DISTINCTIVE CHARACTERISTICS OF THE ARISTARCHUS PLATEAU

P.E. Clark, Albright College, Reading, PA 19612 and A. Basu, Indiana University, Bloomington, IN 47405

Recently, we began a study involving detailed correlation of remote sensing data available and previous interpretive work done for the Aristarchus Plateau. We chose to reexamine this region due to widespread interest in it as a site of great geological diversity (1,2,3,4,5,6,7,8), and a recent proposal that this area be considered as a prime candidate for a lunar base site (9).

Some of the more distinctive remote sensing features of the region are as follows:

1) An area shaped like an inverted triangle and centered around Schroter's Valley is anomalously low in ground-based depolarized radar reflectivity at both 3.8 cm and 70 cm, as well as having a very low infrared eclipse temperature (10,11,12,13).

2) The area has anomalously low, and distinctively red visual albedo, which has been correlated with the presence of pyroclastic deposits and KREEP-bearing basalt (14).

3) The particularly elevated Th concentration is directly correlated with the presence of KREEP. According to deconvolution studies (7), although the area around Schroter's Valley represents the average high Th concentration (6.8 ppm) area, the area including the Cobra's Head and to the east and southeast of the valley appears to be the center of the Th anomaly, with Th concentrations (18.2 ppm) that are more than twice that of the area.

4) Table 1 shows the trends in Th, K, Fe, Ti, Mg, and Al (15,16) concentrations along orbital geochemical data groundtracks, from the Apennine Bench/Montes Archimedes, through central Mare Imbrium, the Aristarchus Plateau, and Northern Procellarum. Averages of groundtracks through Mare Serenitatis are added for comparison. The Aristarchus area is similar in chemistry, although higher in Ti and Mg than Archimedes. The mare basalts of northern Procellarum are distinctively different from either Imbrium or Serenitatis.

Interestingly, the average elemental concentrations for the Aristarchus Plateau are very similar to concentrations for the same elements for the Apollo 15 landing site. Also, the chemical signature of Aristarchus soils is consistent with the presence of a range of KREEP-bearing basalts along with a pyroclastic glass component, such as the brown glass found at the Apollo 15 landing site (17,18,19). Ground-based radar, thermal infrared, and visual reflectivity observations indicate that the pyroclastic deposits may be principally associated with collapsed lava tubes of Schroter's Valley, whereas the KREEP

anomaly lies primarily to the southeast and includes the Cobra's Head, an area previously associated high radon emanation (20).

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TABLE 1

Element	N. PROC.	ARISTARCHUS	M. IMBRIUM	ARCHIMEDES	M. SEREN.
Th ppm	3.6	6.9	5.4	6.7	2.1
%K_2O	.36	.31	.23	.41	.16
%FeO	17.3	13.7	17.5	13.7	17.3
%TiO_2	4.0	4.3	3.3	0.8	3.8
%MgO	4.5	10.6	8.1	5.9	7.9
%Al_2O_3	11.1	15.0	10.9	15.0	11.1