J.M., Spagnuolo, M.G., Williams, J.-P., Viviano-Beck, C.E., Karunatillake, S., Alvarez, O., Anderson, R.C., Miyamoto, H., Baker, V.R., Fairen, A., Mahaney, W.C., Hare, T.M., Robbins, S.J., Niihara, T., Yin, A., Judice, T., Olsen, N., Maruyama, S., 2015. The Mars Plate-Tectonic-Basement hypothesis. 46th Lunar and Planetary Science Conference, Abstract 1741.

Keywords: mars, plate tectonics, basement, felsic