

MAGNETIC POLES AND MAGNETIC DIPOLE

The positions of the magnetic poles can be defined in at least two ways.

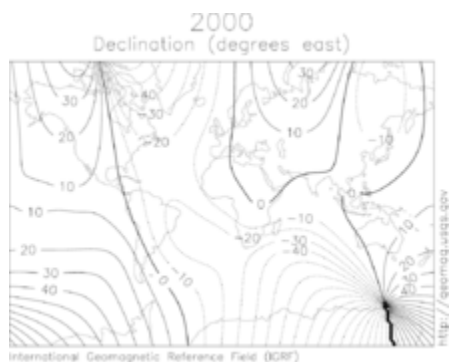
Often, a magnetic (dip) pole is viewed as a point on the Earth's surface where the magnetic field is entirely vertical. Another way of saying this is that the inclination of the Earth's field is 90° at the North Magnetic Pole and -90° at the South Magnetic Pole. At a magnetic pole, a compass held in the horizontal plane points randomly, while otherwise it points nearly to the North Magnetic Pole or away from the South Magnetic Pole, though local deviations exist. The two poles wander independently of each other and are not at directly opposite positions on the globe. Magnetic dip pole can migrate rapidly, observation of up to 40 km per year have been made for the North Magnetic Pole[6].

The Earth's magnetic field can be closely approximated by the field of a magnetic dipole positioned near the centre of the Earth. A dipole's orientation is defined by an axis. The two positions where the axis of the dipole that best fits the geomagnetic field intersect the Earth's surface are called the North and South

geomagnetic poles. For best fit the dipole representing the geomagnetic field should be placed about 500 km off the center of the Earth.

This causes the inner radiation belt to skim lower in Southern Atlantic ocean, where the surface field is the weakest, creating what is called the South Atlantic Anomaly.

If the Earth's magnetic field were perfectly dipolar, the geomagnetic and magnetic dip poles would coincide. However, significant non-dipolar terms in an accurate description of the geomagnetic field cause the position of the two pole types to be in different places.



Magnetic declination from true north in 2000



Magnetic declination from true north in 1700

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