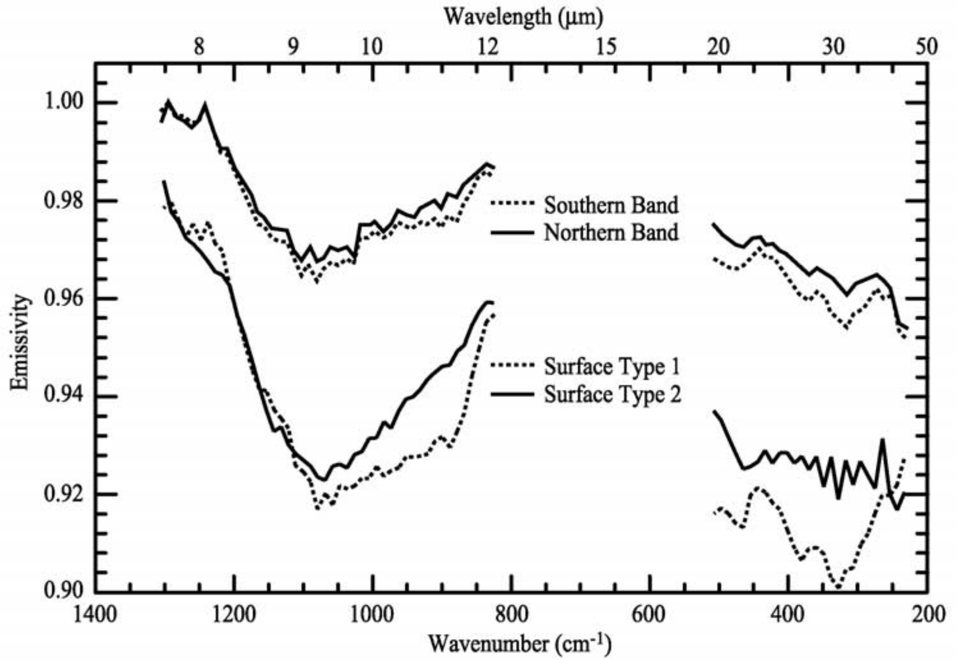

Figure 4. Average atmospherically corrected thermal emissivity spectra of the northern and southern transition bands in Acidalia Planitia compared to surface type 1 and type 2 spectral end-members. The southern band is dominated by surface type 1 components (~60 vol %), whereas the northern band is dominated by surface type 2 components (~66 vol %).

the surface type 1 and 2 end-members confirms the general comparison of spectral features. Impact crater floor materials are almost entirely dominated by a surface type 1 component (~75–100 vol %), whereas impact crater wall materials are dominated by surface type 2 material (~75–100 vol %).

4.4. Mars Pathfinder Landing Site and Source Regions

[25] The MP landing site is among the rockiest locations on the planet; however, nearly all of the rocks have significant amounts of surface dust mantles [*Smith et al.*, 1997; *McSween et al.*, 1999]. For this reason, MP offers an ideal opportunity to test whether rock compositions can be resolved in dust-covered regions. Furthermore, the Alpha Proton X-Ray Spectrometer (APXS) analyses of rocks having andesitic compositions [*Rieder et al.*, 1997; *McSween et al.*, 1999] offers ground truth data for interpreting mineralogies and chemistries derived from thermal infrared spectra measured from orbit.

[26] Figure 8 shows a composite MOC image of Chryse Planitia with the MP landing site and arrows indicating flow directions in the Ares and Tiu Valles outflow channels [*Tanaka*, 1997]. The image is not centered on the MP landing site because the goal of this analysis is to determine whether compositional information can be obtained from both the landing site and its source region to the south. Superimposed on the composite MOC image are boxes representing averaged and binned TES composition pixels at 3.7 km by 3.7 km. At a high-resolution scale, TES coverage of the Martian surface in this region is not complete with data that pass the data filters used in this study. Figure 9a shows a high-resolution MOC NA image of the landing site, with a higher resolution part of the WA mosaic from Figure 8 for reference, and Figure 9b shows an average TES surface spectrum of the MP landing site compared to the surface type 1 and 2 spectral end-members, which are offset by 0.02 emissivity. Also shown in Figure 9b are average spectra of the Ares and Tiu Valles source regions.

[27] The landing site and source region spectra show much shallower spectral absorptions compared to the surface type 1 and 2 spectra. While there are some spectral absorption features observed in the landing site and source regions spectra, their depths are too small to have confidence in any linear deconvolution results. The tops of rocks and intervening ground surfaces at the landing site were observed to be covered by bright fine-grained dust. The apparent spectral roll-off feature at ~1150 cm^{-1} observed in the MP spectra in Figure 9b is a typical result of fine particle size effects [*Christensen et al.*, 2000a]. The fine-grained surface dust, which closely resembles a featureless blackbody spectrum, thus appears to be sufficiently abundant to obscure analysis of rock compositions from TES observations.

[28] The TES instrument is capable of making emission phase function (EPF) observations by using a pointing mirror to measure a surface at various emission angles along an orbital track. Such measurements could potentially enable TES to observe the sides of rocks at the Mars Pathfinder landing site, instead of only the top surfaces which are covered by fine-grained dust. The sides of rocks at the landing site were commonly observed by the IMP camera to have lower albedos compared to the tops of rocks [*Smith et al.*, 1997] and were targeted by the APXS instrument for chemical analyses of dust-free surfaces.

[29] Figure 10 is a plot of albedo versus Incremental Counter Keeper (ICK) for an EPF mosaic of the MP landing site. ICK is the sequential numbering scheme for observa-