

## The Importance of Maps at the Archaeological Excavations Works

İbrahim Murat OZULU, Mustafa SÜEL, Fazlı Engin TOMBUŞ,  
Mustafa COŞAR and Murat ŞAHİN, Turkey



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

- ▶ The Anatolian peninsula, a settlement area which hosted to a number of civilizations throughout the ages, has archaeologically a deep cultural structure and wealthy cultural properties.



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage: 5844  
İbrahim Murat Ozulu, Mustafa Suel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

► The term “Culture”



- The fact that Turkey has a huge wealth for the cultural properties and the importance of this wealth for the common history of mankind is undisputed.
- So each archaeological research in this region has a certain importance not only for cultural facts of Turkey, and also for the humankind.



---



▶ The word “archaeology”

▶ Archaeological excavation

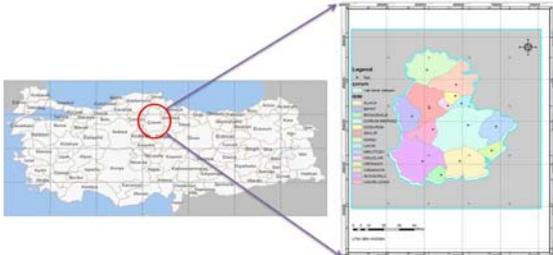


FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Ordu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

## STUDY AREA

---



▶ **Çorum** is a province in Turkey, lying both inside the Middle Black Seas region and also inside Central Anatolian region



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Ordu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

- ▶ The opportunities, which the geographical position, geographical characteristics and the resources, especially the mines, of this city provide, ensure that Çorum has an outstanding cultural level which has improved throughout the history of humanity in Near East, and that the territory in question remains in contact with both eastern and western cultures



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

Ibrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)



- ▶ However Boğazkale-Hattuşa has appeared in “UNESCO’s World Heritage List” since 1986 and the Boğazköy archives including cuneiform tablets also take place in the “UNESCO’s World Memory Registers” from 2001



On the left: Anatolian Hittite (19th-18th century BC)



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

Ibrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)



The Name of Archaeological Area	Beginning Date of Excavation	President of Excavation
Boğazköy- Hattuşa	1906	Dr. Andreas Schachahner
Alacahöyük	1996 (1907)	Dr. Aykut Çınaroğlu
Ortaköy-Şapinuva	1992	Dr. Aygül Süel
Resuloğlu Cemetery-Settlement Area	2003 (1968-1983)	Dr. Tayfun Yıldırım
Eskiyapar	2010	Dr. Tuğç Sipahi



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Ordu, Mustafa Süel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)



## The Phases of Archaeological Field Studies

- ▶ Survey
- ▶ Test excavation
- ▶ Excavation
- ▶ Analyses and researches
- ▶ Documentation and reports
- ▶ Curation



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Ordu, Mustafa Süel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)



### THE MAPS AND MAPPING IN ARCHAEOLOGICAL FIELD STUDIES

- ▶ In archaeological studies, the maps are used for different goals from the phase of planning the survey to the exhibition phase in every stage.
- ▶ The visual mappings relating to the archaeological area will provide easy-comprehensible additional information to the decision makes, so it will ensure to keep on the archaeological studies in a systematic manner.
- ▶ If the data acquiring from the archaeological excavations are treated with maps, or during the creation process of a new map or matching a number of maps each other, it will be required to use Geographic Information System (GIS).



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

### DIAGNOSING THE PROBLEMS

- ▶ Using the different coordinate (projection) systems.
- ▶ Producing final maps in different scales.
- ▶ The measurement errors due to using different measurement techniques.
- ▶ Using a symbol in legend in different meanings (deficiencies in standard illustration).
- ▶ Not including some information such as the creation date, publication date etc.
- ▶ Deficiencies for routing and informing.
- ▶ Not including the contour lines or the information about their intervals.
- ▶ Inconsistencies between the textual information about the area and illustration.
- ▶ Deficiencies about the updates.
- ▶ Deficiencies in 3D studies.
- ▶ The basic analyzes on the numerical maps can't perform, because of using printed maps.



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

### Suggestions for the Solutions of Problems

- ▶ From the statistical information, reports and final maps which are acquired by questioning, analyses and modeling practices performing by means of both attributive and graphic information of archaeological data in numerical environment, it will enable to reach new and different approaches.
- ▶ In order to get efficiency from the archaeology based projects, it is required a field administrator, it is important that the plan of field administration has feasibility and updateability characteristics.
- ▶ To create a plan of field administration, it required to evaluate a number of variables such as physical condition, threats and constrains.



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

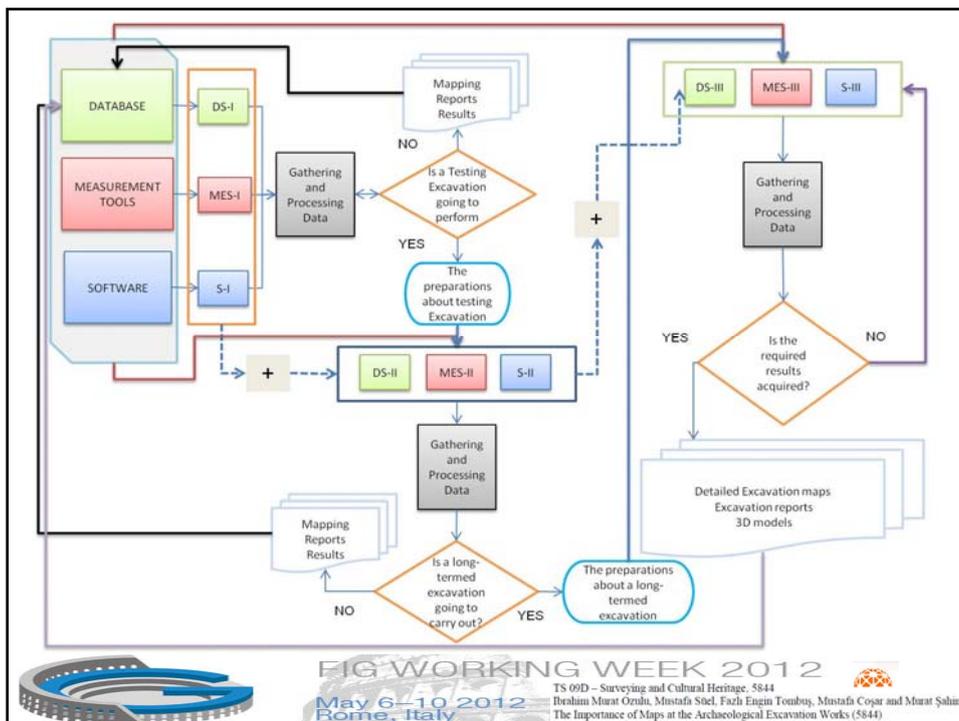
TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)

- ▶ The results acquiring from GIS can be used to support the decision about an archaeological artifact from an excavation. The final decision, concerning that GIS outcomes affect the decisions in which mechanisms, belongs only to the decision-maker.



FIG WORKING WEEK 2012  
May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844  
İbrahim Murat Özulu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin  
The Importance of Maps at the Archaeological Excavation Works (5844)



	PHASE 1	PHASE 2	PHASE 3
	SURVEY	TESTING EXCAVATION	EXCAVATION
TARGET	Documenting the archaeological artifacts acquiring from the pre-defined area, registering them to the maps and marking on them.	Detecting the archaeological levels in a small area defining during the excavation or a survey and examining these levels.	Detecting archaeological levels in a pre-defined archaeological area by long-termed studies, and determining the probable relationships between these levels and neighboring settlements.
Data sets using before the Study	Data Set I (DS-I) STH at scales of 1/25000 Cadastral map at scales of 1/5000 SYM/ DEM (Altitudes) Satellites images > 5m Aerial photos; Geologic maps The literature relating with the area.	Data Set II + (DS-I) Cadastral map at scales of 1/2000; Zoning sheet at scales of 1/1000; Satellites images > 5m Aerial photos LIDAR Survey maps.	Data Set III + (DS-I) + (DS-II) Final maps about drillings; Topographic maps at scales of 1/1000; Aerial Photos (Balloon-Drones)
The Measurement Tools using in Field	Set I of Measurement Tools - (MES-I) GPS/ DGPS; Portable GIS record unit including digital records formats; Digital Photo cameras etc.	Set II of Measurement Tools - + (MES-I) DGPS/RTK-GPS; GPR (Topographic radar); Nivo- Total Station; Detailed register forms.	Set III of Measurement Tools - + (MES-I) + (MES-II) Robotic Total Station Topographic Laser Scanner Balloon- Drones Video and audio recorder etc.
Software	Software Set I (S-I) GPS, CAD and CBS software; Data Transfer Software; Image Processing Software; Office Programs.	Software Set II + (S-I) GPR; Programs about cartography; 3D generating programs.	Software set III + (S-I) + (S-II) Programs about modeling an animation; Architectural programs; Laser scanning Software using to scan the topography; Image Processing software.
OPERATION	GATHERING AND PROCESSING PROCESSES OF DATA		
RESULT	Producing new data; Documentation; Registration; Producing data suited for standards; Survey Reports.	Creating detailed maps; Documentation; Registration; Producing data suited for standards; Drilling excavation reports.	Creating detailed maps of excavation area; Documentation; 3D Models; Producing outcomes suited for Standards. Regular Excavation reports.
DECISION	A decision about whether a testing excavation will perform, or not.	A decision about whether a long-termed excavation will perform, or not.	Planning the excavation - to determine the spatial relationships in other sites.
	The projection system must be indicated formerly. For the maps which will be included to the system, the transformation parameter has to be calculated. (The projection system suggested for Çorum is UTM ZONE 36N-WGS84)		

## RESULTS

- ▶ In a condition of establishing the system which we point out in this context, updating the data from the scientific researches in the archaeological sites, reaching to the information resources and sharing the data will be so quickly and safely. The practices about accessing the data, questioning and reporting the results can be performed safely and quickly apart from the time.



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

İbrahim Murat Özlü, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin

The Importance of Maps at the Archaeological Excavation Works (5844)



## RESULTS

- ▶ By using the sets of data, which we offer as a suggestion here, the measurement tools and software in the archaeological studies, we can produce maps which are suitable for the pre-defined standards.
- ▶ The maps in question will be equipped with a number of characteristics such as accuracy, relevance for the purpose, lucidity, comprehensibility, easy readability and aesthetic.
- ▶ The data which are required by users will be transferred in an accurate, qualified and reliable manner, according to a certain systematic.



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

İbrahim Murat Özlü, Mustafa Söel, Fazlı Engin Tombul, Mustafa Coşar and Murat Şahin

The Importance of Maps at the Archaeological Excavation Works (5844)



## RESULTS

---

- ▶ As the accuracy and the quality of data from the working fields increase, the practices can be varied in this degree.
  
- ▶ Increasing practices in variety will contribute to produce solutions which assist to put forward the facts of history of humanity, to identify the remains both under the surface and above the earth which is the target of archaeological studies and to discover the ancient marks.



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

Ibrahim Murat Ozulu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin

The Importance of Maps at the Archaeological Excavation Works (5844)



- 
- ▶ Thank you for listening
  
  - ▶ Grazie per l'ascolto



FIG WORKING WEEK 2012

May 6–10 2012  
Rome, Italy

TS 09D – Surveying and Cultural Heritage, 5844

Ibrahim Murat Ozulu, Mustafa Söel, Fazlı Engin Tombuş, Mustafa Coşar and Murat Şahin

The Importance of Maps at the Archaeological Excavation Works (5844)

