# Possible evidence of human ability to detect Earth's magnetic field found

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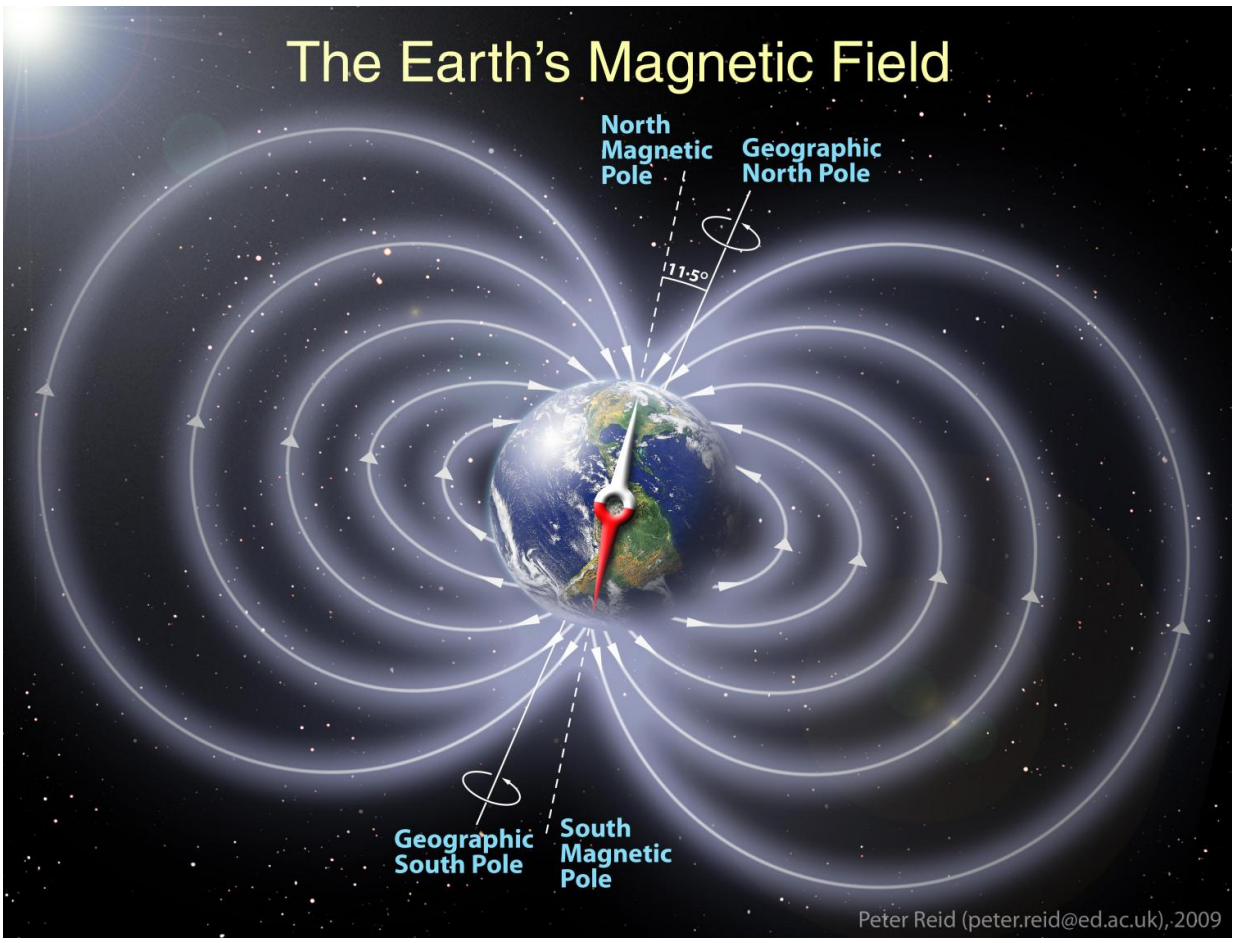


Schematic illustration of the invisible magnetic field lines generated by the Earth, represented as a dipole magnet field. In actuality, our magnetic shield is squeezed in closer to Earth on the Sun-facing side and extremely elongated on the night-side due to the solar wind. Credit: NASA

(Phys.org)—A scientist who has dedicated a significant portion of his life to proving or disproving the notion that humans have an ability to detect and respond to Earth's magnetic field has given a talk at this year's meeting of the Royal Institute of Navigation at the University of London, suggesting that he has found evidence that it is true. Joe Kirschvink with the California Institute for Technology reported that experiments he and colleagues have been conducting have shown reproducible changes in brainwaves of volunteers who sat in a magnetically controllable chamber.

Over the past century scientists have found that other animals do indeed have magnetic sensors and that they respond to them—birds in flight use the Earth's magnetic field at least in part, as a compass, dogs orient themselves north/south to urinate. The list of examples has grown quite extensive, but one problem still remains—no one has been able to figure out how it happens. Scientists have narrowed down the possibilities Eric Hand writes in two extensive News articles on the subject in the latest issue of the journal *Science*, one is called the Magnetite Model, and is based on the idea that magnetite existing in the bodies of living organisms may be tugged by the Earth's magnetic field, controlling neural circuitry. The other is called the Cryptochrome Model and is based on the idea that chryptochromes in the retina are turned into radical pair molecules by sunlight and are flipped between states when impacted by Earth's magnetic field. Kirschvink, Hand, notes, believes the former is the most likely possibility, though his mission has not been to find out how it might work, but to show that it does in humans.

To achieve that goal, Kirschvink and his team built a Faraday cage—an enclosure just big enough for one person to sit in, which has coils placed around its walls that prevent influence by Earth's magnetic field and any other magnetic field, whether natural or man-made. The cage also allows for the generation of a magnetic field and the allowance of the Earth's magnetic field on command. The volunteers sitting in the chair in the

cage were attached to an EEG machine that measured alpha brain waves.

The cage allows for eliminating all sources of stimuli for impacting human brain wave activity. The person sits alone in the dark while the researchers manipulate the magnetic field around him or her. Kirschvink reported in his talk that he was able to record a measurable, and more importantly, reproducible change in alphas brain wave activity in humans based on changes made to the magnetic field around them. And he did so using the cage in two different locations, one in California, and another in a lab in Japan. He acknowledged that the sample size was small, and that more work needs to be done, which will someday lead to a paper—but he is optimistic that he has at long last proven that humans do indeed have magnetic sensors.

**More information:** Eric Hand. The body's hidden compass—what is it, and how does it work?, *Science* (2016). DOI: 10.1126/science.aaf5804

Eric Hand. Maverick scientist thinks he has discovered a magnetic sixth sense in humans, *Science* (2016). DOI: 10.1126/science.aaf5803