Vapour spies to reveal climate clues

Streams of vapour above Mauna Loa, Hawaii.

Scientists will begin collecting the first near-real-time measurements of the isotopes in water vapour on Hawaii's Mauna Loa this week, trialling what could prove to be a new way to study climate and weather systems.

The month-long experiment will deploy a trio of laser-based instruments to measure the isotopic composition of water vapour at least once every few minutes. That information can then be used to create a kind of 'life history' of the vapour, whether the source is a nearby forest, evaporation from the ocean or a cold air mass descending from higher in the atmosphere.

"This could be a new way of detecting fundamental changes in Earth's atmospheric circulation," says Joe Galewsky, an atmospheric scientist at the University of New Mexico in Albuquerque.

He says that Mauna Loa was the obvious place to conduct the experiment because of its sheer elevation and its location in the subtropics, which is influenced by both tropical and northerly atmospheric currents. These same attributes made the volcano an ideal place for the atmospheric carbon-dioxide counts recorded by the late Charles David Keeling, a long-time affilliate of the Scripps Institution of Oceanography in San Diego, California.

At almost 3,400 metres above sea level, the main observatory on Mauna Loa is comfortably above the fray of surface air currents. Galewsky and his team conducted a trial-run on nearby Mauna Kea using flask samples in 2006 and found that the air currents seem to be governed by large-scale atmospheric processes rather than local weather trends (J. Galewsky *et al. Geophys. Res. Lett.* doi:10.1029/2007GL031330; 2007).

The research ultimately relies on minute differences in the way the isotopologues of water are affected by variables such as evaporation, transpiration and condensation. Heavy water (in which the molecule has an extra neutron) precipitates out of the atmosphere faster than the more common 'light' water isotopologue, and light water evaporates faster.

Scientists commonly study isotopic ratios in things such as ice cores and ocean sediments, but extracting them from water vapour in the air is more difficult. The advent of lasers that can be tuned to the specific absorption frequencies of individual isotopes made this work easier, as did the fact that such devices are now portable.

The team plans to test three such devices simultaneously: one from NASA's Jet Propulsion Laboratory in Pasadena and two commercially available devices that use slightly different technologies. The team will also gather air samples for comparison back in the lab. "We really have to convince ourselves that this works," says David Noone, a climatologist of the University of Colorado at Boulder, who is working on the project.

The next — and for many the most important — step is tying these measurements back to satellite data. A comparison of this sort was first published last year by Noone and colleagues in *Nature* (J. Worden *et al. Nature* **445,** 528–532; 2007). In that study, the team analysed water-vapour isotopes using measurements from a passive emissions sensor aboard NASA's Aura satellite, one of two that will be collecting data during the current project.

"This is brand new. This is something that really revolutionizes the study of water vapour," says Gavin Schmidt, a climate modeller at the

Slime and fleas feature in Ig Nobel awards

Slime moulds exhibit the kind of "contemplative behaviour" that Hamlet is famous for, muses Toshiyuki Nakagaki of Hokkaido University in Japan. "Hamlet couldn't decide what to do so he did nothing. Then he chose a strong course of action." Similarly, slime moulds stop moving when they encounter a toxic substance. "But once action occurs, it too is strong," Nakagaki says.

The slime mould's puzzle-solving ability — Shakespearean or otherwise — is a discovery that is unlikely to change the world, but it won Nakagaki and his colleagues an Ig Nobel Prize for cognitive science last week at the annual event held at Harvard University in Cambridge, Massachusetts. Their research, published in *Nature* (T. Nakagaki, H. Yamada & Á. Tóth *Nature* 407, 470; 2000), showed that slime moulds looking for food have "the ability to find the minimum-length solution between two points in a labyrinth".

Subsequently, the team has found that moulds can find the shortest path between 30–50 points, which is something even supercomputers cannot yet work out. "We can't even check the mould's solution," notes Nakagaki, "but it looks good."

From the cognitive feats of slime mould to the physical prowess of fleas: Marie-Christine Cadiergues of the National Veterinary School in Toulouse, France, and her colleagues won the biology Ig Nobel Prize for showing that dog fleas can jump 2 centimetres higher and 10 centimetres farther than cat fleas. "In the daily life of a vet, it's a good thing to know," Cadiergues says.

Other recipients of this year's prizes for amusing research included psychologists Charles Spence of the University of Oxford, UK, and Massimiliano Zampini of the University of Trento in Italy, who won the Nutrition Ig Nobel for research involving eating Pringles potato chips (crisps).

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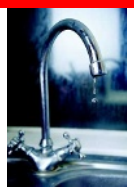

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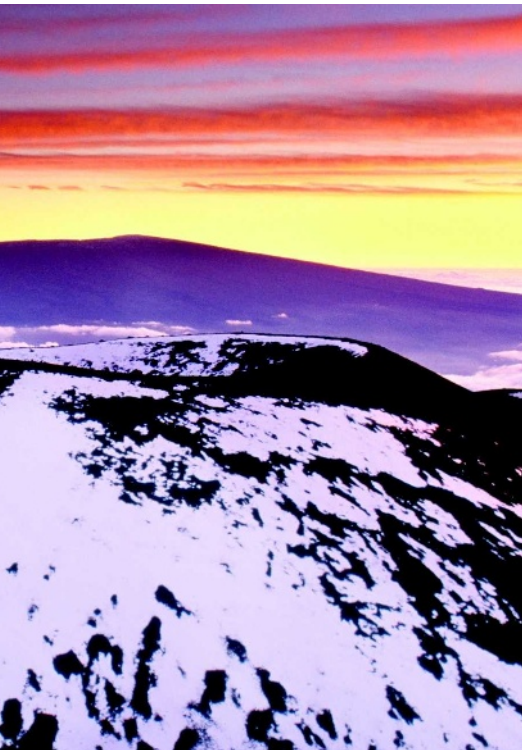

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NASA Goddard Institute for Space Studies in New York, who is not involved in the study. Schmidt calls water isotopes "the most super-duper fantastic thing ever", and says that these types of data could fill a enormous gap in the scientific record by allowing scientists to analyse where water vapour comes from, what it is doing and where it is going.

"The data that are going to come out of this experiment really will allow us to go forward with confidence and know what it is we are modelling," Schmidt says. ■

Jeff Tollefson

The pair showed that when the sound of chomping on a Pringle is amplified, people believe it is fresher than it really is.

The peace prize went to Klaus Peter Rippe, who chairs the Swiss Federal Ethics Committee on Non-Human Biotechnology, which is championing the idea that all living beings, including plants, have dignity (see *Nature* 452, 919; 2008). "Most people in Switzerland have no problem with this concept, though we're aware that many people elsewhere find our ideas ridiculous," he says.

Ironically, Rippe says, the 1952 Nobel Peace Prize was won by German–French physician Albert Schweitzer for, in part, promoting "reverence for life. Fifty years later, we get the Ig Nobel instead." ■

Steve Nadis

Entire-paper plagiarism caught by software

When Eric Le Bourg, a French biogerontologist, came across a paper in a Korean journal recently, he almost fell off his chair; the entire article — text and graphs included — had been taken from one of his earlier articles. "It was plagiarism from beginning to end," he says. "I was astonished; it was pure cut and paste."

Such blatant copying of an entire article is not unknown, says Harold Garner, a researcher at the University of Texas Southwestern Medical Center in Dallas. Garner's team has used its eTBLAST text-matching software to build Deja Vu, a continually updated database that already holds some 75,000 abstracts listed in Medline that seem highly similar. His team has so far found dozens of near-100% clone papers.

Garner estimates that among the 181 papers they have identified so far as duplicates, 85% of the text is similar on average, but one-quarter share close to 100%. For a full list of the most similar pairs of articles see http://tinyurl.com/52s5e3. There are currently 22 'repeat offenders' in the database. These are authors who have published at least two articles that do not share authors (and so are putative or known plagiarisms). On average these people have 'authored' four papers, ranging from two to ten, and spanning 12 countries.

"I was astonished; it was pure cut and paste."

Le Bourg's paper, "A review of the effects of microgravity and hypergravity on aging and longevity" was published in the Elsevier journal, *Experimental Gerontology* (E. Le Bourg *Exp. Gerontol.* 34, 319–336; 1999). The duplicate, by Hak-Ryul Kim, who listed his affiliation as the biology department of Korea University in Seoul, was published a year later in the *Korean Journal of Biological Sciences* (H.-R. Kim *Kor. J. Biol. Sci.* 4, 231–237; 2008).

Le Bourg and the editors of *Experimental Gerontology* have tried to investigate further, but to no avail. They contacted authorities at Korea University but got no response, Le Bourg says. E-mails to Kim were not returned. He seems to have left the university, says Bourg, who hasn't been able to track down Kim's current affiliation. Meanwhile, the *Korean Journal of Biological Sciences* has ceased publication.

With the trail gone cold, *Experimental Gerontology* intends to publish a note in its next issue stating that its editors have done their best to elucidate the case, and that "in the absence of any explanation, we believe that this is plagiarism of our article that we want to bring to the attention of the scientific community".

Garner has begun to systematically contact editors and authors of the duplicates he has identified to assess how other cases have been followed up, and is submitting the results for publication. Many journal editors seem reluctant to pursue cases of plagiarism, and half of the articles that editors are alerted to remain uncorrected, Garner says. Few journals have communicated their retraction decision to PubMed, the most widely used abstracts database.

But the wider availability of tools to detect duplicated text is empowering editors. John Loadsman, an editor of *Anaesthesia and Intensive Care*, who is a researcher at the Royal Prince Alfred Hospital near Sydney, Australia, is one of several editors who been using eTBLAST. He is 'policing' the anaesthesia literature and says that he has already found three cases of duplication. Other publishers are using an anti-plagiarism tool called CrossCheck, which employs text-matching algorithms by iParadigms, a software company based in Oakland, California.

Many of the duplicates in Deja Vu come from non-English-speaking countries, and some scientists have asserted that a degree of plagiarism is justified as a way of improving the English of their texts (see *Nature* 449, 658; 2007). "There definitely is a cultural component," says Garner, "but this appears to be an equal-opportunity behaviour, with scientists from across the world involved."

When confronted with their plagiarism, some researchers can be brazen. One offender, whose paper shared 99% of its text with an earlier report, wrote to Garner: "I seize the opportunity to congratulate [the authors of the original paper] for their previous and fundamental paper — in fact that article inspired our work." ■

Declan Butler