



Cosmic Dust Courier



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VOLCANIC ASH INTERRUPTS COSMIC DUST COLLECTION EFFORTS

The explosive eruptions of El Chichon volcano in Mexico in March and April of 1982 injected enormous volumes of ash and gas into the stratosphere. The El Chichon stratospheric cloud has presented a previously unequaled opportunity to scientifically monitor the effects of such clouds on weather and climate. As described on pages 13-14 of Cosmic Dust Courier No. 2, ash samples collected from the stratosphere by the NASA/JSC Cosmic Dust Program have contributed information of interest to volcanologists, meteorologists, and climatologists. Unfortunately, the El Chichon stratospheric cloud also constitutes an undesirable source of contamination in the collection of extraterrestrial dust from the stratosphere. In fact, NASA/JSC samples indicate that in May of 1982, the abundance of ash at normal sampling altitude (18-20 km) was at least one hundred million times greater than the expected abundance of cosmic dust. Although the stratospheric ash load has decreased measurably with time, all cosmic dust collectors flown since May 1982 have been heavily contaminated with ash particles. As noted in Cosmic Dust Courier No. 2, limited amounts (microgram quantities) of the El Chichon stratospheric ash are available to interested researchers. Prospective sample requesters should contact us for further details.

An especially puzzling aspect of the El Chichon stratospheric cloud has been the settling rates of its solid particles which, at least in the first month of cloud history, were much slower than some currently accepted atmospheric dust models would predict. That anomaly motivated recent work at JSC directed toward understanding the dust settling rates so that stratospheric clearing could be better predicted. New model extrapolations suggest that ash particles greater than 1 micron in size may still be expected to exist in the stratosphere as late as April, 1983, one full year after the volcanic eruption. Meanwhile, cosmic dust collection surfaces flown before the El Chichon eruption are being studied and sampled to provide a continuing supply of uncontaminated cosmic particles for research. In addition, ash-laden collection surfaces are being studied (on a time-available basis) for their information content on particle settling rates and on characteristics of volcanic explosion products, the most significant perennial source of natural contaminants with which cosmic dust collection must contend.

COSMIC DUST INVESTIGATORS INVITED TO MEET DURING LPSC-14

At the suggestion of Professor Robert M. Walker of Washington University (St. Louis), an informal meeting of current and prospective investigators of cosmic dust particles is being organized as part of the Fourteenth Lunar and Planetary Science Conference to be held at the Johnson Space Center during March 14-18, 1983. The session is tentatively scheduled to be held at the Lunar and Planetary Institute on Monday evening, March 14, at 8:00 p.m. No abstracts are being solicited and no formal technical presentations are being planned. Instead, it is intended that the Monday evening session provide a more relaxed opportunity for exchange of ideas and information among interested parties. Also, one or more members of the NASA/JSC Cosmic Dust Curatorial Team will be available to answer questions about techniques, sample requests, and other topics of concern to sample investigators.

WB-57F COLLECTION FLIGHTS TO CONTINUE; U-2 LARGE-AREA COLLECTORS UNDER STUDY

In Cosmic Dust Courier No. 2, we reported that combined effects of budget cuts and schedule changes in the Department of Energy's Project Airstream would force a long interruption, if not total curtailment, in the use of the NASA/DOE WB-57F aircraft for cosmic dust collection flights. Fortunately, it now appears that the hiatus will not occur. Additional changes in the Airstream schedule, combined with the success of the NASA/JSC Cosmic Dust Program in sampling and analyzing the El Chichon cloud which was of great interest to the Airstream program, have resulted in commitment by DOE to continue to fly cosmic dust collection flights on the WB-57F. The aircraft is currently undergoing a regularly scheduled, comprehensive inspection and overhaul. The next cosmic dust collection flight is planned for March, 1983. Meanwhile, the parallel program of collection using U-2 aircraft is continuing. In late spring or summer of 1983, new actuator mechanisms will increase both the rate and frequency with which cosmic dust collections can be made with the U-2 and ER-2 aircraft.

The plan to build and fly large-area collectors (LAC's) on U-2 and ER-2 aircraft, as briefly described in Cosmic Dust Courier No. 2, continues to be developed. A prototype of the LAC design has been constructed and is being used as a model as refinements are made in order to optimize collector characteristics for purposes of both aircraft compatibility and scientific requirements. The major obstacle to continuing progress is the lack of current funds. NASA/JSC has requested funding for the LAC system as part of its fiscal-year 1984 budget.

UPDATE ON COSMIC DUST SAMPLE INVENTORY; CATALOG 4 IN PREPARATION

The Cosmic Dust Catalog series published by the NASA/JSC Planetary Materials Branch represents the principal avenue by which we inform investigators about the availability of stratospheric dust samples. As an aid to investigators preparing sample requests, we offer Tables 1 and 2 as summaries of the

availability of cataloged sample particles. Abbreviations and codes used in Table 1 are explained in the table key which is printed on a separate page.

Briefly stated, the format of Table 1 reflects the fact that individual particles receive preliminary examination and are stored on SEM mounts, most commonly with 16 individual particles per mount. Each particle is assigned a unique identification number which incorporates the identity of the collection flag from which it was taken, the SEM mount on which it was placed for characterization, and its storage location on the SEM mount. For every identification number which has been assigned to a sample particle, the current status of the particle is given in Table 1. Particles allocated to specific investigators are explicitly listed as such whereas particles in inventory and still available for allocation have only blank entries. Exceptions to that convention occur for particles on SEM mounts for which the entire mount has been allocated. For example, particle W7017C6 is still available for allocation whereas W7017A2 is not available because the entire SEM mount identified as W7017A has already been allocated. The "Comments" column shows the existence and status of particles numbered outside the normal series of 1-16 and also special properties which may apply to some samples. Large-particle reconnaissance samples (LPRS in Table 1) are those taken from unusually large (> 20 microns) particles which have been tentatively identified as extraterrestrial materials. Those particles were described in Cosmic Dust Courier No. 2 and the current status of each parent particle is summarized in Table 2 of this issue.

Volume 4/Number 1 of the Cosmic Dust Catalog series is now being prepared. It will include descriptions of approximately 80 new individual particles retrieved from cosmic dust collection flag W7027. As another flag from the same flight series as the highly fruitful W7029 (see Cosmic Dust Catalog, Vol. 2), W7027 has yielded a number of interesting particles. Catalog 4(1) should be published and distributed to members of the Cosmic Dust Program mailing list by April, 1983.

SAMPLE REQUESTS

All sample requests should be made in writing to "Curator/Cosmic Dust" at the address given in the Courier letterhead. Each request should refer to specific samples and contain enough information to permit evaluation of the proposed study and the adequacy of the requester's facilities. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (e.g., copies of pages from related proposals, reprints of publications, flow diagrams for analyses) are welcome. Prospective sample requesters may contact us for further information. In fact, communications made in advance of formal sample requests are helpful in clarifying sample requirements and availability, a step which is essential for expeditious handling of all sample requests. Sample requests will be reviewed by the Lunar and Planetary Sample Team (LAPST), a committee of scientists

which advises NASA on matters related to lunar sample and cosmic dust sample curation and distribution. The NASA/JSC Planetary Materials Branch will arrange for all required LAPST reviews and will inform requesters of results as rapidly as possible.

NEW TELEPHONE NUMBER

Please note that, as shown in the Courier letterhead for this issue, the prime telephone number for information about the NASA/JSC Cosmic Dust Program is (713) 483-6241. The former prime number, (713) 483-3274, will continue to serve as a back-up for the new number.

TABLE 2

NASA/JSC COSMIC DUST PROGRAM:
 AVAILABILITY OF LARGE (> 20-micron) PRISTINE "COSMIC" PARTICLES^a

Effective Date: February 1, 1983

Parent Particle	Sample Allocated	Investigator	Comments
W7026*A	W7026*A1	P. R. Buseck	Parent particle still on flag W7026*A1 previously numbered W7026A1.
W7028*C	W7028*C1	P. R. Buseck	Parent particle still on flag W7028*C1 previously numbered W7028A4.
W7029*A			Several fragments still on flag
	W7029*A1	D. S. McKay	individual fragment W7029*A1 previously numbered W7029C1.
	W7029*A8,A13, A16	R. M. Walker	individual fragments
	W7029*A15	D. E. Brownlee	individual fragment
	W7029*A23,A24, A25, A26	D. S. McKay	< 5-micron "fines"
	W7029*A-- ,A--	J. C. Laul	two individual fragments, to be determined
W7029*B			Abundant "fines" still on flag
	W7029*B2	R. M. Walker	< 10-micron "fines"
	W7029*B3	G. L. Nord, Jr.	< 10-micron "fines"
	W7029*B4,B5, B6,B7	D. S. McKay	< 5-micron "fines"
W7031*A	None		Parent particle still on flag
W7031*B	None		Parent particle still on flag
W7031*C	None		Parent particle still on flag
W7031*D	None		Parent particle still on flag

Note (a): see Cosmic Dust Courier No. 2 for descriptions of particles

KEY TO TABLE 1

- Note (a) : excluding samples known or strongly suspected to be contaminated by volcanic ash, and excluding "large" cosmic particles (which are tabulated separately)
- Note (b) : particles 2 and 3 identified as laboratory contaminants and not cataloged
- Note (c) : particles 1, 2, and 5-13 identified as laboratory contaminants and not cataloged
- Note (d) : particles 3, 4, 7, 8, and 10-14 identified as laboratory contaminants and not cataloged
- Note (e) : particles 1-3 tentatively classified as catalog variety "TCN"; particles 4-7 identified as laboratory contaminants and not cataloged

- A, B, C, ..., etc. = particle SEM mount designation
- I... = allocated to investigator "I..." (see separate listing)
- I...x = allocated to investigator "I..." but without preliminary SEM examination (i.e., no catalog-type data were published)
- (I...) = now at Johnson Space Center but previously allocated to investigator "I..."
- LPRS = large-particle reconnaissance sample tentatively identified as "cosmic"
- n = not available (i.e., lost during sample handling or preliminary examination)
- p = particles "picked" (i.e., retrieved from collection surface) to yield samples as listed
- r = reserved for posterity
- u = unassigned (i.e., no sample yet assigned this number)

Investigators:

- I1 = D. S. McKay (NASA Johnson Space Center, Houston, TX USA)
- I2 = D. E. Brownlee (Univ. of Washington, Seattle, WA USA)
- I3 = R. M. Walker (Washington Univ., St. Louis, MO USA)
- I4 = P. R. Buseck (Arizona State Univ., Tempe, AZ USA)
- I5 = M. Maurette (Laboratoire Rene Bernas, Orsay, France)
- I6 = G. L. Nord, Jr. (U. S. Geological Survey, Reston, VA USA)
- I7 = R. H. Hewins (Rutgers Univ., New Brunswick, NJ USA)
- I8 = J. C. Laul (Battelle Pacific Northwest Labs., Richland, WA USA)



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