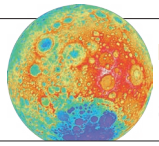
# THIS WEEK

## EDITORIALS

**BEE SEEN** Flowers attract insects by creating blue halo **p.302**

**WORLD VIEW** Cap scientific output to focus on quality **p.303**



**NEW MOON** Lunar impact shows surprising surface ingredients **p.305**

# A view from above

*The world's latest carbon-monitoring satellite has advanced our understanding of how the planet functions. US politicians should take note.*

When a rocket failure saw NASA's first carbon-monitoring satellite plunge into the ocean in 2009, it was a major blow for climate scientists. Space-based greenhouse-gas monitoring was a promising new frontier — and perhaps an eventual tool for monitoring international climate commitments. It took several years to get a replacement into space, but the Orbiting Carbon Observatory-2 (OCO-2) began taking measurements in 2014. The first major scientific results were published last week in *Science* (see go.nature.com/2yr8n6a), and there can be no doubt that the mission is delivering. No doubts, either, that the US government should launch a successor.

The results give an unprecedented insight into one of the most important planetary phenomena: El Niño, the subtle but massively influential gathering of warm waters in the tropical Pacific Ocean. The 2015–16 El Niño was a monster, changing weather patterns and driving the largest and longest coral-reef-bleaching event on record. Through it all, scientists used OCO-2 to watch carbon move through oceans and ecosystems.

The overall trend came as little surprise — a massive increase in global atmospheric carbon levels. Scientists have measured similar rises in carbon dioxide during past El Niños. But the precise mechanism was elusive. OCO-2 helped clarify the matter by producing detailed maps. Researchers saw an initial decrease in the amount of $CO_2$ coming out of the tropical Pacific Ocean, a dip later swamped by $CO_2$ originating from Africa, South America and southeast Asia as the event wore on.

Tracking carbon is just the first step. Those data feed into atmospheric models that can provide a more comprehensive explanation for the origin — and destination — of any given $CO_2$ molecule. Fortunately, sensors on board OCO-2 can assess the amount of photosynthesis using methods other than measuring carbon flux. They detect a photosynthesis-linked signal called solar-induced chlorophyll fluorescence, which gives an independent measure of how much $CO_2$ plants are taking up.

With this suite of tools, scientists have managed to paint a finer picture of how the 2015–16 El Niño affected individual regions. Heat and drought set the stage for the massive wildfires that ravaged Indonesia during the event, whereas drought-stricken trees in the Amazon rainforest took up less carbon than usual. In Africa, the higher temperatures probably boosted plant respiration. All three mechanisms for increasing atmospheric $CO_2$ have been proposed in the past, but it was a surprise to see all play out on different continents simultaneously.

Plenty of questions remain. The satellite measurements are not as precise as scientists would like, and they don't always align perfectly with data from the ground. And getting the models right is a never-ending challenge. It will be some time before satellites are able to provide the precision needed to quantify the natural carbon cycle, let alone to separate out human emissions with enough confidence to verify whether countries are meeting their obligations to cut greenhouse-gas emissions. But OCO-2 is further validation that the effort is worth pursuing.

US politicians should take note. President Donald Trump has proposed scrapping a follow-on mission, OCO-3, presumably because it falls under the rubric of climate — a topic that is anathema to this administration. That would be a self-defeating and damaging move. The bulk of the budget for OCO-3 — which was built from the spare parts of its predecessor — has already been spent; all that's left is the expense of launch and operation. Killing the mission now would waste time and money. But more importantly, as these latest studies show, humanity can learn from the measurements that it will make.

***"OCO-2 is an affirmation of climate science that everybody should be able to appreciate."***

OCO-2 is an affirmation of climate science that everybody should be able to appreciate, regardless of political leanings. Trump might not like talking about climate. But surely his administration — and the lawmakers on Capitol Hill who will decide whether OCO-3 survives — cares about the weather.

El Niño has an impact on weather systems around the world. It raises the likelihood of heavy rainfall from California to the Gulf of Mexico, while increasing the chances of drought and extreme heat in areas farther north. El Niño and its opposite sister system La Niña factor heavily in longer-term seasonal forecasts, which can help governments prepare for fires like those tearing through California at the moment. The more we understand this system, the better we will be at forecasting changes in the weather, the climate — and the economy. A 2014 report from the International Monetary Fund argued that effects of El Niño should be taken into account when nations plan their finances. This has nothing to do with politics, and everything to do with understanding the world in which we live. ■

# Computer future

*Researchers should gather evidence to map how automation will change employment.*

In 2014, the *Los Angeles Times* began beating its rivals to report earthquakes, using an algorithm to convert announcements from the US Geological Survey (USGS) to breaking news within a few minutes. This June, it announced that a magnitude-6.8 quake had shaken Santa Barbara, California. That was certainly news to the distinctly unshaken residents of Santa Barbara; the earthquake the newspaper was reporting on had actually happened in 1925. The paper's Quakebot had misinterpreted

**THE FUTURE OF WORK**
A *Nature* special issue