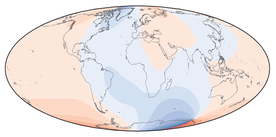
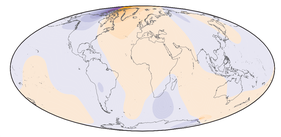
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

SCIENTIFIC INVESTIGATIONS MAP 2964
SHEET 1 OF 5
Version 1.0



DECLINATION



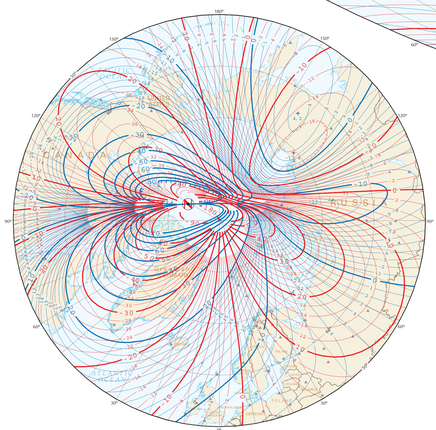
SECULAR VARIATION OF DECLINATION

DECLINATION CHART
THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD, 2005

By

Kenneth S. Rukstales and Jeffrey J. Love

2007



Azimuthal Equidistant Projection

Scale 1:40,000,000
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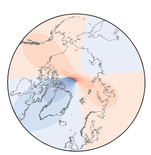
0 1000 2000 3000 MILES



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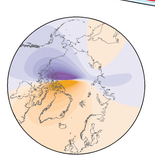


SECULAR VARIATION OF DECLINATION

Mollweide Projection
(Scale true along latitudes 40° 44' N. and S.)

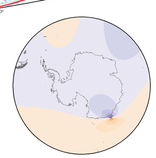
Scale 1:30,000,000
2000 1000 0 1000 2000 3000 MILES
0 1000 2000 3000 KILOMETERS

Declination (degrees)

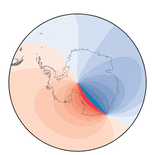
−180 −160 −140 −120 −100 −80 −60 −40 −20 0 20 40 60 80 100 120 140 160 180

Secular Variation of Declination (minutes of arc per year)

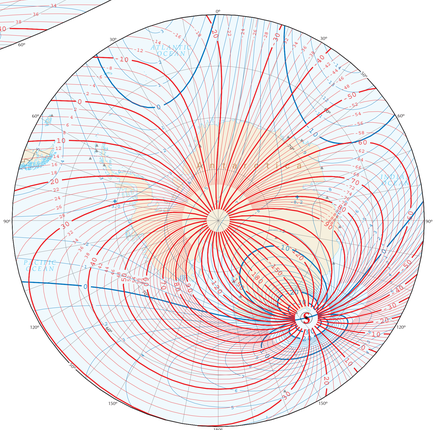
< −90 −80 −70 −60 −50 −40 −30 −20 −10 0 10 20 30 40 50 60 70 80 > 90



SECULAR VARIATION OF DECLINATION



DECLINATION



Azimuthal Equidistant Projection

Scale 1:40,000,000
0 1000 2000 3000 KILOMETERS
0 1000 2000 3000 MILES

EXPLANATION

Declination

10 — Contours of declination expressed in degrees. Declination is the horizontal angle between true north and the direction in which a magnetic compass points. It is considered positive or negative depending upon whether the end of a balanced compass needle points east or west of true north, respectively. Hachures point in direction of decreasing values

8.5 Point value of declination expressed in degrees. Point values enclosed by a single contour are local maxima or minima

Secular Variation of Declination

10 — Contours of the estimated rate of change of declination (secular variation) expressed in minutes of arc per year. To apply change, add algebraically. Hachures point in direction of decreasing values

-3.4 Point value of the estimated rate of change of declination (secular variation) expressed in minutes of arc per year. To apply change, add algebraically. Point values enclosed by a single contour are local maxima or minima

N North and south magnetic poles. Magnetic poles are defined as the locations at which the horizontal magnetic intensity, computed from the degree and order ten spherical harmonic International Geomagnetic Reference Field 2005 model, is effectively zero at 2005.0

S

Geomagnetic observatory recording data since 1990

DISCUSSION

This is one of five world charts showing the declination, inclination, horizontal intensity, vertical component, and total intensity of the Earth's magnetic field at mean sea level at the beginning of 2005. The charts are based on the International Geomagnetic Reference Field (IGRF) main model for 2005 and secular change model for 2005-2010. The IGRF is referenced to the World Geodetic System 1984 ellipsoid.

Additional information about the USGS geomagnetism program is available at http://geomag.usgs.gov/.

ACKNOWLEDGMENTS

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Base map data from ESRI Inc. ArcMap9.0.1.SM

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Digital data prepared with ArcGIS 93
running under Windows 2000