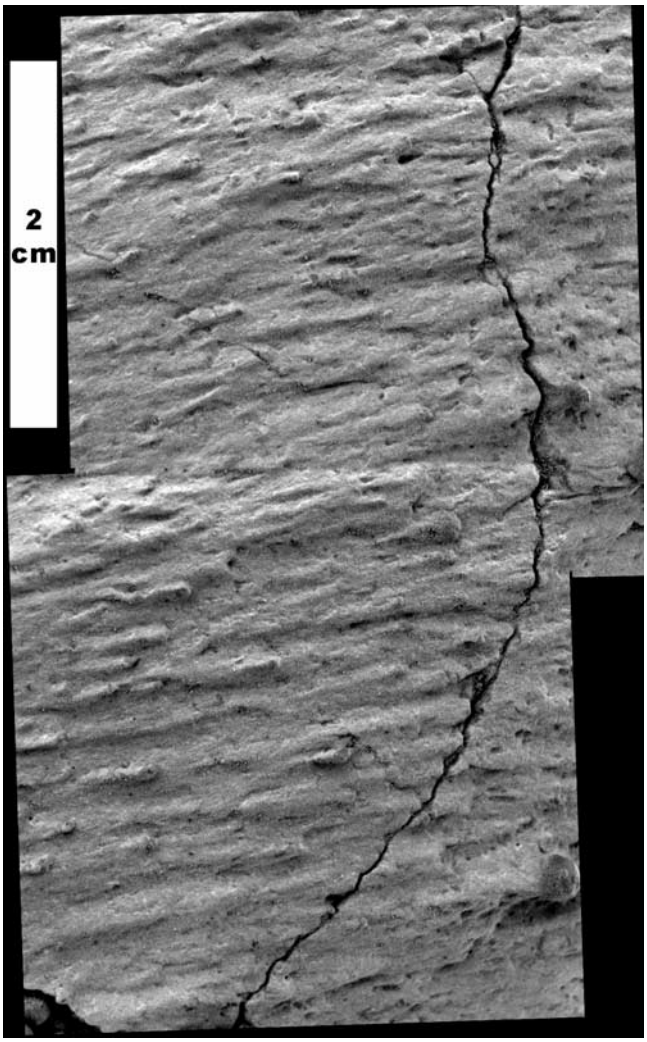

Figure 21. Target Normandy on the rock Omaha, taken on sol 392 when the target was fully shadowed. The streamlined ''wind tails'' on this rock are unique to the Opportunity MI collection.

overall texture to the laminae seen in the nodular and laminar rocks.

4.1.4. Massive-Dark Rocks

[43] Rocks in this class are massive-textured rocks that often display a somewhat granular, heavily fractured appearance, with rounded edges and numerous surface pits (e.g., ''Nala,'' Figure 20). Rock surfaces range from relatively flat and flush (e.g., ''Barlach_3,'' taken on sol 214) to undulating, with small knobs separated by fractures (e.g., ''Twin Otter,'' taken on sol 259). Fractures display a range of fill by surrounding darker soil, from entirely filled to relatively clean and empty.

4.1.4.1. Lithology

[44] Massive-dark rock surfaces are more heterogeneous in reflectance than other classes. No cleavage planes or other distinct lithologic feature is observed. No individual crystalline grains or crystal form pores are evident. Pits appear eroded along their edges, and have likely been wind abraded. Thus, if the pits represent crystal form molds, their shape is no longer discernable enough to be diagnostic.

4.1.4.2. Texture

[45] Targets in the massive-dark rock class have a somewhat granular appearance, best visible along the edges of fractures. Elsewhere, target surfaces display rounded edges, in places well developed, and an eroded, pitted texture. Individual grains are not resolved in MI images. As noted above, pits are abundant in several targets of this type (Figure 20). Pits have rounded edges for the most part and are narrow in profile with depth. In this sense, the pits look similar to low-grade cavernous weathering. Loose clasts lie within low-topography and fracture regions that are similar to those seen in other targets. The exception to this is the ''Afar'' target (taken on sol 210), which has much smaller clasts (averaging $\sim$465 μm diameter) packed closely into the visible fractures. No preferred orientation of grains is evident (grains are too small for any such orientations to be discernable at MI resolution).

4.1.4.3. Sedimentary Structure

[46] No obvious layering or lamination structures are visible in the massive-dark rock class. The exception to this statement is the target ''Normandy'' on the rock ''Omaha'' (Figure 21). A single fracture runs through the entire MI mosaic, but the surface itself is covered with positive topography, elongate teardrop-shaped features that are parallel to each other, somewhat similar to features identified as ventifacts imaged on an outcrop at Fram Crater [*Sullivan et al.*, 2005]. In some cases these features are truncated at a pit; in others, they are truncated at a discontinuous concavity. The embedded spherule visible at lower right in Figure 21 also has this type of feature sweeping away from it, which implies formation of the features subsequent to spherule genesis. These features are probably eolian erosional remnants (wind tails trailing more

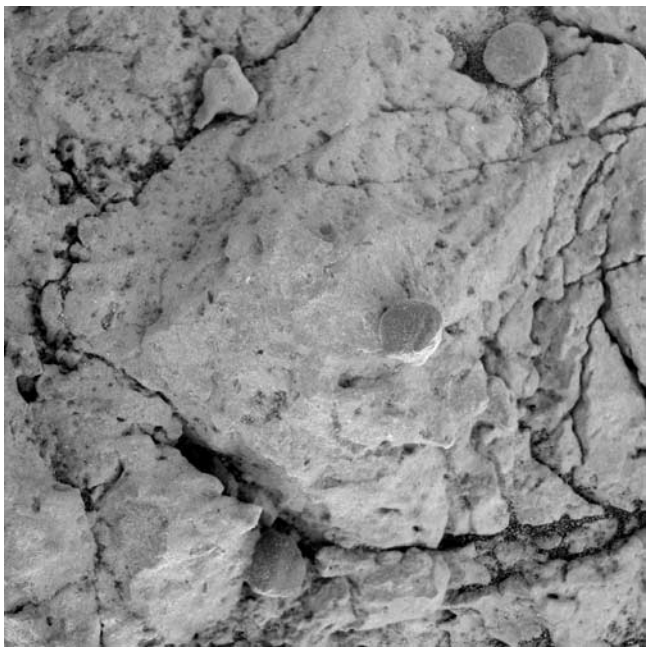

Figure 22. Focal section merge of four MI images of Russett, taken on sol 381 when target was fully shadowed. Sequence of fractures on right side shows range from massive rock to small fragments falling out of matrix. Area shown is 3 cm square.