INTRODUCTION

Traditional palaeostage indicators for palaeoflood magnitudes are less suitable for low-lying river valleys and deltas with minor flood amplitudes. Palaeoflood reconstructions in upstream reaches are also not very suitable for downstream flood frequency analysis: flood pulses die out easily. Hence, independent palaeoflood baseline studies for downstream reaches are needed.

This calls for new approaches and palaeoflood proxies to be developed, for which recent methodological advances exist (presented on this poster). Especially the sedimentological properties and preservation potential of deltaic deposits in palaeochannel fills and dike breach scours are key in this type of palaeoflood hydrology.

SEDIMENTOLOGY

* Understanding of deltaic depositional environment (e.g., channel fills; Toonen et al., 2011)
* High-resolution grain size analysis as a proxy for flow velocities; Statistical transfer of grain size data into flood magnitudes with End Member statistics
* Organic content (LOI) as a quick analysis to detect major trends in sedimentation style and to detect flood peaks (Hoek et al., 2011)
* Chemical element ratios to track down high-magnitude flooding events (Zr/Rb; Jones et al., 2010)
* Chemical fingerprinting of flood laminations to reconstruct source area

FLOOD FREQUENCY ANALYSIS

* Extension of continuous flood record
* Improved accuracy for moderate to extreme floods
* Envelope for maximum discharge

HYDROLOGICAL MODELS

Input data for deltaic palaeodischarge calculations;
* Subtle stage registration of flood amplitudes on different terrace levels
* Accurate timing of floods by dating flood laminations in channel fills
* Preservation of palaeolandscape
* Vegetation roughness, reconstructed from palynology (in channel fills)

GEOCHRONOLOGY

* Abundant organics suit AMS dating
* Organic content (LOI) of deposits as a tool to interpolate between geochronological markers (Hoek et al., 2011)
* Chemical markers - pollutants (Roman Pb, mining etc.)
* Palynological markers - deforestation signals - agricultural introductions - washed-in exotics
* Historical flood records - many deltas have long occupation
* Tephrachronology
* Palaeomagnetism in clayey channel fills

PROSPECTS

Continuous series of Holocene palaeofloods can be deduced from deltas by addressing:
* Non-stationarity of recurrence times
* Climatic influence on mode of flooding
* Human influence on flooding variations

This will result in improved palaeoflood histories, and better flood mitigation and river management