



Flood analysis based on streamflow time series, historical information and paleodata – a case study from southern Norway

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Design flood sizes (eg. 200-year or 500 years flood) are used as the basis for area planning (200 year floods) and dam safety (500-1000 years flood). Commonly used streamflow time series to estimate the size of design flood in Norway has a length of up to 130 years. Such estimates therefore imply a large degree of extrapolation. Important challenges in the design flood calculations are (i) uncertainty inherent in using a limited data set and (ii) how flood size is changing with time. More information about floods from historical sources and sediment cores can increase our knowledge of floods and hopefully anticipated flood sizes.

The main objective of this study is to (i) analyze long-term trends in the incidence of floods through Holocene, (ii) calculate the design flood sizes combining information from paleodata, historical sources and direct streamflow observations for Glomma at Kongsvinger in southern Norway. To achieve these aims (i) instrumental flood observations were collected, (ii) historical records about floods were collected and (iii) sediment cores from lakes were analysed. By comparing (iii) with (i) and (ii), flood layers in the sediment core were identified and used to create a flood archive. Further, the flooding archive was used to analyze how the occurrence of floods changed through Holocene. Finally, flood frequency analysis where the three data sources combined were also carried out.