

## **ED30 - HISTORY**

### **A STANDARDIZED PROCEDURE FOR THE COMPILATION AND DOCUMENTATION OF HISTORICAL FLOOD AND DEBRIS FLOW EVENTS IN SOUTH TYROL WITHIN THE FRAMEWORK OF THE EVENT DOCUMENTATION SYSTEM ED30**

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## **INTRODUCTION**

Hazard events in the Alps have been documented systematically and stored in databases since the 1970ies. For many regions and basins, long-term observations of precipitation, temperature, discharge or other environmental parameters are not or only in a moderate extent available for the use in hazard assessment. In the short observation periods, extreme events could only rarely be observed. Furthermore, series of measurements often show data gaps due to the destruction of the measurement instrument during extreme events. Thus, hazard assessment based only on measured data can lead to false estimations. In these cases, systematically documented historical natural hazard events can be a valuable enhancement of the existing data needed for the hazard assessment. In this report, historical events are defined as natural hazard events dated before the beginning of the systematic documentation and compilation of natural hazard events in specific databases. From silent witnesses or prehistoric natural hazard events, historical events are distinguished by a written or unliteral documentation. From recently documented events, historical events are differentiated by a non-systematic documentation and archiving process.

## **METHODS**

Within the framework of Dis-Alp and other Interreg IIIA-projects, different studies for the compilation and documentation of historical events have been realized by the Department for Hydraulic Engineering of the Autonomous Province of Bolzano South Tyrol. A debris flow event in the Tinne Torrent occurred in 1921 was reconstructed; detailed chronologies of historical events in the Vipiteno Basin and Bressanone Basin have been compiled. A region-wide chronology for historical flood and debris flow events has been established throughout the analysis of historical chronologies and monographs. In this report, the methods used in these studies are summarized and synthesized. All of these studies incorporated the following procedure:

- Definition of the objectives of the study
- Research for historical documents – archives
- Interpretation of historical sources and extraction of the relevant information

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- Systematic processing of the information and compilation in the specific database
- Description of the results

The collected information of the historical events was compiled in the database ED30 (Event Documentation of the Department 30 – Hydraulic Engineering) in concordance with the guidelines of ED30, IFFI and Dis-Alp. In addition, a database of the existing literature with information about historical events was compiled and associated with the event documentation database. All compiled historical events were localized throughout a standardized GIS-data model and associated with the database records. Historical maps, pictures, photography's have been scanned, georeferenced and compiled in a standardized way in the media database of the Department. All media are associated with the database entry of the event.

## RESULTS

In the studies described above, more than 2000 historical flood and debris flow events were compiled and localized. The standardized archiving procedure leads to an effortless access to the information. The query for historical events can be made by community, watershed or by a spatial query throughout GIS-software.

## CONCLUSIONS

The compilation of event chronologies enables the analysis of former dangerous processes. With it, dangerous processes and the areas affected by dangerous processes can be identified and localized. The characteristics of former processes can be described and the estimation of the reoccurrence period can be enhanced. Thus, the systematic documentation of historical natural hazard events contributes to the assessment of recent and potential future processes. Although these opportunities, during the interpretation of this information the following particulars have to be kept in mind:

- The documentation of historical events contains only qualitative descriptions.
- In past times, only events with a certain process magnitude or events with relevant damages had been described and documented.
- Changes within the system man-environment since the documented historical event have to be considered. For example, some flood events as described in historical documents can not occur today because of anthropogenic or natural modifications of the river channel like channel straightening and silting up or erosion of the river bed. System changes due to climate changes since the "little ice age" have to be considered, too.
- Temporal and spatial shifts or changes of the damage potential since the documented historical events have to be considered in risk analysis.

Although these and further limitations for the interpretation and analysis of historical events, the acquired information can enhance the existing fundamental data needed for natural hazard assessment in a valuable dimension. Due to the mainly qualitative information about the undesired consequences of dangerous processes, this kind of information can be understood easily and unambiguously by the public. Thus, beside the applications in technical risk management, the analysis of historical natural hazard events can be particularly helpful in risk communication.

**Keywords:** Flood, Debris Flow, Historical Events, Event Documentation