CLIMATE FEARS OVER PERMAFROST’S METHANE ALLAYED

Runaway global warming driven by the release of methane from the Arctic seems less likely than some scientists have feared.

Methane and its components can be locked up for millennia in permafrost—a frozen mixture of soil and ice—and in deposits of crystal-like structures called methane hydrates. Methane released by modern organic materials contains a form of carbon that methane from ancient sources does not, allowing scientists to distinguish between the two types.

Michael Dyonisius at the University of Rochester in New York and his colleagues analysed Antarctic ice cores to determine the origins of methane released during a warming period that ended the last ice age. The warming raised global temperatures by roughly 4°C—slightly more than the rise projected to occur by 2100 in most scenarios of human-induced climate change.

The team’s results suggest that methane emissions during that big thaw were dominated by emissions from wetlands, not by the release of ancient methane from melting permafrost and methane hydrates. The authors conclude that modern climate change is unlikely to trigger a massive release of ancient methane.

Methane bubbles trapped in a frozen lake.

NEURAL NETWORK UNPICKS THE KNOTS

Machine learning can tell different types of knot apart just by ‘looking’ at them.

For decades, mathematicians have had algorithms that calculate whether any two knots are of the same type—that is, whether the knots can be converted into each other without cutting the string. But these algorithms are slow: the number of steps they require grows exponentially with the complexity of the knots.

Liang Dai at the City University of Hong Kong and his collaborators created geometric models of the five simplest knots and fed those models into neural networks, which are computing systems modelled after the brain’s networks of neurons. After training on hundreds of thousands of such models, the networks had learnt to classify knots with 99% accuracy or better.

The technique is extremely fast, but it provides guesses with a high probability of correctness, rather than certain answers. Moreover, it is unclear how it will perform as the knots grow in complexity. Still, the results show that machine learning could guide the study of knots, the authors say.

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BLACK DEATH SOWED TURMOIL IN RURAL ENGLAND

Archaeologists digging in the English countryside have discovered the first known Black Death mass grave in rural England—a sign of a community overwhelmed by the dead.

While excavating the grounds of Thornton Abbey in Lincolnshire, Hugh Willmott, based at the University of Sheffield, UK, and his colleagues found a large collective burial site holding the remains of at least 48 people. Although epidemic-related mass graves had previously been documented in London, this was the first uncovered in rural England.

The bones date to the fourteenth century, a time period encompassing one of England’s major outbreaks of bubonic plague, also known as the Black Death. Analysis of DNA from the skeletons confirmed the presence of Yersinia pestis, the bacterium that causes plague. Christian burial rites were highly prized in medieval England, so the presence of a mass grave suggests the desperation of those spared by the epidemic.

Further genetic testing of the Y. pestis pathogen from the skeletons, the researchers say, could help to reconstruct the spread of the Black Death across the country.

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