

The Medieval Urbanization of Semirechie

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Summary

This article analyzes the process of medieval urbanization of Semirechie within the context of the urbanization of the Northern Tianshan piedmonts, distinguishing 4 regions (Talas, Chu, Semirechie, NE-Tianshan) and 2 waves (1st-15th century AD, 17th-19th centuries AD). The 4 urban complexes are analyzed and compared in their structural and dynamic characters: by settlement number, total urban area, morphology and chronological development. For the Semirechie region, the urban development is analyzed in chronological detail, century by century; and finally correlated with demographical estimates and paleoclimatic reconstructions. During the first urban wave, the Semirechie complex is interpreted as being the last frontier of a western and an eastern wave of urban, agricultural and commercial activities, showing

chronological similarities with the west and morphological similarities with the east; and during the second wave it appears as the centre of a very peculiar military pastoralist urban park.

KEYWORDS: urbanization, middle ages, Northern Tianshan piedmonts, database

1. Subject, methods and significance of the research

This work is intended to elucidate the characteristics of a specific urban phenomenon: the development of the medieval walled settlement park of Semirechie. More generally, this article aims to highlight the significance of statistical analyses and digital elaboration of large databases concerning historical urban complexes, and for this reason, considerable space has been given to methodological considerations (par. 1.2).

1.1. Subject of research

The main subject of this research is the process of medieval urbanization of Semirechie, viewed within the context of the urbanization of the Northern Tianshan piedmonts, which involved four regions: Talas, Chu, Semirechie, and Northeast-Tianshan. (Fig 1)

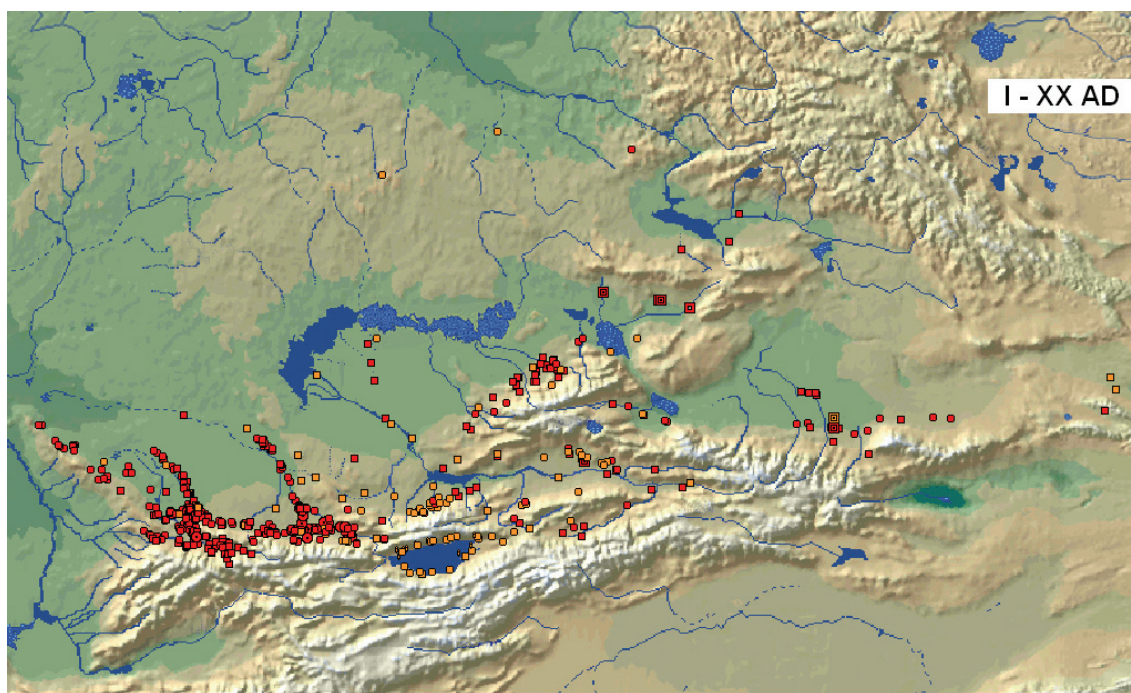


Fig 1. Entire medieval urban complex of Northern Tianshan (1-20th AD): settlement location, size and type

Two waves of urbanization were considered: the first wave between the 1st and the 16th centuries AD, which involved all the Northern Tianshan piedmonts; and the second wave between the 17th and 19th century, which involved only the Semirechie region under Jungar rule and the NE-Tianshan region under Manchu rule. Not considered is the third and last wave of modern urbanization consisting of non-walled

structures, which in Western Tienshan started at the end of the 19th century under Russian rule, and in NE-Tienshan at the beginning of the 20th century under Chinese rule.

Quotations from historical accounts of medieval travelers are included in the text, and considerations of demographic levels and climatic fluctuations are provided in the last paragraph of the article.

1.2. Methods

The documentation of the urban monuments of Semirechie and, more generally, of the Northwestern Tienshan piedmonts, is based on Soviet and post-Soviet reports (see bibliography), updated by new land and aerial surveys. The documentation of the monuments of NE-Tienshan is based on historical sources, modern archaeological reports, and satellite images, in a cooperative work with the sinologist Jean Marc Deom.

The entire Northern Tienshan urban park is divided into 4 *regions* characterized by a specific hydrology, landscape and cultural context, which determined the development of specific urban complexes. Hydrological differences are the most relevant and it is mainly on their basis that the four regions have been distinguished and indexed. Within each region, different sub-regions (*zones*) can be distinguished, generally again on the basis of important hydrological elements (main river course, tributary or distributary stream, trunk canals, primary and secondary deltas, etc), and occasionally on the basis of their special exposure to cultural influences from neighboring regions (as in the case of the upper Ili valley). For example, Semirechie is divided into 3 zones: the Middle and Low Ili valley, the Jungarian piedmonts and, during the second wave of urbanization, the zone of the southern and northern Tarbagatai piedmonts.

For each settlement unit the most important entries are the GPS coordinates, settlement code, size, type and form, function, chronology, geographical context (geomorphology, climate, soil, vegetation, landscape) and cultural-political context.

- The *units* of the settlement park are taken into account when the park is walled and dimensions and a starting-ending chronology are available, which results in the exclusion of the 5 to 20 % of the units that are badly recorded and require additional surveys. The non-walled rabats of the towns (the urban area located outside the walls) are not considered, nor are villages, because apart from some exceptional areas, detailed surveys and recordings of the rabats and villages are lacking. A few large villages are included when archaeologically important, which, in any case, are not representative of the entire village park; their consideration in the case of the Talas basin (the richest in villages) increases by 25% the number of settlements but increases by only 7% the total ha of the settlements. Units are clustered by hydrological basin and coded in progressive order from upstream to downstream following the dendritic pattern of the water system.
- The *size* of the urban structures is always based on the maximum historical development of their external walls, data which is completely reliable only for the flourishing period (which for Semirechie is the 9th–12th centuries AD) and must be decreased for earlier and sometimes also for later periods. The biggest towns in most cases are the most longstanding towns, suggesting the existence of a dynamic morphology that enlarged or doubled their walls.
- The settlement *type* is determined from the *shape* of the walls and the internal partitions. Types

include walled towns (Go, from gorod in Russian), tortkuls (To), fortresses (Fo), monasteries (Mon), and occasionally beacon towers (Be) and a few large non-walled villages (Vi). These types often evolve over the centuries into complex structures by a doubling of the range of the walls with walls of the same type or of a different type (Fig 2.1-2.6). Towns and tortkuls are the most frequent and important types. Towns are civil structures. The oldest, consisting of many cultural layers, are elevated as a tobe (anthropogenic mound, also called tepe); the youngest or the short living ones are flat. They can be in the shape of a horse-shoe (around springs), or circular, oval, square, rectangular, polygonal, irregular (adapted to the relief), or a planned Chinese-type town partitioned into walled quarters and suburbs. In the case of large towns, their actual shape is often the result of morphological development: either development from a more ancient smaller structure clearly included as a citadel, or the result of the building of a citadel inside former walls. Tortkuls are planned square fortified structures with thick walls, flanking towers and ditches, sometimes showing a second stage of development where they are surrounded by a second range of square or rectangular walls. In this research they are classified as a specific type of town-fortress because of their very high frequency and diffusion. Their number decreases from east to west and becomes insignificant in the middle Syrdarya. During the second wave of urbanization that involved Semirechie (17 -18th centuries AD), another type of settlement appears (conventionally called “monastery”) consisting of a Buddhist monastery or temple at the centre of a walled compound for nomadic camps having a military, pastoralist, or metallurgic function. Non-walled villages, unlike the walled settlements mentioned above, are poorly documented and with varying precision in different regions. As such they are kept in consideration in the analysis of the single region but omitted in the comparative analysis of different regions. Exactly opposite to tortkuls, the number of documented villages decreases from west to east, constituting 25% of the total number of settlements in Talas, 17% in Chu, 8% in Semirechie, and are totally absent in NE-Tianshan. This fact must be attributed to a west-to-east increase of urban concentration and also to poorer surveys but, based on the present state of knowledge, tortkuls and villages respectively represent the specific characters of two different eastern and western patterns of urbanization.

- The morphological types Fo and Be coincide with univocal *functions*. By contrast, in the case of types Go, To, Mon and Vi, the function is less clear and can be sometimes individuated by the presence of special signs: the function would be political administrative (as a capital or as a secondary center) when the settlement has a large size and relevant citadel (Po1, Po2); military when heavily fortified (Mil); agricultural when surrounded by irrigation systems (Agr); metallurgic when covered by slag and/or surrounded by mines (Met); pastoralist when enclosing large empty spaces for tents and corrals (Pas); commercial when lacking other functions and clearly aligned along main routes and presenting a caravanserai form (Car). A high number of settlements (in particular large towns, tortkuls and monasteries) are characterized by multiple functions.
- The *chronology* adopted is totally dependant on previous studies, which possibly contain significant mistakes. This is surely true concerning the documentation of the NE-Tianshan monuments, which have been dated not on the basis of archaeological studies but of Chinese historical sources, which are quite precise for the first T'ang and latest Manchu periods, very approximate for the Karluk period, and totally silent about the Jungar period.



Fig2-1. Aerophoto of Tastobe, Talas region (6-12th AD) / oval tobe / orthogonal, view-S



Fig2-2. Aerophoto of Kostobe, Talas region (6-12th AD) / rectangular town with tobe as citadel / orthogonal, v-E



Fig2-3. Aerophoto of Intimak, Talas region (7-12th AD) / tortkul / orthogonal, v-S

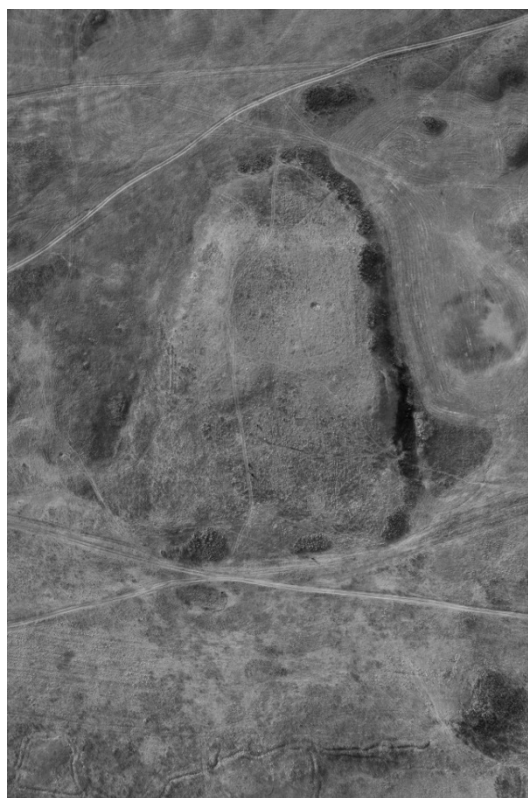


Fig2-4. Aerophoto of Konyrtobe, Talas region (6-13th AD) / tobe with tortkul as citadel / orthogonal, v-E
→



Fig2.5. Aerophoto of Krasnayarechka, Chu region (5-12th AD) / Chinese-type town with tortkul as citadel / oblique, v-N



Fig 2.6. Aerophoto of Shorga, N-Tarbagatai zone (18-18th AD) / walled square structure with monastery at centre / orthogonal, v-N

- The geographical context is represented in the database by the consideration of climate, relief (valley, low-hill, plain, colluvium, terrace, alluvial plain, floodplain), hydrology (stream, delta, tributary and distributary, spring, lake), soil and vegetation, landscape, ore deposits; as well as remains of artificial constructions like canals, dams, karez, external walls several km long, and roads. Geographical analysis helps suggest the kind of function of a given settlement and allows cross-sections for the study of the environmental context and impact of an urban system.

1.3. Significance

The study of ancient processes of urbanization, i.e., the analysis of the rise and fall of towns during historical times, provides information about longstanding patterns of land and water use and adaptations to climatic and environmental conditions, about demographic changes, and about interactions, cooperation and conflict between humans and environment and between human groups themselves.

The information provided by the present article is based on a reading and systemic elaboration of existing materials, which implies three important considerations. On the one hand, the systemic character of this information constitutes a useful preliminary tool for any archaeological study of medieval urban structures of Northern Tienshan, supporting the choice of priority objects and tasks. On the other hand, the reliability of such information is affected by limits and errors in the documentary sources, so the systematization must suggest lines of research in order to correct mistakes and fill in blanks in the present state of knowledge (most important is the implementation of radio-carbon dating analyses). Third, the general data base of the urbanization process of Northern Tienshan must be organized in a format that can easily accept the corrections and additions suggested by new discoveries and be able to automatically express new tables, graphics and maps.

2. Urbanization of the Northern Tienshan piedmonts

The first urbanization of the Northern Tienshan piedmonts happened during the Middle Ages, when the territory represented the ultimate northernmost expansion on the steppes of Eurasia of two civilizations: the civilization of Transoxiana (more precisely the urban cultures of the Middle Syrdarya and the Chach

region) on one side, and the civilization of the Tarim oases on the other side. It was an accelerated and relatively short-lived process of huge proportions. It involved ten zones that, on the basis of hydrological and cultural considerations, can be grouped into four regions representing four large urban complexes.

2.1. The four urban regions of Northern Tienshan

The medieval urban zones of Northern Tienshan occupy ten areas that were most profitable from the point of view of water and land use.

1. The Talas delta
2. The Talas valley
3. The Chu mid valley (containing lake Issykul)
4. The Chu low valley
5. The Ili middle valley
6. The northern piedmonts of the Jungarian Range (which together with the middle Ili valley constitute Semirechie)
7. The southern and northern slopes of the Tarbagatai Range (which were urbanized only during the second wave of Semirechie urbanization of the 17-18th centuries AD)
8. The Ili upper valley
9. The Borotala valley
10. The northern piedmonts of Northeast Tienshan

Strict similarities of landscape features and phases of urbanization suggest the clustering of these 10 zones into 4 regions: Talas (zones 1 and 2), Chu (zones 3 and 4), Semirechie (zones 5, 6, and 7), NE-Tienshan (zones 8, 9, and 10).

Each of the four regions was involved differently in the urbanizing process. They present different agro-pastoral potentials, dimensions, urban forms, and chronology, as shown in Table 1.

The information provided by this table allows the four regions to be compared on the basis of the following entries: agronomical potential, dimensions (number, ha and average ha), morphology (type) and chronology of the settlement park. The most significant similarities and differences, entry by entry, are as follows:

The highest *agronomical potential* (20-10000 km²) is found in the zones of the NE-Tienshan piedmonts, Chu mid-course, upper-Ili, and Jungarian piedmonts.

Higher values for the number of settlements are found in the regions of Talas and Chu, because here small settlements and villages are more abundant and/or better surveyed. The lowest values are found in the NE-Tienshan region where practically no villages are documented.

The highest *total ha* is found in the Chu mid-course zone, followed by the upper-Ili and NE-Tienshan piedmonts. From the point of view of total ha, the complexes of the Chu and NE-Tienshan regions considered as a whole are strictly equivalent.

Table 1. Talas, Chu, Semirechie, NE-Tianshan: structural features of the 4 urban complexes *

Urban complex (region)	Zone	Potential agro area in km ²	Medieval settlement park										
			Total n	Total ha	Dimension		Type		Chronology (century AD)				
					of total	Ave. ha**	of 5 top settlements	Tortkul %	n	ha	Start-end	Flourished	Decay
Talas	Talas delta	5500	148	280	1.8	17	51	89	10-11	1-19	10-11	13-14	
	Talas valley	1500	61	136	2.2	16	47	12	10-12	6-15	10-12	13-14	
	<i>Talas complex</i>	7000	209	416	1.9	21	39	32	10-12	1-19	10-12	13-14	
Chu	Issykul	2500	47	82	1.8	13	95	55	10-12	7-19	10-12	13-15	
	Chu mid-course	8500	103	815	7.9	51	30	36	10-12	5-19	10-12	13-14	
	Chu low-course	3000	25	34	1.3	5	24	9	10-12	7-18	10-12	13-14	
	<i>Chu complex</i>	14000	176	931	6.5	51	46	24	10-12	5-18	10-12	13-14	
Semirechie, Pre-Balkh	Middle Ili (KZ)	5000	44	123	2.7	15	77	77	11-12, 17-18	8-14, 17-19	11-12, 17-18	13-14, 18	
	Jungarian piedmonts	10000	37	134	3.6	17	78	78	11-12, 17-18	8-14, 17-19	11-12, 17-18	13-14, 18	
	Tarbagatai S	5000	13	71	5.7	13	7	7	18	12-15, 18-19	18	15, 19	
	<i>Semirechie complex</i>	20000	94	327	3.4	27	64	63	11-12, 17-18	8-15, 17-19	11-12, 17-18	13-14, 18-19	
NE-Tianshan	Borotala valley	4000	6	56	9.3	13	66	81	15, 19	7-19	10-14, 18	15, 19	
	Upper Ili	17000	21	423	20.1	14	60	19	15, 19	7-19	12-14, 18-19	15, 19	
	NE-Tianshan piedmonts	19000	20	373	18.6	53	69	19	15-17, 19	7-19	7-14, 19	15-17, 19	
	<i>NE-Tianshan complex</i>	40000	47	854	18.1	109	52	23	15-17, 19	7-19	7-14, 18-19	15-17, 19	
total N-Tianshan			479	2434	5.0	129	40	25	-	-	-	-	

* Clusters (by column) of similar values are marked by the same shade of gray.

** Average ha values are depending from the existing documentation of small settlements, which are evidently quite good for the Talas basin and very poor for the NE-Tianshan zone. More accurate surveys and documentation of small towns and villages will increase the value of the number of settlements and decrease the value of average ha.

The highest *average ha* is that of the NE-Tianshan complex, twice as large as that of Chu and 7 to 10 times larger than those of Semirechie and Talas. The average ha of the top 5 capital towns is the same in the zones of the NE-Tianshan piedmonts and Chu mid-course (more than 50 ha), and is 3 times higher than in Semirechie and Talas. The 5 main towns of NE-Tianshan as a region have the peak average of 109 ha.

Regarding the *morphology* of settlements, in all four regions tortkuls constitute a significant percent of the settlement park. By number they represent the 39% in Talas, the 46% in Chu (but the 95% in the sub-region Issykul), the 64% in Semirechie and the 52% in NE-Tianshan. By ha, in Talas and Semirechie they represent the 39 and 63% (i.e. they have an average size); but in the big complexes of Chu and NE-Tianshan they are much smaller than towns and their total ha represents respectively the 24 and 23%. So, Issykul and Semirechie, the two territories linking the Chu and NE-Tianshan urban complexes, are by far the regions where the percentage of tortkuls is higher by number and ha.

Tortkuls are quite peculiar constructions due to their military character and interregional morphological homogeneity. They are rare along the Middle Syrdarya and abundant in the N-Tianshan piedmonts. In the latter territory they appear everywhere during the 6-8th centuries AD; and they represent a significant part (between the 30 and 65%) of the building peak of the 10th century AD. They grow complementarily to towns, often at the periphery of the urban system or along interregional roads: in Talas (and Chu) they appear in the V century AD accompanying the building of the second (the first in Chu) generation of towns, and then again with the following generation in the 10th century AD; in NE Tianshan they are built together with the first large towns of the 7th century AD, in bigger numbers and smaller dimensions. Their presence is totally dominant in Issykul and Semirechie where they basically constitute the core of their 8-12th century urban systems. Chronologically tortkuls are connected with the westward expansion of the Turks and show similarities with Chinese military constructions. As such, this urban morphology apparently comes from the east.

From the point of view of the *chronology* of the growth and decay of urban complexes, two waves of urbanization are clearly observed. The first wave, between the 1st and 15th centuries AD, involves all four regions and is characterized by two quite different processes, a western and an eastern one. The western process starts in Talas in the 1st century AD, in Chu in the 5th, in Semirechie in the 8th, culminates everywhere in the 11-12th, and ends everywhere during the 13th to the 15th centuries. The eastern process starts in NE-Tianshan in the 7th century AD, culminates in the 13th, and fades progressively during the 14th to the 16th centuries. The second urban wave, between the 17th and 19th centuries AD, involves only Semirechie (now together with the Tarbagatai range) and NE-Tianshan.

The Semirechie region, located between NW and NE Tianshan, presents in its urbanization patterns both a western and an eastern character. In fact its first urban wave is chronologically timed to the development and fading of Chu; and, by its morphology consisting of only tortkuls, shares similarities with NE-Tianshan, i.e., it seems to have been planned and built by tribes of eastern origin (Karluk) under the influence of the upper-Ili and NE-Tianshan urban culture (see below par 5). During the second urban wave, Semirechie sees enhanced its eastern links: it represents at first the centre of the Jungar (Kalmyk) urbanization and then the periphery of the Manchu urbanization (see below).

2.2. Comparative graphics concerning the urbanization of Northern Tianshan

This comparative analysis of the 4 regions is supported by graphic tables showing the proportion of morphological types (Fig 3.1), the evolution of the number, total ha and average ha of the four urban complexes of Talas, Chu, Semirechie and NE-Tianshan (Fig 3.2), and the evolution of building and abandonment by number and ha (Fig 3.3).

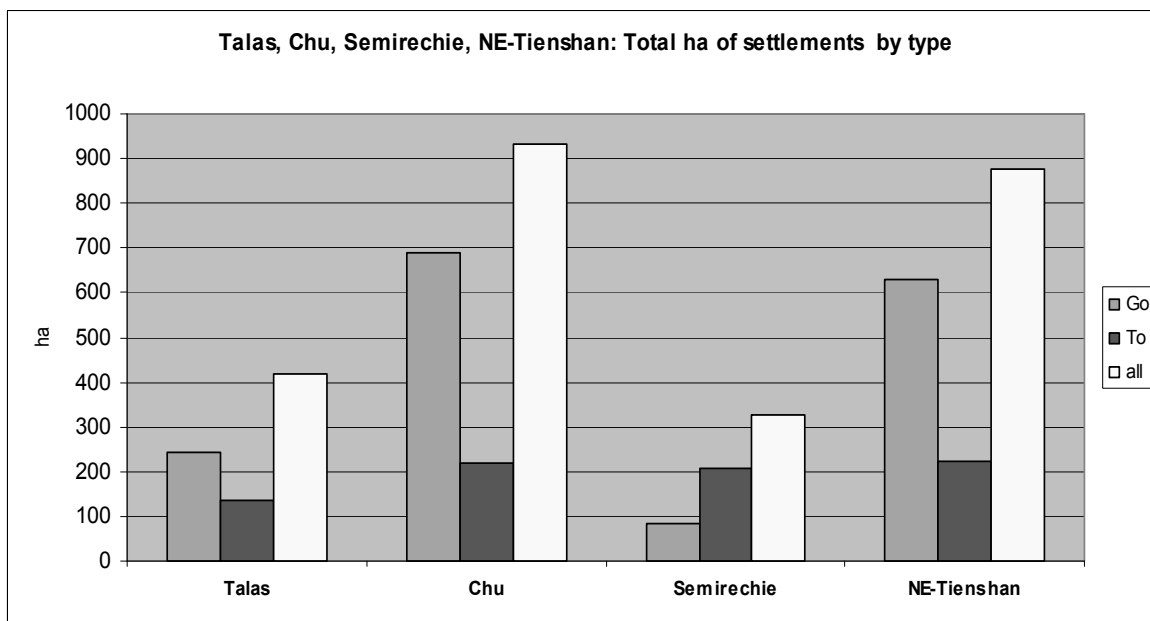
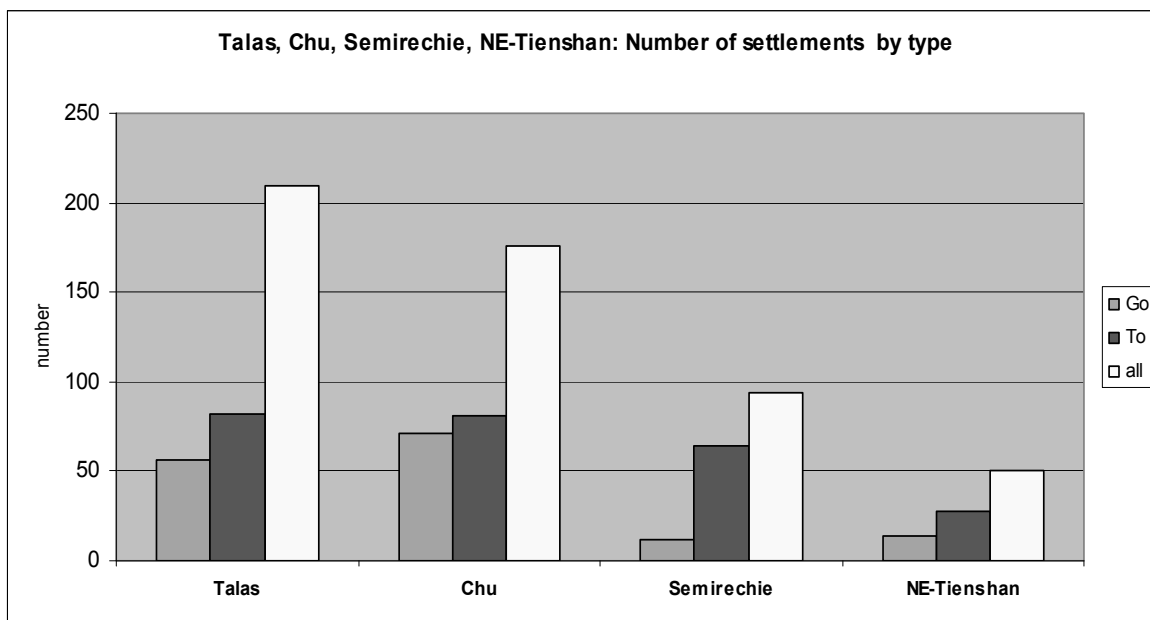


Fig 3.1. Graphics of the number and total ha of the settlement types (Go, To, all) in the 4 urban regions of the Northern Tianshan piedmonts

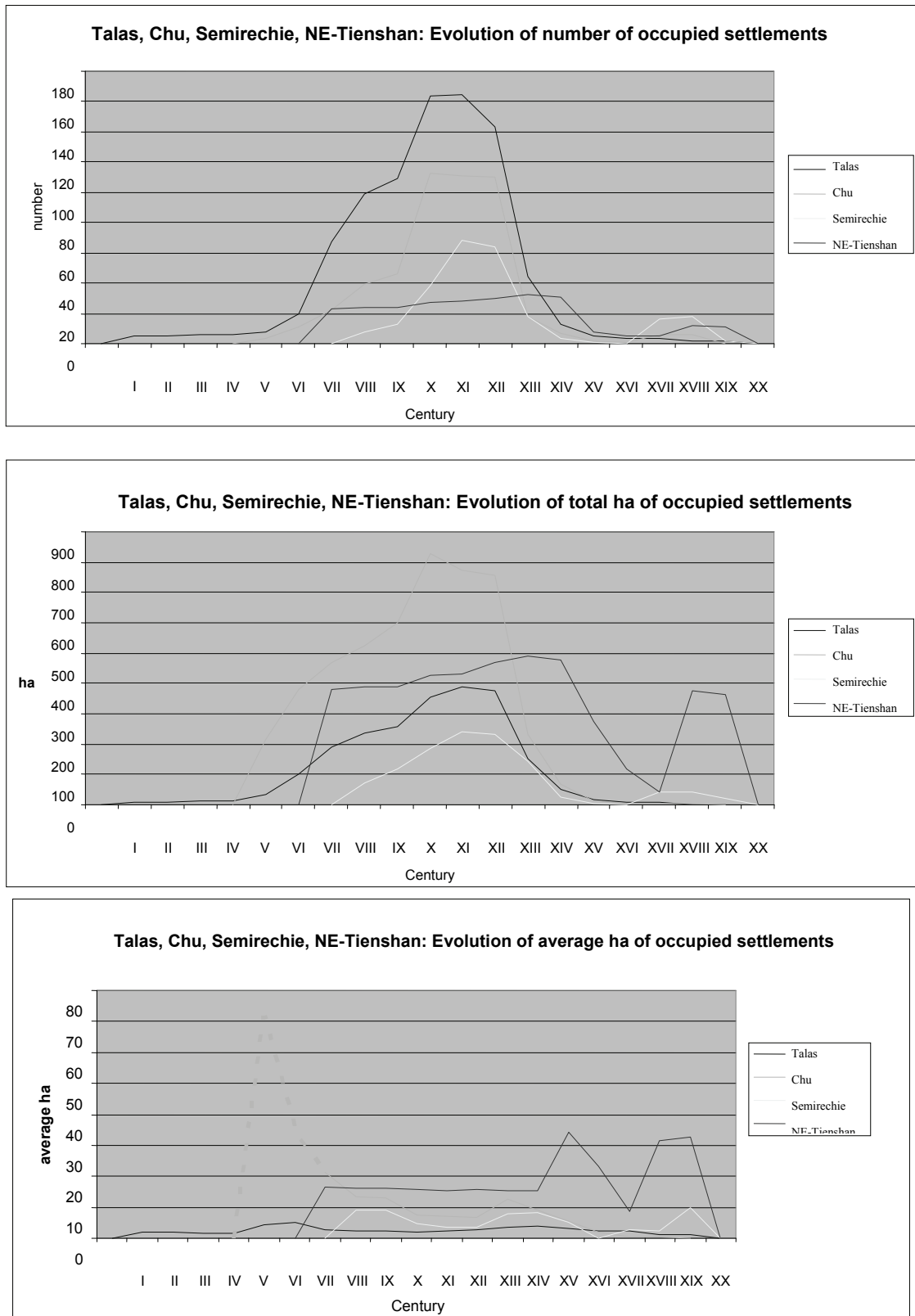


Fig 3.2. Graphics of the development of the number, total ha and average ha of settlements in the 4 urban regions of the Northern Tianshan piedmonts (1-20th centuries AD)

3. Interactions between Human Activities and the Environment in the Context of Historical Transitions in Subsistence

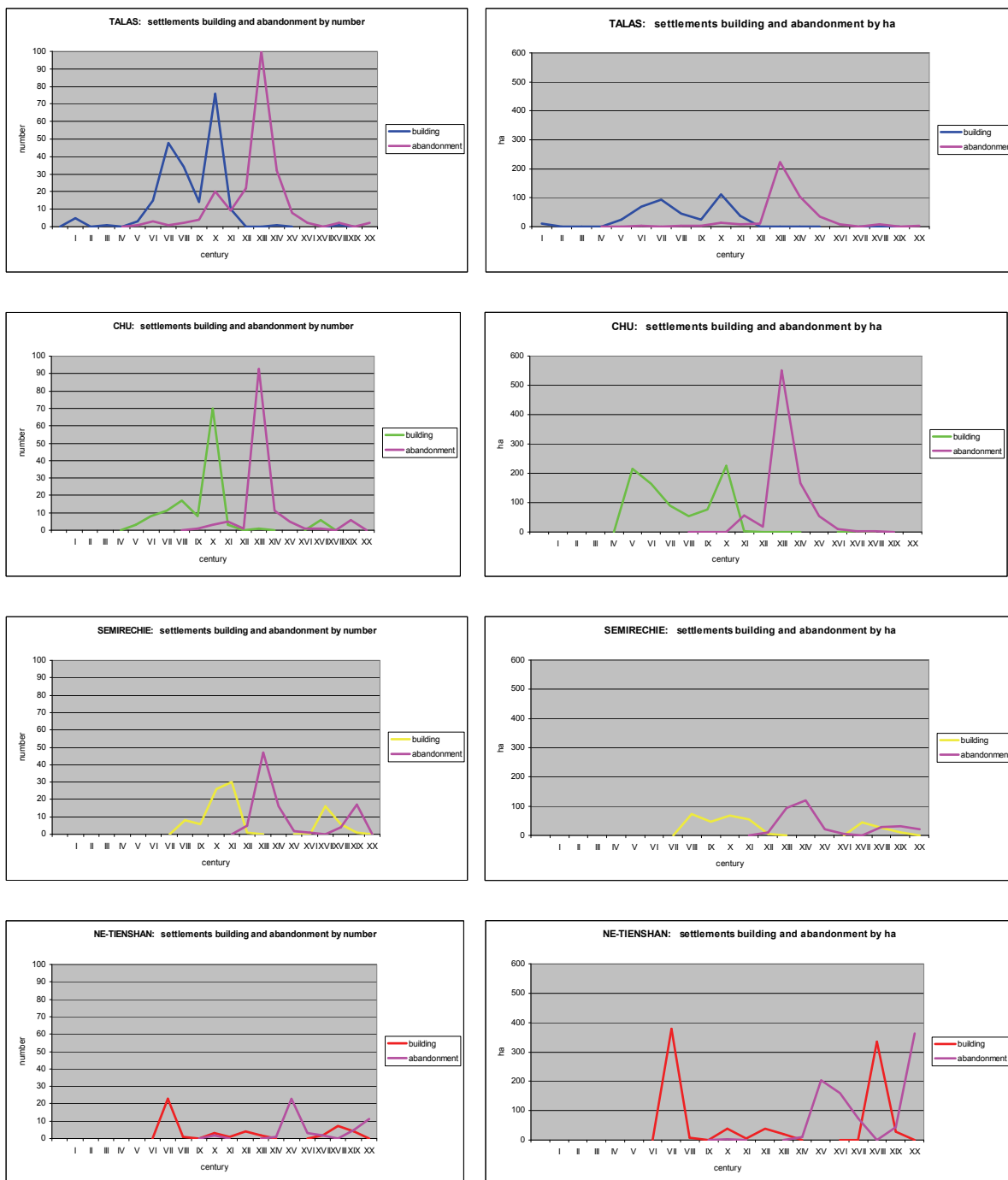


Fig 3.3. Graphics of the development, by number (left) and total ha (right), of the building and abandonment of settlements in the 4 urban regions of the Northern Tianshan piedmonts (1-20th centuries AD)

3. Structure and development of the medieval urban complex of Semirechie

The Semirechie region refers to the northern piedmonts of the Za-Ilisky Tianshan (i.e., the middle course

and delta of the Ili River) and the Jungarian range (i.e., the Karatal, Aksu, Lepsy and Tentek river valleys). Moreover, some neighboring territories of East Kazakhstan that, like Semirechie, are involved in the second late medieval wave of urbanization are also considered: the southern and northern Tarbagatai piedmonts and further downstream, a couple of structures located in the Irtysh basin (see the chronological maps of the 17th and 18th century AD).

3.1. Settlement park dimensions and morphology

Dimensions

Total number: 111 / Unworkable: 17 / Workable: 94

Total workable ha: 327.50 / Average size: 3.48

Morphology

Type: towns 12, tortkul 64, fortresses-monasteries 10, beacon towers 0, villages 8

Size: 1) 3; 2) 7; 3) 9; 4) 12; 5) 22; 6) 26; 7) 11; 8) 4 / Maximum town ha: Chilik, 38.50 ha

Settlements with 2 or 3 zones (citadels, shahristan, or other anomalous partitions): 3; with 2 walls: 8; without walls: 3

Table2. Semirechie: Settlements by number, type and size

Size *		Numbers by shape					Total
		Town	Tortkul	Fortress, monastery	Beacon-tower	Village	
1	≥20 ha	1	2	0	0	0	3
2	19 > x ≥ 10 ha	4	2	0	0	1	7
3	10 > x ≥ 5 ha	1	6	1	0	1	9
4	5 > x ≥ 2 ha	2	9	1	0	0	12
5	2 > x ≥ 1 ha	3	17	1	0	1	22
6	1 > x ≥ 0.5 ha	0	15	6	0	5	26
7	0.5 > x ≥ 0.2 ha	1	9	1	0	0	11
8	0.2 > x ≥ 0.05 ha	0	4	0	0	0	4
Total number		12	64	10	0	8	94
% of total		21.7%	68.0%	10.6%	-	8.5%	100 %

* Settlements of size 1 are called very large, of size 2-3 large, of size 4-5 mid-size, and of size 6-7-8 small

Table 3. Semirechie: Settlements by area, type and size

Size (ha) *		Σ area (ha) *					Total
		Town	Tortkul	Fortress, monastery	Beacon-tower	Village	
1	≥20	28.38	76.43	0	0	0	104.81
2	19> x ≥10	41.56	34.00	0	0	10.00	85.56
3	10> x ≥5	5.25	40.72	8.50	0	6.00	60.51
4	5> x ≥2	5.34	25.57	3.44	0	0	34.35
5	2> x ≥1	4.00	18.36	1.74	0	1.00	25.10
6	1> x ≥0.5	0	7.85	3.00	0	2.50	13.35
7	0.5> x ≥0.2	0.25	2.97	0.23	0	0	3.45
8	0.2> x ≥0.05	0	0.37	0	0	0	0.37
Total area **		84.78	206.27	16.91	0	19.50	327.50
% of total		25.9%	63.0%	5.1%	-	5.9%	100%
Average area (ha)		7.06	3.22	1.69	-	2.43	3.48

* The area of the individual settlement is calculated within its outermost borders and thus is the size in its flourishing phase, not its size in earlier or subsequent times. As such, the area evaluation is quite valid for the 9-12th centuries but must be proportionally diminished for earlier and later periods.

The settlement park of Semirechie (and East Kazakhstan) consists of 94 monuments covering a total area of 327 ha.

Two waves of urbanization are observed: the first wave involved only Semirechie (8th -15th century AD) and consisted of 71 urban structures covering a total of 250.57 ha; the second wave, 4 times less relevant, involved Semirechie and East Kazakhstan (17th -19th century AD) and consisted of 23 units covering 76.93 ha. Referring to the territory of the first wave, two habitats and urban zones are clearly distinguished: the northern Tianshan piedmonts facing the Ili middle valley and the Ili delta, with 44 units covering 123 ha; and the northern Jungarian piedmonts facing the Balkhash depression, with 37 units covering 134 ha. The last zone has an agricultural potential that is two times higher, but as a whole the dimensions, morphology and chronology of the two urban complexes are very similar.

The average size of the units of the settlement park is 3.4 ha (almost two times larger than the average settlement ha of the Talas basin and two times smaller than that of the Chu valley); and the average size of the 5 largest units is 27 ha, as opposed to the 21 ha of Talas, the 51 ha of Chu and the 54 ha of Northeastern Tianshan.

By type, the urban monuments mainly consist of tortkuls (64 monuments representing 68 % of the total number and 63 % of the total area), of which the 10 having the largest sizes (1, 2 and 3) cover all together almost 50% of the total area (151 ha). Tortkuls in Semirechie are classic multi-functional (military, agro-pastoralist and commercial) planned structures, walled and fortified, with a square form, encircled by one or two walls (in this last case the external walls sometimes have a rectangular plan), and are larger in size than the other types of monuments.

Even the monuments that are less fortified and approximately classified as a town or monastery have a square or rectangular shape. In fact, the 12 towns of the Semirechie park do not present an organically de-

veloped morphology adapted to the relief (as is the case with most of the Syrdarya towns and several towns of the Talas and Chu basins), but have instead a planned rectangular or trapezoid form, occasionally evolved out of an original tortkul. The 9 Buddhist temples and monasteries of the Jungar period always constitute the central point of a walled square space functioning as camp for nomadic pastoralist, military, and metallurgic groups, so that they must be considered as a special type of settlement planned for nomadic people (Fig 2.6).

3.2. Chronology

Table 4. Semirechie: Chronology of settlements by number, area and morphology (Go, To)

AD ***	SETTLEMENTS																	
	Number *									Total ha **								
	Built			Abandoned			Occupied			Built			Abandoned			Occupied		
	Go	To	all	Go	To	all	Go	To	all	Go	To	all	Go	To	all	Go	To	all
I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VII	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIII	2	6	8	0	0	0	2	6	8	14.54	58.44	72.98	0	0	0	14.54	58.44	72.98
IX	1	5	6	0	0	0	2	11	13	1.00	44.95	45.95	0	0	0	14.54	103.39	117.93
X	2	16	26	0	0	0	4	26	38	7.37	41.61	68.48	0	0	0	21.91	142.75	184.16
XI	3	27	30	0	0	0	7	53	68	3.25	52.07	55.32	0	0	0	25.16	194.82	239.48
XII	0	1	1	1	4	5	6	50	64	0	5.00	5.00	2.12	7.87	9.99	23.04	191.95	234.49
XIII	0	0	0	4	37	47	2	14	18	0	0	0	6.47	77.57	93.04	16.57	116.63	143.70
XIV	0	0	0	2	12	16	1	2	3	0	0	0	6.25	102.63	119.38	11.32	14.00	25.32
XV	0	0	0	1	1	2	0	1	1	0	0	0	11.32	9.00	20.32	0	5.00	5.00
XVI	0	0	0	0	1	1	0	0	0	0	0	0	0	5.00	5.00	0	0	0
XVII	1	9	16	0	0	0	1	9	16	28.38	4.20	43.35	0	0	0	28.38	4.20	43.35
XVIII	2	0	6	1	0	4	2	9	18	20.24	0	26.42	28.38	0	29.61	20.24	4.20	40.16
XIX	1	0	1	1	9	17	2	0	2	10.00	0	10.00	10.24	4.20	30.16	20.00	0	20.00
XX	0	0	0	2	0	0	0	0	0	0	0	0	20.00	0	20.00	0	0	0
TOT							-	-	-							-	-	-

* Built during the century / abandoned before the start (or at the very start) of the century / occupied within the end of the century / 'all' refers to the sum of Go, To, Fo, Be, and Vi.

** The area of the individual settlement is calculated within its outermost borders and thus is the size in its flourishing phase, not its size in earlier or subsequent times. As such, the area evaluation is quite valid for the IX-XII centuries but must be proportionally diminished for earlier or later periods.

*** White-grey bands distinguish the 5 phases of urban history of Semirechie (see below) / blue highlights mark peaks of development; crimson highlights mark peaks of decay

Table 5. Semirechie: Chronology and rate of development of occupied settlements

OCCUPIED SETTLEMENTS *									
PHASES	AD	Number			ha				
		Total n	Increase		Total ha	Increase		Average ha	
			Δn	%		Δha	%	Aver ha of occupied settlements	$\Delta ha / \Delta n$
	V	0	-	-	0	-	-	-	-
	VI	0	-	-	0	-	-	-	-
	VII	0	-	-	0	-	-	-	-
1	VIII	8	+8	start	72.98	+72.98	start	9.1	+9.1
	IX	13	+5	+62%	117.93	+44.95	+61%	9.0	+9.0
	X	38	+25	+192%	184.16	+66.23	+56%	4.8	+2.6
	XI	68	+30	+79%	239.48	+55.32	+30%	3.5	+1.8
	XII	64	-4	-6%	234.49	-4.99	-2%	3.6	-1.2
2	XIII	18	-46	-72%	143.70	-90.79	-39%	8.0	-1.9
3	XIV	3	-15	-83%	25.32	-118.38	-82%	8.3	-7.8
	XV	1	-2	-67%	5.00	-20.32	-81%	5.0	-10.1
	XVI	0	-1	-100%	0	-5.00	-100%	-	-
4	XVII	16	+16	start	43.35	+43.35	start	2.7	+2.6
	XVIII	18	+2	+12%	40.16	-3.19	-7%	2.2	+2.2
5	XIX	2	-16	-88%	20.00	-20.16	-50%	10	-1.2
	XX	0	-2	-100%	0	-20.00	-100%	-	-10

* White-grey bands distinguish the 5 phases of urban history of Semirechie (see below) / blue highlights mark peaks of development; crimson highlights mark peaks of decay; yellow highlights mark optimal evaluation, green indicates restructuring (the presence of both building and abandonment)

The urban development of Semirechie consists of 2 waves, separated by two centuries of total de-urbanization.

First urban wave (7th -14th century AD). The first and by far most important urban wave starts in the 8th century AD and blossoms in the 11th and 12th century AD. The dismantlement of the settlement park starts in the 13th century AD and is complete by the end of the 14th century AD (Emil, the only town left in the 15th century AD, is located in SE Tarbagatai and was evidently included in the NE-Tianshan complex). In comparison with the other regions of Northern Tianshan, the building process starts relatively late and is accomplished within just 5 centuries, which partly explains why the Semirechie settlements, at the difference from the ones of the Talas and Chu basins, don't present shapes organically evolved from earlier smaller constructions but shapes which are the result of just one or two stages of planning. Their abandonment instead proceeds like in the Chu and Talas valleys, involving at first mid-size structures averaging 0.9 ha (13th century AD) and ending with the largest structures averaging 7.8 ha (14th century AD)

The average size of the settlements occupied in the 11th century AD (the most reliable period for average ha

calculation), is 3.5 ha, two times larger than the average of 1.9 ha of the Talas basin and much smaller than the 6.9 ha of the Chu valley. The 5 largest settlements average 24 ha, as opposed to the average of 21 ha of the Talas basin, the 51 ha of the Chu valley, and the 53 ha of Northeastern Tienshan.

Considering the generations of towns, in correspondence with the first urban wave two analogous peaks of building (8th and 10th -11th century AD) and one of abandonment (13th -14th century AD) are observed. A lesser event of abandonment happens in the 12th century AD, involving 5 mid and small sized towns at the NE borders of the region, on the Lepsy and Tentek Rivers, possibly in connection with the Karakitai invasion. Also the building in the 12th century AD of the S Tarbagatai town of Emil is probably connected with the Karakitai. The average endurance of the units of the whole Semirechie complex is 280 years, with Talgar and Antonovka enduring 7 centuries and the largest 15 towns of sizes 1, 2 and 3 averaging an endurance of 3.7 centuries.

Second urban wave (17th -19th century AD). The second wave of Semirechie urbanization starts in the 17th century, more than 200 years after the disappearance of Talgar and Antonovka. This wave was implemented by the military expansion of the Jungar empire. It consists of 16 units covering 25% of the urban area occupied by the first wave, with structures averaging 2.6 ha and still having a square morphology but, as we said above, they were of a different type and function. The Jungar phase ends in 1753 with the defeat of the Jungars by the Chinese empire, and is followed by a short phase of Chinese Manchu urbanization that in its periphery involves also the S Tarbagatai piedmonts.

In correspondence with the second urban wave, one peak of building and one peak of abandonment are observed in both the Jungar (17th -18th century AD) and Manchu phases (18th -19th century AD). These are warring times and several units are abandoned within a century of their construction, making an average endurance of the units of the whole complex of only 140 years.

As a whole, without considering the two centuries of hiatus, five phases can be distinguished in the development of the urbanization of Semirechie, three in the first wave and two in the second.

1. Phase 1 - Early Karluk and Karluk-Karakhanid (8th -12th century AD). From the point of view of the forms and dynamics of the urban development, in Semirechie, at the difference from the Talas and Chu basins, the 10th century does not seem to constitute a dividing line between two different urban phases. As such, the 8th -12th century AD must be considered as one period of accelerated initial and subsequent development, bringing the complex to full flourishing and stabilization. The process happened in a continuous way, most probably always under the rule of the Karluk tribes acting within different alliances. The urbanization starts in the 8th century AD with 5 units built on the alluvial fans of the Chilik, Talgar and Lepsy rivers (areas clearly endowed with the best agricultural potential and proximate to the NE-Tienshan complex) and 3 units along the caravan road crossing the Ili delta. Together with the agricultural facilities, the commercial routes connecting the eastern Tienshan piedmonts with the western piedmonts and both of these with the northern territories were evidently important. The settlements of Chilik and Talgar in the middle valley of the Ili and the settlement of Antonovka in the eastern Jungarian piedmonts would become the biggest urban structures and evidently acted as the capital towns of their respective zones. From these areas located in the eastern parts of Semirechie the urban process developed, crowding the surroundings with new tortkuls and spreading westward along the Tienshan and Jungarian piedmonts. During the 9th century AD a new major town, Dungene, was established on the

Koksu River in the western spurs of the Jungarian mountains; the 10th century AD sees the further urbanization of the deltas of the Lepsy, Bien, Chilik and Talgar rivers; and during the 11th century AD, with a further development of the Lepsy zone, the urban complex of Semirechie reached a peak of 239 ha. Remarkable is the fact that, in this last territory of urban colonization, unlike the other three regions, the building of settlements continued also during the 11th century and stabilization happened only during the 12th century AD. The unrivalled development of the 11th century gave wealth and power to the Karluk tribes, so that Karluk raids for booty at that time are documented as far as south of Samarkand, on the Kaskhadarya delta.

2. Phase 2 - Early Mongol (13th century AD). Under Mongol rule the area covered by the settlement park contracted by only 39%, 2 times less than in the Chu and Talas basins. Abandoned were 47 middle and small size towns (averaging 1.9 ha) mainly located in the Talgar, Bien and Lepsy zones; and 18 units were left, six of which had a size larger than 10 ha. The main towns of Chilik, Talgar, Dungere and Antonovka resisted and kept acting as capital towns.

In October 1221 the Chinese monk Qiu Changchun, traveling westwards across Semirechie, describes his journey to Talgar (a town of 9 ha) saying that, after “crossing the Ili river on a boat and going southwards, I came to a high mountain (peak Talgar) with a small town on its northern slopes”.

In November 1253 the Franciscan traveler Rubrouck, in his way to the court of Mangu-khan in Karakorum, after finding “a large river (Ili) which we had to pass on boat”, crossed the ruins of a castle and then came to “a large village called Equius (probably Dungere) inhabited by Mohametans who spoke Persian, although so far removed from Persia”. Then, entering the northern Jungarian piedmonts and “having high mountains on our right hand and a sea or lake (Balkhash) on the left”, he calls the region “Organum” (which he explains as a relict toponym referring to the now disappeared local language and culture famous for its musicians) and describes it as “a plain watered or irrigated at will, by mean of streams descending from these mountains and ending in the before mentioned lake; ...formerly crowded with large towns, the most part of which are now destroyed in order to keep space for Tatar pastures, because here pastures are excellent”. The large town of Cailac (Antonovka) is said to host a big crowded bazaar and several religious sects.

In March 1259 the Chinese Chang Te, envoi of Mongke-khan, traveling westwards along the Northern Tienshan piedmonts, crosses the town of Chimuer (most probably Mohe on the upper Ili valley but by some authors individuated as Talgar in the middle Ili valley) where he finds the presence of Chinese immigrants and, like today, the production of wine: “South (of Almalik) there was a city called *Chi-mu-er* (red-tree). Amongst the inhabitants there were a great many Chinese from *Ping* and *Fen* (Shansi, SE of the Gobi desert). There is in this country an animal (snow leopard) which resembles a tiger, but its fur is denser, and is gold-coloured, while the skin is without stripes. It is very ferocious and attacks men. There is also an insect resembling a spider (karakurt). When the poison of it enters a man's body, violent thirst is felt. Should he then drink water he will die instantly; but when he can intoxicate himself by grape wine to induce vomiting, then the poison is neutralized. They have also a kind of wine with a strong smell”. He continues saying that “Going westward from the City of Bu-lo (Dalet, in the Borotala valley) the coins in use are made of gold, silver, and copper, and bear inscriptions, but they have no square holes.” Chang Te then entered the country called *Ma-a*, where the people (in winter) harness horses to sledges, and carry heavy "burdens in this manner from station to station, going very quickly. It is reported that the *Ki-li-ki-sz* (Kirghizes) instead of horses use dogs (for drawing sledges).”

3. Phase 3 - Late Mongol (14th century). The total abandonment of the settlement park happens within just a century of Chagatai and Moghul rule and their intensive wars against the Timurids. Are now abandoned the big settlements, averaging all together 7.8 ha. Chilik, Dungere and all the other settlements that survived the Mongol invasion are abandoned by the end of the 14th century, and only Talgar and Antonovka would resist until the beginning of the 15th century AD. This phase is followed by two centuries with no urban structures (15th -16th century AD), apart from the town of Emil in SE Tarbagatai that, included in the NE-Tianshan complex, survived during the 15th century AD.
4. Phase 4 - Jungar (17th -18th century). A second wave of urbanization starts under Jungar rule. It covers 25% of the urban area occupied by the first wave and consists of square planned walled settlements having not productive or commercial functions but rather military, political, administrative and religious functions, built in conjunction with geopolitical points or ore deposits. In terms of shape they consisted of walled square flat Chinese-type towns (the 28 ha Chinese-type town of Kaljir), and of Buddhist monasteries and temples at the center of a walled area functional to nomadic camps. The entire urban complex was abandoned in 1753 with the defeat of the Jungars by part of the Chinese army; but a few monasteries continued to exist one century longer (Sumbe).
5. Phase 5 - Manchu Chinese (1753-1850). A short fifth phase follows, represented by the building of three typical Chinese towns in the southern piedmonts of the Tarbagatai range, evidently a western protrusion of the Manchu urbanization of NE Tianshan. They are short-lived and abandoned, like the whole Manchu complex, by the first half of the 19th century AD.

3.3. Chronological maps of the development of the urban complex of Semirechie (7th -20th century AD)

A series of 14 alleged maps (Figs 4.1-4.14) represent, century by century from the 7th to the 20th century AD, the location, size and form of the urban development of Semirechie and part of its western and eastern neighbouring regions. During the 7th, 15th, 16th, 19th and 20th centuries AD the Semirechie region was deprived of urban structures.

The legend of the symbols of the maps is as follows:

- Roman numbers: the century to which the map is related.
- Dot size: 5 different sizes indicate settlements that are very large (≥ 20 ha), large ($20 > x \geq 5$ ha), medium ($5 > x \geq 2$ ha), small ($2 > x \geq 0.5$) and very small ($0.5 > x \geq 0.01$ ha).
- Dot form: round dots indicate oval, rectangular or irregular towns; round concentric dots indicate towns surrounded by out-walls several km long; square dots indicate square fortified tortkuls; and square concentric dots indicate Chinese-type towns.
- Dot color: yellow indicates settlements built during the quoted century; red indicates settlements built previously and still occupied; white indicates settlements abandoned just before the start of the quoted century; orange indicates settlements lacking chronological fixation.

3. *Interactions between Human Activities and the Environment in the Context of Historical Transitions in Subsistence*

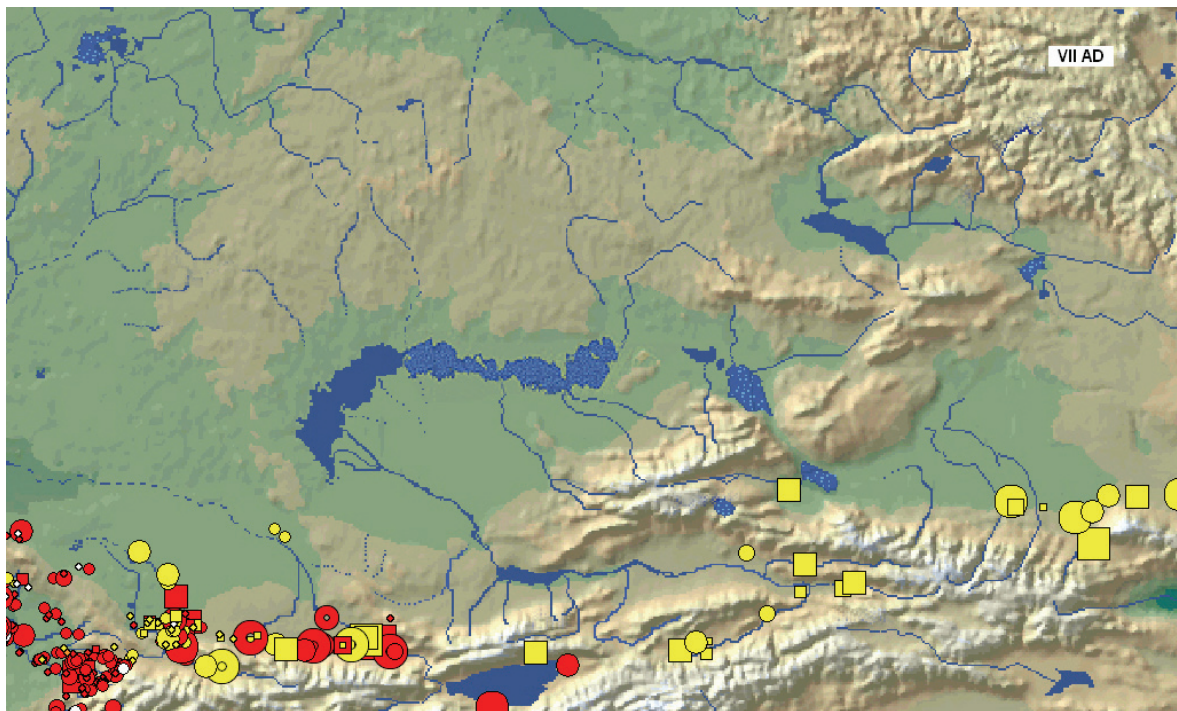


Fig 4-1. 7 AD

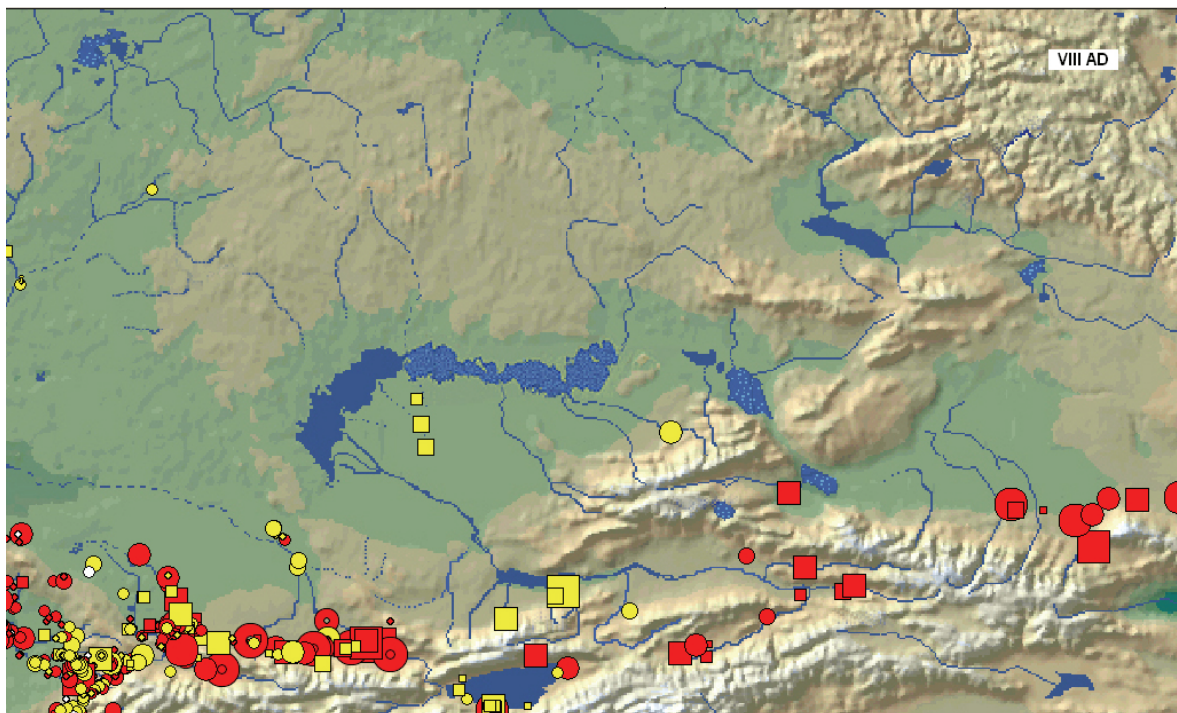


Fig 4-2. 8AD

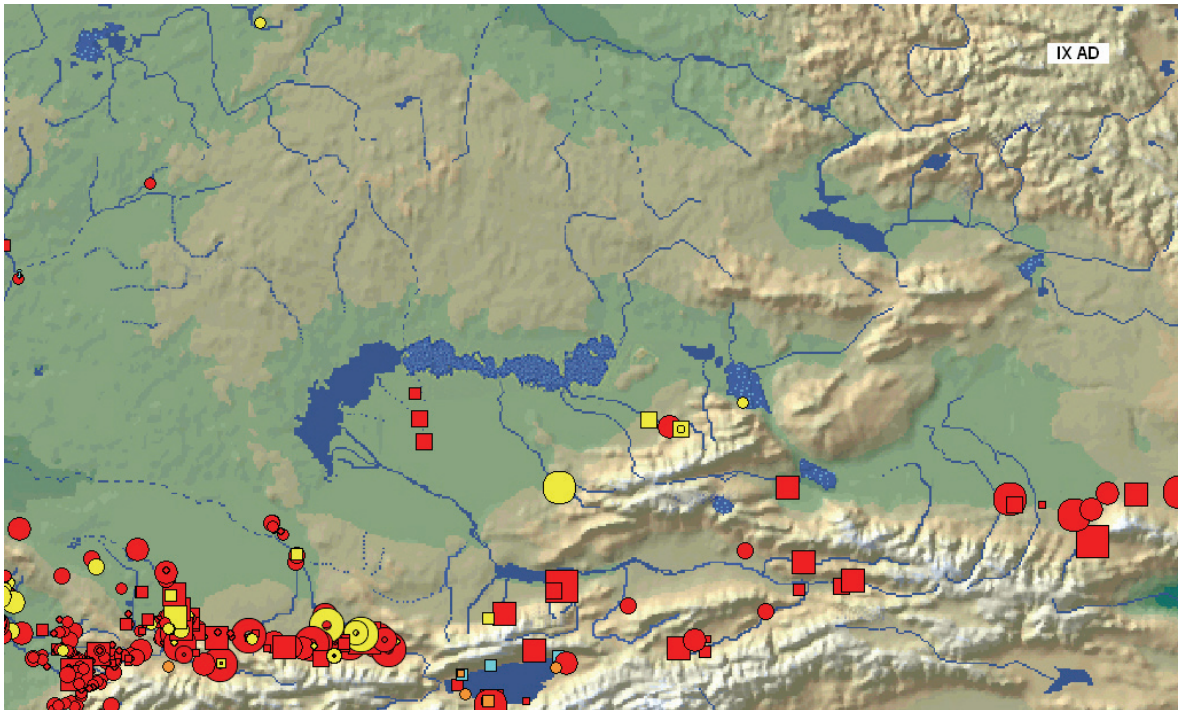


Fig 4-3. 9AD

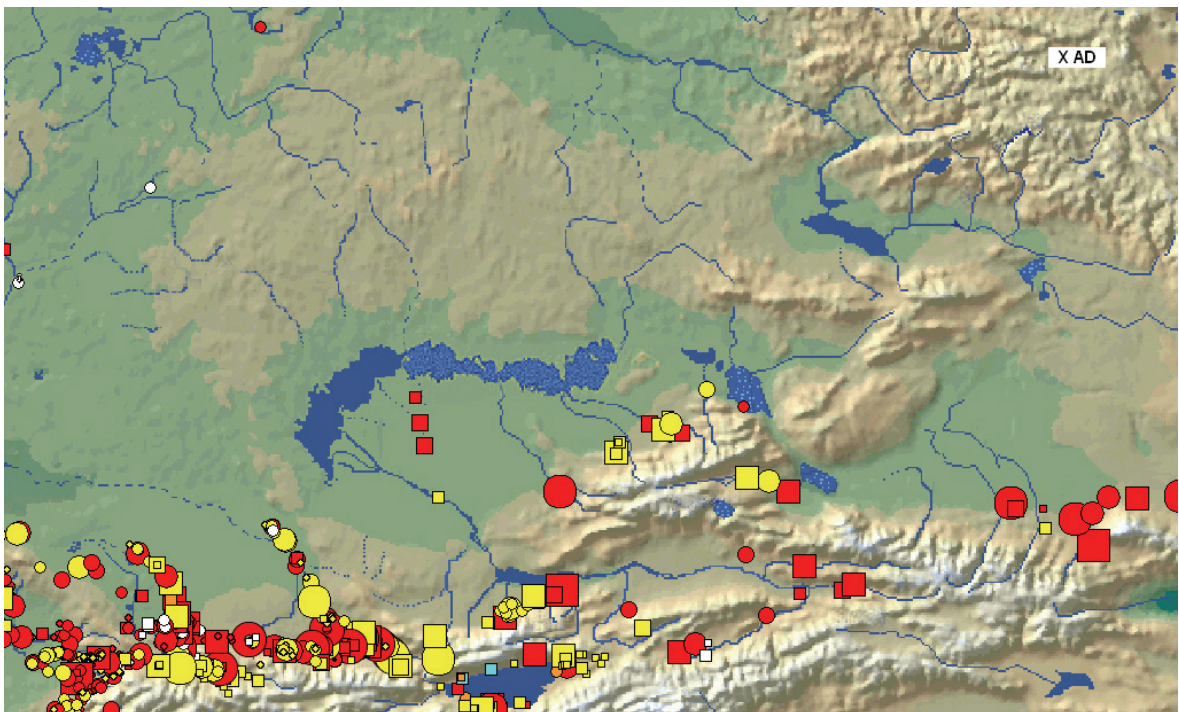


Fig 4-4. 10AD

3. Interactions between Human Activities and the Environment in the Context of Historical Transitions in Subsistence

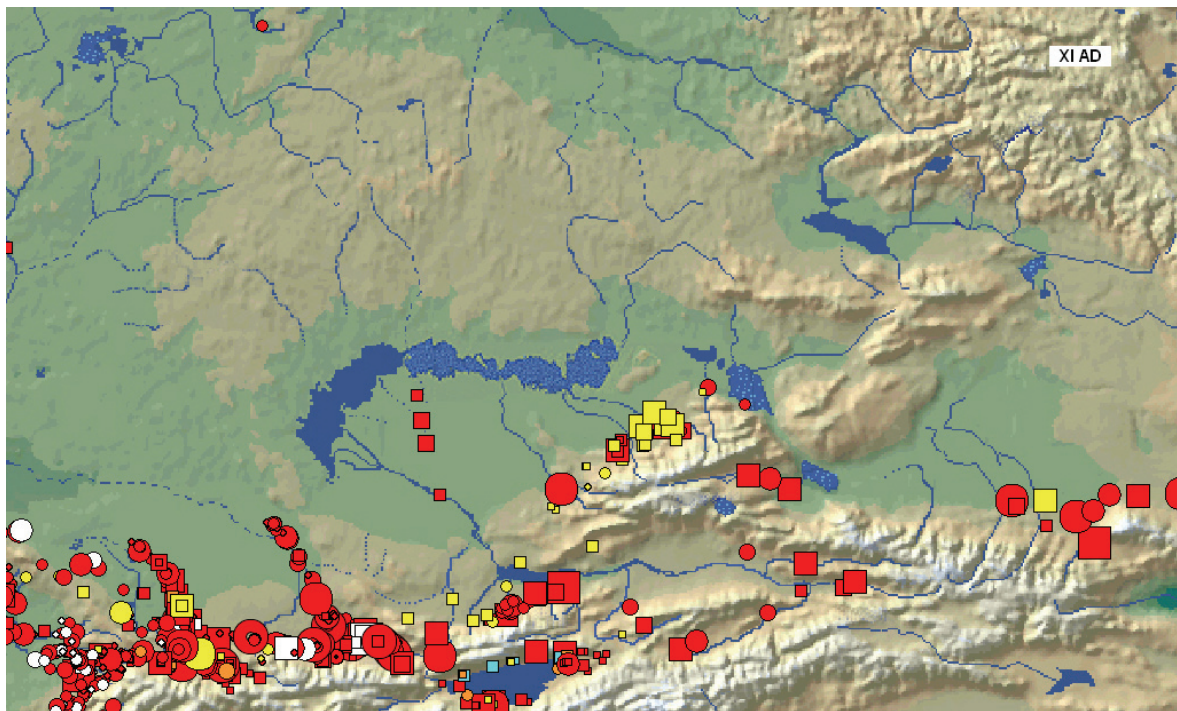


Fig 4-5. 11AD

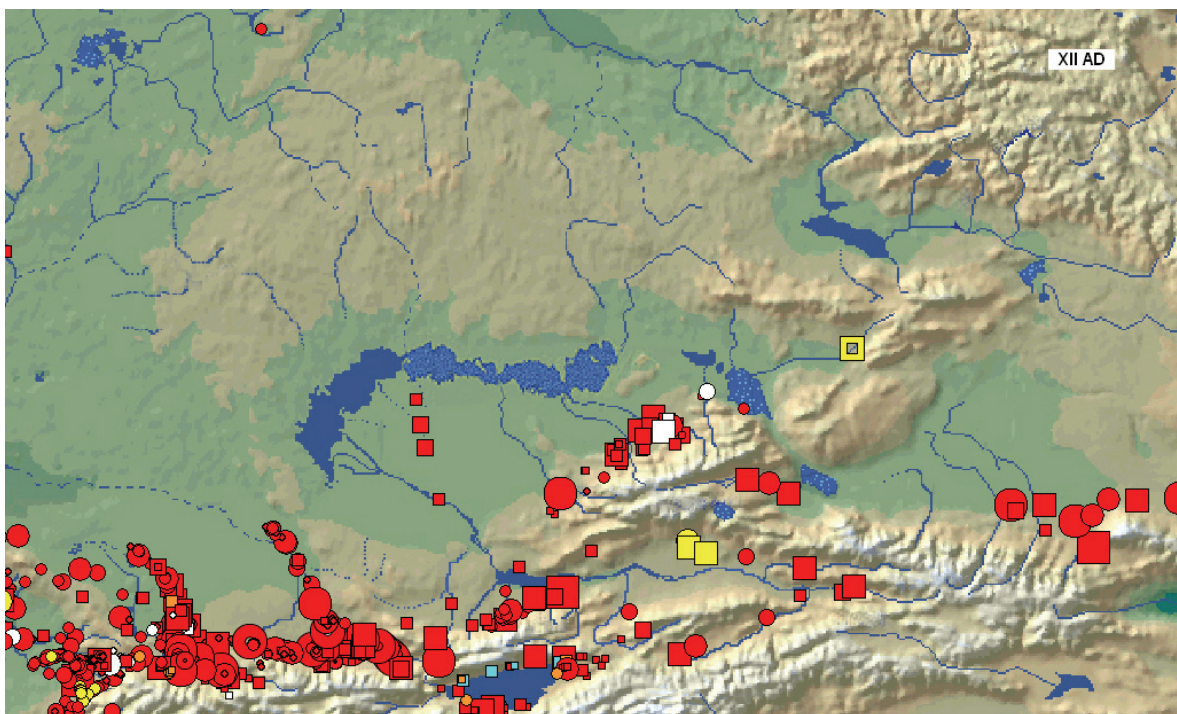


Fig 4-6. 12AD

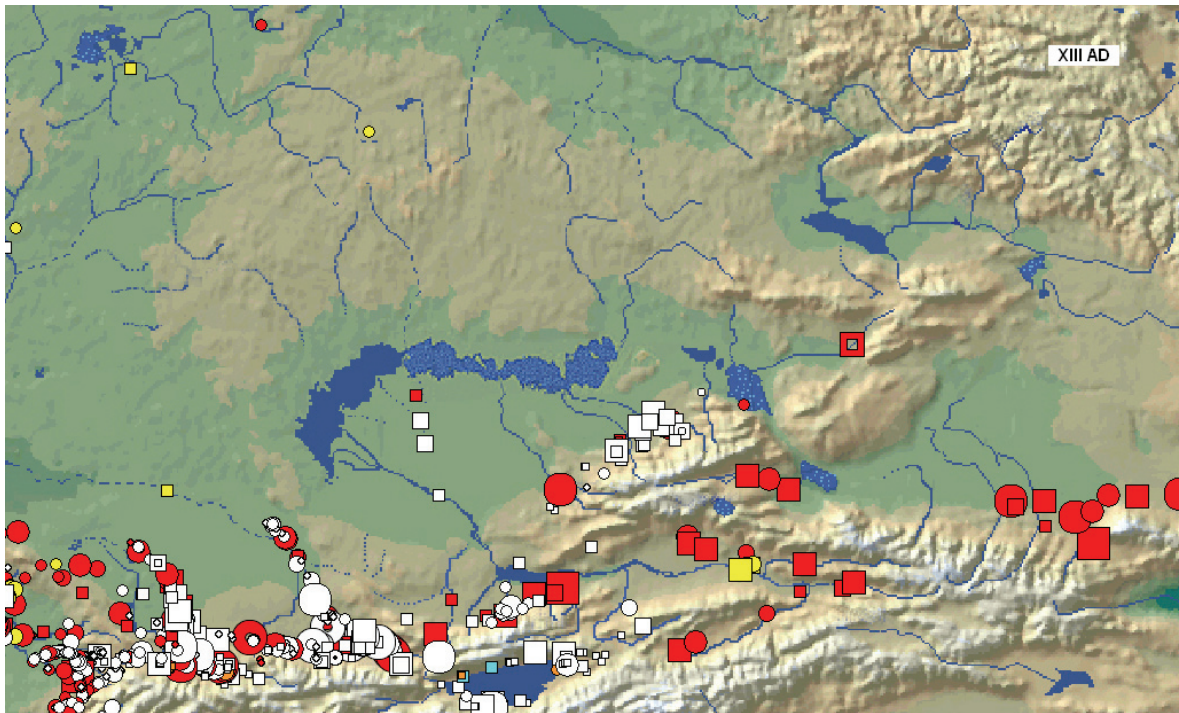


Fig 4-7. 13AD

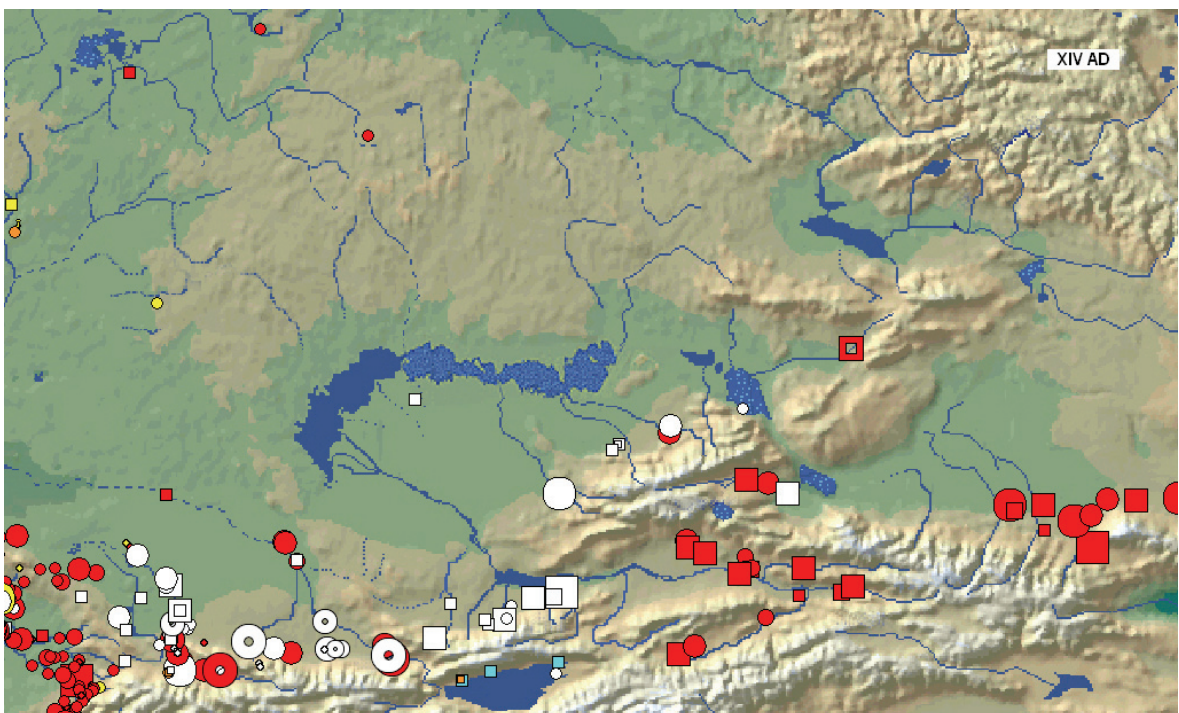


Fig 4-8. 14AD

3. *Interactions between Human Activities and the Environment in the Context of Historical Transitions in Subsistence*

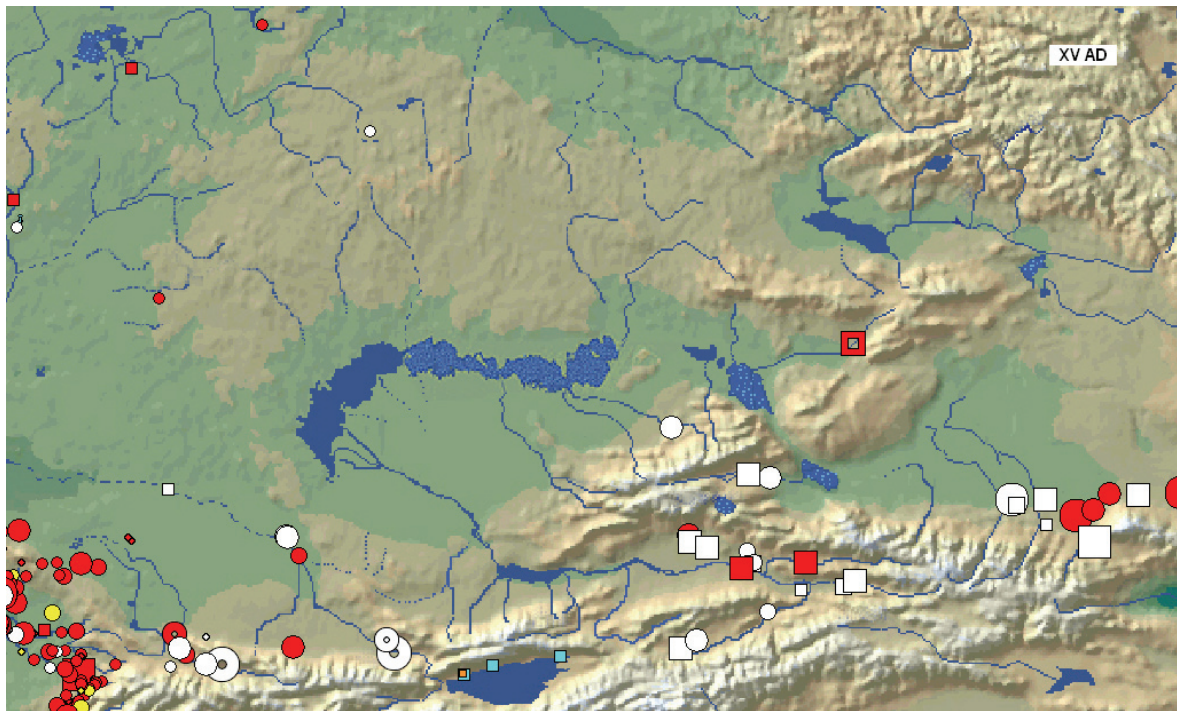


Fig 4-9. 15AD

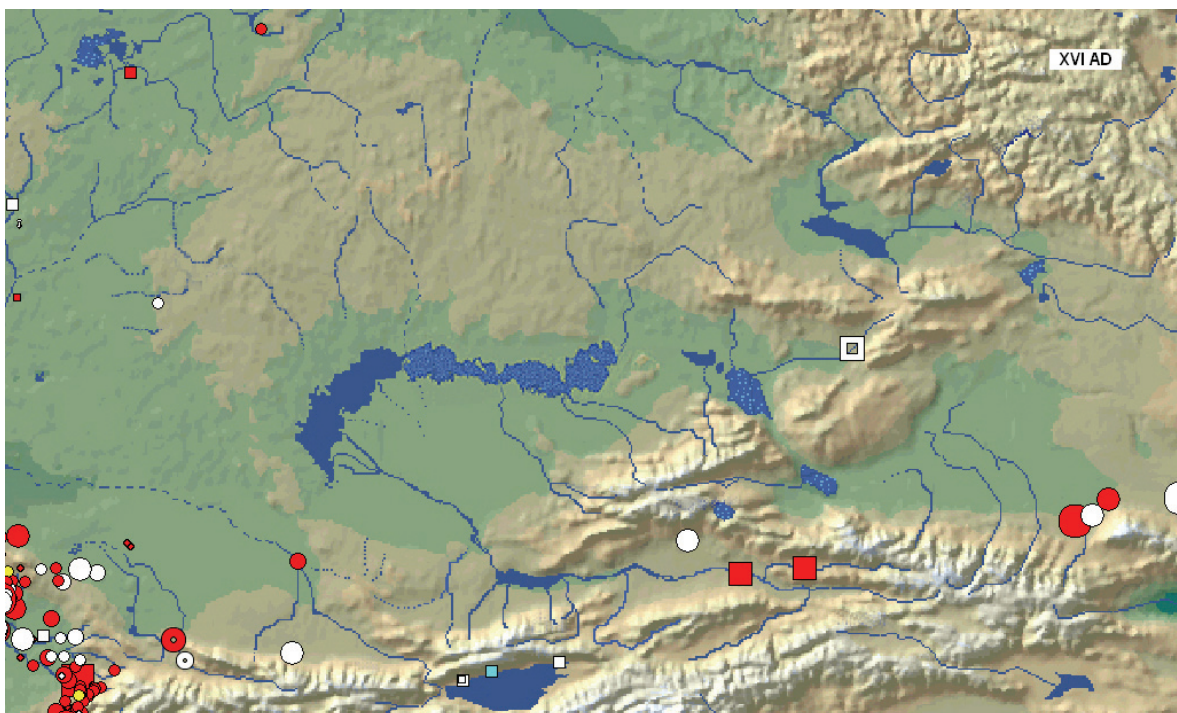


Fig 4-10. 16AD

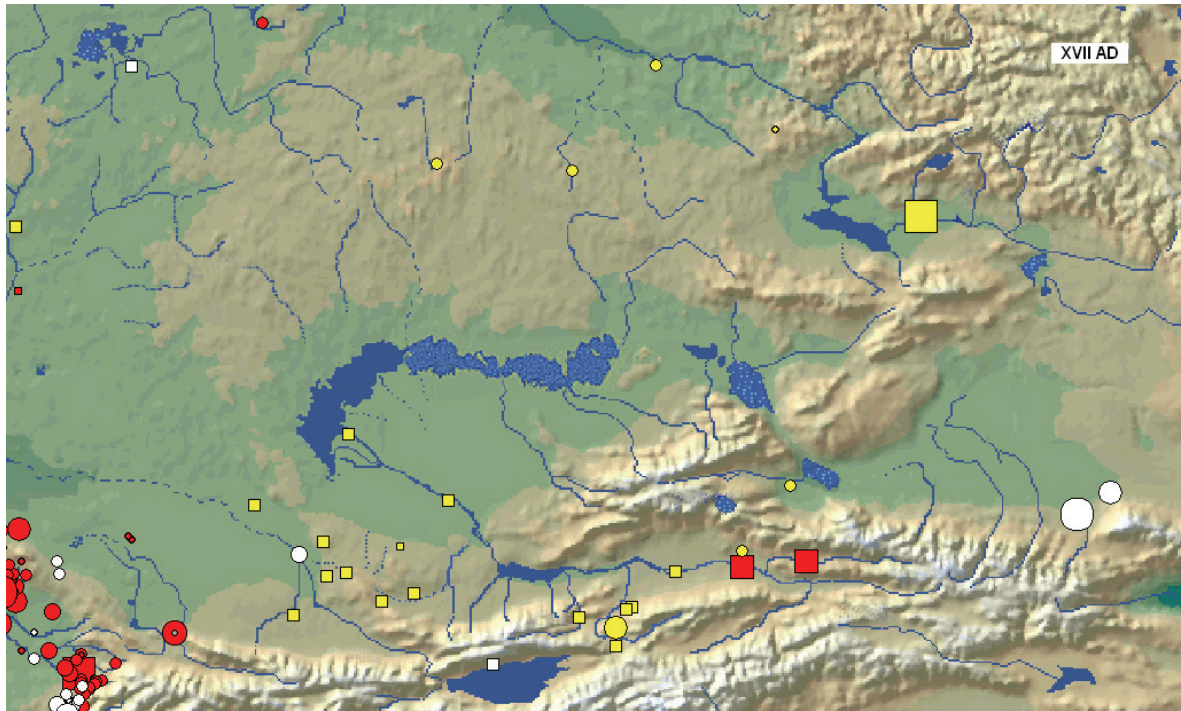


Fig 4-11. 17AD

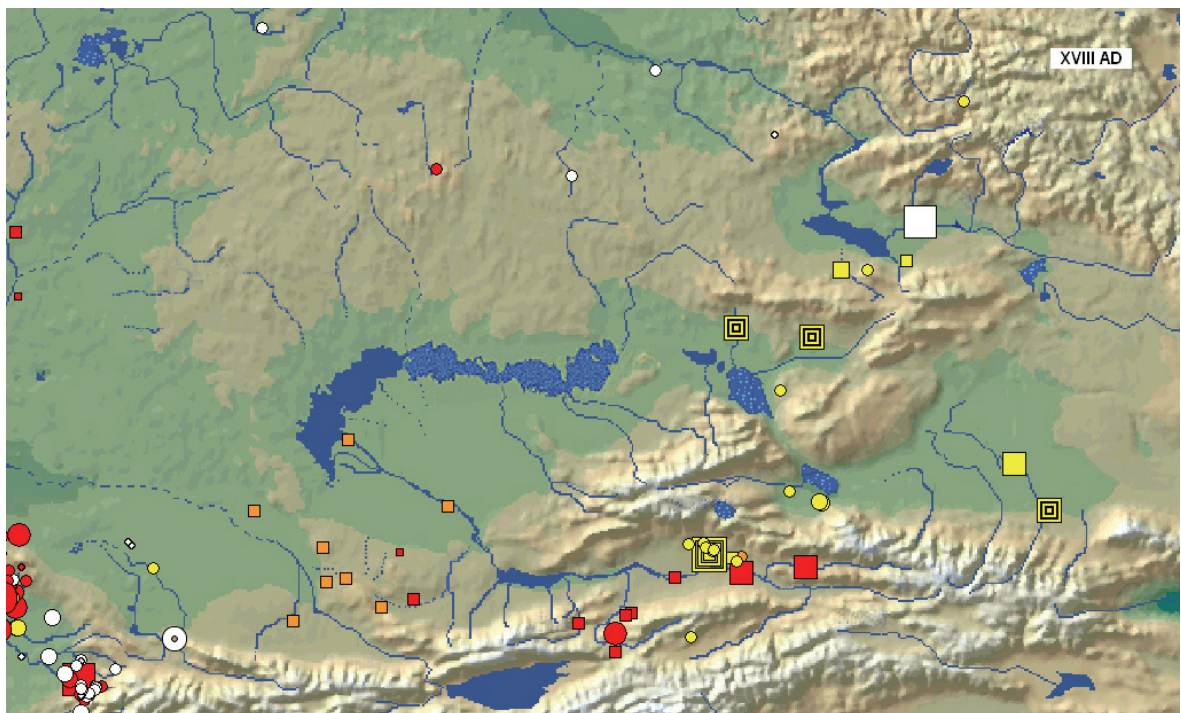


Fig 4-12. 18AD

3. *Interactions between Human Activities and the Environment in the Context of Historical Transitions in Subsistence*



Fig 4-13. 19AD

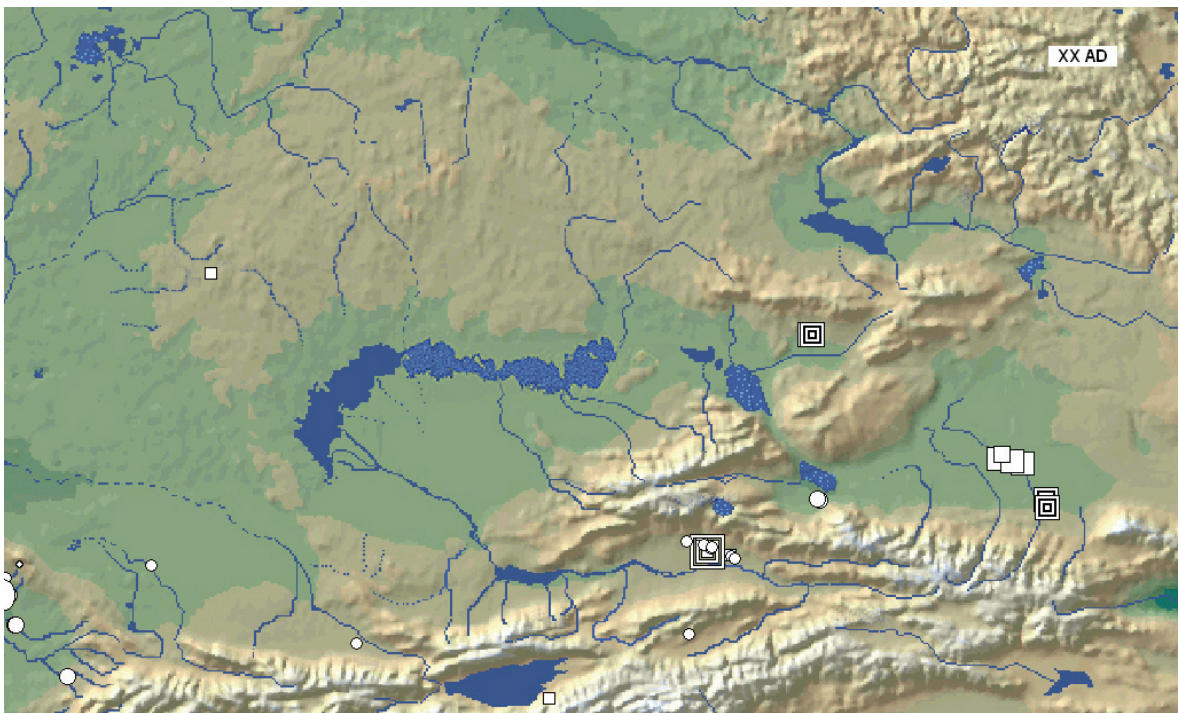


Fig 4-14. 20AD

Fig 4. Historical evolution, century by century, of urbanization in Semirechie (7-20th AD): 14 chronological maps of occupied settlements, marking location, size and shape. LEGEND: Roman numbers represent the century to which the map is related / Dot size: 5 different sizes indicate settlements that are very large (≥ 20 ha), large ($20 > x \geq 5$ ha), medium ($5 > x \geq 2$ ha), small ($2 > x \geq 0.5$) and very small ($0.5 > x \geq 0.01$ ha) / Dot form: round dots indicate oval, rectangular or irregular towns; round concentric dots indicate towns surrounded by out-walls several km long; square dots indicated square fortified tortkuls; square concentric dots indicate Chinese-type towns / Dot color: yellow indicates settlements built during the quoted century; red indicates settlements built previously and still occupied; white indicates settlements abandoned just before the start of the quoted century; orange indicates settlements lacking chronological fixation (like the Issykul settlements in the Chu region conventionally inserted in the 10-12th century figures)

4. Semirechie: Medieval urbanization, demography and climate

Preliminary estimates are provided below concerning demographic levels and climatic trends during the urbanization process in order to sort out possible correlations between the three processes.

4.1. Urbanization and demographic levels

An approximate evaluation of the development of demographic levels in Semirechie (middle Ili valley and Jungarian piedmonts) from the 7th to the 19th century AD has been attempted on the basis of historical estimates of world population provided by various authors (Biraben, Mc Evedy, UNESCO 1999, etc), of values of occupied urban surface, and of Chinese historical sources. Preliminary estimates (which could be adjusted by $\geq 30\%$) suggest that with the 8th century AD, an accelerated demographic growth starts in Semirechie that brings the population from 140000 people in the 7th century AD to a peak of 300000 in the 12th century AD, i.e., an average growth of 0.22 % per year. During the 11th century AD, of a total population of 230000 people, 87000 (37 % of the total) were living in towns (400 people per ha in a settlement park of 217 ha). The following two centuries, with economical crises, wars and black death ravaging the territory, are characterized by demographic contraction (to 240,000 in the 14th century); and the population levels of the 12th century AD are recovered only at the end of the 15th century AD. The following centuries represent a new phase of demographic expansion that, with an average yearly growth of 0.28 % per year, doubles the population to 600,000 people by 1850 AD. (Fig 5)

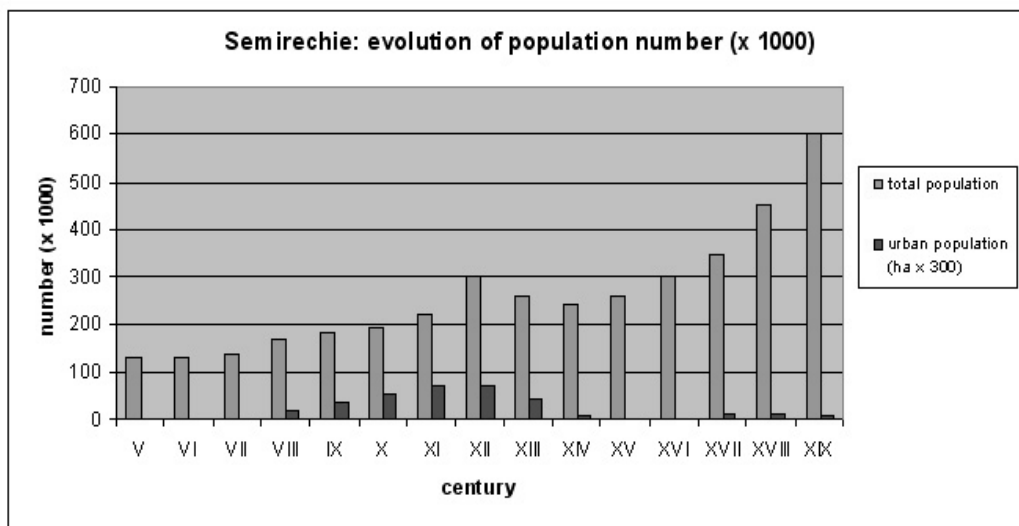


Fig 5 Semirechie: Evolution of population (7th-19th century AD) (elaboration by the author)

On the basis of these data, in Semirechie, the demographic expansion related to the urbanization of the 8th-12th century AD is slightly inferior to the expansion connected with the pastoralist use of the territory during the Jungar and Kazakh phases.

4.2. Urbanization and climate

Paleo-climatic fluctuations in the Semirechie region have been reconstructed on the basis of palynological analyses of samples from several sites of the mountain and plain zones. The results concerning the plain zone (Tamgaly site) are given in Graphic-15.

The development of climatic conditions in Semirechie in relation to the process of urbanization can be summarized as follows.

The flourishing period of Semirechie urbanization, between the 10th and the 12th century AD, happened under a climate that was becoming progressively warmer, drier, and less continental, until conditions similar to the modern climate were reached in the 12th century AD. The strongest regression of water level of Lake Balkhash, as well as the regression of the Aral Sea, happened from the 11th to the 13th century AD, and in both basins is most probably attributed to natural as well as anthropogenic factors, i.e., to a dry-hot climatic phase and to a peak of urbanization, agricultural activity and water use. Evidently anthropogenic water use increases during arid phases and, in Medieval times (like today), could have acted as positive feedback on a naturally induced regression of the Balkhash and Aral Lakes (Aubekerov et alia 2009).

The urban decay of the 13th and 14th century AD, following the Mongol invasion, coincides with a sudden fall of temperature and a slight rise of precipitation, representing the first of a series of cooling and pluvial phases that would continue until the 18th century AD.

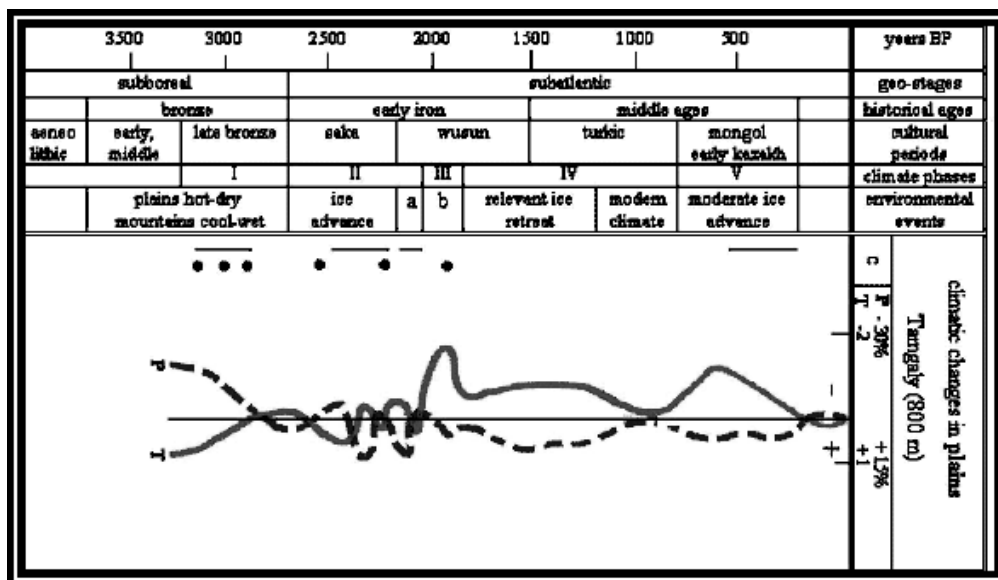


Fig 6. Semirechie: Reconstruction of average fluctuations of temperature and precipitation in the plains during the last 3200 yrs (150-yr temporal resolution), based on palynological analyses. LEGEND: Temperature (T) in continuous lines; Precipitation (P) in broken lines; (a) fires; (b) cryolithic formations; (c) chronological attribution provided by EPR and C14 analyses (dots) and archaeological correlation (segments) (Aubekerov, Sala, Nigmatova 2003)

This means that in Semirechie the development of towns and irrigation practices coincides with a progressive scarcity of water; and the pastoralist conversion that followed the Mongol invasion coincides with the start of a series of pluvial phases and the expansion of the steppe zone. (Fig 6)

5. Conclusion

The preliminary results of this research can be summarized, for the case of Northern Tienshan as a whole and in particular for Semirechie, as follows.

5.1. The urbanization of Northern Tienshan

The first wave of urbanization of the Northern Tienshan piedmonts proceeded from the west and from the east. In the west it started during the 1st century AD (Talas) and in the east during the 7th century AD (NE-Tienshan), reaching Semirechie as the last region during the 8th century AD. The western and eastern trends show different chronologies, settlement morphologies and functions, speeds of development, and political agents; and they affected in a complex way the urban development of Semirechie.

- The urbanization of the Northwestern Tienshan piedmonts (Talas and Chu basins) happened under the influence of the Zeravshan valley, which already reached the Chach region (right bank of Middle Syrdarya) and the NW Karatau piedmonts at the end of the I millennium BC, then the Talas delta at the beginning of the first millennium AD, and from there, in five centuries, the Chu basin. By the 8th century AD the Chu and Talas complexes constitute an integrated political, economical and urban system that flourished, like everywhere in the Northern Tienshan piedmonts, from the 9th to the 12th century, and faded during the following two centuries. Morphologically, the majority of the settlement park consists of rectangular and irregular towns, organically developed from smaller oval or circular tobe-type structures, ending up encircled by one or two ranges of planned rectangular walls and sometimes by out-walls several km long; and a 30-40% of it consists of tortkuls (Fig 2.1-2.5).
- The urbanization of Northeastern Tienshan consists of two waves, both starting under the impulse of Chinese dynasties. The first wave started and immediately flourished during the Tang dynasty in the 7th century AD under the influence of the urbanized oases of Tarim, and remained stable until the end of the 8th century AD. Then, after a long crisis following the Moghul rule, a second short-lived urban wave restarted in the 18th century under Manchu rule. Morphologically the entire urban complex consists of planned structures: very large rectangular towns (29% of total number, covering 73% of the total area) and tortkuls (59% of the total number but, smaller in size, covering 25% of the total area).
- The urbanization of Semirechie started as the last region during the 8th century AD, immediately following the expansion of the Chu urban complex and the rise of the NE-Tienshan complex, on the wave of their economical, political and military interaction; and quickly developed during the general flourishing of the 9th to the 12th century AD. After two centuries of progressive abandonment and two more centuries of total de-urbanization, a second urban wave of a very different character began in the 17th century AD and faded due to military conflict around the middle of the 18th century AD. Morphologically both waves practically consist of planned square walled urban structures (tortkuls and Chinese-type towns).

Semirechie has been the last territory to be urbanized, a kind of last frontier that, during the 11th century AD, was the only region of Northern Tienshan that saw the building of new urban structures around former urban centers or along roads.

Comparing the urban trends of Semirechie with those of its western and eastern neighbors, a distinction must be made between the first and the second wave.

The first wave of urbanization of the Northern Tienshan piedmonts happened first in Talas and Chu, then in NE-Tienshan, and finally in Semirechie (located between the other regions), with different trends and forms (classic organically developed West Central Asian towns and tortkuls in Talas and Chu, planned Chinese-type towns and tortkul in NE-Tienshan, tortkuls in Semirechie), with different economical functions (agricultural-metallurgic in Talas and Chu, agricultural-military in NE-Tienshan, commercial in Semirechie), and by the action of different agents (Turko-Sogdians and Karakhanids in Talas and Chu; Tang, Karluk and Uighurs in NE-Tienshan; Karluk in Semirechie).

The building of the urban complexes starts early and takes place gradually in Talas and Chu, starts early and takes place suddenly in NE-Tienshan, and starts late and is sudden in Semirechie.

Concerning the abandonment of the urban system, this starts simultaneously with the Mongol invasion (13th century AD) in Talas, Chu and Semirechie, where is accomplished by the end of the 14th century. In NE-Tienshan it starts 2 centuries later (15th century) under the Moghuls, and few towns are left until the establishment of the second urban wave. The urban complexes of Talas, Chu and Semirechie see a sudden dismantlement; by contrast the settlement park of NE-Tienshan decays in a gradual way over four centuries.

From a chronological point of view, the urban complex of Semirechie shows more affinities with those of Chu and Talas; and, from a morphological point of view (tortkul forms) and by the patterns of geographical diffusion, shows connections with NE-Tienshan. These similarities lead to the inference that the general urban and commercial activity following the rise of the Chu and NE-Tienshan urban complexes enhanced the importance of trade roads across Semirechie, favoring the rise of commercial and agricultural towns. At the same time, one suspects that those roads and settlements were controlled by tribes that eventually allied with the western powers but by themselves were of eastern origin or at least inspired by eastern urban constructions (the Karluk).

The second urban wave involves only the Semirechie and NE-Tienshan regions and has a totally different character. It started in East Kazakhstan and Semirechie during the 17th century AD under Jungar rule and developed further during the first half of the 18th century, slightly transgressing into the neighbouring regions of Issykul, Chu and NE-Tienshan. The type and function of the settlements is quite peculiar and, as a whole, represents a clear sample of 'nomadic' urbanization (see above). This second urban wave suddenly came to a halt within less than 2 centuries with the military defeat of its agents by the Chinese army. The defeat of the Jungars represents the start of a similarly short lived urbanization spurred by the Chinese Manchu dynasty, centred in NE-Tienshan and slightly involving the S-Tarbagatai piedmonts.

5.2. The urbanization of Semirechie

The further away one moves from the original centers of urbanization based on irrigated agriculture (the Zeravshan valley in the west and the Tarim in the east), the less one finds longstanding settlements endowed

with circular or irregular forms resulting from organic evolution from villages, and planned geometric fortified structures instead become dominant.

Before the 8th century AD, in the most remote areas of the Tianshan piedmonts like Semirechie, the first commercial dwellings were most probably simple bases for organizing the collection and trade of natural resources (metals, furs, stones, slaves) located beyond the reach of the main agro-irrigational urban centers and controlled by independent mobile and armed solidarity groups. The archaeological remains of these monuments are difficult to interpret.

Then, with the interaction of the Chu and NE-Tianshan urban cultures, trading activities increased and, in the 8th century AD, commercial routes crossing the Issykul and Semirechie territories grew in importance. Medieval “copper roads” connected the Ulytau and Sary-Arka regions along the Sarysu River, and both were connected with Semirechie and the northern piedmonts along the Chu valley. Wheat was imported by Kimak tribes from the Talas valley to the Irtysh basin. Along the so-called “mink-road”, Siberian furs were transported across the central part of Lake Balkhash during its regressive phase of the 9th to the 13th century AD, and along the Ili delta to Semirechie. Silver and gold mining brought the rapid development of the Talas valley and from there precious metals were exported along the Northern Tianshan piedmonts to the west and to the east, to Transoxiana and to China. As such, in the 8th century AD, under the impulse of these trading activities, the first primitive trading bases of Semirechie developed into walled settlements supported by local agro-pastoralist production. Their forms, simple and geometrical but massive, are clearly preserved up to the present day. They reflect the planned practical character of structures built in a few decennia in the context of large business purposes. The military strength of their robust defense walls is not surprising considering that their location faced huge wild expanses populated by habitual and non habitual plunderers. However, even these walls were not sufficient to protect the urban structures from being sacked a few times each century. Surely they were surrounded by villages, farms and seasonal camps, which all together constituted an integrated complex of which the systemic character has not yet attracted enough attention from archaeologists and historians. The main tendency for roads was to run along wet corridors and for settlements was to grow in areas endowed with water facilities and agro-pastoralist potential, so that roads and towns developed together in the same areas. Some tortkuls, when straightly aligned (like those between the Ili valley and the Jungarian piedmonts) must be interpreted as being purely functional to travel, transport and interregional commerce.

In general, we can say that in the case of Semirechie, more than agricultural activities, the development of roads and commercial opportunities between eastern, western and northern regions was the main factor that caused the sudden transformation of primitive camps and villages into large planned walled tortkuls from the 8th to the 12th century AD. In the same way, not military destruction but the commercial crisis and the pastoralist conversion that followed the Mongol invasion of the 13th century AD were the main factors that caused the sudden abandonment of the Semirechie urban park. As a whole, the urban system of Semirechie accomplished specific interregional functions of commercial and political character, which explains its chronological dependence on the development of the surrounding regions, its military morphology, and its high vulnerability to the economical and political crises of its neighboring regions.

Regarding the socio-political character of the Semirechie urban complex as a whole, it is possible to say that here, more than in the surrounding regions of Chu, Talas and NE-Tianshan, and surely more than in the hydraulic civilizations of Zeravshan and Tarim, the urban management of the first wave of medieval urbanization was not controlled by a political state-like centralized structure, but rather by an arising class of town-dwellers and farmers that were building and controlling individual towns in cooperation and conflict

with a solid class of tribal shepherds converted into interregional commercial agents and armed speculators. By contrast, the second wave of urbanization witnesses the presence of the solid centralized planning not just of individual urban units but of the whole strategic urban complex.

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