



## **Morphodynamics of a 1000-year flood in the Kamp River, Austria and impacts on valley morphology**

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This paper investigates the impact of a 1000-year flood in August 2002 on river morphology and morphodynamics of an Austrian crystalline river. Discharges with a recurrence interval between 500 and 2000 years caused channel widening, overbank scouring and new secondary channels in the floodplains. After the 1000-year flood, those various erosion patterns (overbank scours, secondary channels) were documented over the whole river stretch. In addition to overbank erosion in curved sections (cut offs), morphodynamic processes were common along straight parts of the river. A hydrodynamic-numerical model, combined with field measurements, was used to analyse the cause of these channel changes. Based on the modelled hydraulic conditions for discharges ( $2 - 400 \text{ m}^3\text{s}^{-1}$ ) and the catastrophic flood of 2002 ( $700 - 800 \text{ m}^3\text{s}^{-1}$ ), the numerical results allowed a cause-effect study with 19 parameters. Deterministic and statistical analysis (ANOVA) showed that the morphodynamic effects of the 2002 flood were influenced by the high variability of floodplain geometry of the Kamp River, which led partially to supercritical flow during flood constriction. These processes were in some cases also anthropogenically influenced. Lateral constriction and expansion of the channel geometry over short distances led to scouring and aggradation in the inundated areas during the event and were responsible for channel shifting in the floodplains.