1.1. Extreme events, natural hazards and natural catastrophes: a terminology

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Extreme events are rare events that deviate heavily from the statistical mean. They are not necessarily associated with damage. Natural catastrophes are events whose consequences cannot be dealt with by the local community. They do not necessarily result from extreme events. Natural hazards are natural processes and situations that threaten the community and the environment.

For our purposes, events will be designated as extreme if they depart markedly from an average value or trend, and are therefore exceptional. The definition of extreme events is thus based on statistical criteria. Extreme events often have negative consequences on humans and the environment. Examples of extreme events in Switzerland are the winter storms Vivian (1990) and Lothar (1999), the extreme floods in the Cantons of Uri (1987) and Valais (Brigue 1993 and Gondo 2000) and the freezing spell in 1963 when the largest Swiss lakes last froze over.

A comparison with long-term measurement series permits the rareness of an extreme event to be quantified. The rareness is expressed in terms of the return period. An event that occurs statistically every 10 years has a return period of 10 years. The present report does not define a general limit for the return period beyond which an event would be classified as extreme. One reason for this is that a meaningful discrimination would depend on the type and frequency of an event and on the size of the area chosen.

- *Type and frequency of events*
  In Switzerland, earthquakes occur more rarely than floods. An earthquake that occurs on average every 300 years is not classed as an extreme event. Furthermore, it does not result in extensive damage. A flood at intervals of 300 years is, however, an extreme event, and the probable damage is very extensive.
- *Chosen geographical area*
  Statistically speaking, an event that would be classed as extreme in the locality may be quite 'normal' for the region as a whole. In relation to Switzerland, for example, the maximum windspeed recorded during the Lothar storm was an extreme event with a return period of 20-100 years. In relation to Europe, however, it was simply a major event with a return period of significantly under 10 years.

Whilst science judges particular events on the basis of critical limits, society judges them on the basis of the material and immaterial damage arising. For example, whilst little attention is paid to an avalanche falling in an uninhabited mountain valley, should an avalanche devastate a housing area resulting in the loss of human lives, it is classed as a catastrophe.

A common characteristic of natural catastrophes is the helplessness of the local inhabitants. These do not have the resources to deal with the situation, and are dependent on assistance from outside. Examples of natural catastrophes of this sort in Switzerland are the floods of 1987 and the avalanche winter of 1951.[1] Natural catastrophes are not, however, caused by extreme events alone. They can result from events extending over a large area or occurring at short intervals. An example of the former is the occurrence of extensive bands of hail, and of the latter when melting snow and heavy precipitation coincide in spring, as was the case in May 1999.

In the connotation of the 'risk society'[2], which has developed since the early 1970s, the term natural catastrophe has been questioned on the grounds that such events must be seen as resulting partly from human activity. In the public mind, the boundaries between natural and 'technological' catastrophes have become blurred. Nature, society and technology are seen as being interrelated.[3]

In recent times, the term natural hazards has become established in the natural sciences.[4] Natural hazards comprise all processes and influences arising in nature that can endanger people and/or material assets (e.g. tornados, earthquakes, avalanches, floods and locust swarms).[5] Natural hazards therefore carry the threat of disaster, and this can be avoided under certain conditions by preventive measures. A natural catastrophe, on the other hand, is a disaster that has actually taken place.

1 Pfister C., Am Tag danach. Zur Bewältigung von Naturkatastrophen in der Schweiz 1500–2000, Haupt Verlag, Bern, 263 S., 2002.

2 Beck U., Risikogesellschaft. Auf dem Weg in eine andere Moderne. Suhrkamp, Frankfurt/M., 1986.

3 Müller U., W. Zimmermann, P. Neuenschwander, A. Tobler, S. Wyss und R. Alder, Katastrophen als Herausforderung für Verwaltung und Politik. Kontinuität und Diskontinuität. Zürich, 1997.

4 Kienholz H., Naturgefahren – Naturrisiken im Gebirge, Schweiz. Zeitschrift für Forstwesen, 145/1, 1–25, 1994.

5 BUWAL, Begriffsdefinitionen zu den Themen Geomorphologie, Naturgefahren, Forstwesen, Sicherheit und Risiko. BUWAL, Eidg. Forstdirektion. Bern, 1998.

Extreme event:	**Event departing markedly from the average values or trends, and that is exceptional. Mostly, the return period substantially exceeds 10 years.**
Natural hazard:	**The threat of disaster arising from a natural process or influence.**
Natural catastrophe:	**Natural event whose consequences cannot be dealt with by the local population without help from outside.**