Photogeology & Rock Chemistry of the Moon

1) Study Figure 1a (an enlargement of the southwest quadrant of Figure 1) in detail and list observations and evidence which might establish the relative age of the rugged clusters of hills and the intervening smooth regions.

2) List possible reasons why craters are more readily apparent on the smooth regions (vs. the hills). Indicate your conclusion about the relative age of the two terrains (which is older?).

3) List the characteristics of the smooth unit which might bear on its mode of formation; suggest a possible origin(s) for this unit.

4) List the characteristics of the rugged hills and suggest possible origins. Interpretations should be preliminary pending examination of the other quadrant enlargements.

5) Study Figure 1b (an enlargement of the northwest quadrant of Figure 1). List any additional characteristics associated with the smooth region which might bear on its mode of origin.

6) Briefly describe the several clusters of craters visible in Figure 1b. What is their age in relation to the smooth region? Propose a tentative mode of origin for these crater clusters.

7) Study Figure 1c (an enlargement of the northeast quadrant of Figure 1). Briefly describe the various characteristics of the topography surrounding and associated with the Euler crater.

8) Propose an origin for the topography of the material at Euler crater.

9) Take a look at Table 1. This table summarizes the chemical analysis of some of the Rock samples from the Apollo 17 mission. Notice the range in compositions. Compare this with the TAS diagram (Fig. 2). Can you see anything peculiar?

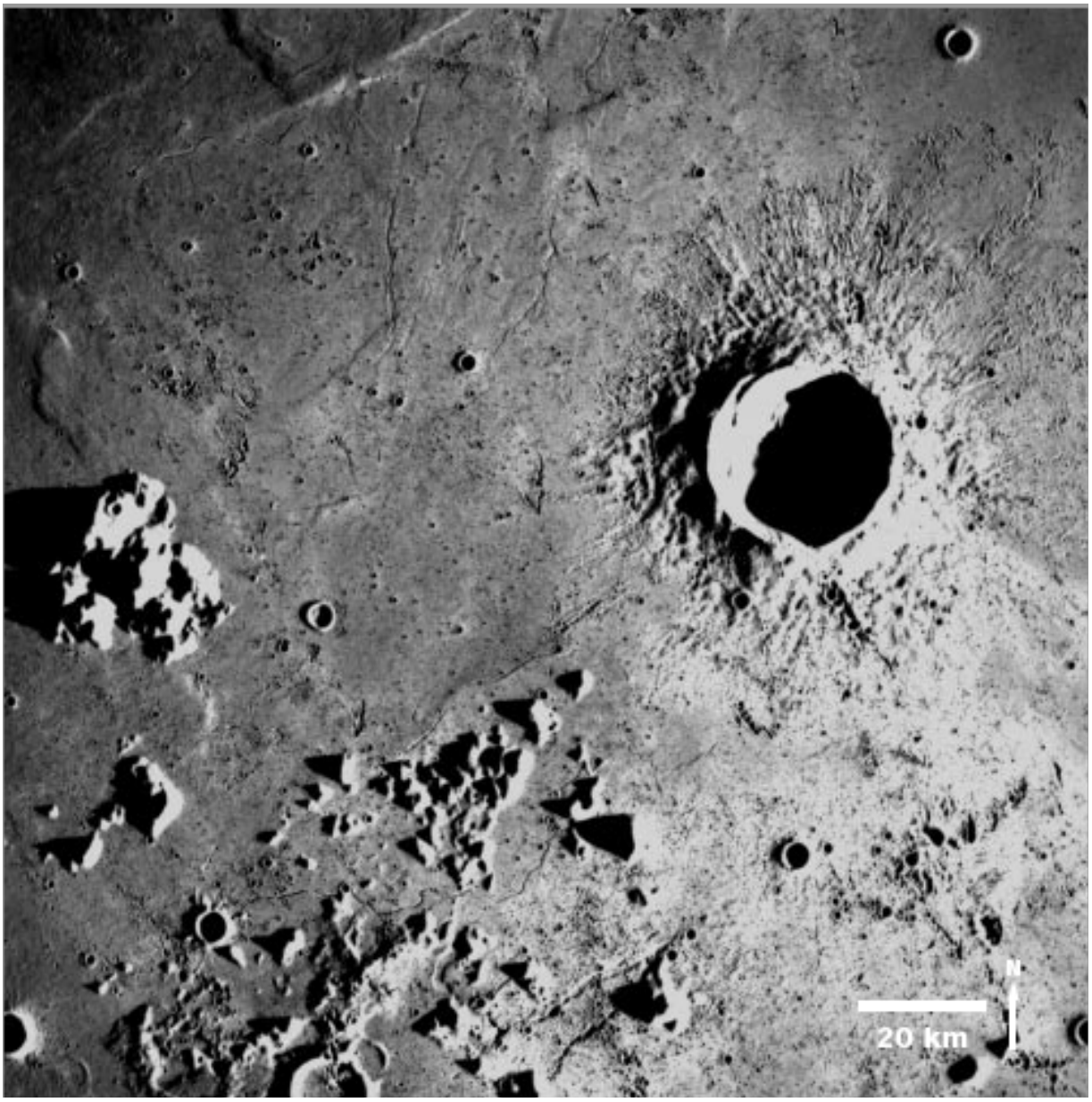

Fig 1. Photograph of the Euler crater region on the near side of the moon. North is to the top. Euler crater (thelarge one) is 27 kilometers in diameter.

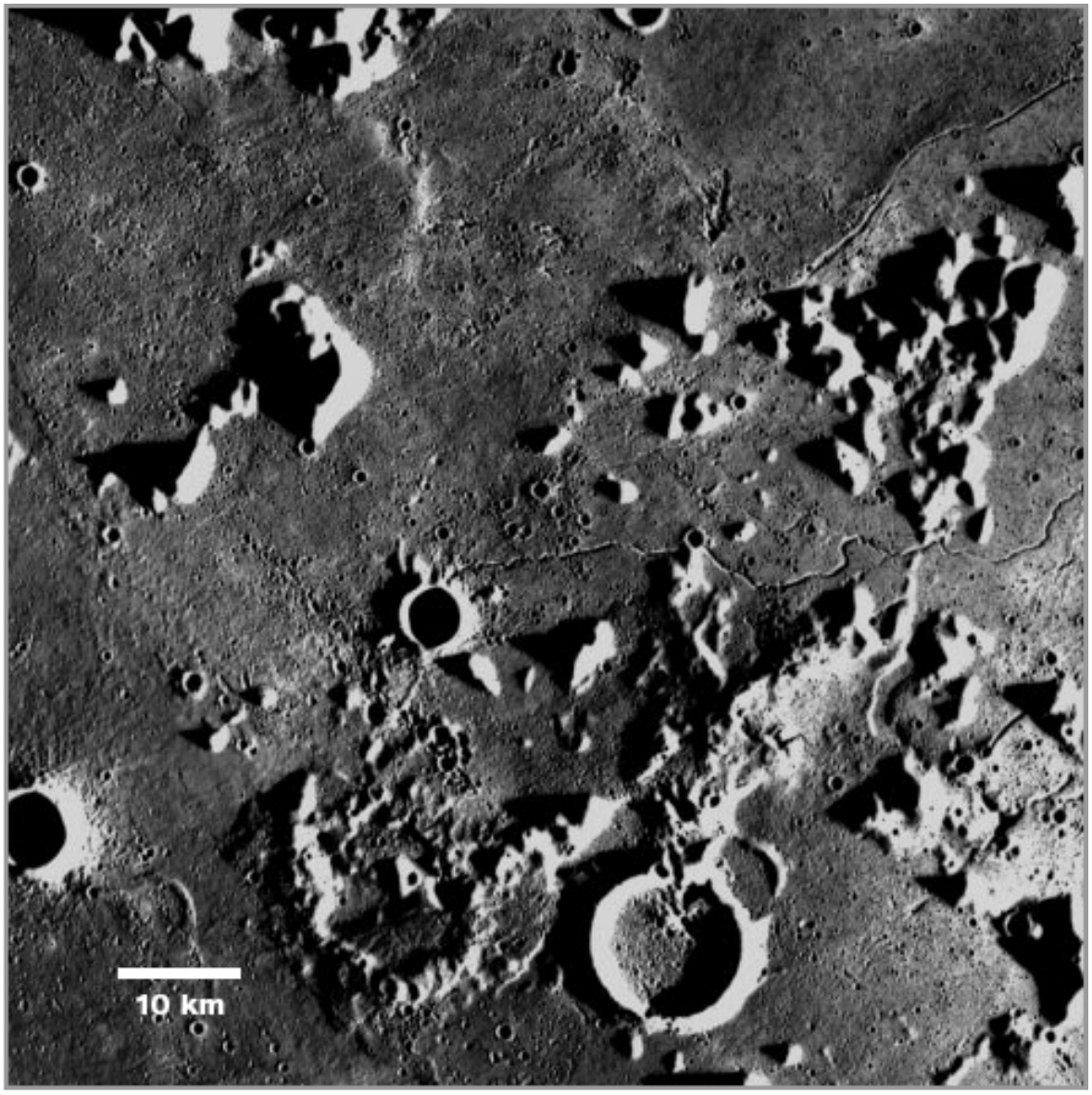

Fig 1a. Southwest quadrant of Euler region photo. North is to the top.

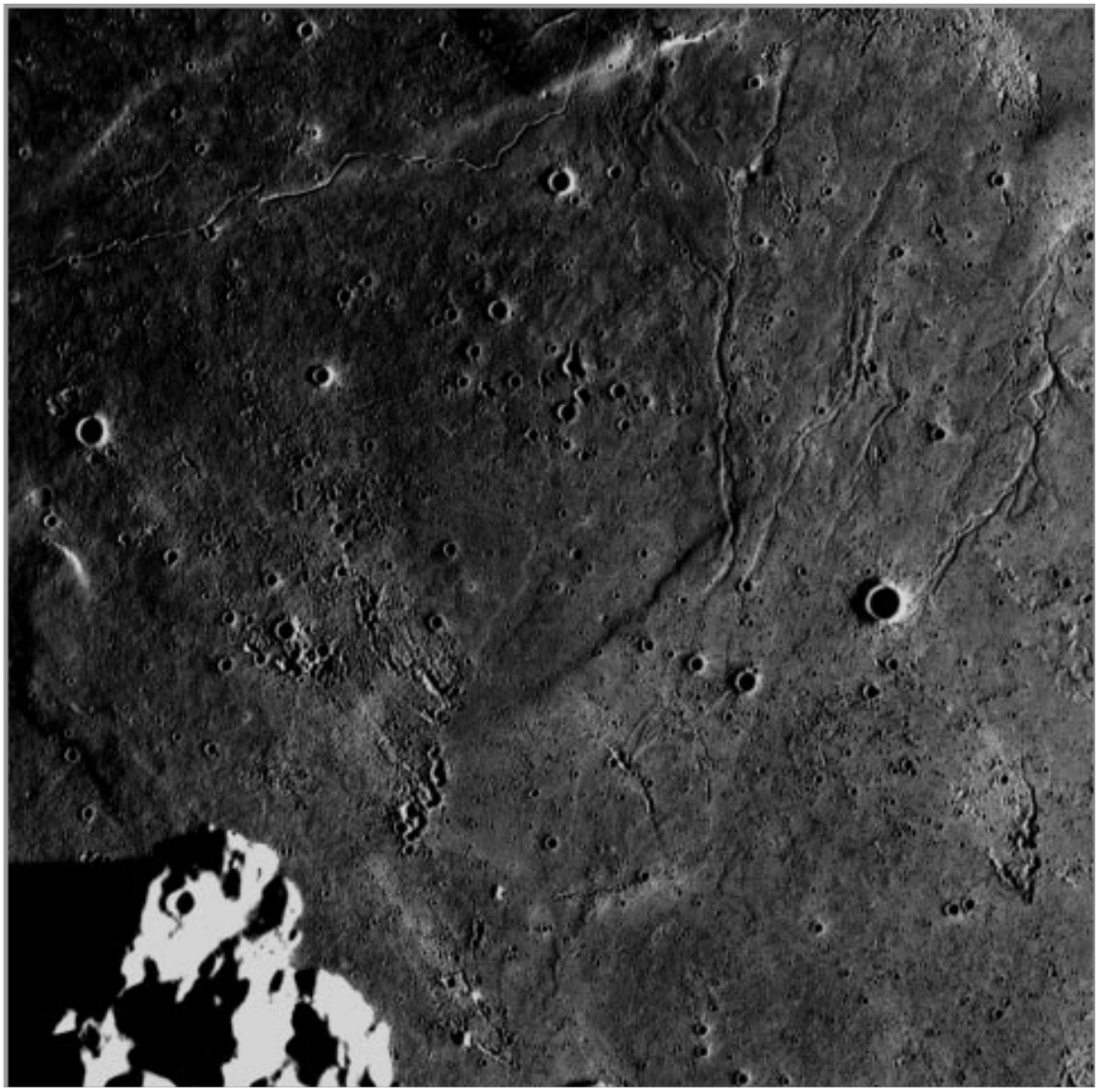

Fig 1b Northwest quadrant of Euler region photo. North is to the top. Scale is the same as for Figure 1a

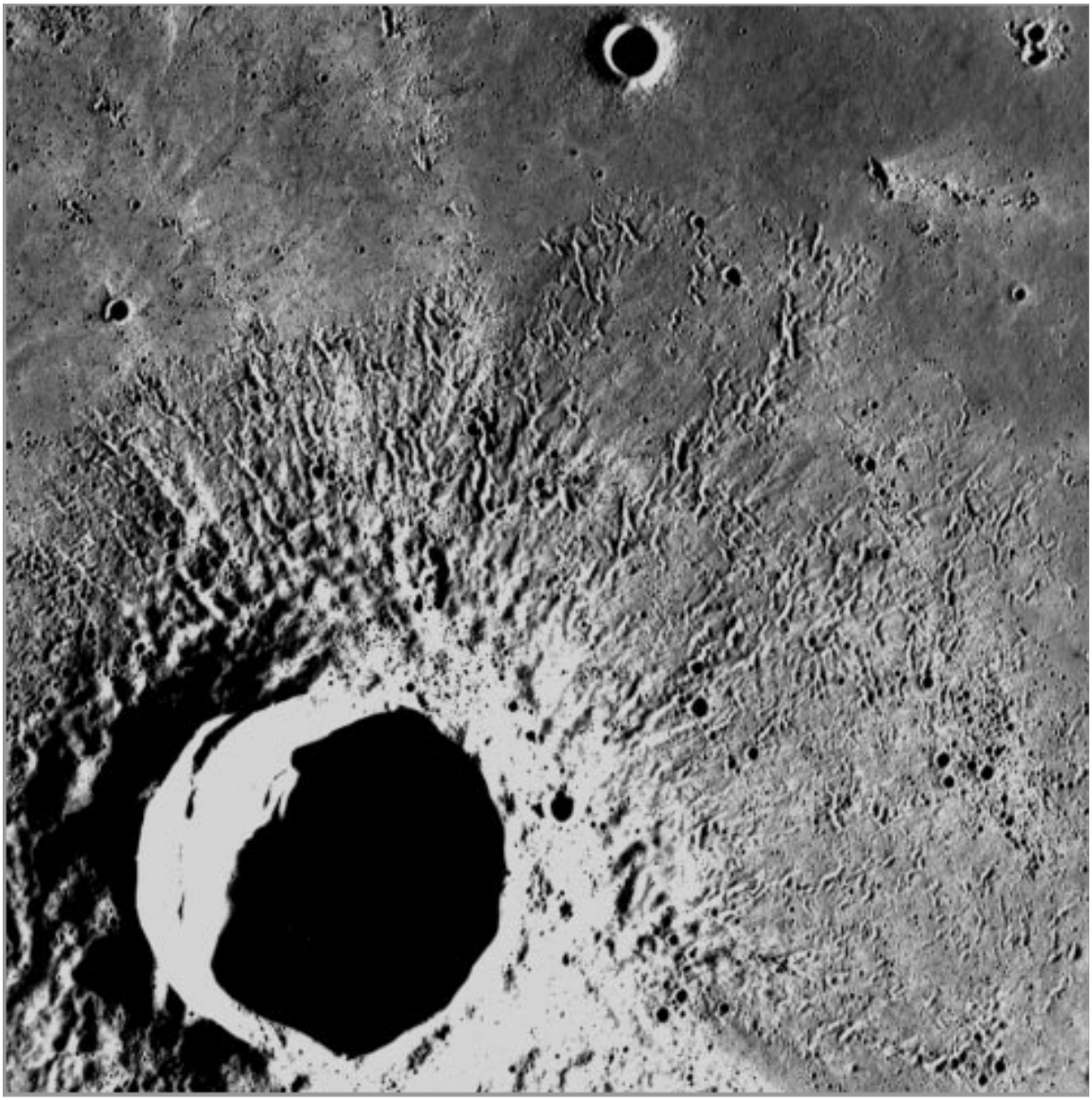

Fig 1c. Northeast quadrant of Euler region photo. North is to the top. Scale is the same as for Figure 1a

	Basalts			Noritic breccias					
	70017,35	70215,56	75075,58	73235,55	73275,30	76315,30M Matrix	76315,30,3 Clast	76315,35 Matrix	76315,52 Clast
Major element data (wt.%)									
SiO_2	38.07	38.46	37.64	46.20	46.16	45.64	46.45	46.21	48.57
TiO_2	13.10	12.48	13.45	0.67	1.43	1.50	1.43	1.50	0.32
Al_2O_3	8.79	9.01	8.20	21.28	18.49	17.53	18.18	18.14	17.91
FeO	18.07	19.40	18.78	7.32	9.05	9.53	8.83	8.95	7.66
MnO	0.27	0.29	0.28	0.11	0.13	0.13	0.13	0.12	0.13
MgO	9.81	7.91	9.49	11.05	11.54	12.50	12.34	12.02	13.84
CaO	10.30	10.94	10.29	12.55	11.30	10.97	11.30	11.32	10.36
Na_2O	0.40	0.42	0.40	0.48	0.67	0.70	0.64	0.60	0.47
K_2O	0.04	0.05	0.05	0.20	0.27	0.26	0.22	0.26	0.15
P_2O_5	0.05	0.10	0.05	0.20	0.26	0.30	0.29	0.29	0.12
S	0.15	0.17	0.10	0.04	0.08	0.08	0.07	0.07	0.00
Cr_2O_3	—	0.39	0.57	—	—	0.19	0.20	0.19	—
Total	99.05	99.62	99.36	100.10	99.38	99.33	100.08	99.67	99.53
Trace element data (ppm)									
Sr	—	123	166	—	—	174	172	177	—
Rb	—	0.9	0.5	—	—	6.7	3.6	6.2	—
Y	—	69	81	—	—	113	107	111	—
Zr	—	185	208	—	—	506	478	522	—
Nb	—	21	21	—	—	33	32	33	—
Zn	—	6	5	—	—	3	2	4	—
Ni	—	4	<1	—	—	77	82	74	—

Table 1. Chemical composition of some rock samples from the Apollo 17 mission

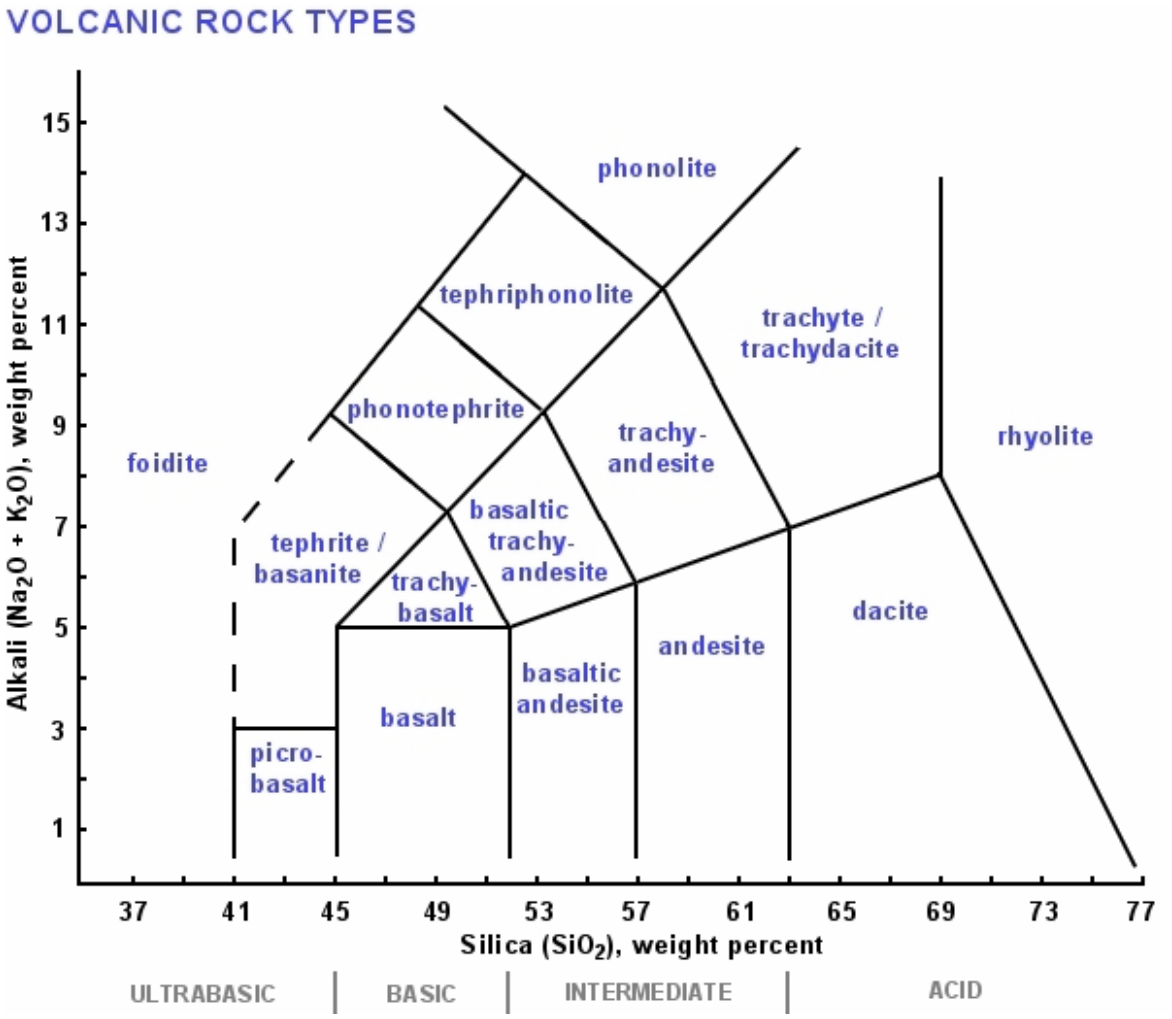

Figure 2. A typical TAS Diagram for classifying Volcanic Rocks.