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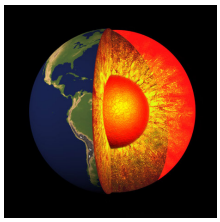

Material movement inside the core determines fast changes in the strength of the magnetic field of the planet
Jason Reed/Alamy

Planet's Magnetic Field Varies Much Faster Than Expected

Effect likely to have impact on electronic equipment at high altitudes

It is widely known that the Earth's magnetic field is varying in strength periodically and has reversed poles several hundred times in the past 4.6 billion years, since our planet exists. However, new measurements show that the changes take place much more rapidly than is has been previously predicted, especially in certain regions near the surface where the magnetic field now appears to be weakening fast. "What is so surprising is that rapid, almost sudden, changes take place in the Earth's magnetic field," said geophysicist Nils Olsen of the Danish National Space Center, co-author of a new study regarding the evolution of the Earth's magnetic field. The results of the study show that the variations in the Earth's magnetic field are basically simultaneous to changes inside the molten-metal core, since its movement triggers the magnetic field in the first place. As the mass of molten iron and nickel revolves around the central regions of the core, it gives birth to an electric current which, in turn, determines a magnetic field. The first evidence of dramatic changes in the strength of the magnetic field came in 2003 when scientists detected a considerable strength variation in the Australasian region of the planet, followed a year later by another such event in South Africa. "This may suggest the possibility of an upcoming reversal of the geomagnetic field," said Mioara Mandea of the German Research Centre for Geosciences, co-author of the study. The complete reversal of the geomagnetic field could take as long as a couple of thousands of years, however it can have significant effects on the short term. The lowering of the strength of the magnetic field in certain regions of the globe, for example, may have considerable consequences on the numbers of charged sub-atomic particles coming from space and entering the Earth's atmosphere. "It is in these regions that the shielding effect of the magnetic field is severely reduced, thus allowing high energy particles of the hard radiation belt to penetrate deep into the upper atmosphere to altitudes below a hundred kilometers," Mandea said. Although such radiation doesn't have a climatic impact on our planet, it can affect electrical and electronic equipment present on board of satellites and airplanes. The study was only targeted at measuring the rate of the flow of molten material deep inside the Earth's core through continuous measurements taken with the help of satellites in orbit around the planet. "They provide a good rationale to continue this monitoring longer," said Peter Olson of the Johns Hopkins University.