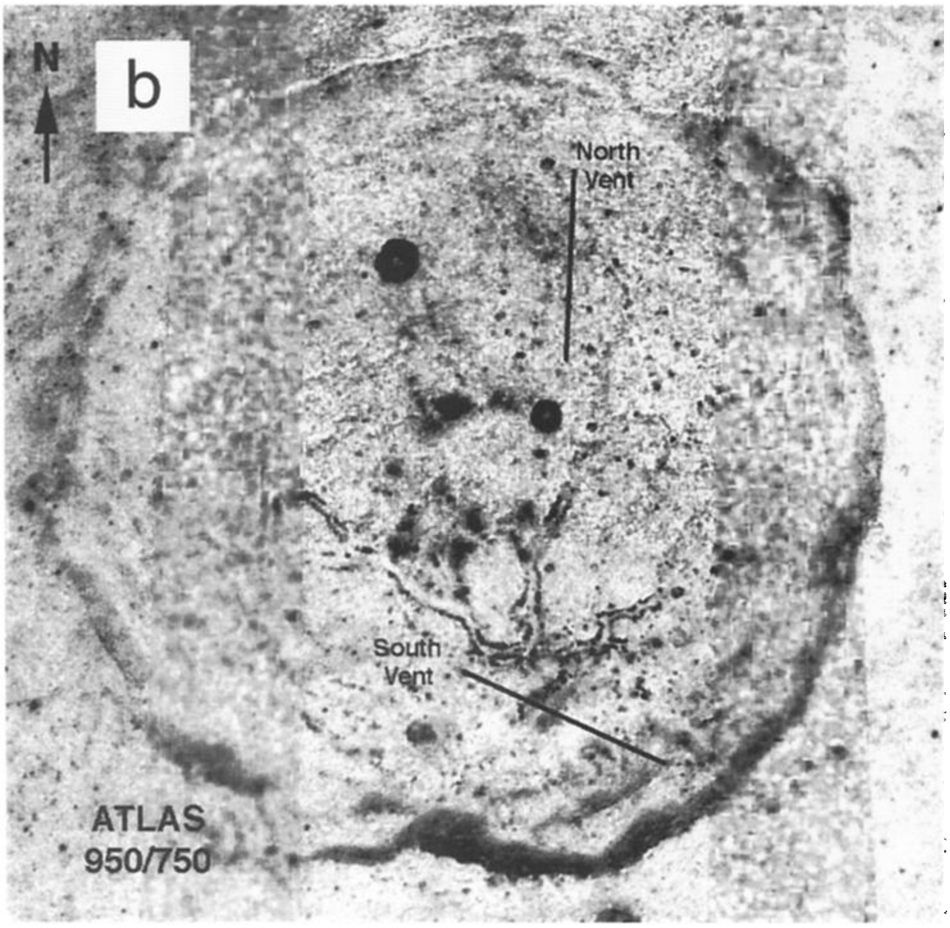

Figure 6. (continued)

to-pixel scale is apparent at a 3% level even where topography is not a major factor, the mean values of the 950/750 ratios show revealing trends. In the case of the North vent deposit, the effect of the superimposed pyroclastic deposit is to lower the 950/750 value to an average of 1.065, well below that of the local mature highlands value of 1.08 (note that 950/750 values for the crater floor vary from 1.075 to 1.093). Note also that the mafic band weakens toward the margins of the deposit, but it does not show abrupt changes that could be interpreted as primary compositional variations within the original deposit. These trends suggest that the North vent pyroclastic deposit has a stronger mafic band than the crater floor and that it is strongest near the vent and weakens as the deposit thins at its margins. By contrast, for the South vent deposit, we see that the average value of the 950/750 ratio (~1.09) is slightly higher than that of the surrounding crater floor (~1.08), and to the southeast, the average 950/750 value (~1.095) is even higher. The pyroclastic deposit in this area appears to have a mafic spectral signature which is much like that of the highlands (as do the Group 1 deposits of *Hawke et al.* [1989]); in this case, the pyroclastic deposit has a weaker mafic band than that of the surrounding highlands. The highest, or weakest, mafic band depth values southeast of the South vent pyroclastic unit may correspond to a thicker deposit; possible changes in mafic band depth with increasing distance from the vent are masked by the topographic features near the margins of the South vent deposit.

To summarize these observations: (1) the mean 950/750 values for the pyroclastic deposits are different than those of subjacent highlands terrain; (2) the mean 950/750 values for each pyroclastic deposit are different from each other; and (3) for the North vent deposit, a compositional trend of decreasing mafic band strength with increasing distance from the vent is observed. The North vent pyroclastic deposit has a relatively strong mafic absorption band as compared to the surrounding highlands in the crater floor, and the South vent deposit has a weaker band than that of the crater floor materials. In the case of the Atlas crater pyroclastic deposits, these data suggest that there are two compositionally distinct pyroclastic deposits within a single vent area. Compositional trends at the North vent can best be explained as a result of thinning of the pyroclastic deposit with increasing distance from the vent; no strong indications of intradeposit compositional variations are observed in this example. Although both pyroclastic deposits occur in the floor of the Upper Imbrian Atlas crater and are thus younger than ~3.25 b.y. [*Wilhelms*, 1987], little detailed information exists on the relative ages of these deposits. The simplest explanation for the origin of the observed compositional variation between the North and South deposits is that magmatic intrusion under the floor of Atlas caused two explosive eruptions, and different proportions of wall rock, cap rock, or juvenile materials were emplaced in each area, perhaps as a result of differences in eruption duration. Nevertheless, we cannot rule out the possibility that two temporally distinct eruptions have