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Geo-scientific Manifesto on Civil Protection against Natural Hazards

Being prepared and taking preventive and mitigation measures

The European Federation of Geologists, with support from EuroGeoSurveys, IAEG, EAGE, IUGS and World Geologists, would like to emphasize the importance of geo-sciences in civil protection against natural hazards to policy-makers at world, European, national, regional and local level. Together, these organisations represent the European geo-scientific community, including the community of geological hazards experts.

The number of victims, the devastating destruction of the infra-structure, the effects on social life, and the subsequent significant setback of the economy in case of natural disasters by far outweighs the combined effects of air, marine and traffic accidents.

The recent earthquake and related tsunami disaster in south-east Asia again emphasizes the importance of focussing on reducing the risks from natural hazards. Europe suffered from a tsunami of similar force, initiated by a submarine landslide, offshore of Norway, approx. 8000 years ago. A similar submarine slide could occur again at any time. Also, the increase in the number of natural disasters during the last few decades underlines the importance of taking preventive and, where necessary, mitigation measures against such hazards. Europe is primarily affected by floods, landslides and earthquakes.

There is a tendency at all policy levels to concentrate on reaction to disasters, rather than taking preventive and mitigation measures. This approach only leads to continuous increase in costs, keeping in mind both climate change and the continuous increase of construction activities into vulnerable areas; whereas hazard identification and risk reduction can significantly restrict the costs and effects of natural hazards. The costs of early geo-scientific investigations and hazard/ risk mapping are generally less than 1-2% of the reconstruction costs after a natural disaster.

Therefore we recommend to:

1) **Integrate geology in land-use planning to avoid unnecessary risks**
   Generate hazard / risk maps for guidance to control construction in vulnerable areas, such as on river floodplains, in landslide-prone areas and in earthquake-sensitive zones prior to the disaster. In parallel, legislation should be considered to involve geo-scientific hazard assessments as part of development planning regulations for areas identified to be at risk.

2) **Educate society to improve the understanding of and response to natural hazards**
   Many natural disasters are compounded by inappropriate human actions or decisions. Raising public awareness and increasing the knowledge of geological sciences will assist disaster management teams and rescue operations to better understand the situation and avoid further escalation of the problems. Better insight in the geological sciences will lead to improved policy-making with respect to adopting the best preventive and mitigation measures against natural hazards.

3) **Develop and install early warning systems (geo-indicators) in areas at risk**
   Small-scale geological variations may be identified as precursors to large-scale natural events. Identification and monitoring of precursors at the earth surface, possibly in combination with earth observation from space, may provide indications of pending large-scale natural hazards, allowing mitigation responses to be initiated.

The group of experts on Natural Hazards of the European Federation of Geologists are available to provide all necessary information and to make recommendations from a geological perspective, such that it will lead to a significant reduction of negative effects caused by natural disasters.

EFG Group of experts on Natural Hazards
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