Preserving the Science Legacy from the Apollo Missions to the Moon

Cindy Evans, Ryan Zeigler, Kerstin Lehnert, Nancy Todd, Erika Blumenfeld

Six Apollo missions landed on the Moon from 1969-72, returning to Earth 382 kg of lunar rock, soil, and core samples—among the best documented and preserved samples on Earth that have supported a robust research program for 45 years. From mission planning through sample collection, preliminary examination, and subsequent research, strict protocols and procedures are followed for handling and allocating Apollo subsamples. Even today, 100s of samples are allocated for research each year, building on the science foundation laid down by the early Apollo sample studies and combining new data from today's instrumentation, lunar remote sensing missions and lunar meteorites. Today's research includes advances in our understanding of lunar volatiles, lunar formation and evolution, and the origin of evolved lunar lithologies.

Much sample information is available to researchers at curator.jsc.nasa.gov. Decades of analyses on lunar samples are published in LPSC proceedings volumes and other peer-reviewed journals, and tabulated in lunar sample compendia entries. However, for much of the 1969-1995 period, the processing documentation, individual and consortia analyses, and unpublished results exist only in analog forms or primitive digital formats that are either inaccessible or at risk of being lost forever because critical data from early investigators remain unpublished. We have initiated several new efforts to rescue some of the early Apollo data, including unpublished analytical data. We are scanning NASA documentation that is related to the Apollo missions and sample processing, and we are collaborating with IEDA to establish a geochemical database called Moon DB. To populate this database, we are working with prominent lunar PIs to organize and transcribe years of both published and unpublished data. Other initiatives include micro-CT scanning of complex lunar samples to document their interior structure (e.g. clasts, vesicles); linking high-resolution scans of Apollo film products to samples; and new procedures for systematic high resolution photography of samples before additional processing, enabling detailed 3D reconstructions of the samples. All of these efforts will provide comprehensive access to Apollo samples and support better curation of the samples for decades to come.