

## Natural calamities and pseudoscientific menace

Whenever a natural disaster strikes, we are bombarded with prophecies and precautions from astrologers, numerologists, Vaastu experts, Vedic scholars, psychics and sometimes even from researchers led astray. Earthquake prediction too has become a favourite pastime of novices and soothsayers. Mainstream media endorses every new story without ascertaining its credibility from other sources. It leads to mixing-up of science with pseudoscience, facts with fiction and professional with novice. Although literacy level in India has crossed the 60% mark, an appalling amount of pseudoscience has been generated as a by-product of this information age; scientific literacy still remains an elusive goal to be achieved. Media has to take a significant share of blame for promoting and reinforcing pseudoscientific beliefs in the society.

Misrepresentation of science in the media can be gauged from some boisterous claims that followed immediately after the recent earthquake events, for example, 'What caused the devastating October 8 earthquake was a powerful alignment of Jupiter and Mercury...'. This was reported in one of the widely circulated English dailies (*The Times of India*, 10 October 2005). A research scholar had gone to the extent of predicting an earthquake on 17 October and 14 November in Uttarakhand, which of course did not happen. Later the same newspaper carried another story of an unusual cloud formation that indicates an impending earthquake! A Varanasi-based cloud-reader seems to have predicted the earthquake five days in advance! A Vedic scholar from Pune lamented the lack of multidisciplinary scientific research into chapter 32 of the *Brihat Samahita*, which correlates earthquake with unusual cloud formation. A scientist in a TV show linked earthquake occurrence with sunspots! A retired seismologist from Pune has even claimed that cell phones can now warn people about the approaching earthquake! In this rat race, numerologists are not far behind. They swear that deadly earthquakes occur only on specific dates like 8, 17 or 26, because their digits add to 8. Quite understandably, public expectations about earthquake predictions are driven by physical and emotional need for safety. Those claiming 'success' in prediction are basically

restating what is an already well understood and investigated phenomenon in physical sciences.

It is a long-settled question among the scientific community that the alignment of planets has no tangible influence on terrestrial events such as earthquakes, volcanic eruptions, cyclones, floods and famines. The moon has the strongest gravitational and tidal effects on the earth. A simple calculation, for example, would show that the total gravitational pull of all the planets combined is only about 2% of the moon's pull on the earth. So planet alignment obviously cannot trigger any earthquake. On 5 May 2000, all planets were lined-up, but no major earthquake was reported on that day! In fact, only 15 earthquakes with  $M 7$  were recorded in 2000, whereas the annual average of such earthquakes was around 19. Those who predicted doom must have been left fuming in disgust.

Another widely spread myth is that more number of earthquakes are occurring now than in the past. According to USGS, earthquakes of magnitude 7.0 or greater have remained fairly constant in the last 100 years or so. More earthquakes are recorded now because there is a wider network of seismographs and observing stations throughout the world, which detect around 12,000 to 14,000 low to high intensity earthquakes every year (roughly 35 per day). It is just that people today get to know about more earthquakes due to better communication and increased awareness about natural disasters and also because previously uninhabited or poorly inhabited regions are now developed, with more people around to feel the event.

It is generally believed that animals have sophisticated and much evolved sensory perceptions to detect environmental signals preceding an earthquake event. Too much has been said and written about the ability of animals to sense an impending earthquake. However, anecdotal and retrospective reports of abnormal animal behaviour are often at variance and do not meet the necessary criteria for statistical reliability.

Common precursors such as sudden rise in water level, increased radon content and foreshock events too have proved illusive, since their applicability to various

geographical locations remains questionable. The presence of electrical and optical precursors related to earthquakes is a controversial and largely unexplored area of research. In all these cases, there is no unique discriminant that can be used to warrant a foolproof earthquake warning system. The merit and value of such predictions have been widely debated in the scientific circle. Having spent over 160 billion Yen in vain, Japan had to finally abandon prediction-related research and divert its resources to designing quake-proof buildings and developing better disaster management and planning skills.

Though a great deal is known about why and where earthquakes are more likely to occur, it is still not possible to deterministically predict the exact location, time and day of their occurrence. So far, the search for reliable and causally related earthquake precursors has proved futile. The best that scientists can do is to estimate the likelihood of a future earthquake by measuring the accumulated strain in rocks. But, most importantly, widespread awareness about natural disasters should be made a national priority by initiating public outreach and education programmes at individual and organization levels.

Obscurantist and pseudoscientific menace must be combated seriously, at least for two reasons. First, because it provides a delusive hope where none exists and secondly, it spreads misplaced fears and a false sense of insecurity among gullible public. Scientists have greater responsibility to communicate carefully their findings and present state of scientific knowledge to general public. To dispel irrational and superstitious beliefs from public imagination, it is imperative that scientists, academicians and the research community in general come out of their closets to promote scientific awareness and understanding at all levels of the society.

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