

**EASIEST, QUICKEST WAYS TO GET  
HEALTHY *WITH MICHAEL MOSLEY***

**BBC**

*The mysterious rumbling waking up Mars*



# Science Focus

## SURVIVING THE NEXT GIANT LEAP

How we'll break through our biological limits  
to colonise space



ARE  
MICROPLASTICS  
HARMFUL?

THE TECH FUSING  
MIND AND MACHINE

CAN YOU  
CHANGE YOUR  
PERSONALITY?



IN THIS ISSUE

**Health**

Why you've been thinking  
about fat all wrong

**Climate**

Can the UK meet its  
ambitious targets?

**Time**

Could you live without  
clocks or natural light?

**MUSHROOM MEDS**

Psilocybin: an alternative to antidepressants? p18

**BONE STRUCTURE**

Spine spokes shed light on pterosaur flight p19

**MINI MASTERPIECE**

Lasers used to 'paint' tiny van Gogh replica p20

**MACHINE LEARNING**

Computers conditioned in the same way as Pavlov's dog p20

# DISCOVERIES

## SOMETHING'S RUMBLING ON THE RED PLANET

Mounting evidence suggests Mars isn't dead



**Soothing cyborgs** Robots with sympathetic gestures show promise as counsellors p21 **Box of tricks** Cats love sitting in boxes, even ones that aren't there p22 **Scratch that itch** New wearable sensors measure eczema sufferers' scratching p23

**V**olcanoes on Mars could've erupted as recently as 50,000 years ago, a study carried out by researchers at the University of Arizona using data from satellites orbiting the planet has found.

Previous studies have suggested that most of Mars's volcanic activity occurred between three and four billion years ago, with some outlying eruptions continuing in isolated locations until about three million years ago.

"This may be the youngest volcanic deposit yet documented on Mars," said lead author Dr David Horvath, who worked on the study as a postdoctoral researcher at the University of Arizona and is now a research scientist at the Planetary Science Institute. "If we were to compress Mars's geologic history into a single day, this would have occurred in the very last second."

The volcanic deposit was found in Elysium Planitia, a smooth, flat plain located just north of the equator. The eruption produced an 11km-wide, smooth, dark deposit surrounding a 32km-long volcanic fissure, and could have spewed ash and rock up to 10km into the Martian atmosphere. The composition and distribution of the

X

## "The interaction of ascending magma and the icy substrate of this region could have provided favourable conditions for microbial life"

material deposited is similar to what would be expected for a pyroclastic eruption – an explosive eruption of magma driven by expanding gases, similar to what happens when you open a bottle of sparkling wine.

Some hallmarks of the volcanic deposit also raise the possibility of

there being conditions capable of supporting microbial life below the surface of Mars.

"The interaction of ascending magma and the icy substrate of this region could have provided favourable conditions for microbial life fairly recently and raises the possibility of extant life in this region," Horvath said.

The site of the eruption is around 1,600km from NASA's InSight lander, which has been studying seismic activity on Mars since 2018.

Further study is required to determine the exact nature of the eruption, but two marsquakes (the Martian equivalent of earthquakes) were found to originate around the Cerberus Fossae system of fissures in Elysium Planitia. Recent work has suggested the fissures could be due to movement of magma deep underground.

"The young age of this deposit absolutely raises the possibility that there could still be volcanic activity on Mars and it's intriguing that recent marsquakes detected by the InSight mission are sourced from the Cerberus Fossae," Horvath said.

The eruption may also have been due to a build-up of gases already present in the magma, or could have happened when the magma came into contact with permafrost, according to the researchers. It's also possible that the eruption was triggered by the asteroid impact that formed the nearby Zunil crater at about the same time.

The volcanic deposit, along with ongoing seismic rumbling in the planet's interior detected by InSight, and possible evidence for releases of methane into the atmosphere detected by NASA's Mars Atmosphere and Volatile Evolution (MAVEN) orbiter, suggest that Mars is far from a cold, inactive world.

"This may be the most recent volcanic eruption on Mars, but I think we can rest assured that it won't be the last," said study co-author Jeff Andrews-Hanna, an associate professor at the University of Arizona Lunar and Planetary Laboratory. "All these data seem to be telling the same story – Mars isn't dead."

**Elysium Planitia on Mars could have experienced volcanic activity in the last 50,000 years**

