THICKNESS OF THE WESTERN MARE BASALT, R. A. De Hon, Department of Geosciences, Northeast Louisiana University, Monroe, LA 71209.

An isopach map of the basalt thickness in the western mare basins is constructed from measurements of the exposed external rim height of partially buried craters (1,2). The data, although numerically sparse, is sufficiently distributed to yield gross thickness variations. The average basalt thickness in Oceanus Procellarum and adjacent regions is 400 m with local lenses in excess of 1500 m in the circular maria. The total volume of basalt in the western maria is estimated to be in the range of 1.5 x $10^6 km^3$.

Oceanus Procellarum and the western maria (Fig. 2) are largely composed of contiguous and superposed circular basins. The youngest basins are readily identified by a large number of basin-related features (3) such as encircling mountainous rings, relatively thick interior basalt lenses, concentric ridge patterns, and positive gravity anomalies (4). Older basins retain progressively fewer identifying features. Mare Imbrium (35°N; 15°W), Mare Humorum (25°S; 20°W), and Mare Vaporum (15°N; 3°E), and Sinus Medii (1°N; 0.5°E) are among those basins which retain a circular outline. Mare Cognitum (10°S; 20°W) and Mare Nubium (25°S; 15°W) are composite structures of contiguous basins, as is the Flamsteed-Reiner axis (10°S; 40°W to 15°N; 65°W) of thick basalts in western Oceanus Procellarum. Thick basalt lenses suggest the presence of older, nearly obliterated basins in the Stadius-Sinus Aestuum region (10°N; 10°W), as well as in east Oceanus Procellarum (20°N; 40°W) adjacent to southwest Mare Imbrium (5).

In general, the correlations noted between basalt surface features and basalt thickness in the eastern maria (2) also prevail in the western maria, but some exceptions are apparent. Positive gravity anomalies are associated with most thick basalt discs. Mare ridges are located at the sites of buried topographic rises or in zones of transition between thin and thick basalts. Mare domes are located on relatively thin basalts associated with regional rises of the basement topography. Regional variations of basalt surface elevations mimic the subsurface relief. Most rilles are located in thin basalts parallel of subparallel to zones of equal thickness. However, many rilles are not restricted to mare basalts; rather, they cut mare material and terra with nearly equal development.

Any comparison of the eastern and western maria draws attention to a distinct difference in the distribution of the mare basalts are emplaced in low-lying terrain forming an inverted yoke around the central highland, earth-facing bulge. The chief distinction between the eastern and western maria appears to be one of basalt volumes erupted to the surface. Maximum volumes of basalt are deposited west of the central highlands and flood

THICKNESS OF THE WESTERN MARE BASALT

De Hon, R. A.

subjacent terrain to a greater extent than on the east. The eastern basalts are more discontinuous, being restricted to basins and associated lowlands with only minor overflow connecting the basalt surfaces of separate centers of accumulation. On the other hand, the western mare basins are submerged beneath a thicker mantle of basalts and are connected by an almost continuous surface of basalt over a much larger area. Surface features, such as rilles, are restricted to the mare basalts in the eastern maria and can be attributed to stresses internal to the basalts. These stresses may be either the result of volume reduction or isostatic sinking of the surface. Similar structures of the western maria transect basalt and highland materials; hence, they are related to less restrictive stresses. The surface structures of the western maria reflect the probability of a greater degree of isostatic response to a larger surface loading by the greater accumulation of mare basalt.

References
(1) Eggleton, R. E. (1963) in Astrogeol. Studies 1963-1964, U. S. Geol. Survey, 19-31.
(2) De Hon, R. A. and Waskom, J. D. (1976) Proc. Lunar Sci. Conf. 7th, 2729-2746.
(3) Moore, H. J. et al. (1974) Proc. Lunar Sci. Conf. 5th, 71-100.
(4) Muller, P. M. and Sjogren, W. L. (1968) Science, 160, 680-684.
(5) De Hon, R. A. (1979) This volume.

THICKNESS OF THE WESTERN MARE BASALT

De Hon, R. A.

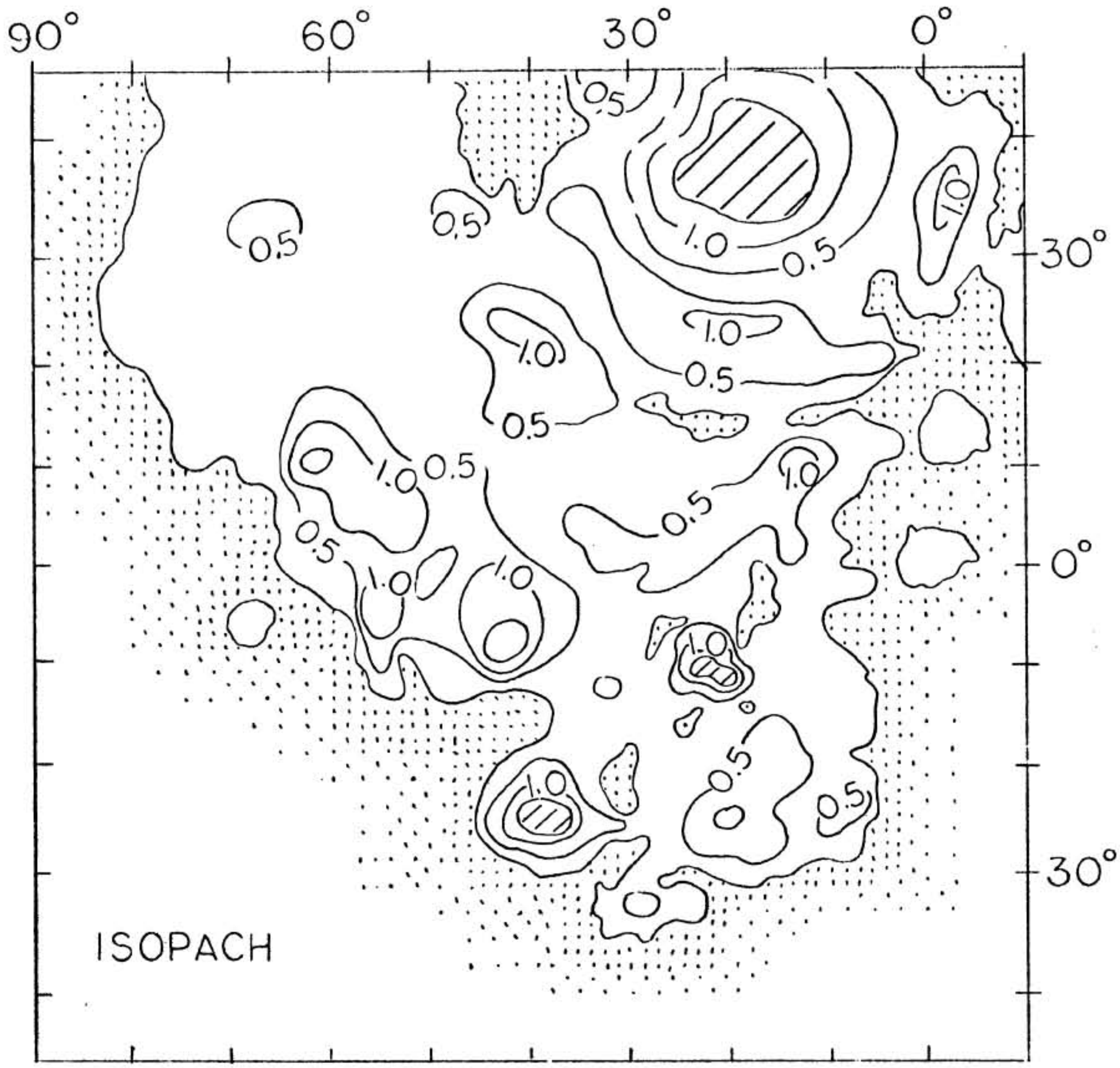

Figure 1. Isopach map of the western mare basalts. Isopach interval is 0.5 km.