

CHECK YOUR COMPASS: THE MAGNETIC NORTH POLE IS ON THE MOVE

Relevant for: Geography | Topic: The Earth and the Solar System

Earth's north magnetic pole has been drifting so fast in the last few decades that scientists say that past estimates are no longer accurate enough for precise navigation. On February 4, they released an update of where magnetic north really was, nearly a year ahead of schedule.

The magnetic north pole is wandering about 55 kilometers a year. It crossed the international date line in 2017, and is leaving the Canadian Arctic on its way to Siberia.

The constant shift is a problem for compasses in smartphones and some consumer electronics. Airplanes and boats also rely on magnetic north, usually as backup navigation, said University of Colorado geophysicist Arnaud Chulliat, lead author of the newly issued World Magnetic Model. GPS isn't affected because it's satellite-based.

The military depends on where magnetic north is for navigation and parachute drops, while NASA, the Federal Aviation Administration and U.S. Forest Service also use it. Airport runway names are based on their direction toward magnetic north and their names change when the poles moved. For example, the airport in Fairbanks, Alaska, renamed a runway 1L-19R to 2L-20R in 2009.

The U.S. National Oceanic and Atmospheric Administration and United Kingdom tend to update the location of the magnetic north pole every five years in December, but this update came early because of the pole's faster movement. The movement of the magnetic north pole "is pretty fast," Chulliat said.

Since 1831 when it was first measured in the Canadian Arctic it has moved about 2300 kilometers toward Siberia. Its speed jumped from about 15 km/h to 55 km/h since 2000.

The reason is turbulence in Earth's liquid outer core. There is a hot liquid ocean of iron and nickel in the planet's core where the motion generates an electric field, said University of Maryland geophysicist Daniel Lathrop, who wasn't part of the team monitoring the magnetic north pole.

"It has changes akin to weather," Lathrop said. "We might just call it magnetic weather."

The magnetic south pole is moving far slower than the north.

In general Earth's magnetic field is getting weaker, leading scientists to say that it will eventually flip, where north and south pole changes polarity, like a bar magnet flipping over. It has happened numerous times in Earth's past, but not in the last 780,000 years.

"It's not a question of if it's going to reverse, the question is when it's going to reverse," Lathrop said.

When it reverses, it won't be like a coin flip, but take 1,000 or more years, experts said.

Lathrop sees a flip coming sooner rather than later because of the weakened magnetic field and an area over the South Atlantic has already reversed beneath Earth's surface.

That could bother some birds that use magnetic fields to navigate. And an overall weakening of the magnetic field isn't good for people and especially satellites and astronauts. The magnetic field shields Earth from some dangerous radiation, Lathrop said.

Junior Research Fellowship hiked to 31,000 a person, a roughly over 20% increase from the existing 25,000.

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