

# The evolution of the South-Atlantic magnetic anomaly

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The models of the Earth's magnetic field represent through the time the effect in surface of the magnetohydrodynamic phenomenology resident in the terrestrial interior. From 1550 to the present time, it is evident that the dipole and quadrupole contributions in the description of the magnetic field are most important. This is verified by means of the temporal evolution of the energy that generates the spherical harmonic development of 1<sup>o</sup> and 2<sup>o</sup> order, being observed that the one of 1<sup>o</sup> order diminishes in the time, whereas the one of 2<sup>o</sup> order increases.

These effects are observed in the South-Atlantic Magnetic Anomaly (SAMA) whose minimum moves towards the SW, appearing in the region of the Río de La Plata (Argentina). The observations of the total intensity of the Earth's magnetic field made in the magnetic observatory of "Las Acacias" (LAS, Buenos Aires Province, Argentina) prove this effect, expanding to the anomaly towards the south and affecting the magnetic observatory of Trelew (TRW, Chubut Province, Argentina).

This work is a revision of the changes demonstrated in the dipole and quadrupole components of the Earth's magnetic field. Also, the registries of the observatories of Network INTERMAGNET (Huancayo-HUA (Peru), Vassouras-VSS (Brazil), Trelew-TRW (Argentina), Hermanus-HER (South Africa), and Las Acacias-LAS (Argentina)) show to the diminution of the total intensity of the field of the SAMA and the present position of the minimum.

The conclusions shows that the mentioned effects go further on, and could demonstrate in the next centuries the migration of the North Pole from the Canadian Arctic region to the region of the Russian-China steppe; the tendency of the Antarctic South Pole towards the west region of Australia, more indeed towards the observatory Gnangara (GNA) whose vertical component is made negative more and more; and the appearance of secondary minimum values within the great anomaly, those that would be possible to observe still making linear the secular trend of IGRF model.