STRATIGRAPHY OF THE APENNINE FRONT CORE 15007/8. Richard V. Morris, Code SN7, NASA/Johnson Space Center, Houston, TX 77058, and Howard V. Lauer, Jr., Lockheed, Houston, TX 77058.

INTRODUCTION

The sampling site of the 15007/8 double drive tube core was the rim crest of a 10 m diameter crater at Station 2, Apollo 15. This locale is on the flank of St. George Crater at the base of the Apennine Front. The soil column in the core was ~ 58 cm long. Dissection of the core is described by (1, 2). We discuss here the stratigraphy of the core as revealed by depth profiles of the FeO concentration and the I_s/FeO surface exposure index; these parameters were determined for every 0.5 cm wide dissection interval of regolith in the core. We have also made similar measurements on sieve fractions of 14 core soils that were selected as representative of different types of soil as indicated by the FeO and I_s/FeO depth profiles. The experimental procedures are described by (3, 4, 5).

This study is one facet of a multidisciplinary study of the 15007/8 core. Grain-size and petrographic data are reported in (6,7); noble gas data for 15008 are reported in (8); and chemical and additional noble gas analyses are in progress.

RESULTS AND DISCUSSION

The depth profiles are shown in Figure 1. The locations of the soils that were sieved are also noted and identified by their parent number. Except for the bottom ~ 2 cm of the core, the FeO concentration lies between 11 and 13 wt. %. This range encompasses the range observed for surface and trench soils collected from the Apennine Front (e.g., 9). Our data indicate the soil in the bottom ~ 2 cm has ~ 9 wt. % FeO, a value lower than previously observed for Apollo 15 soils. In accordance with the FeO data, the petrographic data of (7) show that soil 15007, 167 from this region is the most feldspathic one studied. Since it is apparently unique, this low FeO soil may be important for the interpretation of the geologic history of the Apollo 15 site.

The transition centered near ~48 cm is the most striking feature in the I_s/FeO profile. Soils above it with values of I_s/FeO between 50 and 70 units are submature to mature; soils below it with values between 25 and 38 units are immature to submature. It is within the lower zone between ~ 50 and 55 cm that the green and the grey clasts occur (2). One of the green clasts (15007, 160) was analyzed and found to be very immature with I_s/FeO ~ 2 units; this was calculated using the measured value of I_s and the ~ 20 wt. % value of FeO typical of Apollo 15 green glass (10).

The sieved soils permitted measurement of the variation of I_s (the relative concentration of fine-grained metal) with soil particle diameter. The results are given in Figure 2 as a graph of I_s/FeO for the bulk soil versus N. The parent number of the sample is given beside each data point. The parameter N is the negative of the slope of the equation derived from a linear least squares fit of the data in $\log(I_s)$ - log(soil particle diameter) space. The large majority of lunar soils plot in the region betwen the two solid lines (11). The few soils that plot outside this region , like 15401, are unusual in that they are mixtures of a previously matured soil with an excess of a very immature soil (11). In this way, the resultant soil has approximately the same value of N as the mature component but has a low value of I_s/FeO because the immature component is in excess. Except for the green clast (15007, 160), all of the sieved soils plot within the boundary defined by other lunar soils and are therefore not unusual in this respect. The 0.98 value of N for the green clast is the highest value so far observed. This value may reflect the production profile of fine-grained metal in the lunar

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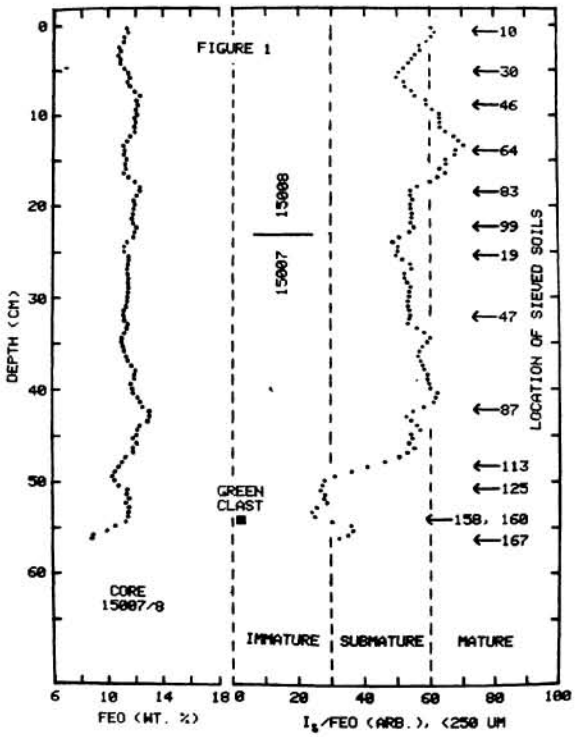
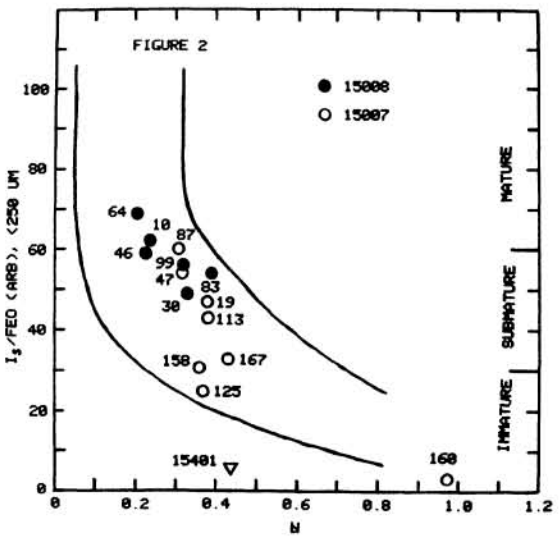
regolith or, alternatively, reflect a mixture of the type discussed above (11). That is, the clast might be "contaminated" by a small amount (< 2%) of surrounding soil. However, it is not clear at present that the grain-size distribution of the green clast is sufficiently coarse to support this interpretation (11).

Detailed stratigraphic interpretation of core 15007/8 must await the noble gas data which are currently being collected by D. Bogard. This core is the first non-mare core analyzed at the Apollo 15 site. Its detailed characterization by a variety of techniques will provide insight into the geologic history of the highlands near this site, and will also provide additional information on mare-highland mixing.

REFERENCES; (1) Nagle (1980) PLPSC11, 1479; (2) Curatorial Newsletter No. 30, Jan. 19, 1981; (3) Morris (1976) PLSC7, 315; (4) Morris and Gose (1976) PLSC7, 1; (5) Morris et al. (1978) PLPSC9, 2033; (6) McKay et al. (1981) LPSXII, 688; (7) McKay et al. (1982) this volume; (8) Bogard et al. (1981) LPSXII, 95; (9) Morris (1978) PLPSC9, 2287; (10) Delano (1979) PLPSC10, 275; (11) Morris (1977) PLSC8, 3719.





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