New study suggests how toads might predict earthquakes

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The trouble with earthquakes, other than their obvious devastation, is that thus far they have proved to be very nearly impossible to predict, despite considerable effort towards that goal; being able to do so would obviously save a lot of lives. Also, despite the fact that there is literally hundreds, if not thousands of years of anecdotal evidence suggesting that some animals may have some innate ability to predict quakes, modern

research has instead been steadfastly focused on studying the Earth, rocks, faults, etc.

That may change now that biologist Rachel Grant, from the UK's Open University has found evidence that toads can predict a quake up to several days before the ground starts shaking. She's teamed up with NASA geophysicst, Friedemann Freund and the two of them, as they describe in their paper in the *Journal of Environmental Research and Public Health*, suggest that it might all be because of changes to the pond water in which the toads are living.

Grant was studying the toads that lived in a pond near L'Aquila, Italy, in 2009 in the days just before a devastating earthquake struck. In those few days just before it happened, she noted that the toads began leaving. Their numbers dwindled from just under a hundred, to zero, causing her to write about her observations in the *Journal of Zoology*. That caught the attention of Freund, who was doing work for NASA in studying what happens to rocks when put under extreme stress, as in say, when an earthquake is in the making. He contacted Grant, and the two of them began investigating ways that such rock pressure could impact the environment where the toads lived.

After some experiments in the lab, the two write that when rocks underground come under pressure as a result of geological processes, they let off charged particles. Such particles can very quickly rise to and above the surface of the Earth, impacting such things as pond water and the biological material in it. In the case of the pond in Italy, it seems the toads may have been reacting to changes they felt in the water itself as ions interacting with it react to form minute amounts of hydrogen peroxide. Or it seems possible that ions interacting with organic material in the pond caused substances to be released that either were toxic or less ominously, simply irritating. Either way, it would explain their sudden exodus.

The problem with proving their theory though, is of course, they'd have to know when and where an earthquake is about to strike so as to allow them to set up testing equipment in advance. Perhaps the best that can be done at this point, is for such information to disseminated all over the world, so that if anyone happens to live near a pond, and notices that the toads are leaving, they would be wise to follow them.

More information: *Int. J. Environ. Res. Public Health* 2011, 8, 1936-1956; doi:10.3390/ijerph8061936