LOW ALTITUDE LUNAR MAGNETIC FIELD OBSERVATIONS,
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Contour maps of the fine scale lunar magnetic field have
been completed using measurements obtained at an altitude of
\( \approx 100 \) km above the lunar surface with the Apollo 15 and 16
subsatellites while the moon was in the geomagnetic tail (1).
The most intense fields (\( >1/3\gamma \)) are observed between 150\(^\circ\)E
and 150\(^\circ\)W in the southern hemisphere. At this altitude the
scale size of the observed variations in the magnetic field
components is of the order of 100 km.

The Apollo 16 subsatellite, which crashed into the lunar
surface after only 35 days of operation provided field mapping
passes at two quite different altitudes over the farside lunar
highlands. The first pass at \( \approx 80 \) km altitude over the region
from 8-10\(^\circ\)N and 80 to 180\(^\circ\)E revealed several discrete
magnetized regions with field strengths up to 1/3\gamma and scale
sizes of the order of 100 km, but none the size and strength
of the Van de Graaff anomaly. However, during the second pass
at altitudes between 10 and 50 km the complexion of the
magnetic variations changed markedly. The field magnitude
often exceeded \( 1 \) \( \gamma \) and the field components were constantly
changing with scale sizes of roughly 30 km, revealing a
clearly discernible pattern of magnetization over the entire
low altitude ground track. This pattern was consistent with
the results obtained during the high altitude pass in that
all features of the high altitude pass had counterparts at
low altitudes. The converse however was not true. Most
of the low altitude detail was attenuated at high altitudes.

The strong altitude dependence exhibited by these data
clearly show that the fields are due to the magnetization of
near surface material. The decrease in the scale size in
proportion to altitude is consistent with this and further
suggests that significant reversals of magnetization exist in
the farside lunar highlands at all scales sizes, probably
down to the scale sizes seen on the lunar traverses (2).

(1) The high altitude maps were completed in time for inclusion
in the frontispiece of the Proceedings of the Fifth Lunar
Science Conference but are not discussed therein.
and the interior of the moon, Rev. Geophys. Space Phys.,
12, 568-591.