



Figure 2. Geologic map of the north polar region, after *Tanaka et al.* [2008]. Units indicated in legend and in text are the Planum Boreum units 1–4 (ABB₁₋₄), Planum Boreum cavi unit (ABB_c), Olympia Undae unit (ABou), Rupes Tenuis unit (ABrt), Scandia region unit (ABS), and Vastitas Borealis interior unit (ABv_i).

Rodriguez et al. [2007] to classify these low-albedo deposits as “veneers.” The veneers are associated with grooves and striations in the residual cap, implying a highly mobile and abrasive particle component, and exhibit variations in albedo indicative of multiple episodes of formation. The older, lighter toned veneers may be indurated by water ice or hydrated minerals. *Rodriguez et al.* [2007] also speculate that the dark layers within the Planum Boreum 1 and 3 units may be remnants of paleoveneers.

[14] The uppermost units of Planum Boreum are the shallow, but extensive, Planum Boreum 3 and 4 units. The Planum Boreum 3 unit makes up the bulk of the upper layered deposits mapped by *Tanaka* [2005], covers all Planum Boreum surfaces except for equatorward trough walls and trough floors, and is also found mantling dunes around the periphery of Planum Boreum. Additionally, HiRISE images have shown the Planum Boreum 3 unit present as bright deposits in interdune areas in Olympia Planum [*Roach et al.*,

2007]. The Planum Boreum 4 unit is composed of the young, bright residual ice cap on Planum Boreum and the polar outliers, and exhibits high surface water ice concentrations in OMEGA and initial CRISM studies [*Langevin et al.*, 2005b; *Seelos et al.*, 2007].

2.3. Olympia Planum and the Circumpolar Erg

[15] The Olympia Planum erg (Olympia Undae) is the largest aeolian accumulation on Mars, with a surface area of 4.7×10^6 km² [*Lancaster and Greeley*, 1990]. For scale, this is slightly larger than the state of California, and 150% larger than the Rub al Khali, Saudi Arabia, the largest active erg on Earth [*Tsoar et al.*, 1979]. As shown in Figure 1, Olympia Undae extends in latitude from 80°N to 85°N, and follows the edge of the residual water ice cap from 140°E to 240°E, with an 800 m topographic high above the adjacent plains near 180°E [*Tanaka*, 2005; *Tanaka et al.*, 2008]. The remainder of the circumpolar erg and associated sand sheets encircle the