



ABSTRACT FORM

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RELATIVE AGE-DATING OF CRATERS OF THE MOON VOLCANIC FIELD, IDAHO USING LANDSAT DATA

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LANDSAT spectral radiance data for the major lava flows of the Craters of the Moon, Idaho area were used to produce a computer classification map. By using a hybrid parallelipiped and Bayesian maximum likelihood algorithm, the major aa and pahoehoe flows were classified on the basis of their relative spectral radiance characteristics. The rough-surfaced aa flows have lower radiance values than the smoother pahoehoe flows. Of the pahoehoe flows, those with higher radiance values typically have more vegetative cover, sediment cover, and weathering on the flow surfaces. These surface effects tend to become more pronounced with age, causing a systematic, time-dependent increase in radiance values.

Field relationships and ^{14}C age-dating established 1) a stratigraphic sequence for the flows, and 2) a minimum duration of volcanicity for this volcanic field of at least 9000 years. During this investigation, a paleosol underlying one of the oldest of the Craters of the Moon flows, the Sunset Flow, was dated at $11,120 \pm 300$ y.b.p. by M. Rubin (personal comm.). Previously some of the youngest flows were dated in investigations by F. M. Bullard and D. L. Rylander (1970, 1971) at an average age of a little more than 2000 y.b.p. The determined stratigraphic sequence closely matches the systematic time-dependent increase in radiance values for the pahoehoe flows. This technique may prove useful in determining the relative ages of pahoehoe flows in other Holocene volcanic fields in arid or semi-arid regions.

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