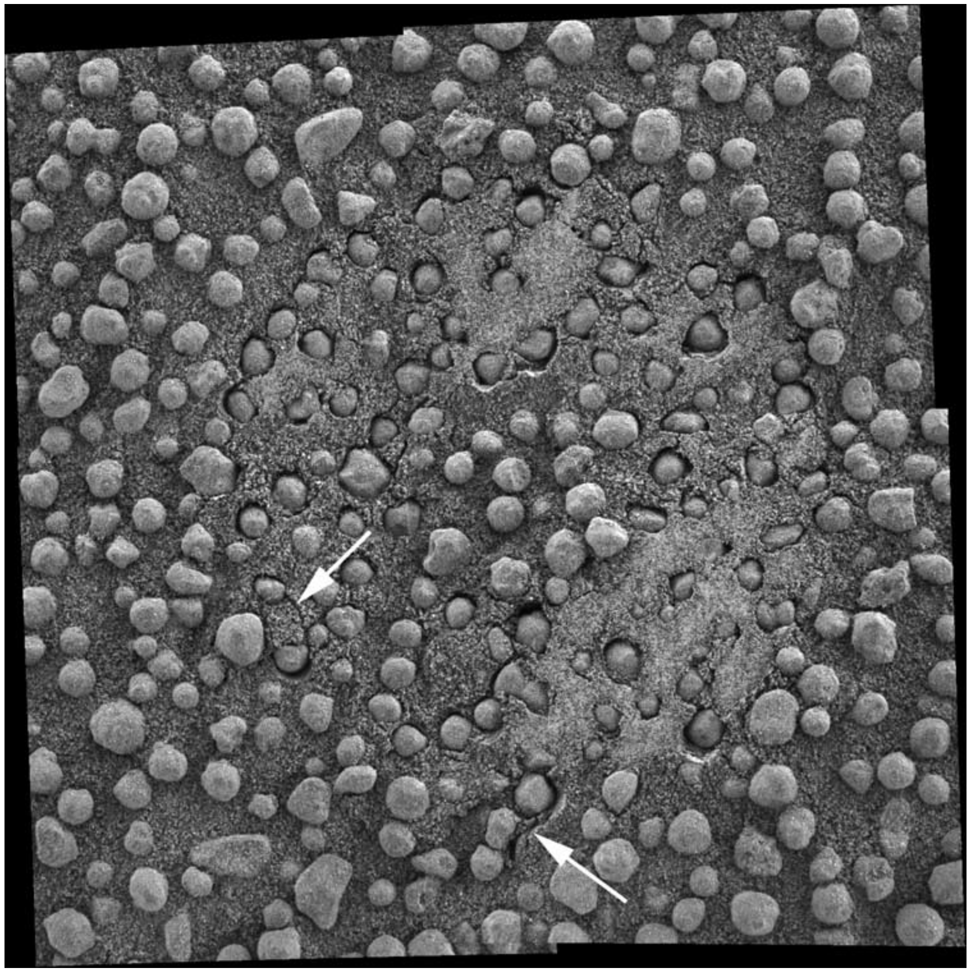

Figure 32. MI mosaic of soil target Troughplain, taken on sol 505 after Mössbauer contact when fully shadowed. Note three common soil components: irregular clasts, rounded particles, and subresolution salt-and-pepper grains. Some pitting of grains near center is indicated by general grain texture rather than conchoidal fracture. No coherent clodding is evident in the sample, but some cohesion is seen around some of the depressed grains (arrows indicate microscale soil fractures). MI mosaic is about 5 cm^2.

difference in gravity on the surface of Mars versus Earth affects the transition between the types of bed forms expected to be formed by fluid flow, but not their existence [*Grotzinger et al.*, 2005]. Therefore, the MI observations of Overgaard support the conclusion, based on previous observations in Eagle Crater, that water flowed across the surface of Mars in the distant past [*Squyres et al.*, 2004b; *Herkenhoff et al.*, 2004b].

4.2.2. Nodular Rock Surfaces

[66] As noted above, this class is genetically related to the laminar class, though no single-grain layers can be resolved. This relationship is evident in the similarity in grain size and shape, as well as the topography that can be seen below the level surface of abraded targets. Nearly all nodular class targets lie in lower Endurance, and appear to have been more affected by secondary cementation than the laminar rocks higher in the stratigraphic section. The isopachous cements, spherule overgrowths, and nodules may have been formed by the same diagenetic process, with variations in porosity, permeability, composition, or fluid residence time causing the various features [*McLennan et al.*, 2005]. In many ways, the observed nodular texture resembles a "weathering" texture not uncommon in soluble rocks (i.e., evaporites). The texture can arise from a combination of differential lithification and partial removal of less lithified soluble or nonresistant phases, either by fluid percolation or by wind. The samples showing laminae appear to have formed in an environment where eolian processes deposited very thin (grain-scale thick) layers. The laminae were then cemented by fluid percolation and evaporation. Areas where the texture no longer shows the layering may have either had less cement or fluid available in that location or a subsequent episode of grain removal may have occurred. Grain removal may have been caused by wind action, which would preferentially remove less-resistant phases, or by reintroduction of a fluid that preferentially removed more soluble phases.

[67] Spherule doublets and linearly aligned triplets are expected for concretions but are unlikely in impact or volcanic environments. Observations of the relations between spherules and other features, notably the lack of disruption of stratification at spherule margins, suggest that the spherules formed largely by replacive (rather than displacive) growth [*McLennan et al.*, 2005].