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GEOLOGIC HISTORY OF KASEI VALLES AND URANIUS DORSUM M. G. Chapman[1], A. Dumke[2], E. Hauber[3], G. Michael[2], G. Neukum[2], S. van Gasselt[2], S. C. Werner[4], W. Zuschneid[2]; [1]U.S. Geological Survey, Flagstaff, AZ, 86001, USA; [2]Institute of Geosciences, Freie Universitaet Berlin, 12249 Germany; [3]Institute of Planetary Research, German Aerospace Center (DLR), 12489 Berlin, Germany; [4]Geological Survey of Norway (NGU), 7491 Trondheim, Norway. mchapman@usgs.gov

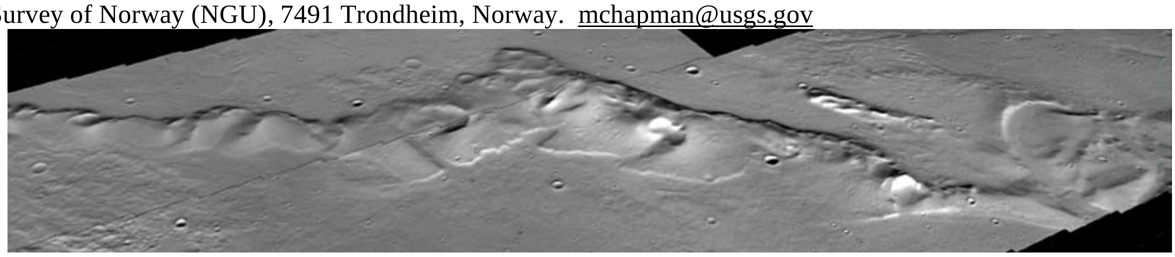

Figure 1. East Uranius Dorsum oblique view; THEMIS VIS images over MOLA topography; view from north.

Introduction: Kasei Valles extends nearly 3000 km north from Echus Chasma (lat 1°S, long 80°W) and turns sharply east (lat 20°N, long 75°) W. to debouch into Chryse Planitia. Uranius Dorsum is a prominent ridge on the NW edge of Kasei that trends NE parallel to scour marks within north Kasei Valles. It is distinctly different in appearance from local wrinkle ridges that trend NW. We are mapping Kasei Valles to determine geologic history and the origin of the channel and unusual features like Uranius Dorsum. The channel cuts into Hesperian material (unit *Hr*) of the Lunae Planum and Tempe Terra plateaus, and Tharsis lava units *At4* and *At5* cover large parts of the channel floor [1]. As Uranius Dorsum lies on the floor of Kasei Valles, it postdates emplacement of unit Hr.

Summary and Discussion: Using the production function coefficients of Ivanov [2] and the cratering model of Hartmann and Neukum [3] to derive absolute ages, our crater counts of the unit *Hr* indicate an average age between 3.6 to 3.8 Ga. Ancient east-trending grooves and streamlined islands were known to have cut Labeatis and Sacra Mensae, remnants of high plateau material (near 25°N.) in north Kasei [1]. Our efforts show additional east-trending streamlined islands farther north (34°N) on the high plateau of Tempe Terra, at least 1 km above the Kasei floor [1]. Island heights (50-100 m) and distribution indicate the ancient source floods from Tharsis (to the west) were widespread and voluminous. Crater counts indicate that this erosion took place around 2.98 Ga. On the Kasei floor, the lava plains north of Uranius Dorsum are part of younger lava unit *At4*. The *At4* lavas north of the dorsum were emplaced around 2.6 Ga. Northeast of about the mid-point of Uranius Dorsum, unit *At4* lavas show indications of flood erosion, and here form moated areas around Labeatis and other mensae with crater ages of 1 Ga to 1.6 Ga [4]. South of the ridge, resistant materials (lava flows?) that are cut by Kasei erosion date from 1.3 Ga. The ridge area is too small for accurate crater counts, but it likely was emplaced between 1.3 to 2.6 Ga. Farther to the south, the eroded floor of Kasei is overlain by lavas of unit *At5*. Emplacement of unit *At*5 took hundreds of Ma (ranging from 1.6 Ga to 90 Ma) and overlapped relatively young episodic Kasei floods from Echus Chasma to the south.

Uranius Dorsum is topographically much higher than lava terminations in the area or west on the flanks of the Tharsis rise. The Dorsum extends 2° farther west (120 km to longitude 80°W) into the Tharsis flank than previously mapped [1], and its trend parallels that of ancient floods from Tharsis. The dorsum has 58 aligned mounds along its length; each with a central pit (Fig. 1). Some mounds have nested pits and one shows material extending away from its pit. The ridge has a prominent frontal scarp on its south boundary. Many closely-spaced incisions cut the ridge (and frontal scarp) roughly perpendicular to its length, and parallel to the north trend of young Kasei Valles floods from Echus. In some places these incisions outline streamlined blocks of ridge material. Of the aligned ridge mounds, 47 are breached via their central pits in a northern direction. This trend and streamlined blocks of ridge material suggest Uranius Dorsum predated and was eroded by younger Kasei floods from Echus. The frontal scarp may be due to erosion by Kasei or ridge material abutting ice. Hypothetical ridge origins include formation as a flood levee, glacial moraine, littoral volcanic cones, mud volcanoes, and fissure-fed volcanic cones.

References: [1] Chapman, M. et al. (2007) *LPSC XXXVIII*, Abs. #1407. [2] Ivanov, B. A. (2001) *Space Sci. Rev.*, 96(1), 87–104. [3] Hartmann, W. K., and G. Neukum (2001) *Space Sci. Rev.*, 96, 165–194. [4] Hauber, E. et al. (2007) *LPSC XXXVIII*, Abs. #1666.