

Critically stressed Earth. Sep 2019 Jonathan Turner

The upper 10km of the crust is the most brittle section with countless fractures from which minor earthquakes are recorded; recent occurrences include those recorded from the Groningen gas field underlying the Netherlands, and the Horse Hill field near Gatwick.

Unlike fracking of course, movements at Groningen after 1969 were the result of fluid reduction, rather than injection, but nearby residents felt earthquakes all the same.

The fracking project near Preston in Lancashire is at shallow depth, raising the question of what is the nature of the fractures and their orientation; but the science of forces in the stress field has barely moved on in 50 years.

However, Bristol Uni has announced a project to measure real time stress near San Francisco with fibre optic instruments and modern communications.

The key issue is that geologists need to be much better at explaining what we do and finding better ways of measuring it.

Discussion

Where are records of crustal events kept? There is a new BGS monitoring network in the UK.

There is a terminology problem as all micro seismic events are called earthquakes by the media!

One of the most powerful earthquakes attributed to dam activity happened in western India in 1967. Three years after completion of the Koyna Dam, a 6.5 magnitude earthquake hit the area, undoubtedly proving a link between dam filling and movements 15km deep in the crust.

Fracking is a lost cause for geologists in terms of communication with the public, so how do we communicate scientific issue to the wider public to show that in fact we have earthquakes all the time? The public simply do not understand technical issues at all; they seem to want emotional issues only e.g. the likely impact on our grandchildren.

Millions of microfractures are preferable to stress build up and a sudden release – which is a very simple message, but how do we communicate that? Do we need advice from social scientists? There are plenty of PhDs in the radioactive waste management field but no social scientists!

John Bennett