

THE PALEOMAGNETIC RECORD OF THE APOLLO SAMPLES

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The burst of early work on the magnetism of the Apollo samples was followed by a quiescent period until recently. It had been thought that the strong magnetization in samples, whose ages ranged from approximately 3.65 to 3.9 Ga, was evidence of a lunar dynamo at that time, and possibly until 3.4 Ga.. New results have yielded evidence for (1) an early dynamo at ~4.2 Ga giving surface fields of the order of μT 's (2) a better understanding of Shock Remanent Magnetization (3) and new paleointensity determinations. Reanalysis of the lunar paleomagnetic data has been carried out using Principal Component Analysis (PCA) and comparison of the AF demagnetization characteristics of the Natural Remanent Magnetization (NRM) with other possible mechanisms of origin. This work suggests that although the NRM of many samples is not likely to be a primary Thermal Remanent Magnetization (TRM), acquired when the samples initially cooled on the lunar surface, a number of Mare Basalts do appear to carry a primary NRM. The results are consistent with the suggestions of Stephenson, Collinson, and Runcorn, (1976) that a lunar dynamo generated a lunar surface field, which weakened by about an order of magnitude from its peak ~3.9 to 3.4 Ga.