

The Earth's magnetic field: Where do we stand? Where do we go?

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The Earth's magnetic field is by far the best documented magnetic field of all known planets. The convergence of many different approaches has led to considerable progress in our understanding of the geomagnetic field characteristics and properties. The usefulness of magnetic field charts for navigation has led to the compilation of the longest series of quantitative measurements in the history of science. One of them is provided by the Kakioka observatory, unique series in this part of the Globe, able to bring information about the temporal variations of the geomagnetic field. More recently, the Earth's magnetic field have been measured in much more details than was previously possible, by a few very successful space missions.

Here, an attempt is given for an overview of the current status in terms of observing, interpreting and understanding the behavior of the magnetic field produced within the Earth's core. Ground-base and satellite data are brought in, and the way they can be used to derive the temporal evolution of the core field is discussed. Interpretation of this behavior from very short timescales (less than one year) to those covered by direct measurements (a few centuries) is exposed. Finally, a status-of-the-art of the Swarm mission, scheduled for launch in 2012, is given. The three spacecraft will provide the most detailed data yet on the geomagnetic field of the Earth and its temporal evolution, giving new insights into improving our knowledge of the Earth's interior and climate.

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