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Comparison of risk assessment methods: multiple perspectives of flood and avalanche hazards in North East France

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Mountainous areas are exposed to several natural hazards such as snow avalanches, debris flows or floods. Such processes may be more frequent and intense in high mountains but they occur in medium-high mountains as well causing loss of life and materials. Thus, the Vosges range, a medium-high mountain located in the north-east of France, is concerned by two kind of natural hazards namely avalanches and floods. While the avalanches constitute the most murderous natural risk in Alsace, its management is paradoxically not a priority. Because it causes more material damages and affects larger places with multiple and complex consequences, the flood risk is more worrying for the administrators. They didn't have the same approach toward these two kinds of risk.

So, two different approaches used to assess risk and two study cases are presented: flood risk in the river Bruche (located in the north of the Vosges range, Alsace) and avalanche risk in the Vosges range. The first one is mainly focused on economic aspects of risk. Flood risk analyses are discussed from a hydro-economical perspective. The second one focuses the analysis on human, material and environmental vulnerabilities. Avalanche risk analysis is discussed from a geo-historical point of view. About 300 avalanche events have been reported since the end of the 18th century.

The two approaches that we describe illustrate the complementarity of human and physical science to improve the understanding and assessment of hazardous processes in medium-high mountain range. On the one hand, the geo-historical method developed for the avalanche risk could be extended to the flood hazard. Indeed, contrary to high mountains, no service is in charge of the systematic inventory of floods and avalanches in the Vosges mountains. The geo-historical approach could address this lack of data. On the other hand, the methods of damages assessment and vulnerability characterization could be a good tool for the human science.