



September 26, 2008  
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## Cal Poly Physics Professor Kenneth Hoffman Publishes Groundbreaking Research on Earth's Magnetic Field

SAN LUIS OBISPO – The Earth's magnetic field may be more complex than we originally thought. That's according to groundbreaking research by Cal Poly Physics Professor Kenneth Hoffman and colleague Brad Singer, who published an article on their evidence in this week's Science Magazine.

According to Hoffman and Singer, two independent sources of Earth's geomagnetic field – one generated deep within the outer core of the planet and the other generated in the shallow core – are responsible for the ever-changing magnetism of our planet. "This hypothesis addresses the long-standing problem as to how the source of Earth's strong, axial dipole field – which runs north-south through the planet – reverses its polarity," said Hoffman.

Hoffman and Singer compared historic observations of the Earth's magnetic field at two geographically separated sites, Germany and Tahiti, along with paleomagnetic data obtained from ancient lavas flows that had erupted since 780,000 years ago. These flows erupted during times when the axial dipole was especially weak and underwent apparently unsuccessful attempts to reverse.

Both scientists concluded that a "flip" of Earth's polarity first involves the demise of the deeper source generating the axial dipole, leaving behind the source of magnetic field generated in the shallow core – a complex field pattern controlled by the physical variability of the lowermost mantle.

"This dichotomy of field sources may be the key to understanding what triggers an attempt by the axial dipole to reverse," said Hoffman.

Singer is a geology professor at the University of Wisconsin-Madison. You can read the entire paper online at <http://www.sciencemag.org/cgi/content/full/321/5897/1800>.

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