Flood are natural processes that shape river systems via different geomorphic processes, such as bank erosion and channel widening. In terms of hazards and risks, these processes may cause significant damages to infrastructures and buildings. However, understanding their control factors, predicting, and taking them into account when determining flood hazard is still very challenging. On the other hand, many anthropogenic impacts, such as flow regulations and the presence of dams greatly affect the natural functioning of rivers. Thus, restoration measures like environmental flows (e-flows or artificial floods) are being used to recover part of the fluvial dynamics. This talk covers these two important topics.

First, a unique database on channel widening during floods will be presented. Around 3000 river cross sections from more than 80 rivers in 7 countries (e.g., Austria, Italy, Poland, Spain and Switzerland) covering a large range of climatic, hydrological and geomorphological conditions, form this database. The statistical analysis of this data aims to improve the understanding of geomorphic factors controlling channel widening during floods and may provide important information for land use planning, hazard zonation, and other risk reduction strategies.

Second, the environmental flow program in the Spöl River, western Switzerland, will be presented. The Spöl River is regulated by two dams, and in 2000 an artificial flood program started from the upper most dam. The program had to stop two years ago due to a pollutant leak in the upper part of the river and shifted to the lower dam in 2018. The first e-flow was realized on September 4th and lasted 8 hours, peaking at 25.9 m$^3$/s. Pre- and post-event field surveys were carried out to analyse the geomorphic changes and instream wood transport along a 1.5 km-long reach. A new e-flow is programmed in June 2019. This talk will show the main observations during the e-flow in 2018 and will discuss potential measurements to be undertaken during the second flood in 2019.

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