
Babbage
Science and technology

Seismology

Can animals predict earthquakes?

Feb 15th 2014, 17:25 by R.W.

THE idea that animals can forecast earthquakes is not a new one: the notion occurred to the Romans. For more than 2000 years, people have reported unusual animal behaviour just minutes or hours before powerful seismic events. But now, a new space programme could be about to provide the facts to explain such stories.



In December 2013, the German Aerospace Agency announced its plan to invest approximately €19m (\$26m) in the ICARUS initiative (International Cooperation for Animal Research Using Space)—a joint venture with the Russian Space Agency—which aims to reveal a previously hidden side to life on Earth: the migration routes of flying animals.

When ICARUS launches late next year, around 1000 birds and bats will be fitted with ultralight tracking tags. These will record the creatures' locations in real time, using radio-frequency communication linked to instruments onboard the International Space Station.

But as well as monitoring migrations, ICARUS will also be used to look for unusual movements of animals. Martin Wikelski, a professor of ornithology involved with the project, explains that ICARUS will test for the first time whether flying animals can be used as "intelligent sensors" of impending earthquakes.

Birds and bats might serve the purpose because of their ability to detect magnetic fields. This capability probably helps the creatures navigate—but it could also allow them to sense earthquakes before they strike.

Since the late 1990s, it has been known that fluctuations in the Earth's magnetic field occur before some earthquakes. The reason why, however, had eluded seismologists until the early 2000s, when a bizarre new property of rocks was discovered.

The underlying cause of all earthquakes is the build-up of stress in subsurface rocks—invisible at

the Earth's surface. But laboratory tests carried out in 2002, by NASA's Friedemann Freund, revealed that the stresses which lead to earthquakes can be detected electromagnetically.

Dr. Freund found that, because of atomic defects that exist in rock-forming crystals, rocks generate "clouds" of positive electric charge when subjected to stress. (The same clouds are also thought to be behind the startling phenomenon of "earthquake lights", a kind of aurora sometimes seen in the air just before seismic events). Just prior to an earthquake, this positive charge induces magnetic fields at the Earth's surface (which ICARUS hopes to spot by observing changes in the behaviour of the birds and bats it will follow).

Currently, the only evidence that flying animals can sense the magnetic disturbance which occurs before earthquakes is anecdotal. In the past decade, zookeepers in China and America have reported peacocks and flamingos acting strangely before quakes. These accounts were isolated and unsubstantiated. ICARUS, though, will soon be able to monitor hundreds of bird groups across the whole globe, continuously and precisely.

On average more than 100 large earthquakes (magnitude 6 or higher) strike each year, meaning the chances of at least some tagged animals flying by a future epicentre are high. If and when they do, the information collected by ICARUS could solve the mystery of whether animal can predict earthquakes. But scientists involved should beware of having aspirations that are too high.