The Role of CAPTEM in Lunar Sample Allocation

Meenakshi (Mini) Wadhwa, ASU
Chair, CAPTEM

“Dedicated to Maximizing Planetary Sample Science While Protecting the Integrity of NASA Collected Extraterrestrial Materials”
CAPTEM HERITAGE

CAPTEM
Curation & Analysis Planning Team for Extraterrestrial Materials

LAPST
Lunar & Planetary Sample Team

LSAPT
Lunar Sample Analysis Planning Team


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CAPTEM FUNCTIONS

• Primary role in the allocation of NASA collected planetary materials to the broader scientific community

• Provides analysis and guidance for NASA sample curation

• Provides sample science expertise as needed

• Sponsors community-initiated sample science based initiatives, workshops, white papers
Planetary Materials under CAPTEM Purview

Apollo (Lunar) Samples: 382 kg of lunar material (rocks, soils, regolith cores), representing 2200 individual samples from 6 different sites on the near side of the Moon in 1969-1972.

Stardust (Comet Wild 2) Samples: Returned in 2006; thousands of cometary grains in 1000 cm$^2$ of aerogel.

Cosmic Dust Samples: Since 1981, >2000 cosmic dust particles collected in the stratosphere by high flying aircraft.

Genesis (Solar Wind) Samples: Returned in 2003; >15,000 pieces >3mm recovered.
CAPTEM STRUCTURE

Main CAPTEM Committee
Chair: M. Wadhwa

Lunar sample allocation subcommittee
Chairs: Lars Borg (LLNL)

Stardust allocation subcommittee
Andrew Westphal (UC Berkeley)

Genesis allocation subcommittee
Andrew Davis (U Chicago)

Cosmic Dust allocation subcommittee
George Flynn (SUNY Plattsburgh)

Facilities subcommittee
Dimitri Papanastassiou (JPL)

Additional Members: Christine Floss (Washington U), Brad Jolliff (Washington U), Lindsey Keller (NASA JSC), Scott Messenger (NASA JSC), Mac Rutherford (Brown U), Steven Symes (U Tennessee, Chattanooga), Allan Treiman (LPI)

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Sample Allocations Oct 2008-July 2009

• Lunar Allocations:
  • 18 requests: 15 approved, total 138 samples

• Stardust Allocations:
  • 104 requests: 86 approved, total 522 (TEM grids, keystones, blanks, wall sections, foils, etc.) samples

• Genesis Allocations:
  • 13 requests: 13 approved, total 40 samples

• IDP Allocations
  • 8 requests: 7 approved, total 34 samples
CAPTEM’s International Reach

• A substantial proportion of sample requests handled by CAPTEM are from international research groups and investigators (e.g., 38% of Stardust requests this last round)

• Involvement of the sample curation personnel in international missions (e.g., Hayabusa)

• Planning of future Mars Sample Return (quarantine, curation and allocation) with greater international participation (Mars Exploration Joint Initiative)
Current Issues

• Inputs to the Planetary Science Decadal Survey on future potential sample returns from small bodies, Moon and Mars

• Initiation of an independent review of the status of curation of Stardust samples

• Addressing the issue (in collaboration with ESMD personnel through OSEWG) of a recent increase in the number of requests for lunar samples for engineering/resource utilization studies in anticipation of future lunar exploration
New Initiatives under Consideration

- CAPTEM sponsored workshop on Lunar Volatiles in Fall 2010

- Mining the Apollo collections for “new” samples: Apollo special samples and lunar breccias

- CAPTEM sponsored workshops on tying sample science to the latest orbital data sets from Moon and Mars

- New opportunities for upper stratospheric timed collections (new cometary materials)

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Apollo Lunar Samples

The Apollo missions (1969-1972) returned 382 kg of rocks, soils, regolith core samples from 6 sites from the lunar near-side. NASA provides access to these for three purposes:

- **Research**: rocks, soils and regolith core samples for destructive and non-destructive analyses for basic planetary science research and applied studies in support of lunar (robotic and human) exploration (resource utilization, toxicity, hazards etc.)

- **Display**: rocks for short-term or long-term displays at museums, planetariums, expositions, or professional events that are open to the public

- **Education**: lunar sample disks for classroom use by qualified school teachers and lunar thin sections for use in petrology courses for advanced geology students

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Procedures for Requesting Apollo Lunar Samples: Step I

To request samples from the Apollo Lunar Sample Collection:

A) The investigator must demonstrate favorable peer review of proposed work involving lunar samples by (1) a formal research proposal approved for funding through a NASA program (such as LASER) within last 3 years, or (2) peer-reviewed articles pertinent to the sample request

B) The investigator must submit a written request to the Lunar Sample Curator specifying the numbers, types and quantities of lunar samples, and the planned investigations to be conducted on these. A resume is additionally required for new investigators
Procedures for Requesting Apollo Lunar Samples: Step I

For planetary science studies, the request is submitted to:
Lunar Sample Curator (Dr. Gary Lofgren, NASA JSC)

For engineering/resource utilization studies, the request is submitted to:
Lunar Simulant Curator (Dr. Carlton Allen, NASA JSC), who verifies that all necessary tests with lunar simulants have been satisfactorily completed, and determines whether the request warrants use of lunar samples, in which case it is forwarded to the Lunar Sample Curator
Procedures for Requesting Apollo Lunar Samples: Step II

The Lunar Sample Curator evaluates the submitted request and supporting materials, and EITHER

A) makes a curatorial allocation if:
   • The request is from an investigator who has previously been approved for sample allocation by CAPTEM, and
   • The request is for thin sections, “returned” lunar samples, or <1 g of other lunar samples with no pristinity issues, OR

B) forwards the request to CAPTEM for evaluation if:
   • The request is from a new investigator, and/or
   • The request involves >1 g of samples, or any samples with pristinity issues
Procedures for Requesting Apollo Lunar Samples: Step III

• The lunar sample requests forwarded to CAPTEM are evaluated by this standing committee

• A positive recommendation by CAPTEM, followed by approval by NASA HQ representative (currently Dr. Marilyn Lindstrom), constitutes formal approval of the request

• Lunar Sample Curator prepares a Lunar Sample Loan Agreement (incl. security plan) to be signed by the investigator

• Samples <10 g are shipped within US by US registered mail, outside US by US diplomatic pouch mail to an American embassy; >10 g must be hand carried by the investigator or his/her representative
Some Final Thoughts

• The Apollo lunar samples are a unique, but limited, resource of rocks and soil from another planetary body; important for addressing planetary science as well as engineering/resource utilization goals.

• The planetary science community has a long heritage of developing sample handling protocols and instrumentation for maximizing science while minimizing sample consumed.

• With the renewed interest in robotic and human exploration of the Moon, greater interest in the engineering/RU communities in studying lunar materials. Need to demonstrate that:
  • Studies require actual lunar material rather lunar simulants.
  • Effort has been made to minimize sample consumed.
For more information…

http://www-curator.jsc.nasa.gov/lunar/sampreq/index.cfm

http://www.lpi.usra.edu/captem/