both hemispheres. These data support our interpretation that Pd result from impacts into ice-rich paleodeposits.

2. High-latitude pedestal craters

Although the geographic distribution and morphology of mid-latitude Pd have been well-documented with a range of new image and altimetry data (e.g. Kadish et al., 2009), there have been no recent studies dedicated to the comprehensive mapping and characterization of Pd at high latitudes. Preliminary analyses of Pd in north polar (e.g. Tanaka, 2005; Tanaka et al., 2008) and south polar regions (e.g. Bleacher et al., 2003; Head and Pratt, 2001; Plaut et al., 1988) have, however, noted that the presence of Pd on and around the polar caps indicates the removal/erosion of large volumes of material. Although these studies discuss the emplacement, evolution, and erosion of high-latitude units, they do not come to a consensus on the nature of the material composing the pedestals. In the north polar regions, Tanaka et al. (2008) suggest that Pd are the eroded remnants of the Rupes Tenuis unit. They note that this unit may have formed via precipitation and cold-trapping of a dust–ice mixture, with the sediment sourced from eolian erosion of the nearby Scandia region unit during the Early Amazonian. However, they state that the role of volatiles in cementing the Rupes Tenuis unit cannot be established. In the south polar regions, at least one Pd is present on the polar cap (Plaut et al., 1988) and many are superposed on the Hesperian-aged Dorsa Argentea Formation (DAF) (Bleacher et al., 2003). The material composing these pedestals may be preserved remnants of the widespread Noachian-aged cratered units from the plateau sequence (Npl_1 and Npl_2) (Bleacher et al., 2003; Plaut et al., 1988), as mapped by Tanaka and Scott (1987). These units have been interpreted to be primarily volcanic in origin, although they are likely to have been mixed with sedimentary materials and impact breccias. Where Pd are present on the DAF, there is evidence that significant mantling has taken place.

Through an extensive survey using MOLA, THEMIS, CTX, and HiRISE data of more than 200 high-latitude Pd (poleward of 60° in both hemispheres), we have confirmed that, similar to those at the midlatitudes, high-latitude Pd are extremely circular with flat

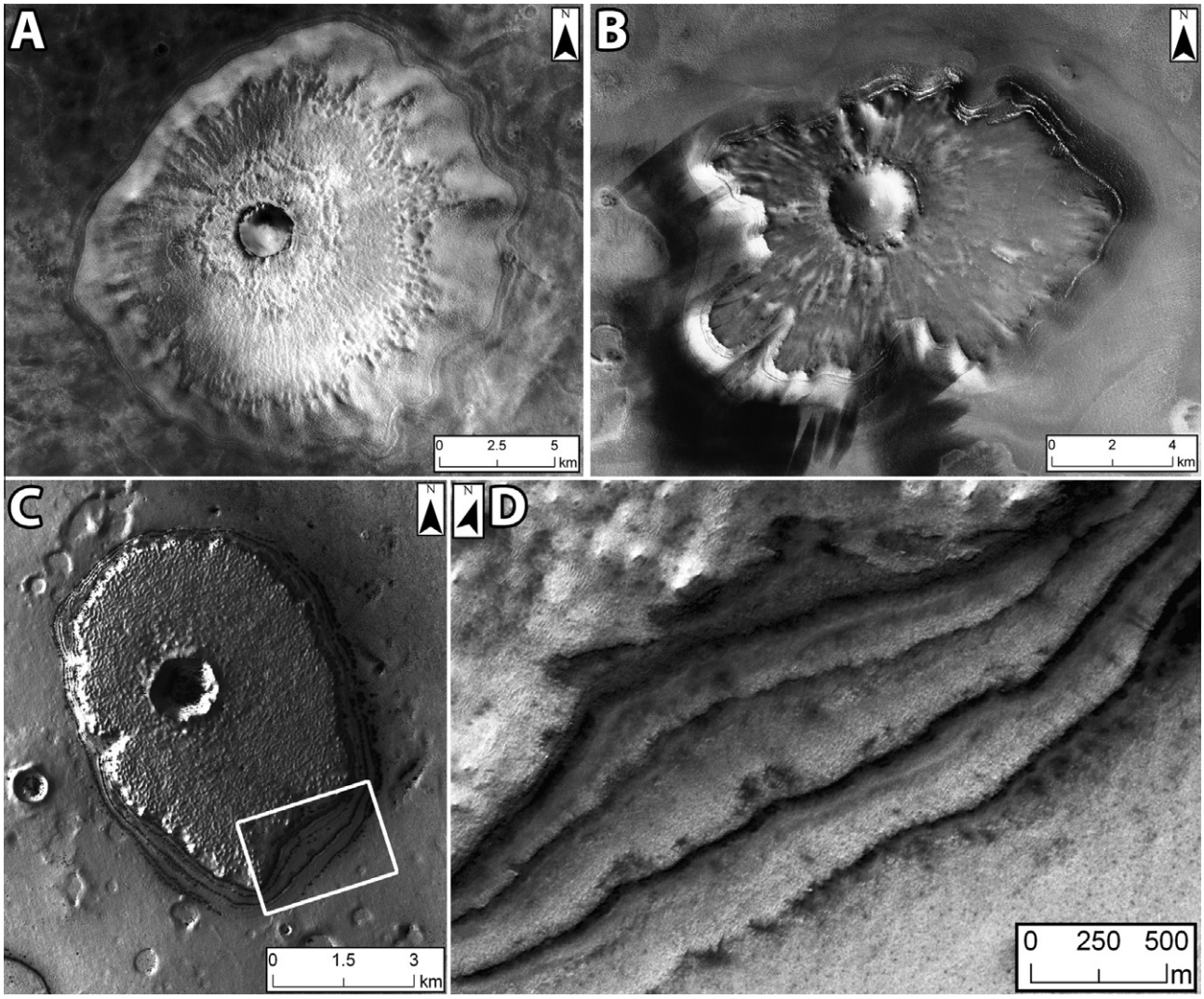

Fig. 1. Three examples of Pd that show layers along their marginal scarps. (A) Crater #6 in Table 1, shown in CTX image P17_007516_2496. Layers are continuous around the base of the marginal scarp, but are not visible in the light-toned material that forms a halo around the edge of the pedestal surface. (B) Crater #4 in Table 1, shown in CTX image B01_010074_2564. The layers, which occur near the top of the marginal scarp, are expressed topographically. (C) Crater #11 in Table 1, shown in CTX image B08_012702_1012. The white box outlines the location of the image seen in part "D". The dark discontinuous layers surround a very rough-textured pedestal surface. (D) An enlarged view (MOC image s1101636) of the layers along the crater in part "C". The four visible layers have a distinctly lower albedo than the rest of the scarp, and create a stepped pedestal margin.