FIELD CHARACTERISTICS

The strength of the field at the Earth's surface ranges from less than 30 microteslas (0.3 gauss) in an area including most of South America and South Africa to over 60 microteslas (0.6 gauss) around the magnetic poles in northern Canada and south of Australia, and in part of Siberia. The average magnetic field strength in the Earth's outer core was measured to be 25 Gauss, 50 times stronger than the magnetic field at the surface.[9][10]

The field is similar to that of a bar magnet. The Earth's magnetic field is mostly caused by electric currents in the liquid outer core. The Earth's core is hotter than 1043 K, the Curie point temperature above which the orientations of spins within iron become randomized. Such randomization causes the substance to lose its magnetization.

Convection of molten iron within the outer liquid core, along with a Coriolis effect caused by the overall planetary rotation, tends to organize these "electric currents" in rolls aligned along the north-south

polar axis. When conducting fluid flows across an existing magnetic field, electric currents are induced, which in turn creates another magnetic field. When this magnetic field reinforces the original magnetic field, a dynamo is created that sustains itself. This is called theDynamo Theory and it explains how the Earth's magnetic field is sustained.

Another feature that distinguishes the Earth magnetically from a bar magnet is its magnetosphere. At large distances from the planet, this dominates the surface magnetic field. Electric currents induced in the ionosphere also generate magnetic fields. Such a field is always generated near where the atmosphere is closest to the Sun, causing daily alterations that can deflect surface magnetic fields by as much as one degree. Typical daily variations of field strength are about 25 nanoteslas (nT) (i.e. ~ 1:2,000), with variations over a few seconds of typically around 1 nT (i.e. ~ 1:50,000).

Source: http://web.ua.es/docivis/magnet/earths_magnetic_field2.html