150 years of historical flood events and related impacts in the catchment area of the Arve river (Northwestern Alps, France)

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Flooding is the main cause of natural disasters and affect more people worldwide than any other natural hazards. This shows how vulnerable modern societies are to hydrological extremes and emphasized once again the need for improved flood risk assessments. In addition, the global warming is expected to lead to an intensification of the hydrological cycle, which is likely to impact magnitude, frequency and timing of such river floods. Potential effects of such changes bear large uncertainties associated to observed trends and projected changes in flood recurrence and magnitude. Mountainous areas could be even more impacted than any other regions as the warming is there twice more important. A holistic understanding of the flood risk is, however, even more difficult to approach in those areas because of the variety of hydro-meteorological (e.g. short-rain flood, long-rain flood, rain-on-snow flood, glacial outburst) and societal processes (e.g. changes in land use, touristic pressure) and, very often, the lack of observations. In this study, we aim to tackle this issue through the compilation of historical information on floods and their societal impacts that occurred during the period 1850-2015 in the Arve catchment area (2000 km^2, northwestern French Alps). A broad variety of sources (e.g. municipal and departmental archives, local and regional newspapers, existing databases and scientific / non-scientific literature) has been explored, allowing to inform ca. 900 localized impacts related to ca. 330 flood events in a single database. All details found in the diverse documents about the event causes, the event itself or the societal impacts were stored and categorized. By analyzing this rich dataset, we propose to explore the variety of floods and impacts in space and time.