ENVIRONMENTAL ASPECTS OF CHINESE ANTIQUITY: PROBLEMS OF INTERPRETATION AND CHRONOLOGICAL CORRELATION

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Introduction

Archaeologists and historians studying various aspects of the human past consider "perceptions of antiquity" and "recreating antiquity" to be important research topics (see for example Kuhn/Stahl 2001). For representatives of the social sciences "the past has many meanings" and "a return to a real or a supposed past is often an opportunity for creative innovation" (Rawson 2001, 397). Geographers and Quaternary geologists, for their part, do not to focus on such philosophical aspects of the past, but instead deal with natural history, climate change, and landscape dynamics. Does this mean that, for natural science, reconstruction of the past is less problematic and the view of antiquity is clearer? To answer this question, we need to look first at the process by which the past is converted into perceptions of the past, taking Chinese antiquity as a case in point.

We tend to see the ancient world – as well as the modern one – as consisting of natural environments and human beings. As already mentioned, studies of these two principal components are separated between the natural and social sciences, which have different subjects and research methods applied to different proxies. In the real world, however, there is no such clear separation. Living in certain environments, people consciously or unconsciously interact with all components of nature. On the other hand, gradual or abrupt changes in the regional environments and climate influence all aspects of people's spiritual and material culture, including folklore, religion, art, house construction, diet, tools, and weapons. Humans can even be understood as part of nature, as "an integral part of our biotic environment" as the botanist Michael Zohary pointed out some thirty years ago (Zohary 1973).

The role of nature in people's lives (and vice versa) has been interpreted from different standpoints, including such extremes as geographical or cultural determinism (Gumilev 1980). The degree of interference between people and nature lies outside the scope of our paper. However, it is an objective reality that humans modify natural landscapes and create cultural ones, and that the traces of human activities and natural processes stored in biological, geological, and historical archives can be investigated. The results of these investigations, transformed into "environmental reconstructions", are then spread among specialists via scientific publications and the mass media, as well as among a wider public, contributing to the prevailing perceptions of the past.

The past twenty years of paleogeographical studies in China have yielded much evidence of environmental changes that occurred during the early, middle, and late Holocene. Many studies have been translated into English and published in synthesis volumes (e.g., Shi et al. 1993; Winkler/Wang 1993). The cited authors have made great efforts to summarize paleoenvironmental

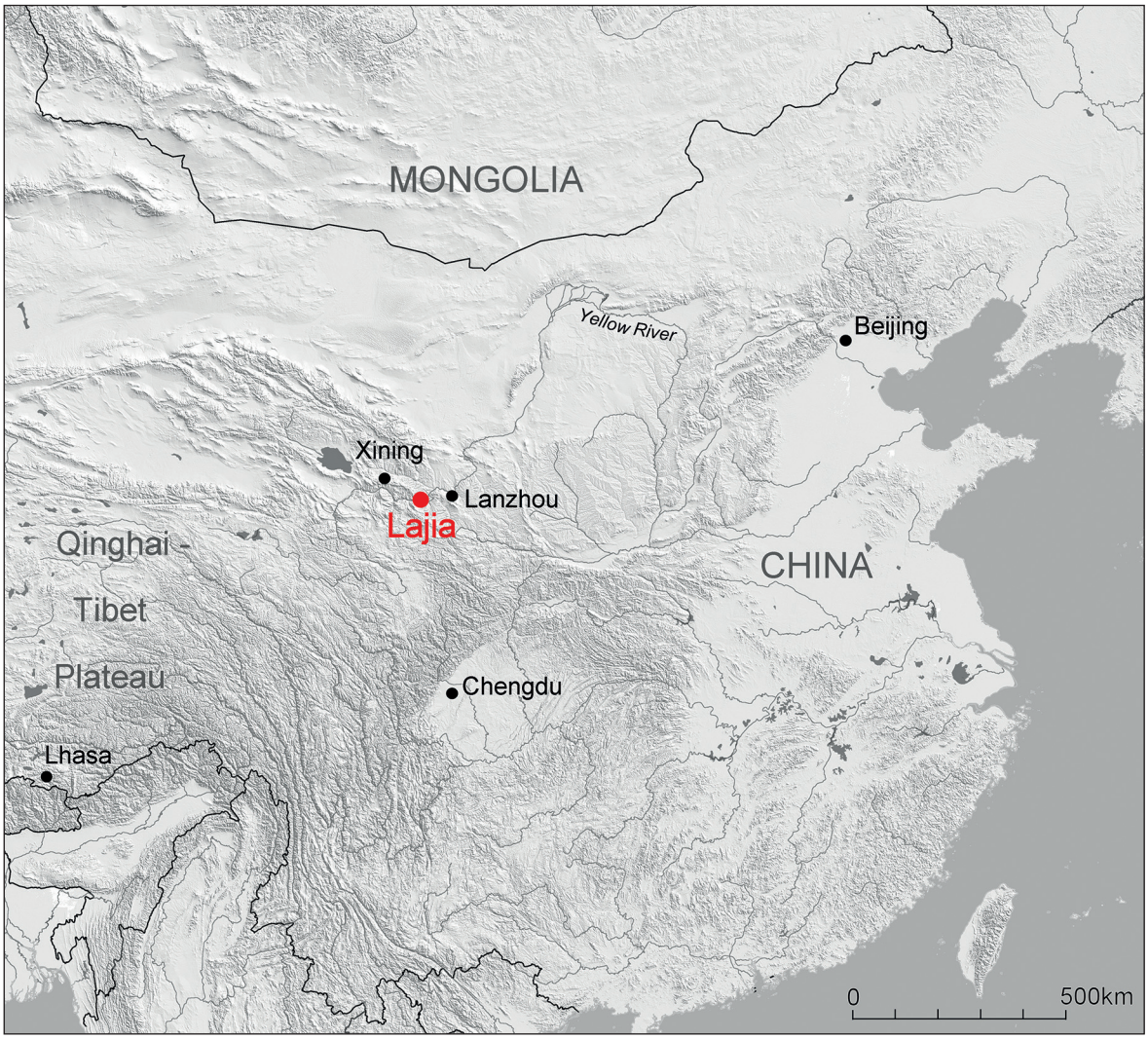

Fig. 1. Topographic map showing location of the Lajia village and archaeological site in the upper reaches of the Yellow River, Minhe County, Qinghai Province, China. Selected modern cities are shown for orientation.

data from the available publications. Among the records analyzed and frequently used to derive paleoclimatic information are the following: botanical data (e.g., pollen, plant macrofossils, tree rings); aquatic organisms (e.g., diatoms, foraminifers, ostracods, mollusks); sedimentary data (e.g., loess, paleosoils, peat sequences, sand dunes); geochemical and stratigraphic data; lake and sea levels; archaeological data (e.g., artifacts, animal bones). However, changes in the analyzed proxy can often be caused by different factors and allow alternative interpretations. For example, high lake levels reconstructed in the coastal zone – a commonly used indicator of humid conditions – can be also explained by marine transgression, which is not necessarily associated with changes in precipitation/evaporation (Tarasov/Harrison 1998). Similarly, an increase in herbaceous pollen may reflect a shift towards drier conditions or equally it could be a result of deforestation caused by man. The use of several lines of evidence and arguments is usually the best method to obtain a strong, highly plausible and reliable reconstruction (Battarbee et al. 1998).

Case Study – Lajia

Let us now move from theory to a recent example. "China Daily" (12.04.2002) informed its readers that "evidence of a 4000-year old flood associated in Chinese legends with an ancient hero Yu and in the Bible with Noah has been found in the village of Lajia in Minhe County in the upper reaches of Yellow River" (Fig. 1). In the given case the information about an environmental catastrophe which is assumed to have happened at the beginning of Chinese antiquity is accompanied by an explanation, precise dating, and even long-distance correlation. Precise dating and clear statements lend more credibility to the story, in which mythological events and personages are mixed with archaeological finds and environmental reconstruction. However, an interesting question is what kind of data lay behind the newspaper article. A brief bilingual Chinese/English account of the discovery of the Lajia site published in "Major archaeological discoveries in China in 2000"[1] stated that "in May–September 2000, the archaeological excavation on the Lajia site revealed six house foundations, a number of ash-pits, a section of a large ditch and two tombs, all belonging to the Qijia culture[2]. A total of 20 human skeletons were found at house foundations 3, 4, and 7, the people having died as a result of a disaster. The direct cause of the disaster is unclear at present, but in the deposits at the site, wavy sandy sediments have been found to be records of floods from the Yellow River." A photo showing "red clay deposits covered with a section of wavy sandy sediments" was provided together with photos of Qijia pottery, stone knives, jade discs, and an excavated house with fourteen skeletons (men, women and children[3]). The poses of the human bodies (a woman holding a child in her arms and a man lying over the fireplace) and their location in the house suggest that their death occurred quickly and unexpectedly, so that no one could leave the house or even get close to the exit (Fig. 2).

In March and September 2002 a multidisciplinary research team including specialists from the Archaeological Institute of Qinghai Province, the Department of Eurasian Archaeology at the German Archaeological Institute, and the Institute of Geoecology at Potsdam University visited the Lajia site[4]. The main aim was to establish if it was possible to set up a Chinese-German co-operation project concerning the reconstruction of landscape development in the Guanting Basin around the Lajia site during the time of Qijia culture (ca. 2300–1800 yr BCE) within the framework of a long-term co-operation program focused on settlement history in Northwest China. The first and most intriguing question was: what killed the people in Bronze Age Lajia?

1 Qijia culture site at Lajia village in Minhe, Qinghai. In: Major archaeological discoveries in China in 2000 = Zhongguo zhong yao Kao gu fa xian 中国重要考古发现 (Beijing 2001) 25.

2 Qijia culture is dated by pottery typology and analogy method to about 2300–1800 cal. yr BCE. Radiocarbon dating of the charcoal pieces, collected from the excavated pits at Lajia site reveal following ages: 3574±73, 3685±42 and 3637±75 yr BP (Ye 2004). These dates being calibrated fall in the interval from 2140 to 1810 cal. yr BCE, which is within commonly accepted interval of Qijia culture. However, one date of 4200±107 yr BPE reveals much older age, e.g., 2900–2620 cal. yr BCE, which is interpreted as an existence of the settlement at Lajia site long before the Qijia interval.

3 In house no. 4, skeletons of 14 people (seven male 8 to 45 years, two female 28 to 35 years, five children gender unknown 1 to 9 years) were identified; see Zhongguo 2002, Fig. 4 and Pl. 3.

4 Acknowledgment: The field visit was organized and joint by Ren Xiaoyan and Xiao Yongming (Archaeological Institute of Qinghai Province), Mayke Wagner, Karl-Uwe Heussner and Michael Ullrich (Department of Eurasian Archaeology, German Archaeological Institute), Pavel Tarasov (Moscow State University), Bernd Tschochner, Karl Geldmacher, and Carsten Hoffmann (Institute of Geoecology, Potsdam University). We would like to express our sincere thanks to Ye Maolin (Archaeological Institute of Chinese Academy of Social Sciences) and Wang Guodao (Archaeological Institute of Qinghai Province) for their hospitality at the field station in Lajia, an introduction to the site as well as for many informative talks. The development of the "mudflow theory" was kicked off by B. Tschochner and K. Geldmacher in March 2002.

Fig. 2. A photo showing red clay deposits filling the house and surrounding human skeletons. The pose of a man lying over the fireplace with the head and hands oriented towards the door, suggests that his death occurred quickly and unexpectedly, so that he could not leave the house or even get close to the exit (photo M. Wagner).

Our environmental observation in the Guanting Basin included the evaluation of the existing hypotheses, e.g., catastrophic flooding of the Yellow River and an earthquake suggested by Xia Zhenkai (Yang et al. 2003).

Hypothesis 1 (flooding of the Yellow River) should be given serious consideration because of the location of the Lajia site (35°52'N; 102°49'E) on the alluvial terrace of the Yellow River (Fig. 3b). In the Guanting Basin the river marks the border between the provinces of Qinghai and Gansu. The modern-day climate of the area is transitional from sub-humid to semi-arid with mean annual precipitation at 250–500 mm (Leemans/Cramer 1991; Domrös/Peng 1988). Rainfall is controlled by the summer monsoon, which fluctuates and is difficult to predict. Up to 70 % of the annual precipitation is concentrated in July–September and up to 40 % of the precipitation has been known to fall in a single storm (Derbyshire et al. 1991). This type of hydrological regime associated with sparse vegetation and mountain relief promotes quick accumulation of surface runoff and consequently flooding. In the lower reaches of the Yellow River "erosion, followed by the depositing of suspended sediment, made the river bed rise above the surrounding plain, only kept in its place by man-made levees. In the absence of levees the banks would have overflowed from time to time" (Elvin 2004, 24), causing serious danger for the people's life and econ-

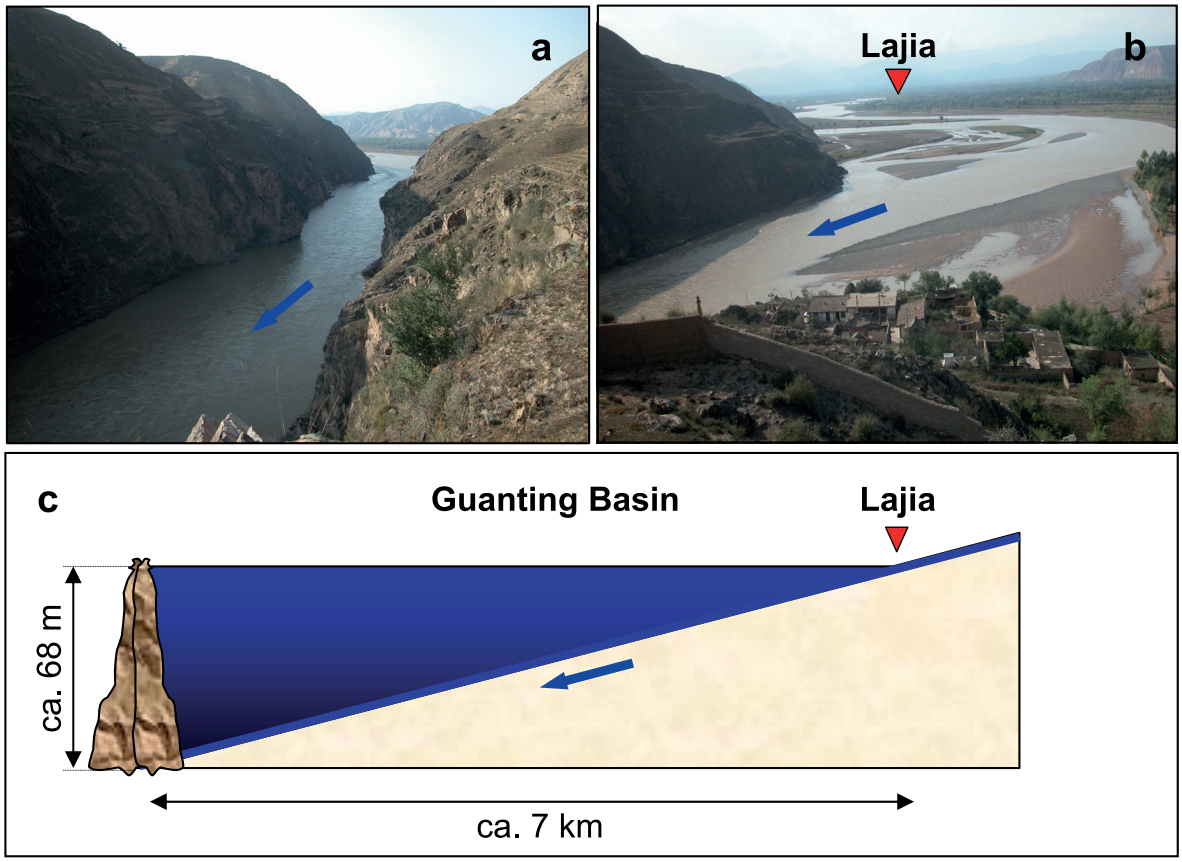

Fig. 3. The Yellow River gorge (a) located ca. 7 km downstream from the prehistoric Lajia site in the Guanting Basin (b). A schematic topographic profile (c) illustrates a hypothesized flood scenario in the Guanting Basin associated with a damming of the Yellow River gorge by the earthquake (photos and drawing P. Tarasov).

omy. Floods are well documented in historical sources since the Han dynasty. "Thus during most of the Han, from 186 BC to 153 AD, one disastrous breach in the levees of the Yellow River occurred about every sixteen years. The highest concentration was between 66 BC and 34 AD, when the frequency rose to one breach every nine years" (Elvin 2004, 25). The last cited work suggests that the frequency of the floods increased with the intensification of farming and the associated destruction of the natural forests and grasslands. An argument in favor of this suggestion is that a decrease in the frequency of serious breaches in the levees down to one in every fifty years or less may be noted for the period between ca 150 and 500 CE when "the frontier between farmers and pastoralists moved south and grass and forests re-grew" (Elvin 2004, 24–25). Both historical records and the results of geomorphological studies suggest that floods of the Yellow River occurred with varying frequency during the Holocene (Yang et al. 2000). However, we should bear in mind that the mere possibility of flooding does not necessarily mean flooding would be capable of destroying Bronze Age Lajia and killing the villagers. The geomorphological situation of the excavation site (Fig. 3) is different from that of the lower reaches of the Yellow River and the East Chinese Plain. According to the topographic profile (Yang et al. 2003) the destroyed houses were built on the upper terrace of the Yellow River, ca. 25 m above the present mean water level, and at a distance of about 1000 m from the river channel. The ancient people who constructed their village about 4000 years ago obviously believed this place to be lo-

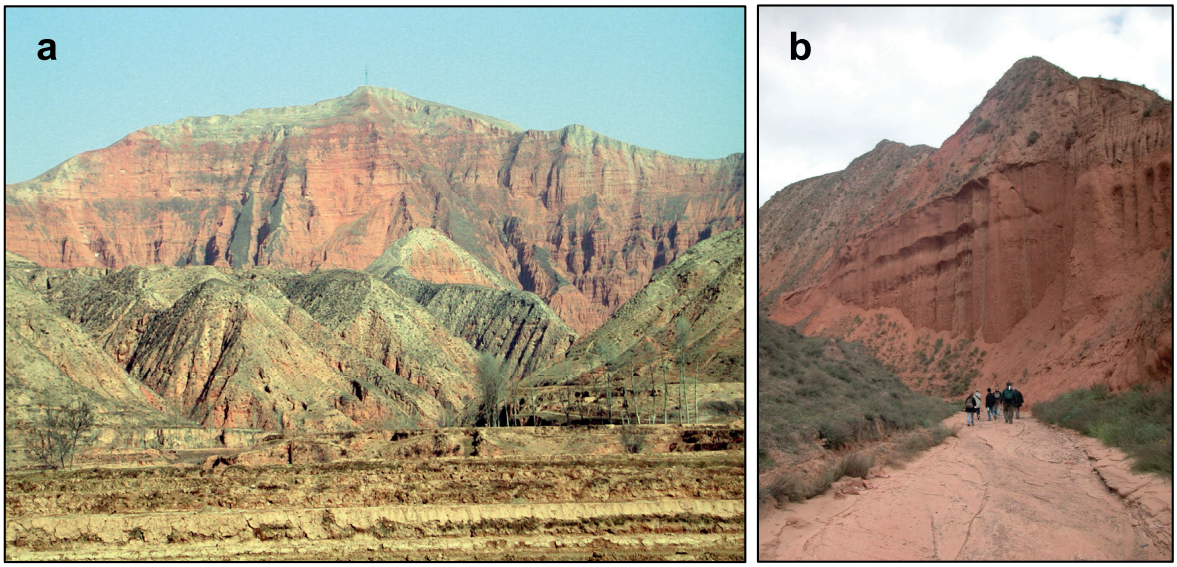

Fig. 4. A more distant (a) and a closer look (b) on the red-clay mountains ca. 2 km north of the Lajia site (photos P. Tarasov).

cated at a safe distance from the dangerous river. Moreover, the rise of the water level up to 25 m could be neither immediate nor unexpected for the villagers, who should have had enough time to leave their houses if the catastrophic flood indeed reached the settlement. In autumn 2003 Ye Maolin, Wang Guodao, and their team, excavating to the west of the destroyed houses, found a relatively undisturbed ritual platform of several layers of compacted earth within which a single shaft pit tomb was inserted (Ye et al. 2004). The assemblage as a whole provides surprising new insights into the funerary customs of the Qijia culture, and moreover, what is interesting for the Lajia site is that the construction details also show that it was in use over a long period of time.

Hypothesis 2 (earthquake) might also have its merits in the seismically active area around Lajia. Earthquakes in the region are well documented in Chinese historical records. Official statistics show that the earthquake of 1920 in Ningxia and Gansu triggered over 1000 landslides and killed about 200,000 people (Derbyshire et al. 1991). Cracks crossing the floor in one of the excavated houses have been interpreted as the result of a catastrophic earthquake that preceded the conjectured Yellow River flood, destroyed the houses and killed the people in Lajia (Yang et al. 2003). However, some observations do not support such a scenario. Two of the excavated victims were found in semi-upright positions with their arms raised, as though they had been trying to swim towards the exit of the house (Fig. 2). Such postures would be impossible if the people were killed by debris from roof or walls which collapsed in an earthquake. Moreover, these two skeletons were surrounded by red clay sediments significantly different from both the local loess and the alluvial deposits of the Yellow River. The "red clay deposits covered with a section of wavy sandy sediments" were already shown after the first excavation (see p. 117), but left without comment. By the time of our visit, almost all material from the excavated houses had already been cleaned out.

However, we used the partial presence of the red clay as the basis for Hypothesis 3. The first task – to identify the source of the clay – was relatively easy. Red-colored mountain slopes,

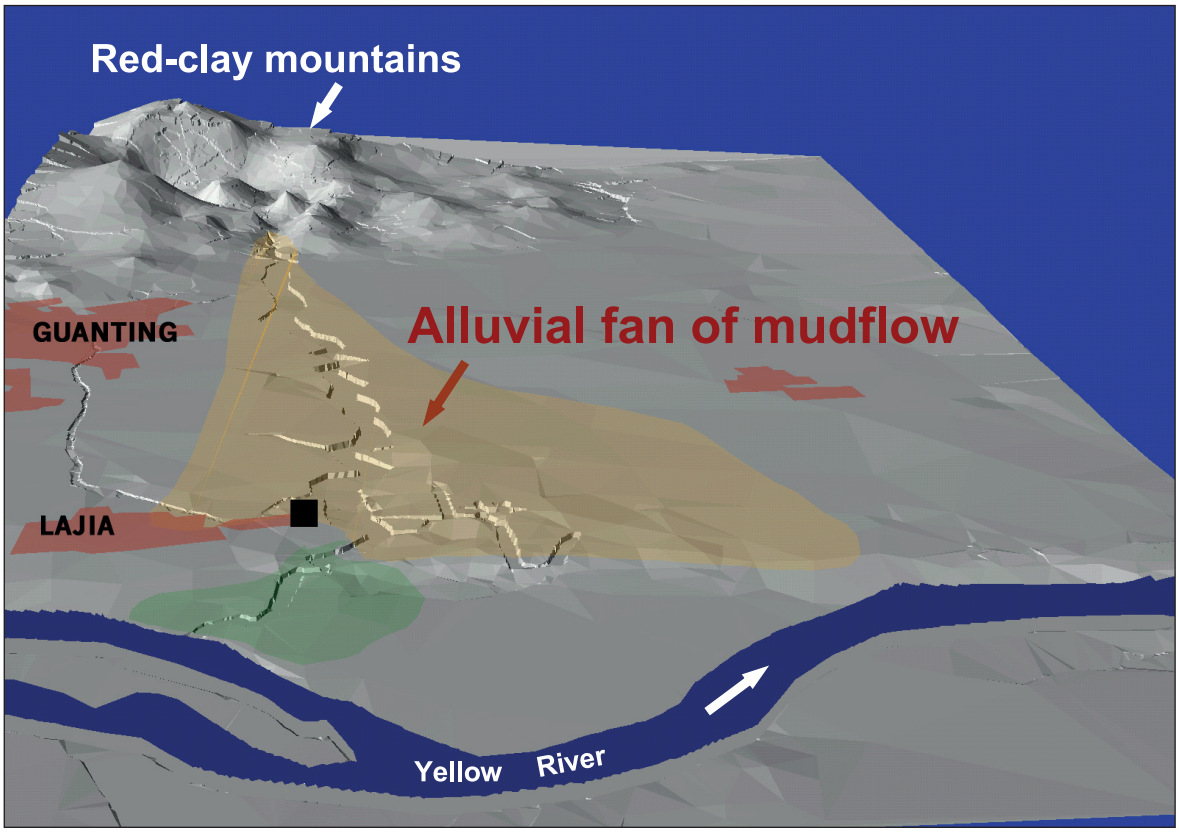

Fig. 5. Spatial model showing the northern part of the Guanting Basin, a large alluvial fan created by one or several mudflows, and the modern villages of Lajia and Guanting located outside the alluvial fan between the Yellow River and the red-clay mountains (reworked after Hoffmann 2003). A dry valley of a small tributary of the Yellow River is well pronounced in the modern landscape and connects the source of the red clay with the ancient houses (black square) destroyed by the mudflow.

which form the left bank of the Guanting Basin ca. 2 km north of Lajia, are well visible from the excavation site (Fig. 4). A dry valley – a small tributary of the Yellow River – originating from the red-clay mountains is well pronounced in the landscape (Fig. 5) and in the topographic map of 1:50,000 scale. According to the map, this valley is the shortest pathway connecting the source of the red clay with the ancient village. Our investigation of the "red mountains" showed that the clay and the covering loess sediments have been severely disintegrated by weathering processes and are ready for relocation by water flow. Former erosion activities of the currently dry river created three deep canyons which merge into one large canyon opening into the Guanting Basin. The measurements done in the field and further calculations suggest that the amount of loose clay and loess material eroded from the canyon was sufficient to form a large alluvial fan, which can be traced in the eastern part of the destroyed village and further east (Hoffmann 2003). We assume that this alluvial fan (Fig. 5) was created by one or several mudflows, which could have at least partly affected Bronze Age Lajia.

At present in the Qinghai and Gansu loess areas, more than 75 % of the catastrophic landslides and associated loess and mudflows occurring on an annual basis are initiated by the monsoon rains (Derbyshire et al. 1991). The latter publication describes as an example a single event at

Sale Shan in 1983 when "over 200 ha became a sea of mobile loess, burying four villages and killing 227 people in just 57 seconds". Excavation results obtained in Lajia also provide evidence that the catastrophe that caused the death of the people happened in a very short time.

The landscape modeling done by C. Hoffmann (2003) suggests that the catastrophic mudflow, originating from the red clay mountains in the northern part of the Guanting Basin, covered and destroyed only the eastern part of ancient Lajia and did not affect the western part (Fig. 5). This scenario explains the fact why not all excavated houses contained human skeletons, but only those in the eastern part of the settlement. On the other hand, such a scenario argues against flooding of the Yellow River as the main cause of the environmental disaster. Logically a river flood should have affected the whole village, especially the western upstream part of it. However, this has not been observed to date.

Discussion and Conclusion

X. Yang et al. (2003) reported that geologic and geographic evidences indicate that the site of Lajia was destroyed by simultaneous disasters such as earthquakes and the Yellow River flooding accompanied by intense rainfall. They further concluded that a focus on the driving forces behind these disasters allows to evaluate the effect of natural calamities on the development of human civilizations. However, the conclusion delivered by the previous investigators offers no explanation of the cause and mechanism of the environmental catastrophe in Lajia. Instead several hypotheses are amalgamated. By contrast, the most reasonable and tenable explanation for the excavated phenomena would seem to be a mudflow which abraded the structures above the ground, filled pit houses and other depressions and left the sediment layer that is still traceable today. The underlying mechanisms of the mudflow are still unclear. It might be initiated by heavy rainfall. The effect of a rainfall-initiated mudflow could have been intensified by other factors such as an earthquake or landslide causing the temporary damming of the canyon outlet and the accumulation of a large volume of rain water, which finally burst through the dam and poured down the slope, sweeping along masses of sediments. Human activities, such as deforestation of the mountain slopes, might also have increased soil erosion and surface runoff in the area[5].

These questions can be solved on the basis of systematic paleobotanical investigations and quantitative reconstructions of the past climates in the study area. In modern China such investigations are quite numerous. However, interpretation of the same paleobotanical records may vary among the publications. This can be illustrated by the recent dendrochronological and dendroclimatological studies of living and archaeological juniper wood from Dulan County, Qinghai Province. These tree-ring records cover the last 2500 years (Sheppard et al. 2004). There have been several attempts to explain variations in the ring widths by reference to climate change. In one of the earlier works "a succession of cold and warm intervals" was reconstructed and correlated with the so-called Medieval Warm Period and Little Ice Age found in European

[5] For example, a paper by Xu et al. 2003 reports that wood was the main material for house construction at Fengtai archaeological site, in the remote area of northeastern Qinghai Province, about 1000 cal. yr BCE. However, already 900 cal. yr BCE wood was replaced by clay, likely due to the lack of timber. At present the area around Fengtai is covered with severely grazed steppe and cultivated field vegetation, and soil erosion is a serious problem.

records (Kang et al. 1997). This reconstruction was based on a rather weak correlation (r = 0.3–0.4) between juniper tree rings and temperatures of the autumn months. Another interpretation of the ring-width chronology from Dulan (Zhang et al. 2003) considered May–June precipitation to be an important factor (r = 0.58) influencing tree growth in the area. However, the latest evaluation of the relationship between different climate variables and tree rings suggests that ring-width data from Dulan correspond much more closely to the precipitation of the 'hydrological year' (r = 0.7) lasting from July of the previous year to June of the current year (Tarasov et al. 2003). This relationship can be explained by the physiological processes limiting tree growth in the semi-arid regions of China and thus can be used for the reconstruction of climatic changes with higher confidence than the others.

Existing theories can substantially bias the interpretation of newly obtained records (Selivanov 1994). A recent synthesis of abrupt changes in the Asian summer monsoon since the last deglaciation (Morrill et al. 2003) provides the results of an objective statistical analysis of the century-scale events in 36 records published by different authors. The moving t-test detects an important abrupt climatic change 11,500 cal. years ago and another one 5000 to 4500 cal. years ago. The first event marks the Pleistocene/Holocene transition and is frequently reported by the authors. However, the event that occurred between 5000 and 4500 cal. years ago is not very often noted in the publications. "This could be the case because previous review articles commonly suggest that an abrupt change in the monsoon occurred at the start of the Holocene, and researchers have logically sought to confirm this in their own records" (Morrill et al. 2003, 470). As could be expected, the next few years after this publication showed an increase in the number of publications concerning the abrupt change in monsoon-influenced areas of China during the mid-Holocene.

The ancient legends compiled in Chinese historical texts are another source influencing the perception of the natural environments of Chinese antiquity. An overview of the mid-Holocene climates and environments in China written by geoscientists contains the claim that "between 4 and 3 ka B.P., many calamities happened […] in east China, the legendary catastrophic flood lasting several dynasties might have led to the end of the Longshan and Liangzhu Cultures. The story about King Dayu regulating rivers and water courses shows that by then people were organized to struggle against natural calamities and made great achievements" (Shi et al. 1993, 227). This paragraph clearly demonstrates how the legend dominates the data. The word "might" is added mainly for scientific diplomacy, not to cast doubt on the conclusion in general. Repeated in several scientific publications, the story about a "flood period" becomes an axiom which does not require further proof, but itself is used to date and explain archaeological and environmental phenomena, as for example with the case of Lajia (Yang et al. 2003) discussed in our paper.

Accurate dating is crucial for chronological correlation and understanding of the causes and results of reconstructed events (for details, see Jäkel 2004). Archaeologists and historians normally operate by calendar dates, while most paleogeographical publications appearing before 1995 present uncalibrated radiocarbon ages. The difference between the two scales is substantial. Thus, 12,000 radiocarbon years BP being calibrated into a calendar date becomes not 10,000 years BCE, but 11,837±150 calibrated years BCE[6]. The more recent the age, the less pronounced the difference, but the difference is still essential, e.g., 2050 radiocarbon years BCE = 2519±34

[6] CalPal software package used for the calibration of the radiocarbon ages is available free of charge from the Internet: http://www.calpal-online.de

calibrated years BCE, and 1050 radiocarbon years BCE = 1246±19 calibrated years BCE. In the last case, the calibration is of crucial importance. If radiocarbon dating is used without being calibrated, then an object or find assemblage dated by this method will be regarded as belonging to the Zhou dynasty, while calibrated dating places it within the Shang dynasty. Historians, however, are not always aware of this problem. In the chapter describing environments of ancient China in "The Cambridge History of Ancient China", radiocarbon ages (^{14}C yr BP) from the Winkler and Wang (1993) synthesis are simply converted to the calendar ages (cal. yr BCE) by subtracting 2000 years without calibrating them (Keightley 1999, 36).

The error range for the dates provided by different physical dating methods usually exceeds 100 years and should always be taken into account when geological records are compared with archaeological or historical dates. However, laminated lake sediments and tree rings are capable of supplying records with annual resolution. Environmental archives are free from politically-influenced subjectivism, while later editions often betray a bias towards historical chronicles.

Last but not least, the authors of geographical and archaeological publications concerning Chinese pre-history and antiquity are critically discerning with regard to their own materials and the data coming from the same study field, but it seems that the conclusions from the other disciplines are usually taken "on belief". Such uncritical use of sources creates a very specific and ideal image of antiquity. As a result geoscientists believe that "the existence of well-developed cultures is thought to indicate more favourable climatic conditions" (Winkler/Wang 1993, 232) and historians conclude that "it is not implausible to suppose that such a favourable environment helps to explain the increasing prosperity of the Neolithic and Bronze Age cultures and contributes to the general optimism about the human conditions and human nature that characterizes much early Chinese religion, legend and philosophy" (Keightley 1999, 36). The argument thus turns full circle.

REFERENCES

BATTARBEE et al. 1998
R. W. Battarbee/N. N. Davydova/G. Digerfeldt/M. Eronen/M.-J. Gaillard/A. K. Gliemeroth/G. Hannon/S. P. Harrison/W. Hofmann/P. M. Liew/A. F. Lotter/H. Loeffler/B. Marciniak/J. P. Smol/P. E. Tarasov, Biological records of climate change in lake sediments. Paläoklimaforschung/Palaeoclimate Research 25, 1998, 161–167.

DERBYSHIRE et al. 1991
E. Derbyshire/Wang Jiangtai/Jin Zexian/A. Billard/Y. Egels/D. K. C. Jones/ M. Kasser/T. Muxart/L. Owen, Landslides in the Gansu Loess of China. In: S. Okuda/A. Rapp/Zh. Linyuan (eds.), Loess. Geomorphological Hazards and Processes. Catena, Supplement 20 (Cremlingen-Destedt 1991) 119–145.

DOMRÖS/PENG 1988
M. Domrös/G. Peng, The Climate of China (Berlin, Heidelberg 1988).

ELVIN 2004
M. Elvin, The retreat of the elephants. An Environmental History of China (New Haven/CT, London 2004).

GUMILEV 1980
L. N. Gumilev, Istoriia kolebaniĭ urovnia Kaspiia za 2000 let. (s IV. v. do n.ė. po XVI v. n.ė.). In: B. Andrianov/L. Zorin/R. Nikolaeva (otv. red.), Kolebaniya uvlazhnennosti Aralo-Kaspiĭskogo regiona v golotsene (Moscow 1980) 32–47. Л. Н. Гумилев, История колебаний уровня Каспия за 2000 лет (с IV в. до н.э. по XVI в. н.э.). In: Б. Адрианов/Л. Зорин/Р. Николаева (отв. ред.), Ко-

лебания увлажненности Арало-Каспийского региона в голоцене (Москва 1980) 32–47.

Hoffmann 2003
C. Hoffmann, Spätholozäne Landschaftsentwicklung am Oberlauf des Gelben Flusses. Unpublished diploma thesis, University Potsdam 2003.

Jäkel 2004
D. Jäkel, Critical comments on the interpretation and publication of ^{14}C, TL/OSL and $^{230}Th/U$ dates and on the problem of teleconnections between global climatic processes. In: W. Smykatz-Kloss/P. Felix-Henningsen (eds.), Palaeoecology of Quaternary Drylands. Lecture Notes in Earth Sciences 102 (Berlin, Heidelberg, New York 2004) 233–242.

Kang et al. 1997
X. Kang/L. J. Graumlich/P. Sheppard, The last 1835 years climate changes inferred from tree ring records in Dulan region, Qinghai, China (in Chinese with an English abstract). Quaternary Sciences 17, 1997, 71–75.

Keightley 1999
D. N. Keightley, The Environment of Ancient China. In: M. Loewe/E. L. Shaughnessy (eds.), The Cambridge history of ancient China: from the Origins of Civilization to 221 B.C. (Cambridge, New York 1999) 30–36.

Kuhn/Stahl 2001
D. Kuhn/H. Stahl, Die Gegenwart des Altertums. Formen und Funktionen des Altertumsbezuges in den Hochkulturen der Alten Welt (Heidelberg 2001).

Leemans/Cramer 1991
R. Leemans/W. P. Cramer, The IIASA Database for Mean Monthly Values of Temperature, Precipitation and Cloudiness on a Global Terrestrial Grid. Research Reports, International Institute for Applied System Analysis 91,18 (Laxenburg 1991). http://epic.awi.de/29861/1/Lee1991a.pdf

Morrill et al. 2003
C. Morrill/J. T. Overpeck/J. E. Cole, A synthesis of abrupt changes in the Asian summer monsoon since the last deglaciation. The Holocene 13, 4, 2003, 465–476.

Rawson 2001
J. Rawson, The Many Meanings of the Past in China. In: Kuhn/Stahl 2001, 397–422.

Selivanov 1994
A. O. Selivanov, Global climate changes and humidity variations over East Europe and Asia by historical data. In: M. Desbois/F. Desalmand (eds.), Global precipitation and climate change. Proceedings of the NATO Advanced Research Workshop on Global Precipitations and Climate Change, held at l'Agelonde, LaLonde-les-Maures, France, September 27 – October 1, 1993. NATO ASI series, Series 1, Global environment change 26 (Berlin 1994) 77–104.

Sheppard et al. 2004
P. R. Sheppard/P. E. Tarasov/L. J. Graumlich/K.-U. Heußner/M. Wagner/H. Österle/L. G. Thompson, Annual precipitation since 515 BC reconstructed from living and fossil juniper growth of northeastern Qinghai Province, China. Climate Dynamics 23, 7–8, 2004, 869–881.

Shi et al. 1993
Shi Yafeng/Kong Zhaozheng/Wang Sumin/Tang Lingyu/Wang Fubao/Yao Tandong/Zhao Xitao/Zhang Peiyuan/Shi Shaohua, Mid-Holocene climates and environments in China. Global and Planetary Change 7, 1–3, 1993, 219–233.

Tarasov/Harrison 1998
P. E. Tarasov/S. P. Harrison, Lake status records from the former Soviet Union and Mongolia: a continental-scale synthesis. Paläoklimaforschung/Palaeoclimate Research 25, 1998, 115–130.

Tarasov et al. 2003
P. Tarasov/K.-U. Heußner/M. Wagner/H. Österle/Sh. Wang, Precipitation changes in Dulan 515 BC – 800 AD inferred from tree-ring data related to the human occupation of NW-China. Eurasia Antiqua 9, 2003, 303–321.

Winkler/Wang 1993
M. G. Winkler/P. K. Wang, The Late-Quaternary Vegetation and Climate of China. In: H. E. Wright, Jr./J. E. Kutzbach/T. Webb III/W. F. Ruddiman/F. A. Street-Perrott/P. J. Bartlein (eds.), Global Climates since the Last Glacial Maximum (Minneapolis 1993) 221–264.

XU et al. 2003
X. Xu/W. Wang/M. Wagner/K.-U. Heußner/P. E. Tarasov/B. Grieß/Niu Shishan/Song Jiangning/Xiao Yongming/Cai Linhai, Results of the first archaeological excavation and environmental survey at Fengtai, Qinghai Province, PR China, in 2001. Eurasia Antiqua 9, 2003, 85–111.

YANG et al. 2000
Dayuan Yang/Ge Yu/Yuebo Xie/Daojiang Zhan/Zhijia Li, Sedimentary records of large Holocene floods from the middle reaches of the Yellow River, China. Geomorphology 33, 1–2, 2000, 73–88.

YANG et al. 2003
Xiaoyan Yang/Xia Zhenkai/Ye Maolin, Prehistoric disasters at Lajia Site, Qinghai, China. Chinese Science Bulletin 48, 17, 2003, 1877–1881.

YE 2004
Maolin Ye 叶茂林, Lajia yizhi juedui niandai de chubu renshi 喇家遗址绝对年代的初步认识. Zhongguo wenwubao 2 June 2004, 267.

YE et al. 2004
Maolin Ye 叶茂林/Linhai Cai 蔡林海/Guodao Wang 王国道/Kezhou He 何克洲/Xiaohu Zhang 张小虎, Qinghai Lajia yizhi faxian Qijia wenhua jitan 青海喇家遗址发现齐家文化祭坛. Zhongguo wenwubao 17 March 2004, 317.

ZHANG et al. 2003
Q.-B. Zhang/G. Cheng/T. Yao/X. Kang/J. Huang, A 2,326-year tree-ring record of climate variability on the northeastern Qinghai-Tibetan Plateau. Geophysical Research Letters 30, 14, 2003, 1739. doi:10.1029/2003GL017425.

ZHONGGUO 2002
Zhongguo shehui kexueyuan kaogu yanjiusuo Gan Qing gongzuodui 中国社会科学院考古研究所甘青工作队/Qinghai sheng wenwu kaogu yanjiusuo 青海省文物考古研究所, Qinghai Minhe xian Lajia yizhi 2000 nian fajue jianbao 青海民和县喇家遗址2000 年发掘简报. Kaogu 2002, 12, 12–28.

ZOHARY 1973
M. Zohary, Geobotanical foundations of the Middle East. Geobotanica selecta 3 (Stuttgart, Amsterdam 1973).

COMPLEXITY OF INTERACTION ALONG THE EURASIAN STEPPE ZONE IN THE FIRST MILLENNIUM CE

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PREFACE

This volume combines contributions to a conference of the same title which was held February 9 to 11, 2012, in Bonn. Idea and format of the meeting had been developed through a process of intensive discussions among the editors in close cooperation with Dieter Quast, RGZM Mainz. Our original intention was to organize a conference with a focus on archaeology, bearing in mind questions concerning mobility and communication or – stated differently – exchange patterns in Eurasia. After having recognized that research in Eurasia is still dominated by site centric approaches which makes vast overviews as we imagined them somewhat cumbersome we deviated from our first outline.

As a consequence, we broadened the field for two further aspects which had been nearly neglected thus far. First, there are West–East ranging communications in the Eurasian steppe zone which lie beyond the overarching term "Silk Roads". As written sources rarely throw light on interactions among steppe polities, these interactions are markedly less frequently subject to scientific discussions. This question is best approached via archaeological analyses with a wide focus in geographical terms. North–South contacts are by far more commonly discussed than West–East communications, as they encompass interactions between states with foremost sedentary population and nomads who live north of these territories. As a rule, it is the sedentary viewpoint which is being told, as these cultures opposed to the nomads left numerous written accounts[1]. At the same time we wanted to encourage comparative perspectives. Characteristics often assumed to be typical of the relations between sedentary people and nomads are also true in comparable measures of those between Rome/Byzantium and their "barbaric" neighbors. What they all have in common is at least a distinct mobility in space, even though to varying forms and degrees. Furthermore, questions and themes long discussed in European archaeology and history entered the research of Inner Asia and Central Asia only recently, as, for example, identity, the emergence of new ethnic groups, frontiers, frontier societies, contact zones, elites, economies of prestige goods. We therefore wanted to invite colleagues of different disciplines and regions to join in a scientific dispute. Lively discussions during the conference and positive feedback by attendees show that this idea was appreciated.

The second aspect to be included can be summarized under the term "complexity", which in this context should not be understood as a concept from the social sciences but metaphorically. Over long periods of time simple explanations of cultural phenomena were favored, be it statements on pure and poor nomads, the dependency theory or the bad habit of explaining every cultural change with large-scale migrations. "Complexity" is meant as a signal and reminder that the simplest explanations are not always the best, which is reflected by the contributions in this volume.

[1] Numerous projects within the framework of the Collaborative Research Center (Sonderforschungsbereich) 586 "Difference and Integration" at the University Leipzig and the Martin-Luther University Halle-Wittenberg dealt intensively with interactions between nomads and settled people, a good overview of publications thus far is given by the center's website http://nomadsed.de/home/.

We consciously limited the temporal scope of the papers to the time after the Scyths and before the Mongols, somewhat clumsily described as the "first millennium CE", because these two eras have been traditionally paid enormous attention to and are represented in a corresponding flood of publications[2]. At the same time interactions in the steppe zone witnessed only during the centuries around the turn of the era a hitherto unknown rise in intensity and dynamics.

Not all of the works presented at the conference are included in this volume as they were already noted for publications elsewhere. This applies to the presentations given by Enno Giele, Valentina Mordvintseva, and Matthias Pfisterer. However, other colleagues who could not attend the conference were invited to hand in manuscripts. All contributions were revised and partly expanded, which to our delight resulted in this comprehensive volume. We would have loved to have included a paper on the consequences of climate change and meteorological events on the polities of the Eurasian steppe as such conditions win more and more popularity as *explanans* of significant changes[3], but it did not work out. To our dismay and because of different reasons the western steppes and Central Asia are less represented than we wished for.

We subdivided the contributions into four parts: "Nomadic Empires – Modes of Analysis" encompasses highly different approaches to interpretations and analyses of nomadic empires, ranging from computational agent-based models, over anthropological to historical methodology. Better than any perfect introduction this multi-facetted research shows how exciting it is to deal with this area much neglected in World History. Although the section "Xiongnu, the Han Empire and the Oriental Koine" assembles merely three contributions, it covers more than 260 pages. If nothing else, this certainly echoes the boom of Xiongnu archaeology of the past decades. By taking into account enormous amounts of archaeological, art historical, and written sources the authors surmount traditional and often too static schemes of interpretation. These new analyses detect an astonishing variety of interactions during the centuries around the turn of the era, which broadens our understanding of this epoch and provides new avenues for other regions and periods at the same time. In the third section, "Inner and Central Asia from the Türks to the Mongols", nine contributions exemplify a multicolored and almost continuously changing picture of languages, ethnicities, and political affinities for Inner and Central Asia from the sixth to the twelfth centuries. Political affinities, however, were changing so quickly due to situational demands as to almost refute all efforts to retrace them within the archaeological record. Decision makers were astonishingly well informed about even distant regions and they acted accordingly over vast distances. The studies at hand analyze exchange processes on varying

[2] See for the Scyths for example W. Menghin/H. Parzinger/A. Nagler/M. Nawroth (eds.), Im Zeichen des goldenen Greifen. Königsgräber der Skythen. Begleitband zur gleichnamigen Ausstellung: Berlin, Martin-Gropius-Bau, 6. Juli – 1. Oktober 2007; München, Kunsthalle der Hypo-Kulturstiftung, 26. Oktober 2007 – 20. Januar 2008; Hamburg, Museum für Kunst und Gewerbe Hamburg, 15. Februar – 25. Mai 2008 (München, Berlin 2007); H. Parzinger, Die Skythen. 3rd ed. (München 2009); J. Aruz (ed.), The Golden Deer of Eurasia: Scythian and Sarmatian Treasures from the Russian Steppes (New York, New Haven 2000); J. Aruz/A. Farkas/A. Alekseev/E. Korolkova (eds.), The Golden Deer of Eurasia. Perspectives on the Steppe Nomads of the Ancient World. The Metropolitan Museum of Art Symposia (New Haven 2006). See for the Mongol period Dschingis Khan und seine Erben. Das Weltreich der Mongolen (2005); W. W. Fitzhugh/M. Rossabi/W. Honeychurch (eds.), Genghis Khan and the Mongol Empire (Seattle 2009); see also the website of the European Research Council Grant "Mobility, Empire and Cross Cultural Contacts in Mongol Eurasia" http://mongol.huji.ac.il/, which provides an extensive bibliography.

[3] N. Pederson/A. Hessl/N. Baatarbileg/K. Anchukaitis/N. Di Cosmo, Pluvials, Droughts, the Mongol Empire, and Modern Mongolia. Proceedings of the National Academy of Sciences 111, 2014, 4375–4379; J. Fei/J. Zhou/Y. Hou, Circa A.D. 626 Volcanic Eruption, Climatic Cooling, and the Collapse of the Eastern Turkic Empire. Climatic Change 81, 2007, 469–475.

levels – from language to embassies – as well as aspects of mobility, from the integration of foreign symbols of power to large-scale migrations, or methods of state-building to the strategic destruction of complex states. The last section combines papers that focus on "Nomadic Interaction with the Roman and Byzantine West" traversing the Eurasian steppe zone from east to west. These case studies, either already comparative or suitable for further comparisons, give reason to assume that although there are certain encompassing communalities every conquest and struggle with the empires of the West is historically unique. At the same time it becomes apparent that the knowledge base of the decision makers in the Roman Empire had been greater than hitherto thought.

The variety of studies assembled in this volume leaves no doubt as to how dynamically and diversely the interactions, processes, and transformations developed in the Eurasian steppe zone. These changes cannot be studied under common schemes of interpretation which are more often than not inseparable from overcome clichés.

Chinese names and terms have been transliterated according to the Pinyin system, Russian names and references according to the system of the Library of Congress. Arabic, Persian, and Turkic names and terms appear in the form chosen by the authors of the individual chapters.

Acknowledgements

The conference had been jointly prepared and organized together with Ursula Brosseder and Timo Stickler. We thank both of them for their cordial and companionable collaboration. Susanne Reichert engaged to such an extent in the editing work of the papers that it was a delight for us to include her as co-editor. The edition of this volume in addition to ongoing obligations and projects could only be managed as a team.

Our heartfelt thanks also goes to Daniel Waugh, Seattle, who has helped us now repeatedly with translations and language editing. Without his honorary efforts we would never have been able to integrate Sergey Vasyutin's thoughts in this book. Thanks to his enormous overview and language knowledge Peter Golden saved us from mistakes concerning the correct transliteration of names in the contributions of Tatiana Skrynnikova and Sergey Vasyutin. Image editing lay in Gisela Höhn's sterling hands. She also promoted to create – as far as possible – a unified map basis for all contributions as to facilitate visualizing the different regions. Editing work was done by the proven team Ute Arents and Güde Bemmann, substantially supported by Susanne Reichert. We owe Alicia Ventresca Miller, Kiel, as a native speaker many suggestions for improvement and stimuli. All authors and editors highly appreciate their painstaking efforts. For desktop publishing, which in the face of a multitude of different scripts demands unconventional solutions, we were able to win Matthias Weis. If not stated otherwise, images were provided by the authors and merely serve to illustrate.

The conference was made possible by the generous financial support from the Gerda Henkel Foundation. As always, it was our delight to collaborate with the foundation, a cooperation characterized by mutual trust. The meeting took place in the LVR-LandesMuseum Bonn, which during the same time displayed the exhibition "Steppe Warriors – Nomads on Horseback of Mongolia from the 7th to 14th centuries" ("Steppenkrieger – Reiternomaden des 7.–14. Jahrhunderts aus der Mongolei"). Thus the participants had the opportunity to get insight into an on-

going cooperation between the Institute of Archaeology of the Mongolian Academy of Sciences, the Department of Prehistory and Early Historical Archaeology of the University of Bonn, and the LVR-LandesMuseum Bonn. We thank the State Association of the Rhineland (Landschaftverband Rheinland) for the use of rooms and technical equipment of the museum and the financial support in printing this volume.

Our sincere thanks is owed to everyone who contributed to the success of the conference and the resulting book. With great joy we remember the inspiring and cordial atmosphere during the meeting.

Jan Bemmann, Michael Schmauder March 2015

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