15091

Soil

205.5 grams

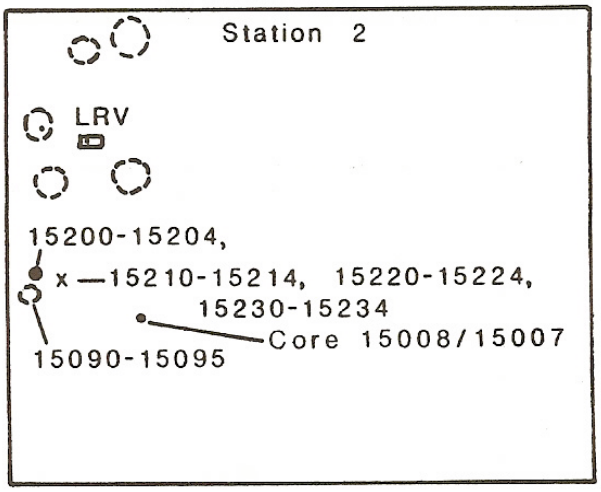


Figure 1: Map of station 2, Apennine Front Apollo 15.

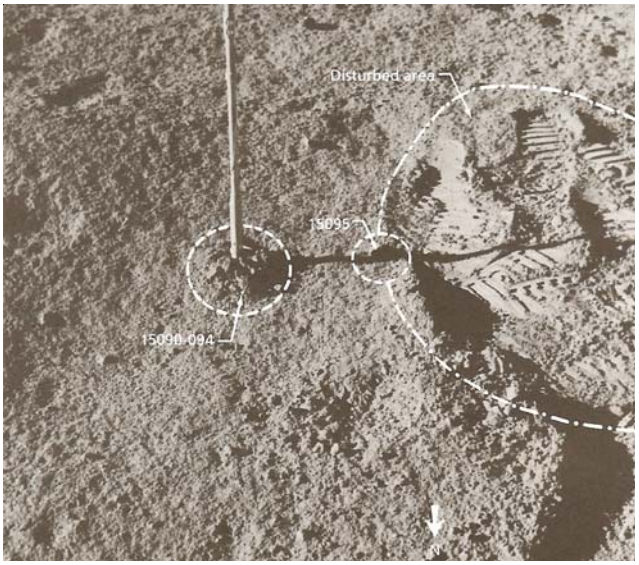


Figure 2: Photo of scoop digging 15090. AS15-86-11549.

Introduction

15091 is a surface soil collected near the boulder at station 2 on the Apennine Front (figures 1 and 2). It should be compared with the top of the double drive tube 15008 collected nearby.

Petrography

The maturity index (I_s/FeO) is 74 (Morris et al. 1978) and it has a high agglutinate content of 53% (Basu et al. 1981). The average grain size is 53 microns (figure 6). It is a mature highland soil with only minor mare component.

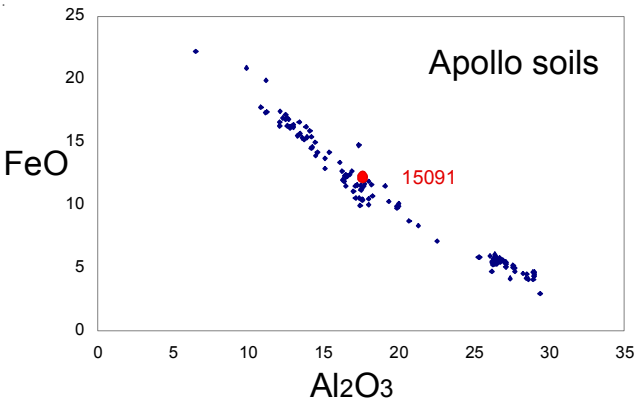


Figure 3: Chemical composition of soil sample 15091 compared with other Apollo soils.

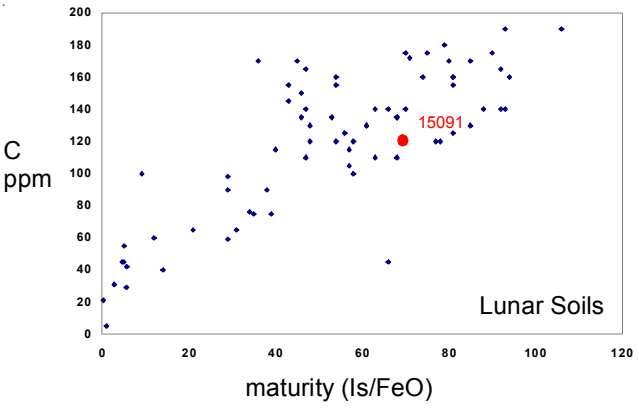


Figure 4: Maturity vrs carbon content inc. 15091.

Modal content of soil 150291

From Basu et al. 1981.

Agglutinates	55.5%
Basalt	2.8
KREEP basalt	1.8
Breccia	14.7
Anorthosite	1.7
Norite	
Gabbro	0.4
Plagioclase	12.2
Pyroxene	14.2
Olivine	2.8
Ilmenite	0.4
Glass other	10.1

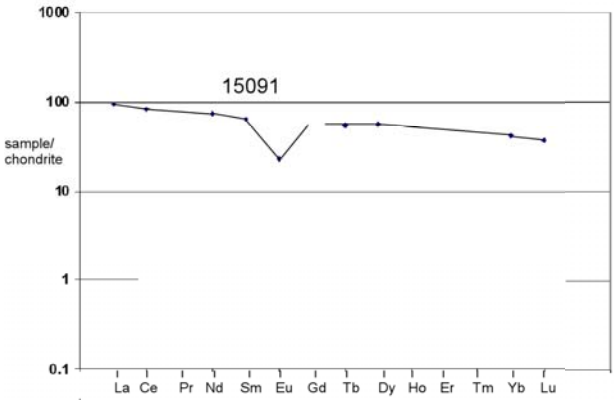
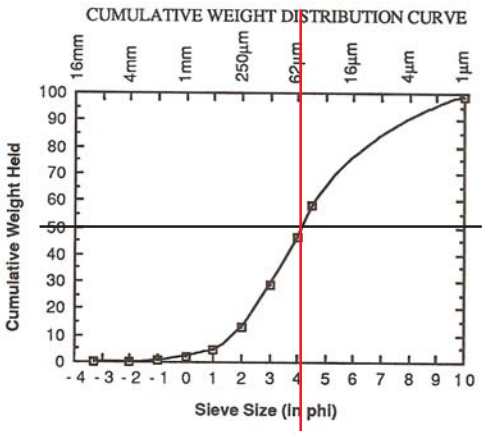


Figure 5: Normalized rare-earth-element diagram for 15091



Average grain size = 53 microns

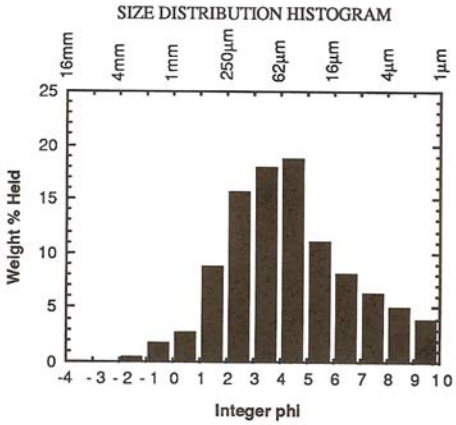


Figure 6: Grain size distribution for 15090 (Graf 1993).

Chemistry

Fruchter et al. (1973), Wanke et al. (1973) and others analyzed 15091 (figures 3 and 5). Moore et al. (1973) reported 120 ppm C, consistent with maturity (see figure 4). Reed et al. (1972) also determined the halogens, Li, Hg Te, Ru and Os.

Radiogenic age dating

Murthy et al. (1972) analyzed the Sr isotopic and Rb/Sr ratios.

Cosmogenic isotopes and exposure ages

Bhandari et al. (1973) included 15091 in their study of fossil cosmic ray tracks.

Other Studies

Heymann et al. (1972) and Jordan et al. (1974) determined the concentration and isotopic ratio of the rare gasses in 15091.

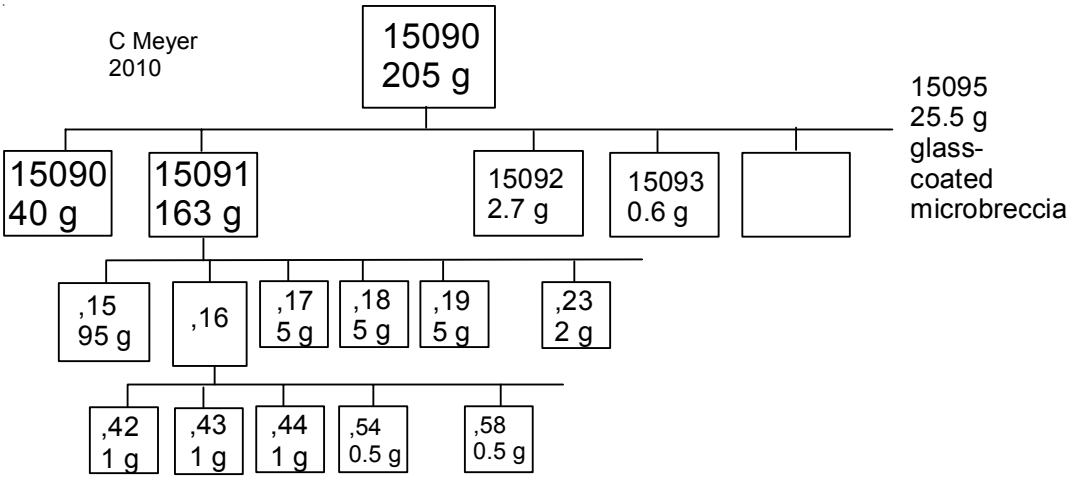
Processing

15090 was returned in a sealed ALSRC (#1) (Butler 1972). Soil breccias 15095 was returned in same bag.

Table 1. Chemical composition of 15091.

reference	Fruchter73		Baedecker73		Cuttitta73		Wanke 73		Rancitelli72		Murthy72	
weight												
SiO2 %					46.47	(c)	46.9	(a)				
TiO2	1.08	(a)			1.31	(c)	1	(a)				
Al2O3	16.6	(a)			17.47	(c)	17.6	(a)				
FeO	11.7	(a)			11.57	(c)	11.75	(a)				
MnO					0.17	(c)	0.15	(a)				
MgO					10.5	(c)	10.4	(a)				
CaO					11.77	(c)	11	(a)				
Na2O	0.41	(a)			0.41	(c)	0.43	(a)				
K2O	0.126	(a)			0.18	(c)	0.17	(a)	0.173	(d)	0.196	(e)
P2O5					0.16	(c)						
S %												
sum												
Sc ppm	23	(a)			21	(c)	21	(a)				
V					80	(c)						
Cr	2100	(a)					2120	(a)				
Co	38	(a)			39	(c)	40	(a)				
Ni			251	(b)	365	(c)	170	(a)				
Cu				(b)	7.9	(c)						
Zn			15.2	(b)	16	(c)						
Ga			4.1	(b)	3	(c)						
Ge ppb			410	(b)								
As												
Se												
Rb					5.4	(c)					5.05	(e)
Sr					155	(c)					139.7	(e)
Y					70	(c)						
Zr	250	(a)			240	(c)						
Nb					18	(c)						
Mo												
Ru												
Rh												
Pd ppb												
Ag ppb												
Cd ppb			42	(b)								
In ppb			10.7	(b)								
Sn ppb												
Sb ppb												
Te ppb												
Cs ppm												
Ba	240	(a)			295	(c)					208	(e)
La	21.5	(a)			32	(c)	22	(a)				
Ce	56	(a)					50	(a)				
Pr												
Nd	30	(a)					33	(a)				
Sm	9.8	(a)					9.4	(a)				
Eu	1.34	(a)					1.29	(a)				
Gd												
Tb	1.8	(a)					2	(a)				
Dy							13.6	(a)				
Ho												
Er												
Tm												
Yb	6.7	(a)			7.7	(c)	6.8	(a)				
Lu	1.05	(a)					0.9	(a)				
Hf	7.1	(a)					6.9	(a)				
Ta	1.3	(a)					0.95	(a)				
W ppb												
Re ppb												
Os ppb												
Ir ppb			8.2	(b)								
Pt ppb												
Au ppb			2.7	(b)								
Th ppm	5.8	(a)							3.97	(d)		
U ppm									0.93	(d)		

technique: (a) INAA, (b) RNAA, (c) "microchemical", (d) radiation counting, (e) IDMS



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