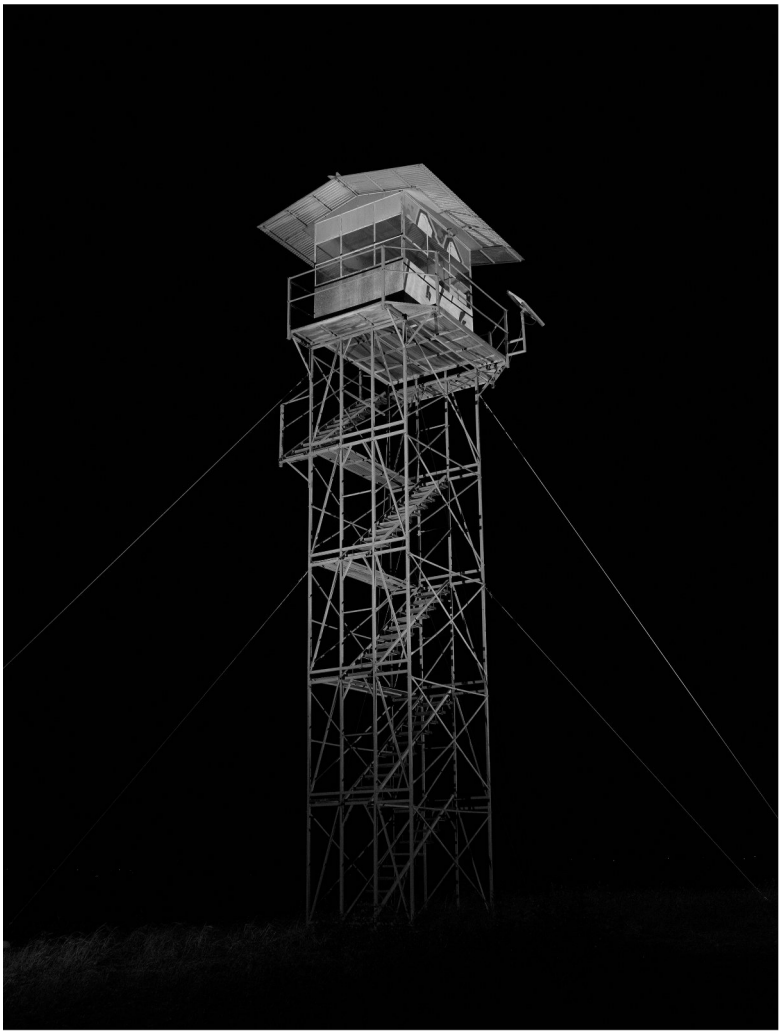
DUARTE AMARAL NETTO

PROPOSTA

ART3C

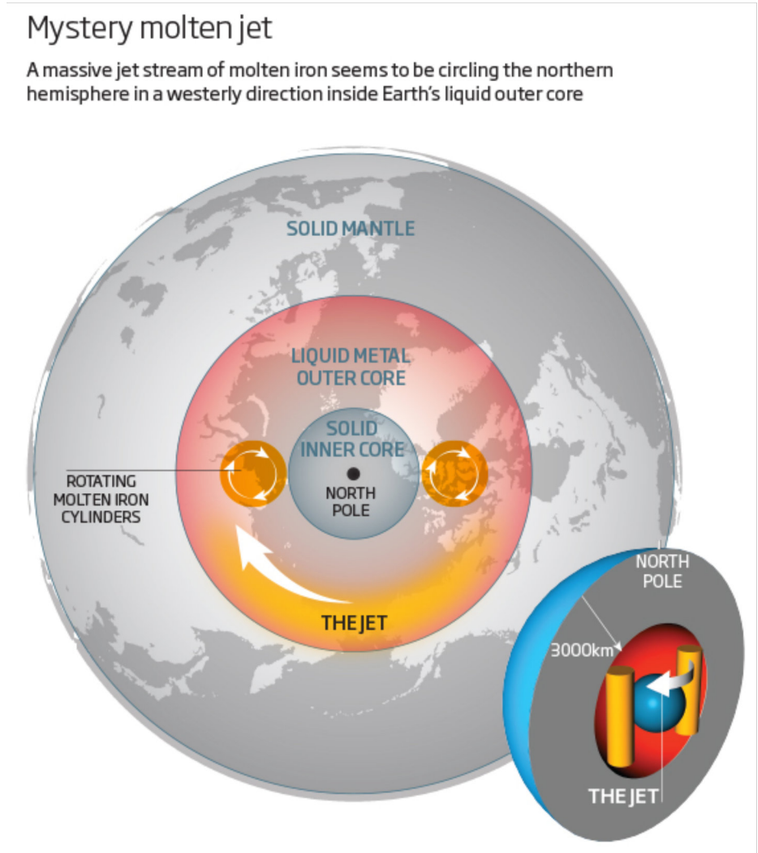


Proposta Residência – Continuação do projecto Cratera

Este trabalho, iniciado em 2015, centra-se numa distopia sobre o fim de uma era e o início de outra. É resultado de uma interligação entre factos e notícias científicas e a criação de um grupo fictício de investigadores que tentam provar uma teoria relacionando gravidade e alterações no campo magnético que provocariam uma aproximação à Terra de asteróides. Este tema, do fim do mundo e das catástrofes naturais, é um clássico da ficção e amplamente trabalhado em diversas áreas artísticas, do cinema à literatura, mas também pelas religiões e profecias que formam cultos com bastantes seguidores.

As alterações climáticas são responsáveis pela duplicação das catástrofes naturais nos últimos vinte anos (segundo dados da ONU analisados entre 2000 e 2019). A percepção é que o planeta como o conhecemos está a sofrer uma viragem drástica e uma boa parte dessa aceleração é-nos imputada pelo recurso de combustíveis fósseis e fontes de energia menos limpas. Desde secas extremas, vagas de calor a inundações, os desastres naturais vieram revelar a iminência e urgência de lidarmos com estas alterações.

Há um relógio - Doomsday Clock - que indica, de uma forma simbólica, quanto tempo falta para a meia-noite, o fim do nosso tempo. Esse relógio, que metaforicamente avança segundo previsões de vários cientistas, está apenas a cem segundos de unir os ponteiros ao centro. Este trabalho reflecte sobre essa urgência e sensação de fim, que será sempre o início de outra coisa.



Molten iron river discovered speeding beneath Russia and Canada

By **Andy Coghlan**

Deep below our planet's surface a molten jet of iron nearly as hot as the surface of the sun is picking up speed.

This stream of liquid has been discovered for the first time by telltale magnetic field readings 3000 kilometres below North America and Russia taken from space.

The vast jet stream some 420 kilometres wide has trebled in speed since 2000, and is now circulating westwards at between 40 and 45 kilometres per year deep under Siberia and heading towards beneath Europe (see diagram, below). That is three times faster than typical speeds of liquid in the outer core.

No one knows yet why the jet has got faster, but the team that discovered the accelerating jet thinks it is a natural phenomenon that dates back as much as a billion years, and can help us understand the formation of Earth's magnetic fields that keeps us safe from solar winds.

Straight to the core

"It's a remarkable discovery," says Phil Livermore of the University of Leeds, UK, who led the team. "We've known that the liquid core is moving around, but our observations haven't been sufficient until now to see this significant jet."

"We know more about the Sun than the Earth's core," says another team member, Chris Finlay, from the Technical University of Denmark in Kongens Lyngby. "The discovery of this jet is an exciting step in learning more about our planet's inner workings."

What made the discovery possible was the combined monitoring power of the European Space Agency's trio of satellites, called Swarm, which were launched in 2013. From orbit, they can measure magnetic field variations as deep down as 3000 kilometres below Earth's surface, where the molten core meets the solid mantle.

"Having all three meant we could strip away magnetic fields from elsewhere such as the ionosphere and the crust, providing our sharpest ever image of the fluctuations at the core-mantle boundary alone," says Livermore.

Plugging the new data into models also allowed the team to figure out how the fluctuations changed over time.

Invisible river

Earth's magnetic field is generated by the movement of molten iron in the outer core, so examining the magnetic field can reveal details of the behaviour of the core that underpins it.

*The discovery of the jet involved tracking two massive but unusually strong lobes of magnetic flux originating from the **core-mantle boundary**, situated beneath Canada and Siberia respectively, but moving with the flow of the molten iron. Because their motion could originate only from the physical movement of molten iron, the lobes served as markers, allowing the researchers to track the flow of iron.*

Livermore likens it to being able to track the course of a river at night by watching candles floating on the surface. "As the iron moves, it drags the magnetic field with it,"

he says. "We can't see the flow of iron itself, only the motion of the flux lobes."

He says there may be a southern counterpart to the jet, but because there are no trackable flux lobes in the south, any magma stream there can't be picked up geomagnetically.

Rotating cylinders

Livermore and his colleagues say the jet is created by movement of molten iron around the inner, solid iron core.

Next to the inner core, there are parallel cylinders of swirling molten iron in the outer core running from north to south. Where these swirling cylinders meet the solid core, and squash
against it, they act like a pair of rollers, squeezing out additional molten iron sideways to create the jet stream.

This produces and moves the two lobe-like magnetic fields, which is what the satellites detected and tracked.

Why the jet is getting faster is more of a mystery. It may be related to the rotation of the inner core, which was found in 2005 to rotate a bit faster than Earth's crust, says Xiaodong Song of the University of Illinois in Champaign, Illinois. Xiaodong was a member of the team that used seismological data to make that 2005 discovery.
"If these seismological and geomagnetic observations can be tied together to a common process in the fluid core, it would be really exciting," he says.

Livermore thinks the acceleration of the jet is down to push-back from magnetic fields. The flow of iron generates the magnetic field, but, he says, the magnetic field may then be affecting the flow of the iron.

Studying the jet should enable geophysicists to better understand how the planet's core behaves, and the factors that influence Earth's magnetic field strength.

Flip the polarity

"If we can understand how the field is generated, we understand how it changes over time and whether and when it will weaken and reverse," says Livermore.

Other geophysicists agree. "The more we understand the core's behaviour at various time and spatial scales, the more we can hope to understand the beginnings, renewal and future of our magnetic field," says William Brown of the British Geological Survey's geomagnetism team.

*Earth's magnetic field seems to have been weakening, **especially since around 1840**, at about 5 per cent per century. The magma stream should help geophysicists predict more*
*accurately **if and when the magnetic field of the planet's core will flip**, and magnetic north and south poles trade places, which happens every few hundred thousand years. And thanks to the satellite monitoring system, says Xiaodong, we have now opened a new window to view in "real time" the activity of molten iron deep in Earth's core. (**Journal reference:** Nature Geoscience, DOI:10.1038/NGEO2859)*

Workshop – *Olhar a Charneca – Entre o deslumbre e a preocupação*

09 de Janeiro - 14h > 18h

Público: alunos do 3º ano da licenciatura em Fotografia e alunos de multimédia da Chamusca.

Objectivos: Pensar e representar a paisagem entre a sua concepção romântica e a preocupação actual. Como olhar para a natureza quando ela se transforma num cenário trágico e esse olhar não pode ser inocente? É a paisagem a expressão máxima da tragédia actual? Se sim, que sinais podemos encontrar desta beleza trágica?
Os alunos deverão juntar-se em grupos de 2+2 e pensar nestas questões apresentado um conjunto de 4 imagens que se relacionem com estas questões, assim como um pequeno texto de dois parágrafos a justificar as suas opções. Estas simbioses entre os dois grupos (IPT+Chamusca) serão coordenadas pelos seus professores responsáveis.