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Quakes can be catastrophic. But they may have a silver lining

May 30th 2016 | Science and technology



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LONG before people started dumping large amounts of carbon into the atmosphere, the planet was producing—and managing—such emissions rather well all on its own. Volcanic eruptions release massive amounts of carbon dioxide into the air, putting even the dirtiest smokestacks in the shade. According to new research, another terrifying natural phenomenon plays a role in storing carbon.



Geologists have long known that CO2 from big volcanic eruptions has in the past triggered a greenhouse effect which raised temperatures, drove evaporation, increased rainfall and then dropped rain that is rich in carbonic acid onto surface rocks, resulting in much of the carbon from the droplets getting locked away as layers of carbonate in the ground. They suspected that earthquakes made things worse, by causing landslides that destroy large amounts of trees and vegetation. The carbon stored in dead plant tissues would then escape into the atmosphere through oxidation.

Not so, reckons a report in Geology by Zhangdong Jin of the Institute of Earth Environment in China and Robert Hilton of Durham University in England. The pair suspected something else might be going on, as they both had first-hand experiences of seeing landslide debris quickly swept away by rivers. That meant the debris would be buried in areas like lake beds and ocean deltas, where it would effectively be locked away for millennia rather than releasing carbon into the air. Hence they theorised that earthquakes ought actually to increase long-term carbon storage.

Under normal circumstances such an assumption would be impossible to test. But Dr Jin and Dr Hilton found a way. As it turns out a hydrologic station on the Zagunao River in Sichuan province in south-west China had been collecting water and sediment samples for two years before a giant magnitude 7.9 earthquake in 2008 devastated the nearby Wenchuan area. More than 69,000 people were killed and 4.8m made homeless. The earthquake also caused 57,150 landslides along river valleys in the region.

These unusual circumstances provided the researchers with a rare opportunity to look at

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the sorts of sediments flowing down the river both before the disaster and after it. Moreover, Dr Jin, Dr Hilton and their colleagues were able to investigate if debris from the landslides had oxidised and thus released carbon back into the atmosphere before getting washed away.

After analysing 154 samples taken from the river for four years after the earthquake and comparing those samples with ones that were collected in previous years, the researchers were able to work out that the amount of sediment in the water increased by seven times following the landslides. Crucially, they found that less than 20% of the carbon in the water from plants and soil had been released through oxidation before being carried away by the river. Thus, they estimate that most of the 14 megatonnes of carbon that was probably released by the earthquake ended up being stored away. Quakes can be catastrophic, of course. But even they may have a silver lining.

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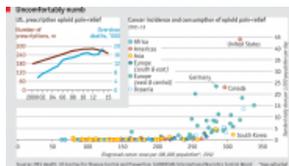
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