

Earthquake predictions prove accurate for researchers

Two large earthquakes have occurred in quick succession in Sumatra, Western Indonesia, only months after University of Queensland researchers publicly identified the area as a high-risk zone for seismic activity.

The quakes, which were measured at 7.5 and 7.0 on the Richter scale and caused significant damage and at least three deaths between them, occurred on February 20 and 25 respectively, precisely in the regions pinpointed by researchers.

The successful forecast is just the latest in a string of accurate predictions made by researchers at the University's Earth Systems Science Computational Centre (ESSCC), using their pioneering advanced computer simulation software.

In December last year, centre scientist Dr Huilin Xing presented the accompanying research at the 40th annual meeting of the American Geophysical Union, to much international interest.

“We have been focusing on the computational mode and development for simulating earth crustal dynamics on supercomputers [for some time now],” Dr Xing said.

“The successful predictions so far have demonstrated the capability of our software, which has already drawn the attention of earthquake scientists from around the world... and some from China and the USA have already applied or will apply it to study earthquake behaviour of their own regions.”

Building on this breakthrough work, Dr Xing and team member Dr Can Yin are continuing to apply the modelling software to the southern Indonesian region that has become notorious since the 2004 Boxing Day tsunami.

With the Eurasian and Indian/Australian tectonic plates converging just off the coast, Sumatran waters will likely be the site of seismic activity for some time to come.

“The question is how big and where it will happen in the near future, and whether it will induce a deadly tsunami,” Dr Xing said.

In the meantime, ESSCC researchers will continue to perfect simulation software and the prediction process, hoping to contribute to significant improvements in this important area.

“As we gain more experience in model construction and parameter selection, as well as more experience and confidence in the process, we will no doubt work towards a more accurate and reliable earthquake forecasting platform and filling more wide applications,” he said.

This will include the application of the crustal dynamics software in supercomputer simulation of hot fractured geothermal reservoir systems in the field of alternative energy; and with ongoing funding, exploration of other applications in regards to modelling the deep geological disposal of nuclear waste and carbon dioxide.

Dr Xing said these endeavours owed much to the ongoing support of the Department of Education, Science and Training, the Australian Research Council, and industry collaborators such as Geodynamics Ltd.

The ESSCC conducts research on the mechanics and physics of solid Earth processes on all scales using supercomputer simulation and by applying the methodologies of geophysical fluid and solid mechanics.

Source: University of Queensland

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