target in the Kuiper belt, the realm of space rocks that orbit the Sun beyond Neptune. New Horizons visited its first Kuiper belt object, Pluto, in July 2015.

But MU_{69} is special because it hails from an undisturbed part of the Solar System known as the cold classical Kuiper belt. Scientists think that objects there have been in a deep freeze since the Solar System formed, more than 4.5 billion years ago. Data from the MU_{69} fly-by will give scientists their most direct look at these pristine relics of planetary formation.

"This is a perfect contact binary," says Michele Bannister, a planetary astronomer at Queen's University Belfast, UK. "Of all the hundreds of thousands of cold classicals out there, this is a gorgeous choice."

Its two lobes probably formed as innumerable small particles swirled together and lumped into larger objects, two of which eventually coalesced into what scientists see today, says Moore. "These are the only remaining basic building blocks" of planets, he says.

Even as New Horizons scientists celebrated the first close-up images, they also came under fire over the rock's nickname, Ultima Thule. The team chose it in March 2018, after a public naming contest.

NASA/JHUAPL/SWRI

The space rock has two distinct lobes.

Ultima Thule means 'beyond the known world' in Latin, and is commonly associated with the Arctic and exploration. But the Nazis also appropriated the phrase to describe the mythological homeland of the Aryan race, as *Newsweek* pointed out last March. A retweet of that piece on 1 January drew attention to the Nazi associations.

Asked about the issue, Alan Stern, the mission's principal investigator, said that Ultima Thule has been used for centuries to describe far-off lands. "That's why we chose it," says Stern, a planetary scientist at the Southwest Research Institute.

Like much of the US government, NASA remains shut down while Congress and President Donald Trump battle over federal spending and immigration policy. The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland, where mission control is based, has taken over releasing the scientific images and data to the public until NASA reopens. ■

GEOPHYSICS

Earth's magnetic field is acting up

Erratic motion of north magnetic pole forces update to model that aids global navigation.

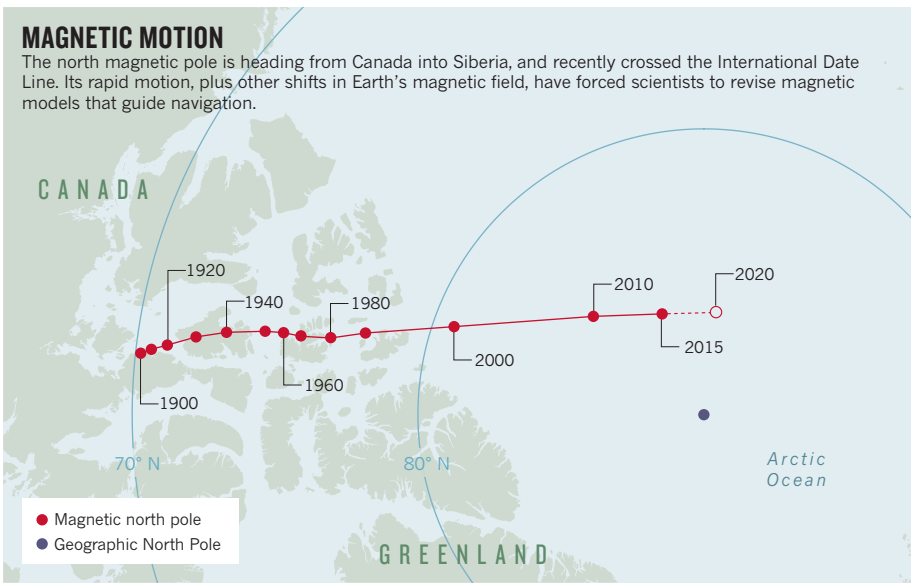
BY ALEXANDRA WITZE

Something strange is going on at the top of the world. Earth's north magnetic pole has been skittering away from Canada and towards Siberia, driven by liquid iron sloshing within the planet's core. The magnetic pole is shifting so quickly that it has forced the world's geomagnetism experts into a rare move.

On 15 January, they are set to update the World Magnetic Model, which describes the planet's magnetic field and underlies all modern navigation, from the systems that steer ships at sea to Google Maps on smartphones.

The most recent version of the model came out in 2015 and was supposed to last until 2020 — but the magnetic field is changing so rapidly that researchers have to fix the model now. "The error is increasing all the time," says Arnaud Chulliat, a geomagnetist at the University of Colorado Boulder and the National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information.

The problem lies partly with the moving pole and partly with other shifts deep within the planet. Liquid churning in Earth's core generates most of the magnetic field, which varies over time as the deep flows change. In 2016, for instance, part of the magnetic field temporarily accelerated deep under northern South America and the eastern Pacific Ocean. Satellites such as the European Space Agency's Swarm mission tracked the shift.



SOURCE: WORLD DATA CENTER FOR GEOMAGNETISM/KYOTO UNIV.

By early 2018, the World Magnetic Model was in trouble. Researchers from NOAA and the British Geological Survey in Edinburgh had been doing their annual check of how well the model was capturing all the variations in Earth's magnetic field. They realized that it was so inaccurate that it was about to exceed the acceptable limit for navigational errors.

WANDERING POLE

"That was an interesting situation we found ourselves in," says Chulliat. "What's happening?"

The answer is twofold, he reported last month at a meeting of the American ▶

Geophysical Union in Washington DC.

First, the 2016 geomagnetic pulse beneath South America came at the worst possible time, just after the 2015 update to the World Magnetic Model. This meant that the magnetic field had lurched just after the latest update, in ways that planners had not anticipated.

Second, the motion of the north magnetic pole made the problem worse. The pole wanders in unpredictable ways that have fascinated explorers and scientists since James Clark Ross first measured it in 1831 in the Canadian Arctic.

In the mid-1990s the pole picked up speed, from around 15 kilometres per year to around 55 kilometres per year. By 2001, it had entered the Arctic Ocean — where, in 2007, a team including Chulliat landed an aeroplane on the sea ice in an attempt to locate the pole.

In 2018, the pole crossed the International Date Line into the Eastern Hemisphere. It is currently making a beeline for Siberia (see 'Magnetic motion').

The geometry of Earth's magnetic field magnifies the model's errors in places where the field is changing quickly, such as the North Pole. "The fact that the pole is going fast makes this region more prone to large errors," says Chulliat.

To fix the World Magnetic Model, he and his colleagues fed it three years of recent data, which included the 2016 geomagnetic pulse. The new version should remain accurate, he says, until the next regularly scheduled update in 2020. (As *Nature* went to press, project leaders were trying to determine whether the model's release would be delayed by the ongoing US government shutdown, which includes NOAA.)

CORE QUESTIONS

In the meantime, scientists are working to understand why the magnetic field is changing so dramatically. Geomagnetic pulses, like the one that happened in 2016, might be traced back to 'hydromagnetic' waves arising from deep in the core (J. Aubert *Geophys. J. Int.* **214**, 531–547; 2018). And the fast motion of the north magnetic pole could be linked to a high-speed jet of liquid iron beneath Canada (P. W. Livermore *et al. Nature Geosci.* **10**, 62–68; 2017).

The jet seems to be smearing out and weakening the magnetic field beneath Canada, Phil Livermore, a geomagnetist at the University of Leeds, UK, said at the American Geophysical Union meeting. And that means that Canada is essentially losing a magnetic tug-of-war with Siberia.

"The location of the north magnetic pole appears to be governed by two large-scale patches of magnetic field, one beneath Canada and one beneath Siberia," Livermore says. "The Siberian patch is winning the competition."

Which means that the world's geomagnetists will have a lot to keep them busy for the foreseeable future. ■

AGRICULTURE

The quest to build a better cassava

Researchers in Nigeria are combining genomics and conventional breeding to improve the starchy staple crop.

BY AMY MAXMEN IN IKENNE, NIGERIA

"I like this one," says Ismail Rabbi, placing his palm on a cassava plant and smiling coyly, like a parent picking favourites. "It doesn't look impressive — it's not tall," he says, "but it beats all the obstacles we throw at it."

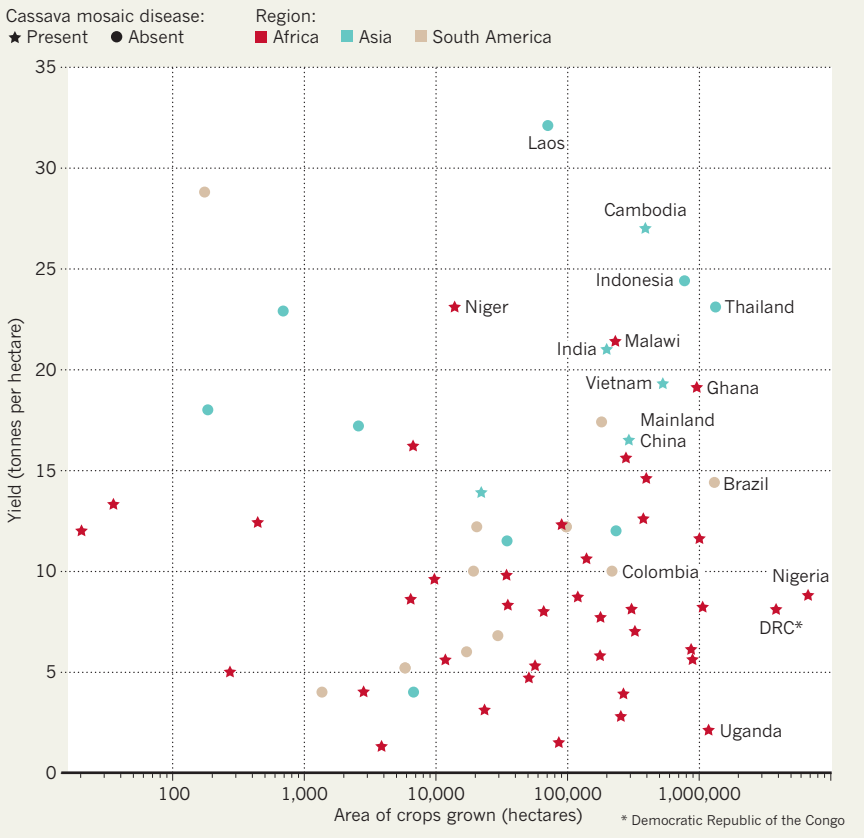
Rabbi, a geneticist at the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria, and his colleagues are on a mission to improve cassava (*Manihot esculenta*). Also known as yuca or manioc, its starchy roots provide food and income to more than 800 million people worldwide. In Africa, where consumption is highest, cassava plants bear smaller yields than their cousins in Asia and South America. But African varieties tend to be more tolerant of blights, such as the deadly cassava mosaic disease now spreading across Asia.

In November, Rabbi shipped five varieties of African cassava that resist the disease to Thailand, the world's largest cassava exporter. He and his colleagues created the plants under the auspices of the US$62-million Next Generation Cassava Breeding project, which the UK government and the Bill & Melinda Gates Foundation launched in 2011.

Project scientists are using genomic data to identify useful traits for breeding cassava varieties that will suit the world's needs

A STARCHY STAPLE

Cassava, also known as yuca or manioc, is crucial to food security in parts of Africa, Asia and South America. But the level of edible starch varies with geography and climate, as does the presence of a blight known as cassava mosaic disease.



SOURCE: UNITED NATIONS FOOD AND AGRICULTURE ORGANIZATION