

Earthquake Predictions

A. Giesecke

CERESIS Lima/Peru (giescere@ceresis.org)

A Seminar on Earthquake Prediction Case Histories was organized jointly by UNESCO and UNDRO in Geneva in 1982. The objectives were to review cases of earthquake prediction which had led to considerable concern and reaction on the part of populations and governments, with special reference to social and economic effects and the problems faced by emergency preparedness authorities. Global experience at the time of such situations was relatively limited and still remains so. The Geneva symposium identified problems which can be expected when an earthquake prediction is widely publicized. They illustrate that no matter how unreliable its source may be, such a prediction can easily and rapidly develop into a major social, economic and political problem. In fact, the prediction of a destructive earthquake in a given region, when and how big, is at this time only a much desired hope.

In the absence of any one to one relationship between the occurrence of precursory phenomena and the occurrence of earthquakes one is led to adopt a "probabilistic" approach to prediction. When more observational data become available, it may become possible to base predictions on quantitative statistical analysis.

Probabilistic earthquake hazard maps are used for earthquake resistant building codes. These maps are a probabilistic prediction of maximum ground acceleration with 10% probability of exceedence in 50 years. They certainly are not an earthquake prediction.

This dilemma scientists are facing when predictions are required will be discussed in this lecture, based on two characteristic examples: The famous earthquake which hit the coastal region of central Peru during July 1981, and the eruption of the El Nevada del Ruiz volcano in Colombia in November 1985.