Olympus Mons Missing Volume Calculation – VERSION 2

1Uses input DEM

Olymons centered at 18.42N, 226..83E

DEM average pixel dimension 463m

Method –

Rays radiate from caldera center to points along the rim trace defined by PMM. At each pixel along the trace we calculate the direction out from the center and increment the distance by 1 pixel. At each pixel, we calculate the elevation along that ray based upon distance from start point and slope angle. We have used slopes of 1, 1.5, and 2 degrees. Points in the dem not covered by the rays are filled in by averaging neighboring pixels.

Directory location is /home/harold/Downloads/olymons moved to 4\_pmm/olymons\_missvolume

DEM – *OlyMons2* with *olyshade* for display

Results in version2 subdirectory

Output files are :

Outrays\_1deg – which is image with all values of -99999 except for points along the rays which are assigned elevations based upon distance from start and slope angle. There is a 1deg, 1p5deg (1.5 degrees) and 2 deg file

Outrays\_fill\_1deg – Pixels between the rays are interpolated to produce a solid region for the missing volume

Surf\_minus\_1deg – Produced from outrays\_fill\_deg minus the dem will represent the filled volume.

Surf\_plus\_1deg – Produced by adding the missing volume to the dem.

**Missing area and volume results**

2.5 degree slope –

ROI – 841763 pixels

Area – 1.80E11m2 or 1.8E5km2

Volume – 4.96E14m3 or 4.96E5km3

Mean Thickness – 2749m

*2 degree slope* –

ROI - 1096804 pixels

Area - 2.35E11 m2 or 2.35E5 km2

Volume – 7.023E5 km3

Mean Thickness – 2987 m

1.5 degree slope –

ROI – 1547923 pixels

Area – 3.318E11 m2 or 3.318E5 km2

Volume – 1.06 E15 m3 or 1.06E6 km3

Mean thickness – 3179 m

1 degree slope –

ROI = 2691274 pixels

Area = 5.77E11 m2 or 5.77E5 km2

Volume = 1.888E15 m3 or 1.88E6km3

Mean Thickness = 3272 m