



## How extreme where the Floods of River Rhine in the pre-instrumental Period? A novel interdisciplinary approach to reconstruct and quantify pre-instrumental floods

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History of natural disasters has become a key topic during the last decade, not least because of the widespread impression that the world in our days is being hit by such events at more frequent intervals. The still very young scientific field of Historical Hydrology mainly concentrates on reconstructing flood events of the pre instrumental period, usually by specifying damages caused or occasionally by addressing the issue to inundation heights or meteorological reasons. This paper in contrast is going to shed light on discharge quantities of several pre instrumental floods in such a way that comparisons between instrumental measured and unmeasured pre instrumental floods can be drawn for the first time.

Why Rhine floods at Basel? The evidence for this town from the Middle Ages up to the present days is well preserved, because Basel was never destroyed since the disastrous earthquake in 1356 which nearly annihilated the town. Narrative reports of several trustworthy contemporary town chroniclers are still at hand more or less without gaps from the thirteenth to the late seventeenth century. Most major events are so well documented that the maximum height of the flood as well as the size and location of inundated areas could be assessed. More recent events are documented with flood marks or with reports referring to flood-marks which were later destroyed. In 1808 a gauge was established near the (only) bridge. Daily readings are preserved up to the present overlapping with streamflow measurements after 1867. The traditional scheme of flood reporting documented in nineteenth century newspapers was compared with flood-marks and gauge readings especially from the example of the extreme flood in 18th September 1852. The intercomparison of narrative with instrumental evidence allowed calibrating flood information from the Medieval Period. Based on this calibration hydrologists attempted discharge calculations based upon software Flux/Floris2000. Moreover Basel's body of source material also implies the chance to reconstruct all floods of a certain height in as much the authorities – whenever a major flood took place – summoned up a bridge guard who had to protect the bridge from driftwood and similar jeopardies. The expenses for this guard, as was demonstrated by Gerhard Fouquet, have left their footprint in the weekly led books of account of Basel.

A well fail-safe series of flood occurrences as well as an extension of extreme flood series into the pre instrumental period therefore could be obtained in this way. Both series will help to augment knowledge of coherencies between climatic variation, precipitation and flood events.