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Symposium “Natural Hazards”

in the framework of the Symposium Global Change of the Swiss
Academy of Natural Sciences in Zurich

September 10–11, 1996

Organizers:

Swiss national committee of IDNDR, National research program PNR 31, Swiss Geological Society,
Swiss Geomorphological Society, Swiss Group of Engineering Geologists,
Swiss Society of Hydrology and Limnology

1. Context

Disasters from natural events may deeply affect the social structure of the area struck. Mature societies may fall apart, working places may be destroyed, and infrastructure built up during several decades may break down. Switzerland is a small country located in the Alps, exposed to natural disasters such as floods, mudflows, snow avalanches, glacier breakdowns, windstorm, hailstorm, landslides, forest fires and earthquakes.

The United Nations made prevention and preparedness against disasters caused by natural extreme event their task and declared the nineties as the **International Decade for Natural Disaster Reduction (IDNDR)**. It is intended to inform people in disaster-prone countries of the Earth about protective measures against natural forces and to make these means accessible. To achieve this goal, the following targets should be reached during the decade:

By the year 2000, all countries should have in place, as part of their plan to achieve sustainable development:

- national assessments of risk due to various types of disasters;
- national and/or local prevention and preparedness plans;
- access to global, regional, national and local warning systems.

In March 1990, the Swiss Federal Council established a Swiss IDNDR committee to carry out an evaluation of the country's capacity to reduce natural disasters and their socio-economic implications, to improve existing knowledge and to contribute supporting the transfer of know-how to the developing countries.

In June 1990, the National Research Programme NRP 31 on «Climate Change and Natural Disasters» of the Swiss Na-

tional Science Foundation was approved by the Federal Council as a Swiss contribution to international research efforts on this theme in the framework of the IDNDR Decade.

2. Symposium “Natural Hazards”

During the 176th annual meeting of the Swiss Academy of Sciences and the Symposium “Global Change – Earth in mutation” in Zurich, different societies along with the Swiss IDNDR committee and the Swiss National Research Programme NRP 31 decided to contribute to the topics by organizing a specialised symposium on “Natural Hazards”. On September 10th and 11th, more than twenty papers were presented during the five sessions of the Symposium “Natural Hazards”. We selected eleven of these papers for publication in *Eclogae Geologicae Helveticae* devoted to the Symposium “Natural Hazards”. The abstracts of the other papers appear at the end.

In the first session called **Natural hazards and society**, Robert Hamilton (USGS) presented the increasing potential for catastrophic natural disasters in the United States. Gerhard Berz (Münchener Rück) proposed the viewpoint of an international reinsurer on catastrophes and climate changes. The strategy for risk reduction according to the new regulations in Switzerland was discussed by Thomas Peter (E. Basler & Partner). Philippe Schoeneich (Lausanne) talked about the perception of the risks by the inhabitants of a mountain region in Switzerland.

The second session was dealing with **Floods** and Erich Plate (Karlsruhe) explained the risk management in Germany. A comparison between Luxemburg and Switzerland in flood risk assessment and protective measures was discussed by Fritz

Baehler (E. Basler & Partner). Typology, probability of occurrence, magnitude and hazard assessment for debris flows were presented by Hans Kienholz (Bern) in mountain streams and by Markus Zimmermann (Bern) in the alpine region in general. Dieter Rickenmann (Birmensdorf) proposed some empirical rules to evaluate runout distance and mobilised volume for debris flows.

In the third session **Ice and avalanche**, the research programmes in Europe and Switzerland were discussed by Gerard Brugnot (Grenoble) and Walter Ammann (Davos). Slope stability problems related to glacier shrinkage and permafrost degradation in the Alps were illustrated by Wilfried Haeberli (Zürich). Based on statistical data during the past 100 years, Martin Schneebeli (Davos) showed the relation between avalanche occurrence and climate changes.

Landslide was the topic of the fourth session and Michael Moser (Erlangen) demonstrated the various kinds of forecasts for soil slips, sagging and rock slides. Based on structural parameters, Christian Marro (Sion) proposed a new methodology for hazard assessment in rockslides and rockfalls. The relationship between landslides in flysch terranes and climate change during the past 10,000 years was shown by Hugo Raetzo (Fribourg) with the help of dendrochronological analysis and ¹⁴C dating on fossil wood collected in the unstable zones.

In the last session called **Volcanoes and earthquakes**, Götz Schneider (Stuttgart) presented the earthquake hazard in Europe. The influence of geological conditions in hazard assessment were discussed by Christoph Beer (Zürich) and an example of the microzonation of Basels' city was given by Thomas Noack (Basel). Jean-Jacques Wagner (Genève) spoke about volcanic risks and possibilities of mitigation. Simon Löw (Baden) discussed the Eifel volcanic hazard assessment in Germany through probabilistic studies.

3. Perspectives

In the Symposium «Natural hazards», many papers were dealing with typology, magnitude, frequency and hazard assess-

ment and represent essential contributions to the topic "Climate change and Natural Disasters" of the National Research Programme PNR 31. Further work should concentrate on monitoring, simulation, prediction and warning systems for natural disasters.

Only few papers were dealing with risk assessment, involving vulnerability of the structures and damage evaluation. The level of acceptable risk will determine the policy for reducing the hazard as part of the development planning process. Such a policy would estimate the technological and economic capacity to absorb the difference between high risk and acceptable risk in relation to the costs of risk reduction. Further work should aim at establishing some criteria for risk evaluation and for estimating acceptable risk levels, taking into account the ecology, the safety of the population and the economical development of endangered areas.

A strategy for risk reduction in Switzerland will be the main concern of the new "**Plate-forme nationale des dangers naturels**", created in the spring of 1997 by the Federal Council. A number of decision-making techniques can assist the choice of disaster mitigation policies/plans implemented by the cantonal or communal authorities. Efficient allocation of resources, costs/benefits of prevention works, comprehensive planning and decision making will heavily depend on the criteria of risk assessment analysis. Scientists should contribute significantly to the establishment of these criteria for a better prevention of natural disasters in Switzerland.

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