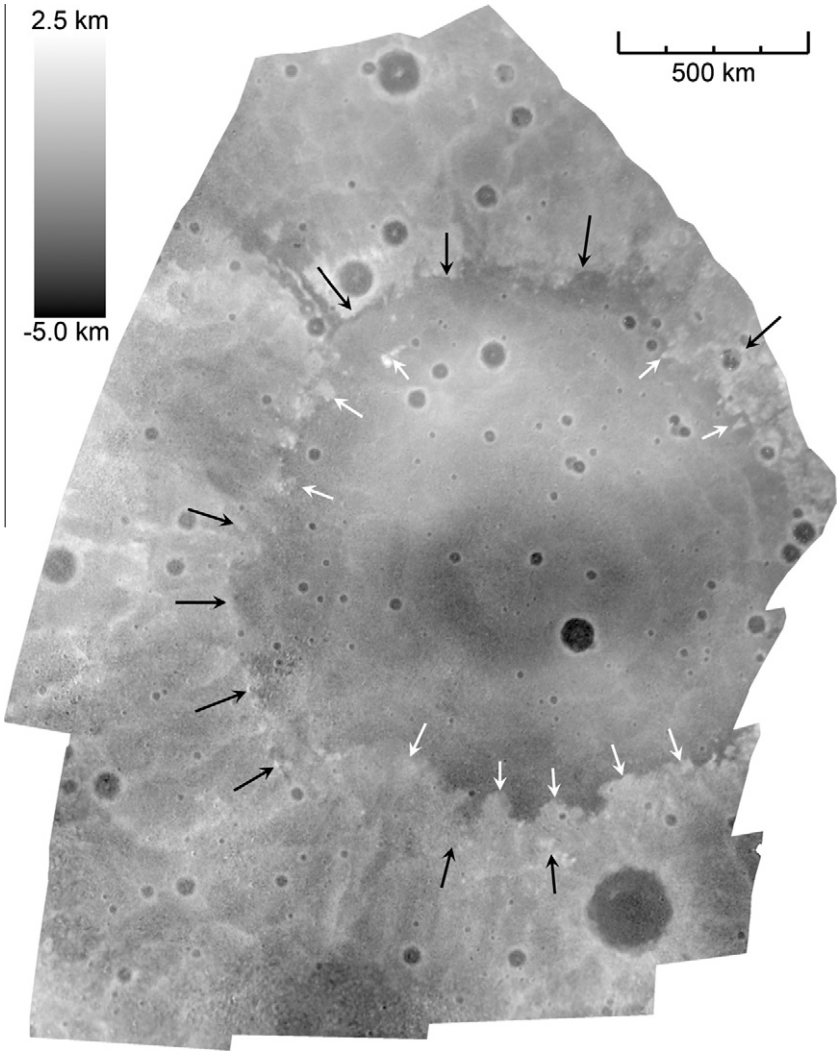

Fig. 2. Grey-scale representation of the Caloris basin DTM. Black and white arrows mark segments of the outer and inner rings, respectively, of the basin rim region.

Murchie et al. (2008). The two rings are centered at 31.7°N, 161.5°E.

There is further evidence for two or perhaps three circular concentric topographic highs within the basin (see Fig. 3, marked points A–C) at radii of approximately 315, 530, and 640 km, respectively. These highs represent modest variations in elevation with a horizontal scale of 50–100 km and with amplitudes of approximately 300 m. Although these highs can be difficult to identify in single profiles, the circular pattern becomes visible in the two-dimensional representation of the DTM. This pattern provides tentative confirmation of earlier suggestions of inner rings from Mariner 10 images (Spudis and Guest, 1988; Murchie et al., 2008). At the resolution and limited coverage of the DTM, we do not find clear evidence of rings outward of those identified here, as suggested by Spudis and Guest (1988) from Mariner 10 observations.

4.3. Pre-Caloris topography?

From inspection of the area around Caloris, it is difficult to determine a mean pre-impact elevation level, consistent with the possibility that the Caloris impactor hit rugged terrain with substantial topography in the form of pre-existing basins or large craters. We suggest that some of the Caloris basin-rim topography and its lack of continuity may be related to pre-Caloris topography. The rim structure shows significant asymmetry in level of preservation (see discussion above) as a function of radial range and sector, similar to what has been reported from studies of lunar impact basins, such as Imbrium (Head, 1982). From lunar studies it is known that where the pre-existing topography was large, the basin rim crest can be poorly developed. Some pre-Imbrium-basin lows are known to have influenced the subsequent Imbrium mare fill. We find traces of several pre-Caloris basins and smaller craters, tentatively marked in Fig. 7.

4.4. Caloris interior plains

The DTM provides critical data for assessing the nature of post-Caloris plains. It indicates that the interior topography of Caloris is smoother on average than its surroundings. Smooth areas follow the geologic boundaries of the basin rim. These characteristics support the idea that the interior of the basin was infilled by extensive volcanism (Murchie et al., 2008; Head et al., 2008).

It is instructive to compare the morphology of Caloris with those of lunar impact basins. Single profiles across prominent basins were selected from Clementine lunar topography (Smith