GEOLOGY OF THE VENERA AND VEGA LANDING SITES

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Geologic mapping of the seven Venera/Vega landing sites (radius of error= 150 km) using Magellan data has shown that the dominant type of terrain at these sites is plains. At the Venera 8 and 13 sites, where a non-tholeiitic composition was measured for the surface material, the Magellan imagery shows that both these sites have unusual volcanic features associated with them, such as steep-sided domes and coronalike features. At the other five sites, where no peculiar volcanic activity occurred within the landing circle, the landers measured geochemical signatures of tholeiitic basalts. This association between unusual volcanic activity and non-tholeiitic composition suggests that the geochemistry measured by the landers correlates well with the morphology seen in the Magellan imagery, A strong correlation also exists between the SAR imagery and the TV panoramas taken by the Venera 9, 10, 13, and 14 landers. Based upon Magellan data and the lander geochemical and TV panoramas, we have been able to suggest the most likely material in the Magellan imagery sampled by the landers. Backscatter cross-sections, altimetry, emissivity, and rms slopes were calculated inside each Venera/Vega landing circle. Most of the variations in backscatter, emissivity, and rms slopes reflect variations in roughness at each site. All of the sites have either small patches of complex terrain or complex ridge terrain that is embayed by the plains. The plains at the Venera 9 and Vega 1 and 2 sites represent vast outpourings of lava associated with regional-scale plain-forming volcanic eruptions. Both the Venera 9 and Vega 2 sites have an elder plains that has been heavily fractured by major geologic rifting and uplift adjacent to these two sites. The plains at the Venera 8, 10, 13, and 14 sites represent more restrictive flows that formed "spots". The volcanic activity associated with the Venera 8, 10, 13, and 14 sites is probably the result of both older, regional-scale and younger, local, hot-spot volcanic activity.

Submittal Information

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2. Session PS 1.3, Evolution and State of Crusts and Lithosphere of Planetary Bodies

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4. I would like 2 slide projectors.

5. Oral Presentation