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Geological Survey

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Allocation of subsamples of Apollo 17 lunar rocks from the boulder at station 7, for study by the International Consortium

by

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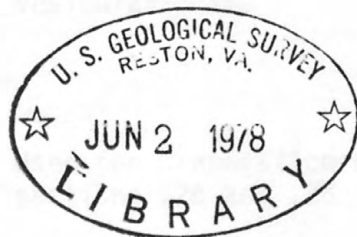
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The International Consortium was organized, under the leadership of E. C. T. Chao, to conduct a systematic interdisciplinary study of four lunar rock samples (77135, 77115, 77075 and 77215) collected by the Apollo 17 astronauts as representative of the four lithologies they recognized in the boulder at station 7. Tables 1 to 4 document the allocation of subsamples for consortium studies, and table 5 lists the members of the International Consortium.



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Table 1. Allocation of subsamples of 77135 for International Consortium Studies

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
1. More Vesicular Part:			
77135,3	0.81	Single chip, lunar exterior and fresh surfaces. Used for preparation of thin sections ,7, ,22 and ,23.	Chao
,6	1.17	Chip	Goles
,10	0.51	Chip	Anders
,34	4.94	13 chips, adjacent to clast 2 (see below)	Tatsumoto (4.793 g.) Goles (,34a = 0.13 g.)
,71	3.44	Single piece, with lunar surface at one end	Geiss
,76	1.95	One piece, oriented	Fuller
,77	1.32	4 freshly exposed chips	Philpotts
,80	0.51	Interior piece with one sawed surface	O'Hara
,81	0.34	Oriented chip, used to prepare thin sections ,119-,121	Chao
,82	0.41	Chip	Chao
,89	0.46	6 documented interior chips	Geiss
,110	PTS	Thin section prepared from ,11	Geiss
,126 and ,127	PTS	Thin sections of the contact between the more vesicular and less vesicular parts	Chao
2. Less Vesicular Part:			
77135,14	0.27	Used for preparation of thin sections ,26 and ,28	Chao
,33	1.08	4 chips	Tatsumoto (0.932 g.) Goles (0.131 g. = 33a) (,9009) Chao (0.003 g. = 33b) (,9010)

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
,66	1.18	6 chips	Philpotts
,68	1.15	Oriented piece with one sawed surface	Fuller
,69	0.29	3 chips with some sawed surfaces	Anders
,70	0.26	One chip, not oriented	Chao
,91	0.15	Subsample of ,40	Philpotts
,92		Subsample of ,40, used to prepare thin sections ,96 and ,97	Chao

3. Clast 1 (Recrystallized Troctolitic Breccia):

77135,41a	0.14	Miscellaneous chips and powder	Tatsumoto
,41b (,9006)	0.86	Clast 1 material	Philpotts
,41c (,9007)	0.44	Clast 1 with adhered less vesicular matrix	Chao
,41d (,9008)	0.31	Clast 1 material	Geiss
,57a	0.79	Clast 1 material	Tatsumoto
,57b	0.16	Mostly clast 1 material	Tatsumoto
,57bb (,9012 & ,136 (consumed))	0.04	Clast 1 material	Anders
,57j (,9005)	0.13	Clast 1 material from ,57b	Geiss
,59	1.09	Oriented piece with one exterior surface	Fuller
,62	0.12	Single chip with one sawed surface	Anders
,112 & ,114	PTS	Thin sections prepared from subsamples ,61 and ,63 respectively	Chao

4. Olivine-rich Clast from Clast 1:

77135,57c	0.06	Olivine-rich clast	Tatsumoto
,57d (,9002)	0.06	Olivine-rich clast	Philpotts

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
,57e (,9003)	0.02	Olivine-rich clast	Chao
,57f (,9004)	0.05	Olivine-rich clast	Geiss
,57g	0.04	Mostly olivine-rich clast material	Tatsumoto
,57h	0.06	Mixture of clast 1, matrix and olivine-rich clast	Tatsumoto
,57k	0.04	Fragments from ,57f -- mixture of clast 1 material and olivine-rich clast	Tatsumoto
,61	0.29	Chip: 1/2 clast 1, 1/2 olivine-rich clast. Used for preparation of thin sections ,112 and ,113	Chao

5. Clast 2 (Troctolitic Anorthosite):

77135,24	0.12	Clast 2 material with some of the more vesicular matrix adhering. Used for preparation of thin sections ,27 and ,29.	Chao
,49	0.24	Chip of clast 2 material, unoriented	Fuller
,50	0.06	3 small chips (0.006 g of ,50 consumed as ,133)	Anders
,51	0.12	2 chips, of which only half the material is clast 2	Geiss
,52	0.17	3 chips	Nava
,53	0.26	4 small chips	Tatsumoto

Table 2. Allocation of Subsamples of 77115
for International Consortium Studies

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
1. Gray Matrix:			
77115,14	2.2	Oriented single chips with exterior surface	Fuller
,21	0.59	Gray matrix with small coarser-grained olivine-bearing clast	Chao
,22	1.0	Single sawed interior piece	Geiss
,28	0.5	Single interior chip with sawed surfaces	Price
,30	0.55	Chip of gray matrix	Philpotts
,35	1.6	Piece with 2 sawed surfaces	Tatsumoto
,38	0.05	6 small interior chips	Anders
,40	0.4	2 small interior chips plus piece with one small sawed surface	Tatsumoto
,41	?	Thin sections prepared from ,41 are ,59 - ,61	Chao
2. Gray Matrix with Brownish Area Contact:			
77115,36	0.58	Used for preparation of thin sections ,50 - ,55 and ,66 - ,68	Chao
,37	?	Used for preparation of thin sections ,56 - ,58	Chao
,39	0.16	Brown pyroxene-bearing areas with gray matrix	Chao
3. Gray Matrix Plus Tan Breccia:			
77115,29	0.9	Mixed gray matrix plus greenish-tan breccia. Chipped from 77115,15	Chao
4. Tan Breccia:			
77115,3	0.2	Used for the preparation of thin sections ,10 and ,11	Chao

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
5. White Clast with "Chilled" Border Zone			
77115,17	?	Used to prepare thin sections ,48 and ,49	Philpotts (,48) Chao (,49)
,19	1.06	Single cutoff piece of gray matrix with white clast surrounded by a darker "chilled" zone.	Philpotts
,69	.19	5 chips from ,19	Nava
,70	.19	2 chips from ,19	Nava
,71	.32	3 chips from ,19	Nava
,72	.22	2 chips from ,19	Nava
,73	.04	chip from ,19	Chao
,74	.2	Part of white clast in ,19	Anders
,75	.22	Clast and matrix from ,19	Geiss

Table 3. Allocations of subsamples of black dikelet 77075 for consortium studies

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Recipient</u>
77075,18	0.25	Geiss
,19	0.05 (.03 g consumed as ,26)	Anders
,20	0.01	Chao
,21	0.20	Philpotts
,22	0.49	Tatsumoto

Table 4. Allocation of Subsamples of 77215
for International Consortium studies

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
77215,37	3.92	Representative mixture of lithologies of 77215 with three small distinct clasts, one noritic, one anorthositic and one with plagioclase and pyroxene (?)	Tatsumoto
,45a	1.05	Representative mixture of major lithologies of 77215, with perhaps less yellow orthopyroxene than dark glassy particles	Geiss
,45b	1.13	Representative mixture of major lithologies of 77215, with perhaps less yellow orthopyroxene than dark glassy particles	Nava
,45c	.66	Representative mixture of major lithologies of 77215, with perhaps less yellow orthopyroxene than dark glassy particles	Tatsumoto
,45d	.01	Representative mixture of major lithologies of 77215, with perhaps less yellow orthopyroxene than dark glassy particles	Chao
,58	.98	Subsample contains a 3-4 mm dark gray glass clast besides mineral clasts of yellow orthopyroxene and white plagioclase	Chao and Huebner
,119	.22	Subsample is taken from 77215,19, from contact between the white noritic breccia matrix and the black dikelet	Nava
,121	.26	Subsample is taken from 77215,19 from the middle part of the black dikelet. The dikelet is about 2 cm wide at the point sampled	Nava
,114	.09	Subsample consists of the interior of a norite clast from 77215,19 with greenish yellow orthopyroxene and milky white fractured plagioclase	Tatsumoto
,117	.13	Chip taken with one corner showing contact between dikelet and the noritic breccia, from 77215,19. Polished thin section 77215,140	Chao

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
,122	.03	Chip taken from the middle of black dikelet from 77215,19. Polished thin section 77215,142	Chao
,124	.03	Chip taken from the middle of black dikelet from 77215,19. Polished thin section 77215,156	Chao
,100	---	Thin slice from 77215,22 containing a small part of the norite (clast 1) with yellow orthopyroxene and white plagioclase. The rest is matrix breccia material. Part of a gray glass clast also present. Polished thin sections 77215,138 and ,139	Chao
,145	.07	One large chip and about 10 small fragments including black particles and yellow orthopyroxene, all from norite (clast 1) and with no matrix material, from 77215,22	Tatsumoto
,146	.10	Two small chips from the interior of norite (clast 1) with no adhered matrix material from 77215,22	Geiss
,147	.12	Powder left over from chipping, with matrix contamination from 77215,22	Chao
,151 and ,154	.12	Two fragments broken from the same norite (clast 2) consisting of greenish yellow orthopyroxene and white plagioclase from 77215,22	Geiss
,152	.62	Two large chips and one small chip from norite (clast 2) with adhered matrix breccia material from 77215,22. The norite (clast 2) materials consist of fractured white plagioclase and greenish yellow orthopyroxene. Small dark specks are also present. Sample was further separated in Chao's laboratory then transferred to Nava for chemical analysis. Polished thin section 77215,152	Nava Chao
,153	.34	One large and two small chips from 77215,22 from norite (clast 2). The large chip consists of mostly the noritic breccia matrix. The two small chips are essentially clast 2 materials with little or no adhered matrix material. Dark material present may be troilite	Tatsumoto

<u>Subsample</u>	<u>Weight (g.)</u>	<u>Description</u>	<u>Recipient</u>
,129	.01	Chips from the gray glass clast from 77215,29. Polished thin sections 77215,158 and ,159	Chao
,130	.71	Fragments from the gray glass clast in 77215,29. The gray impact glass contains yellowish white shocked plagioclase inclusions. Sample was further separated in Chao's laboratory and then transferred to Nava for chemical analysis	Nava
,133	.15	One large and one small fragment and some powder from the interior of gray glass clast from 77215,29. Xenocrysts of milky white plagioclase and pale brown particles are present as inclusions in the glass.	Geiss

Table 5. The International Consortium

- a. E. C. T. Chao -- consortium leadership and mineralogy-petrology
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Reston, Va. 22092
- b. E. Anders -- heavy rare metal elements
Enrico Fermi Institute and Dept. of Chemistry
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- c. P. Butler, Jr. -- dissection and documentation
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- d. M. D. Fuller -- magnetic properties
Dept. of Geological Sciences
University of California
Santa Barbara, Ca. 93106
- e. J. Geiss -- Ar/Ar ages and rare gas studies
Physikalisches Institut
University of Bern
Sidlerstrasse 5
3012 Bern, Switzerland
- f. D. F. Nava -- major, minor and rare-earth element chemistry
Astrochemistry Branch
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Table 5. continued

- g. M. J. O'Hara -- Rb/Sr and U-Th-Pb systematics
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