FECUNDITATIS: BASIN STRUCTURE AND MARE RIDGES. J.D. Waskom, Northwestern State Univ., Natchitoches, La. 71457, and R.A. DeHon, Univ. of Arkansas, Monticello, Ark. 71655.

Mare Fecunditatis is an irregularly-shaped mare basin on the eastern portion of the visible lunar disc. The mare surface is approximately 600 km across in an east-west direction, 850 km in the north-south direction, and includes approximately 400,000 km^2 of exposed Imbrian age mare basalts. Undifferentiated Imbrian-pre-Imbrian terrian materials form most of the materials around the basin along with crater materials of all ages. Prominent craters in or near the basin (Fig. 1) include Copernican age craters--Taruntius and Langrenus--and pre-Imbrian age craters--Columbo, Gutenberg and Goclenius.

There is a close correlation between surface topography and basalt thickness. In general, broad surface depressions tend to be associated with areas of increased basalt thickness. It follows that most surface depressions also overlie depressions of the basin floor. This reflection of basin floor topography in surface topography might result from either post-flooding subsidence of thick lenses or volume reduction of mare lavas upon cooling and crystallization.

The central deep portion of the Fecunditatis basin is smaller than multi-ringed basins and the positive gravity anamoly is smaller in absolute magnitude and areal extent (1) than that of well-developed circular basins. Scott (2), upon examining the gravity anamolie, concludes that local variations in thickness of mare basalt within moderate-size buried craters will account for the relatively small mascon and that the absence of a large positive anamoly in Fecunditatis discounts that it was the site of a large basin-forming impact. We are in agreement with (3) and (2) that the central Fecunditatis depression appears to be localized around one or more sub-basin-sized craters.

When mare ridge patterns, trends and clusters are compared with the isopach map (4), there is an apparent correlation between these patterns and basalt thickness configuration. In the thickest portion the basin ($3^{\circ}S$; $50^{\circ}E$), which corresponds to the gravity high, there are few wrinkle ridges present. However, to the north and east of this thick zone of mare material there are ridges associated with an abrupt increase in thickness. Many ridges are associated with this zone and tend to form a larger arcuate pattern which has the same general curvature as the thicker portion of the basin. The other two deep portions of the basin ($2^{\circ}S$; $45^{\circ}E$ and $8^{\circ}S$; $46^{\circ}E$) are located in areas where there are no wrinkle ridges present on the surface of mare material. There are, however, numerous ridges associated with an abrupt increase in thickness in the zone between those two areas of thick mare material. Possible shelf areas of the basin ($3^{\circ}N$; $49^{\circ}E$ and $10^{\circ}S$; $52^{\circ}E$) are indicated by sparse clusters of ridges all with the same general north-south trend.

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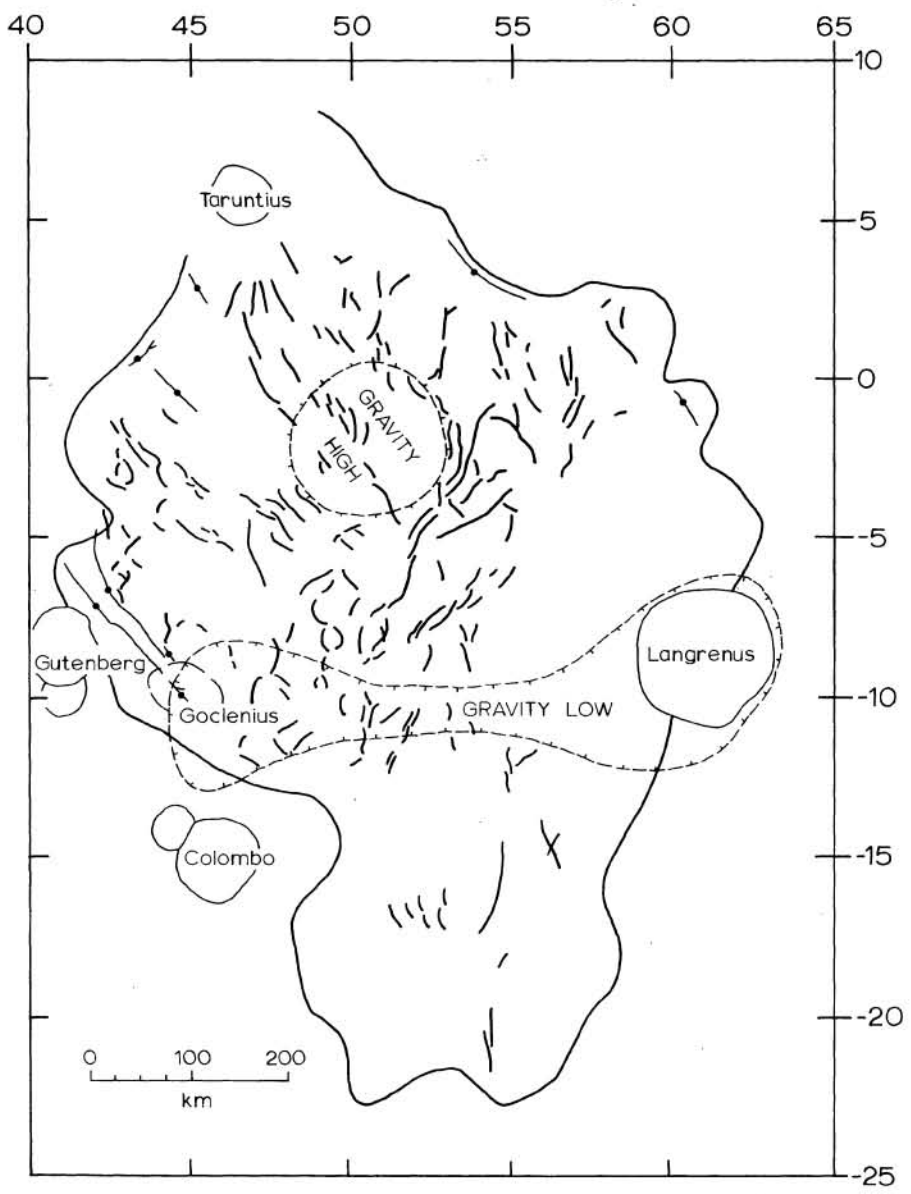

Fig. 1. Surface features of Mare Fecunditatis. Mare ridges shown as arcuate lines marking axis of ridge.

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Shallow areas at or near the margin of the basin have few or no ridges associated with them.

In summary, there is a direct correlation between wrinkle ridge patterns and areas of different thicknesses of mare material. Wrinkle ridge patterns, trends and clusters are associated with changes in the basin floor configuration. Shallow areas of the basin are indicated by the absence of/or few wrinkle ridges. There is an increase in the number of wrinkle ridges in intermediate shelf areas. There is also a large concentration of ridges in areas of sudden change in both thickness and floor configuration. Finally, there is an absence of ridges in areas of extreme thickness of mare material.

Although we have not specifically confronted the problem of the origin of mare ridges, the results of this study do place restructions on hypothesis of origin. Mare ridges are demonstrated to have a restricted occurrence with respect to the thickness of the mare basalts and the sub-basalt basin structure. We suggest that any proposed mode of origin must account for this preferred location.

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