



Fig. 2. A) CTX mosaic of images P01\_001553\_2232 and P01\_001619\_2232, showing the ~8 km impact crater superposed on the ~32 km crater. The floors of both craters show evidence for significant modification of the surface. B) MOLA topography (color) over CTX data. MOLA tracks that intersect two craters are shown. C) MOLA track 17237. Circled numbers indicate portions of the crater described in the text. D) MOLA track 13024.

craters" (Kress and Head, 2008), unusual impact crater structures that suggest the presence of buried ice at the time of and subsequent to the impact event.

Mars Orbiter Laser Altimeter (MOLA) profiles show that the floor of the crater is asymmetric and generally slopes poleward (Fig. 2B–D). We subdivided the interior of the crater into five distinct segments from south to north: 1) the steep upper part of the southern interior wall that descends over 800 m from the sharp rim crest (~3060 m) to the base of the wall; 2) a shallow depression, about 4 km wide, that corresponds to a zone of radial ridges and depressions; 3) a convex-upward portion of the floor, about 7.5 km wide, characterized by concentric ridges and troughs, and pitted terrain in its down slope portion (the lowest portion of the floor, at ~4300 m, separates this segment from the next); 4) a slightly convex-upward portion of the floor about 8 km wide and sloping to the south that is characterized by concentric textured and ridged material; 5) the northern inner wall of the crater, about 5 km

wide, rising about 1320 m to the crater rim crest at -2880 m (Fig. 2). These topographic attributes, along with the morphology of the crater interior, are all indicative of concentric crater fill as initially described and mapped by Squyres (1979).

The deposits observed on the floor of the crater represent only the final phase of modification of the crater interior. To decipher the extent of modification that occurred before this most recent phase, we examined the superposed crater on the northern rim of the larger crater, and the walls and exterior of the larger crater to study the crater filling processes.

### 3. Detailed geology

#### 3.1. Superposed smaller crater

The floor of the superposed smaller crater (~8 km in diameter) exhibits a texture similar to that observed in other LVF/LDA terrains