

River floods and their impact on urban economies (c. 1350-1600)

Christian Rohr, University of Bern



27 November, 2012

1

Outline

- General considerations
 - natural hazards – disasters
 - unexpectedness – preparedness
- Sources
- A severe flood of the Rhine River in Cologne (1374)
- Urban economic structures in a „culture of flood management“: the example of Wels (14th-16th c.)
- A major summer flood and sudden ice flood in Krems (1572/73)
- Conclusions

27 November, 2012

2

From natural hazards to (natural) disasters

- Cultural history approach asks for the perception, interpretation and (risk) management of natural hazards
- Parameters to perceive a natural hazard as disaster
 - Helplessness of the people trying to cope with the damage with the available means
 - People's helplessness in explaining the reasons and the meaning of the event
 - Material and personal affliction
 - Unpreparedness / unexpectedness
 - Series of natural hazards within a short time
 - Symbolic connotations and patterns of interpretation
 - General crisis

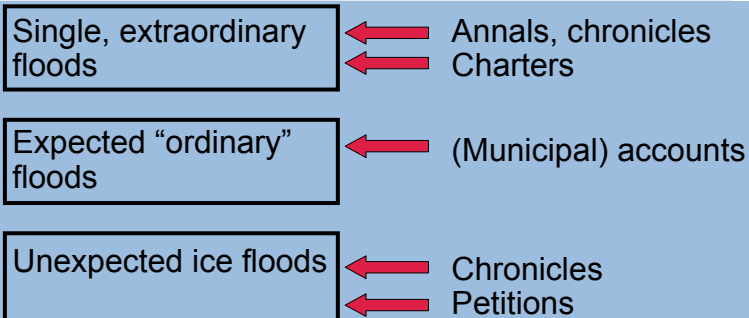
Unexpectedness – preparedness (1)

- Unexpected natural hazards are rather perceived as disasters than events people can prepare for
 - E.g. earthquakes, storm surges, severe thunderstorms with hail, ice floods
 - People do not have time to install an effective system of prevention, higher number of victims
 - Carelessness: settlements on dangerous places, unsuitable building materials etc.

Unexpectedness – preparedness (1)

- Frequently occurring hazards rarely become a disaster for the afflicted people
 - „Cultures of Disaster“ (Greg Bankoff) in the Philippines and in other regions
 - „Cultures of flood management“ in pre-modern European societies
- People know about the reasons and indicators for these extreme events
- Strategies of prevention are undertaken also in times without hazards

Sources



Floods of the Rhine River – the example of Cologne (1374)

- One of the biggest floods of the Rhine River and its catchment area in the Late Middle Ages
 - Obviously a series of three or even more floods (3-6 January, 21 January, 11-14 February)
 - Large areas remain flooded from early January to early April
- Afflicted areas:
 - Upper Rhine valley (Basel), Alsace, Hesse (Main and Lahn Rivers), German Rhineland (Mainz to Cologne)
 - Burgundy and the Netherlands (river floods and storm surge)
- Numerous reports in contemporary and later chronicles
- Detailed report in the so-called “World Chronicle of Cologne”
 - Written by an eye-witness
 - The whole chronicle was finished two years after the event

Floods of the Rhine River – the example of Cologne (1374) (1)

- The World Chronicle of Cologne
“In this time, in the year of the Lord 1374, in the months of January and February, there was a very big and tremendous flood (*diluvium aquarum maximum et stupendum*) in various regions. The Rhine River rose so heavily that, according to the reliable judgement of the people watching the water of this river, it rose 34 feet higher and even more than the level normally was, and beyond that the river flooded everything. However, the waters of the Rhine River passing by occupied the city of Cologne, which is situated along the riverside. So, the people inside the city went along by boat in many areas (*homines infra civitatem in multis eiusdem locis navigio ferebantur*). ...”

Floods of the Rhine River – the example of Cologne (1374) (2)

- “... But the waters did not only flow with a powerful stream through the part of the town, where the Rhine River runs through, but also through the part, which is situated near the countryside. Its waters impetuously occupied and filled all moats of the city up to the top, but they also streamed inside the city through joints and gaps, through the paths and the embankments, on which the groundwork of the city walls is erected. Finally, the people from the town came together from everywhere and brought material in order to build dikes; they ploughed the fields and could divide the stream of the water on the plain fields. So, the waters were detained and turned away from the town. What a wonderful change of God’s hand! ...”

Floods of the Rhine River – the example of Cologne (1374) (3)

- “... During the time of the flood, however, the carnival feast was forthcoming, during which the people traditionally used to dine and dance together, and they came together for public spectacles. But in these days the people were frightened by such a big flood, and they changed the profane character of the feast into a better one: The clergymen announced public litanies and processions in honour of God and the saints, and a large crowd flocked together with devotion and repentance to the churches and the relics of the saints like in a contest. Therefore, on the last day of the processions, the 11th of February, when the divine services and the holy masses had been finished, the flood began to decrease and the waters to go down; God in his mercy had arranged it like that.”

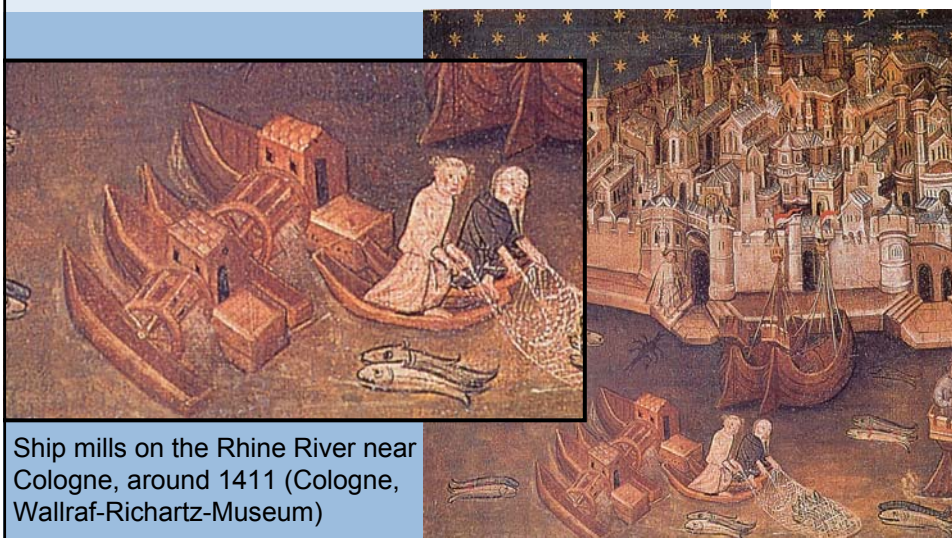
Floods of the Rhine River – the example of Cologne (1374)

- Remarkable features of the report
 - Detailed description how the waters entered the city centre
 - People use boats to move through the streets
 - Experienced behaviour: the citizens detour the water away from the city by constructing dykes in the neighbouring fields
- Religious dimension
 - The flood experience helps the (church) authorities to discipline the citizens in the time of carnival
 - People rather repent their sins instead of celebrating
- Economic dimension
 - No mention of disastrous damages or losses (grain and other goods seem to have been stored at secure places)
 - People obviously able to cope with the stoppage of mills

27 November, 2012

11

Floods of the Rhine River – the example of Cologne (1374)



Ship mills on the Rhine River near Cologne, around 1411 (Cologne, Wallraf-Richartz-Museum)

27 November, 2012

12

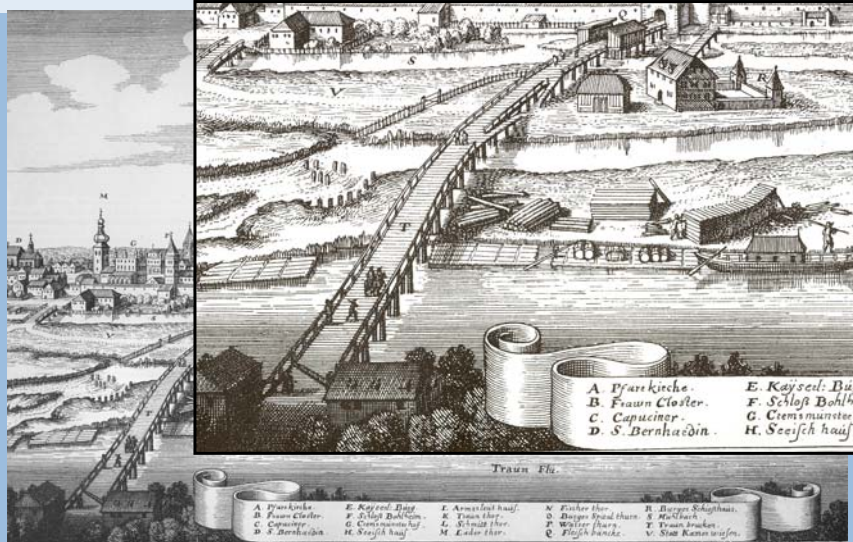
The Danube River and its catchment area in Austria



“Ordinary” floods – the example of Wels

- “Ordinary” floods usually not mentioned in annals or chronicles (no extraordinary event for the afflicted people)
- They can be reconstructed only from economic sources (series of municipal accounts) and similar
- Types
 - Continuous rain coming from Northern Italy (Vb weather)
 - Floods in spring after snowmelt
 - Rarely in autumn or winter
- Development of a “culture of risk management”

The city of Wels and the Traun River (Copperplate print by Matthäus Merian, 1649)



27 November, 2012

15

Medieval floods in Wels according to charters

- The evidence from the charters (six charters dating from 1352 to 1469)
 - The taxes at the toll house in Wels on salt, wine and textiles are dedicated to the construction of water defences
 - The tax interests of the citizens of Wels are reduced by the Habsburgian dukes. More money should be spent for dykes and other water defences
 - The land owners have to admit the construction of water defences on their properties
 - The land owners, their bondsmen and two large monasteries in the neighbourhood have to assist, if damage after a flood has to be removed

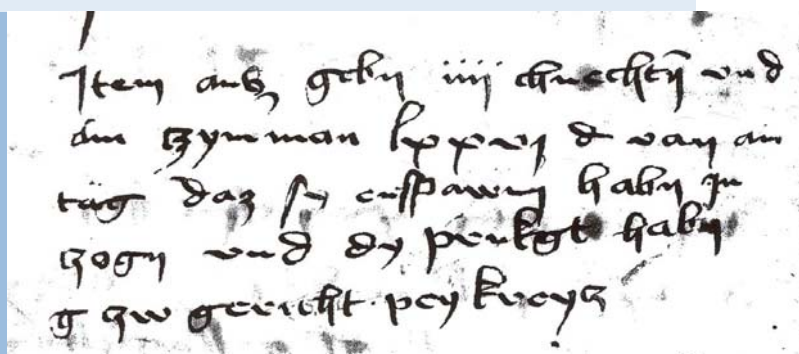
27 November, 2012

16

The bridge master's accounts of Wels

- Office of the bridge master since the 13th c. to maintain the wooden bridge (about 600 meters long)
- Financed by the revenue of a nearby church
- Incoming and outgoing accounts for every year since 1350, since 1441 without major lacunae
- Accounts from 1441 to 1599 examined
- Entries were made weekly:
 - purchase of timber
 - salaries for carpenters and their servants
- Expenses only concern the bridge, not other buildings

The bridge master's accounts of Wels (1443)



Item aus gebn iiii chnecht(e)n und dm
zymman lxxvi d van ain
täg daz sy enspawm haben in-
zogn und dy prukgt haben
g zw gericht pey kreyz

Classification of written data

- For the times before instrumental measurement (earlier than the 19th c.) only the impact of the floods can be classified (cf. historical seismology)
- Homogeneous sources for a longer period required
- Source criticism („Quellenkritik“) necessary
 - Contextualisation of individual expressions and formulations
 - „Questions of auxiliary sciences“ (script, enumerative system etc.)

Classification of written data

- Classification scheme by Glaser et al. (3 categories) modified
- Adaptation to Alpine and pre-Alpine regions
- Introduction of a fourth category
 - I: little or moderate floods without major ravages
 - II: larger floods, ravages can be overcome within one month
 - III: extraordinary floods, severe ravages, e.g. bridges destroyed, ravages can be overcome within three months
 - IV: extreme floods, economic and social infrastructure destroyed, perception as disaster, flood marks

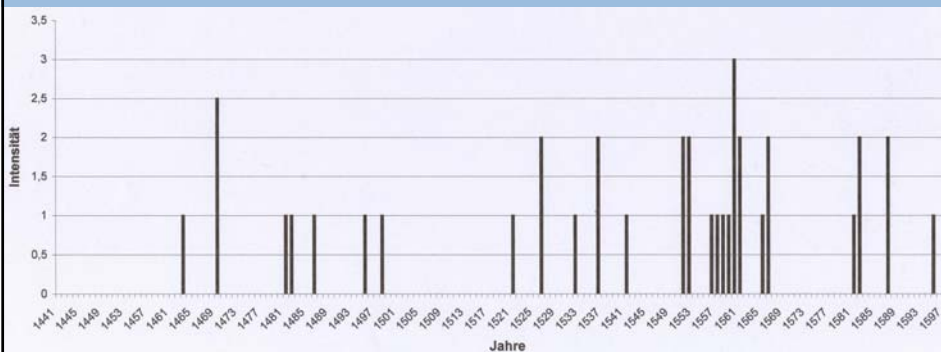
Hydrological results

- Major floods occur one to three times every decade (most of them cannot be reconstructed from other written sources)
- Frequent occurrence of floods around 1500 and 1570
- Most of the floods take place in summer (June to August), typical for the Alpine and pre-Alpine regions
- Ravages caused by ice increase from the 1520ies onwards (cf. Little Ice Age)

Floods of the Traun River, 1497-1510

Year	Month	Flood	Intensity
1497	May/early June	flood with ravages	strong (2)
1498	March, August?	two floods	moderate (1/1)
1499	end of May/June	flood with severe ravages	very strong (3)
1500	April, May	two? flood with ravages	moderate/strong (2)
1501	July?, August	disastrous flood	extremely strong (4)
1502		no flood	
1503	September	flood with severe ravages	very strong (3)
1504	May	flood	moderate (1)
1505	May/June, August	two floods	moderate (1/1)
1506	July	flood?	little (1)
1507	August?	flood?	moderate (1)
1508	July, August	two floods with ravages	very strong (3)
1509	fall?	flood?	little (1)
1510		no accounts	

Floods of the Traun River January-March (1441-1599)

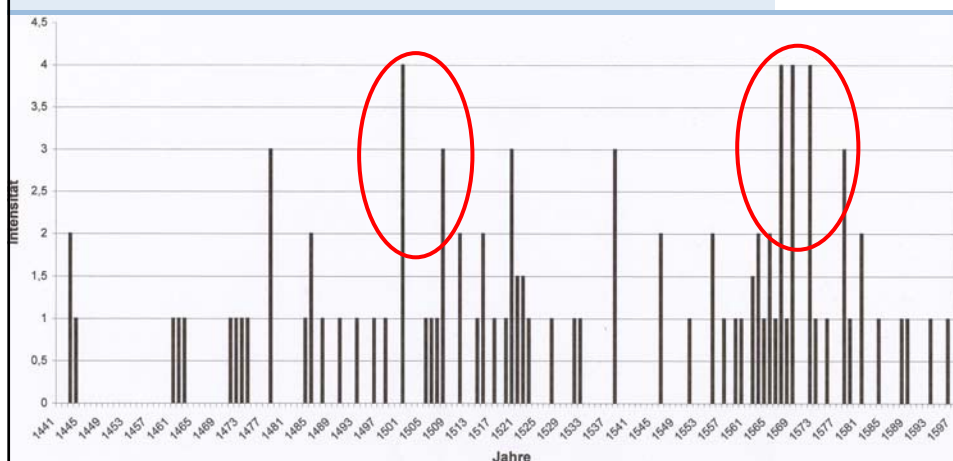


Source: Rohr, C. (2007): Extreme Naturereignisse im Ostalpenraum, 209.

27 November, 2012

23

Floods of the Traun River June-August (1441-1599)



Source: Rohr, C. (2007): Extreme Naturereignisse im Ostalpenraum, 212.

27 November, 2012

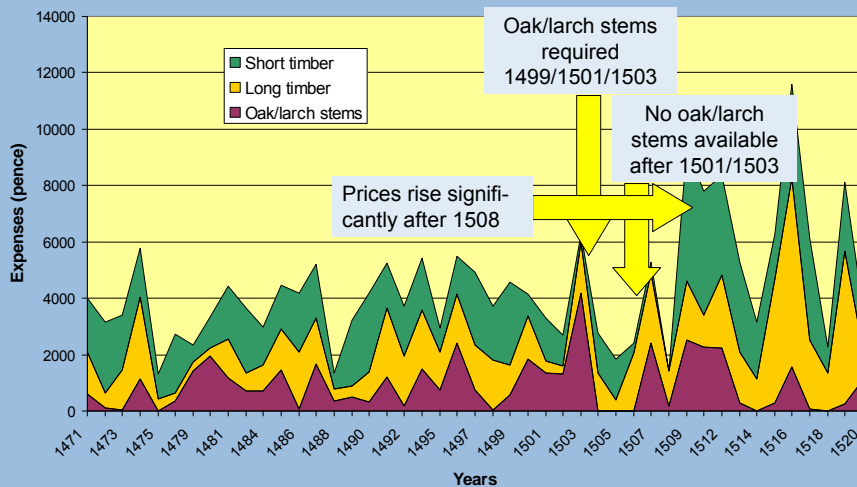
24

Results for economic history

- High amounts of timber were bought every year, no matter whether there had been a flood or not (large dumps)
- The consumption of timber and the expenses for the bridge have been enormous every year
- Carpenters and other crafts earned a lot of money from the repairs (10-20 percent of the carpenters' annual turnover)
- Skippers warned the citizens of Wels, if floods were approaching → cover of the bridge removed in good time

Expenses for timber – Wels (1471-1520)

Source: Rohr, C. (2007): Extreme Naturereignisse im Ostalpenraum, 310.



The ice flood in Krems 1573 (1)

- Increased vulnerability of the people along the Danube River
 - Catastrophic flood in summer 1572
 - Severe damage also after the floods of 1567 and 1569
 - Bad harvest in many years, prices for wheat and rye rise significantly (first „peak“ of the „Little Ice Age“)
 - Higher taxes due to the wars of the Habsburg rulers against the Ottoman Empire
- Ice flood on the Danube River hits the cities of Krems and Stein in January 1573
- Petition to the Habsburg ruler Maximilian II to gain financial support

The ice flood in Krems 1573 (2)

- The petition of the inhabitants of Krems and Stein (1573):
 - Vineyards, orchards, meadows and crop fields near the river totally destroyed
 - No harvest of grapes and other fruits can be expected for numerous years
 - Wine cellars flooded, many houses cannot be inhabited any longer
 - People are unable to cope with the damages:
vil aus Armuert ihre Heuser Ödt und wüst werden ligen lassen
(„many people will leave their houses desolate and deserted“)
 - The ruler will not receive taxes from his impoverished subjects

The ice flood in Krems 1573 (3)

- Perception as a disaster caused by the sequence of two extraordinary events
- Economic basis of the people (mostly winemakers) destroyed → a quick reconstruction is not possible
- Municipal law from 1524:
 - Floods frequently threaten the vineyards near the Danube River
 - Winemakers are allowed to serve their wine also at other places of the town, when their property is hit by a flood
- Nevertheless, rich citizens from Krems allowed a high credit to the emperor Maximilian II in summer 1573

Conclusions: Economic and social adaptation

- Extreme flood (Cologne)
 - Report of the World Chronicle of Cologne emphasizes an experienced behaviour of the afflicted people
 - Economic adaptation can be deduced “between the lines”
- “Ordinary” floods (Wels)
 - High amounts of timber were bought every year, no matter whether there had been a flood or not (large dumps)
 - The consumption of timber and the expenses for the bridge have been enormous every year
 - Carpenters and other crafts earned a lot of money from the repairs (10-20 percent of the carpenters’ annual turnover)
 - Economic and social life adapted to frequent floods
 - Obviously warning systems

Conclusions: Economic and social adaptation

- Sudden ice flood (Krems)
 - Lack of prevention and risk management only towards sudden events
 - Solidarity within the city
 - Winemakers are allowed to sell their wine also outside their properties
 - Richer population lives in secure quarters (no financial losses)
 - Natural hazards mainly hit the poorer population

Thank you for your attention!

Christian Rohr

University of Bern (Switzerland)
christian.rohr@hist.unibe.ch