

Preliminary Abstract for Second Lunar Science Conference

U-Th-Pb Isotope Relations in Apollo 11 and 12 Lunar Samples

Leon T. Silver

Division of Geological Sciences
California Institute of Technology
Pasadena, California 91109

Analyses of four Apollo 12 basalt rocks indicate two distinct types of U-Th-Pb isotope systematics, (1) two rocks with Pb^{207}/Pb^{206} apparent ages of 3.95 ± 0.02 b.y. and (2) two rocks with apparent ages of 4.17 ± 0.02 b.y. The latter group is strikingly similar to the isotope systematics observed in nine Apollo 11 rocks. This observation may be placed in a plausible geological model of the local mare volcanic sequence, although limited by sample statistics. Relations between the Apollo 11 and 12 sample sites are suggested.

The isotope systematics observed in the analysis of lunar soil 12070, especially when evaluated for various possible components, clearly indicate the complexity of the geological and geochemical evolution of the soil. Previous attempts to deduce a unique age from the Apollo 11 soil need reevaluation in view of the presence of astonishing fractions of readily volatilizable leads in that soil. Volatile transfer of ancient leads, mechanical transfer of ancient rocks, and the presence in Apollo 12 soils of highly radioactive and highly discordant components similar to Apollo "rock" 12013 preclude simple analyses. The age of the moon has not yet been established by direct analysis of the soil and continues to be a fundamental and fascinating target for the lunar research program.