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Mammalian brains have millions of cells, and human brains even have billions. And the cells come in some 10,000 different types, marked by differences in shape, size and the genes they express. Neuroscientists hope that mapping out the structures and how they interact will help to reveal their functions (see *Nature* **548,** 150–152; 2017). By comparing particular neuron types across multiple brains, scientists might be able to pick out the effects of a disease or a learned behaviour on cell structure, says Jürgen Goldschmidt, a brain-imaging researcher at the Leibniz Institute for Neurobiology in Magdeburg, Germany.

But such maps often require months or years of effort. The process involves shaving centimetre-long mouse brains into 15,000 ultrathin slices with a diamond blade, staining each layer with chemicals or fluorescent tags to pick out particular features, imaging each layer with a microscope and then reconstructing the images into a 3D map.

HIGH-SPEED MAPPING

That's where Luo's institute can help. Its vast number of machines have impressive speed and resolution, collaborators say. According to Zeng, the devices can gather the same amount of detail on a mouse brain in two weeks as would require months using other technologies, such as super-resolution confocal imaging.

Participants at a February meeting of the US BRAIN initiative (Brain Research through Advancing Innovative Neurotechnologies) in Bethesda, Maryland, were treated to a display of the technology's capabilities when they were shown an image of a neuron that wrapped all of the way around a mouse brain (see *Nature* **543,** 14–15; 2017). Allen Institute neuroscientist Christof Koch, whose team did the work in collaboration with Luo's group, suggests the extensive reach of the neuron shows that the cell has a role in coordinating inputs and outputs across the brain to create consciousness.

The Suzhou institute will generate a huge amount of data: each mouse brain map alone will be 8 terabytes, Luo says. But the volume of a human brain is nearly 1,500 times that of a mouse brain; it would take a single machine around 20 years to digitally reconstruct one at the institute's current rate. Luo aims to increase the speed of his machines and to use multiple devices in parallel.

Luo is keen for worldwide collaboration; along with the Allen Institute and Cold Spring Harbor Laboratory, Stanford University in California is forming a partnership with the centre. But Luo says that interest is so high that he won't be able to accommodate everyone. "We are already turning people down." ■

The number and severity of forest fires in Asia increased during the recent El Niño warming.

CLIMATE SCIENCE

El Niño drove up carbon emissions

Climate disruption altered behaviour of tropical forests.

BY GABRIEL POPKIN

The monster El Niño weather pattern of 2014–16 caused tropical forests to burp up 3 billion tonnes of carbon, according to a new analysis. That's equivalent to nearly 20% of the emissions produced during the same period by burning fossil fuels and making cement.

Measurements taken by NASA's Orbiting Carbon Observatory-2 (OCO-2) satellite, which tracks the levels of carbon dioxide in the atmosphere, suggest that El Niño boosted emissions in three ways. A combination of high temperatures and drought increased the number and severity of wildfires in southeast Asia, while drought stunted plant growth in the Amazon rainforest, reducing the amount of carbon it absorbed. And in Africa, warming temperatures and near-normal rainfall increased the rate at which forests exhaled CO_2. The overall jump in emissions from tropical forests was roughly three times the annual average carbon output from deforestation and land-use change globally between 2006 and 2015 (C. Le Quéré *et al. Earth Syst. Sci. Data* **8,** 605–649; 2016).

The analysis, presented on 7 August at a meeting of the Ecological Society of America in Portland, Oregon, is a coup for OCO-2. Since 2014, the satellite has given scientists their best view yet of the ebb and flow of CO_2 emissions. The 2014–16 El Niño was one of its first big tests.

"In the past, we had to model how those vegetation changes affected carbon dioxide," says David Schimel, an ecologist at NASA's Jet Propulsion Laboratory in Pasadena, California, who presented the results. "Now we're getting a chance to see what we got right and what we got wrong." Combining data from OCO-2 and satellites that measure methane and carbon monoxide is giving Schimel and his colleagues a detailed view of how forests around the world respond to El Niño's climate shocks.

All three emissions-increasing mechanisms that the team saw had been previously identified as ways in which extreme weather could affect plants, says Abigail Swann, an atmospheric scientist and biologist at the University of Washington in Seattle. "What's interesting is that they all happened," she says. "It suggests that [El Niño response] is going to be a more complicated combination of factors in the future." ■