
CHRONOLOGICAL MODELLING OF THE WEST – EUROPEAN INFORMATION ABOUT THE MEDIEVAL MAPS OF THE OTTOMAN WORLD 16TH-18TH CENTURIES

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Abstract: *We present results of a study of the information about the medieval maps and travellers' geographic descriptions of Turkey. It is based on Ian Manners' monograph "European Cartographers and the Ottoman World 1500-1750" (University of Chicago, 2007). The obtained chronological distributions show some peculiarities; we discuss one of them.*

Keywords: *chronological distribution of information, ottoman world 1500-1750, maps, Little Ice Age*

ACM Classification Keywords: *I.6 SIMULATION AND MODELLING, I.6.3 Applications*

Introduction

The monograph "European Cartographers and the Ottoman World 1500-1750" and Maps from the Collections of O. J. Sopranos show the level of the mapmakers and the knowledge concerning the Turkish territory between the 15th and 18th centuries. It opens with the intellectual and geographical discoveries of the period that undermined the medieval view of the cosmos and illustrates how mapmakers sought to produce and map a new geography of the world. The maps depict a number of selected spots, characterized by their surface being constantly changed, the way they were at the time they were drawn (or the way the cartographer saw them) and they can also be regarded as universal means of communication. The old maps provide a lot of information on how the world was apprehended in the past.

The goal of the investigation is to find a comparative assessment of the number of the published maps in different periods of time. Here "a comparative assessment" means that we are not interested in the exact number of items. We are investigating the changes of this number in order to build a pattern of the chronologically distributed information as regarding the medieval maps of Turkey and to compare it with another kind of information about Turkey of the same period. The casually picked-up maps in the Sopranos collection are considered to be "representative" and give us the grounds to justify the hypothesis, that the chronological distribution of all maps of Turkey of the period between the 15th and 18th centuries, would be characterized by similarly the same peculiarities.

Used Data and methods

This study is based on bibliographic data published in Jan Manners' book "European cartographers and the Ottoman World 1500-1750" [Manners, 2007] and maps from the collection of O. J. Sopranos.

The book contains a list of maps which includes 59 exhibits (List of figures).

From page 21 to page 57 there are included the following sections: "Mapping and discovery during the Renaissance", The "rediscovery" of Ptolemy, "Asia Propria" – and sixteenth century Ptolemaist Atlases and Isma'il Abu al Fida [Manners, 2007]. There are 57 exhibits enumerated. The information from pages 57 – 67

comprises the section "The Mediterranean Traditions of Carting" and it includes 18 exhibits. From page 61 to page 81 there are depicted maps of cities which existed during this period (Mapping the city). Most numerous are the maps of Istanbul (Constantinople) – 10 of them. There are maps of Babylon, Damascus, Alexandria, Medina, Mecca, Jerusalem and still others. The section of maps drawn by explorers in these lands (Through the eyes of travelers) includes the information from page 81 to page 95 as well as 25 exhibits.

The basis of the idea for the study in this paper of a set of objects is called chronological distribution of information in historical texts: in the article [Tabov, 2003] J. Tabov has proposed methodology for its construction. Its variations have been applied to the design of specific "historical allocations" (abbreviated as XP) for coin finds [Tabov et al, 2003] of old manuscripts [Tabov et al, 2004] which have reached to us as well as other written sources: [Hristova and Dobрева, 2004], [Tabov & Panayotova, 2010].

Chronological distributions

The chronological distribution of the old maps illustrates the intensive use of maps in the 16th-18th centuries.

The command "search" includes maps from List of figures from the respective intervals of time. There are 59 exhibits corresponding to periods of 25 years.

The information is presented in the following table, where in $L(x)$ there is denoted the distribution of these 59 maps over periods of 25 years.

	To 1500	1500- 1525	1525- 1550	1550- 1575	1575- 1600	1600- 1625	1625- 1650	1650- 1675	1675- 1700	1700- 1725	1725- 1750	After 1750
$L(x)$	3	1	6	15	2	2	0	6	8	6	3	7
$\frac{1}{2}[L(x)+L(x+1)]$	-	2	3,5	10,5	8,5	2	1	3	7	7	4,5	5

Table 1.

The data can be considered as a time series and there can be investigated the trends in specific variables over time. Using the method of "averaging" the peaks and troughs of any seasonal influences are smoothed by the process. This follows from the substitution of the initial levels of the row with the arithmetic average in the selected time interval (third row of Table 1).

According to the third row of Table 1 we construct a graph (in Excel) of the chronological distribution of the maps listed in "List of figures" of the monograph of Manners [Manners, 2007].

The exhibits included in the present list (from a chronological point of view and complied with the year of printing) represent a random sample of published during the period of 1500-1750 maps of the Ottoman Empire. Table 1 and Diagram 1 may be regarded as a reference to chronological distribution of all published maps of the Empire.

The graph shows the following anomaly: during the period from 1600 to 1650 - in the course of 50 years there were published very few maps, a fact that requires special studies, analyses and explanations. In the period around 1540 - 1580 there was a maximum of all graphs. An increase of the number of published maps is observed after the year of 1650.

Similar anomalies are observed in other publications related to the history of the Ottoman world during this period. Significant decrease in the amount of information has been established by other studies: [Kiel, 2005], [Tabov & Panayotova, 2010] and etc.

The book [Kiel, 2005] offered an explanation that regards this anomaly as a result of climatic changes - the so-called "Little Ice Age", which in recent years has been actively discussed in the scientific literature. We will draw attention to two of the most important summarizing researches on this topic – those of Loehle - 2007 and Huston McCulloch from the year of 2008.

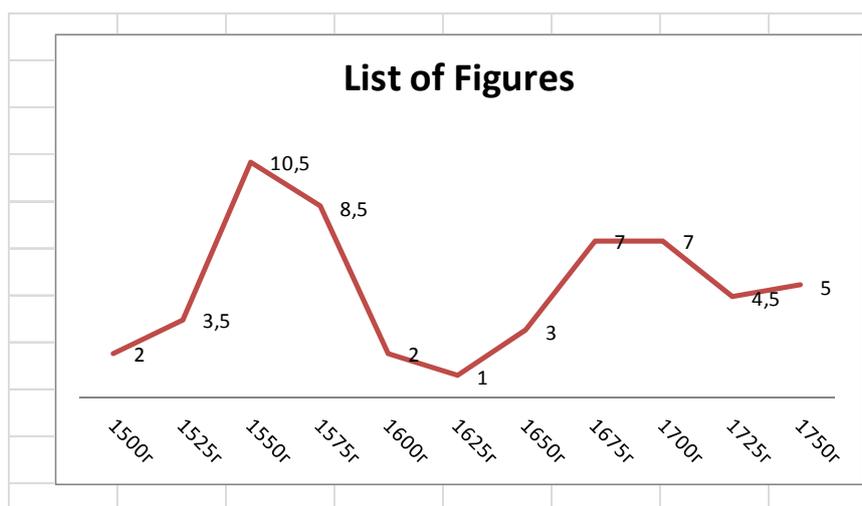


Diagram 1. Chronological distribution of the maps in "List of figures"

In Diagram 2 there is shown a graph of the variation of the average annual temperature from 1400 to 1800 in [Loehle and Huston McCulloch, 2008]. The three lines indicate the highest, middle and lowest deviation from the average (conditionally) annual temperature for the period.

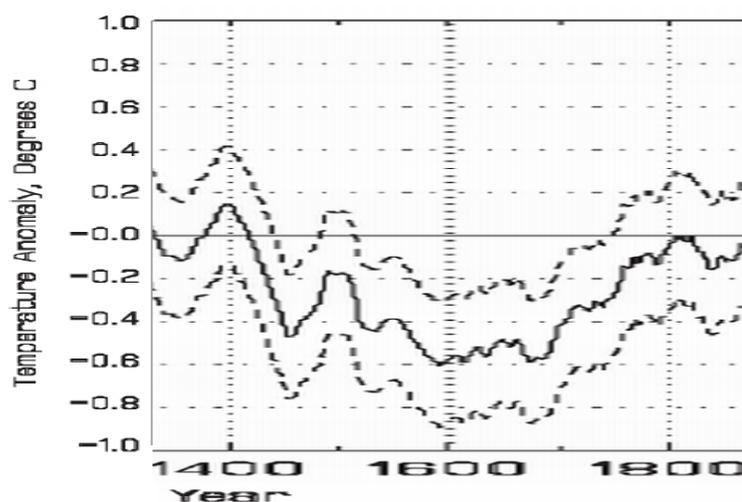


Diagram 2. Graph of the deviation from the average annual temperature from 1400 to 1800 in [Loehle and Huston McCulloch, 2008]

We will use simple graphic (for the period 1500-1700) of the average deviation from the mean annual temperature. The construction of this graph is based in Diagram 2 and shown in Diagram 3. Here the intervals are within 25 years.

The information is presented in Table 2 (second row), where T^o denotes the average deviation of the mean annual temperature in each period.

	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1750
T^o	- 0,20	- 0,44	- 0,40	- 0,53	- 0,57	-0,52	- 0,50	- 0,60	- 0,40	- 0,30	- 0,25
$\frac{1}{2}L(x)+L(x+1)$	2	3,5	10,5	8,5	2	1	3	7	7	4,5	5

Table 2.

In Diagram 3 there is shown a simple graph of the deviation from the average annual temperature for the period 1500-1700.

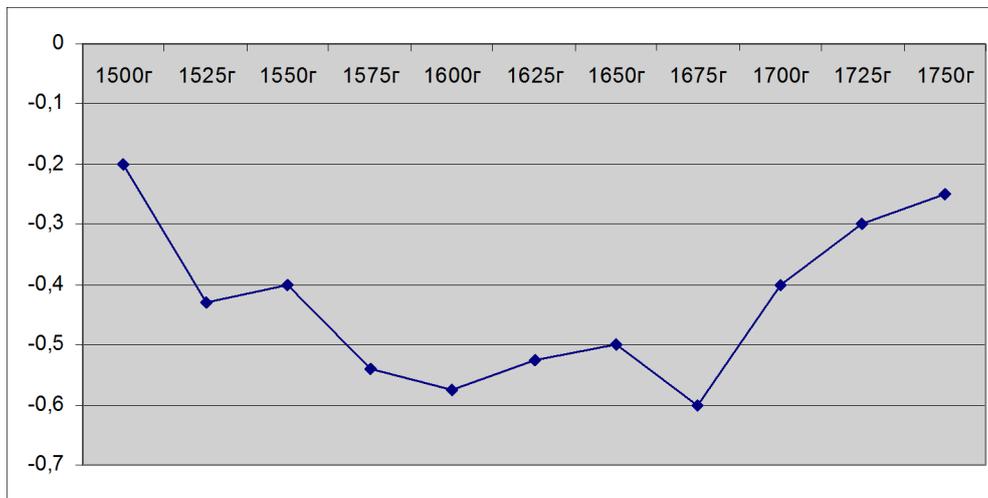


Diagram 3. Simple graphic of the average deviation from the average annual temperature for the period 1500-1700

The data of Table 2 enable us to check the hypothesis of a correlation between the chronological distribution of the maps in "List of figures" of the monograph of Manners [Manners, 2007] and the deviation from the average annual temperature for the period 1500-1700. Using standard software we calculate the coefficient of correlation which is

$$R = - 0,189740344$$

This result gives reason to conclude that there is no direct correlation between the values that are being compared, i.e. Kiel assumption is unfounded.

Concluding remarks

The above brief analysis of randomly chosen quantitative information from the exhibit European Cartographers and the Ottoman World 1500-1750; Maps from the Collections of O.J.Sopranos provide evidence in support of the following:

- i) In chronological distribution of the number of maps that are the subject of our study, we can judge for the "intensity" of the maps published at different times. Comparing the periods and amplitudes of the growth

and decrease we notice some features that require special studies, analyses and explanations. There are features such as - a small number of maps in the first half of the 17th century.

- ii) There's been tested the hypothesis of the existence of correlation between chronological distribution of the maps in "List of figures" of the monograph of Manners [Manners, 2007] and the average deviation from the mean annual temperature for the period 1500-1700. There's also calculated a slight negative correlation. The result shows that climate change is not the cause of perceived anomalies.

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