

# Mapping Classical Greek Cities with Archaeological Geophysics



Ian Moffat  
McDonald Institute for Archaeological Research, University of Cambridge

# Co-authors

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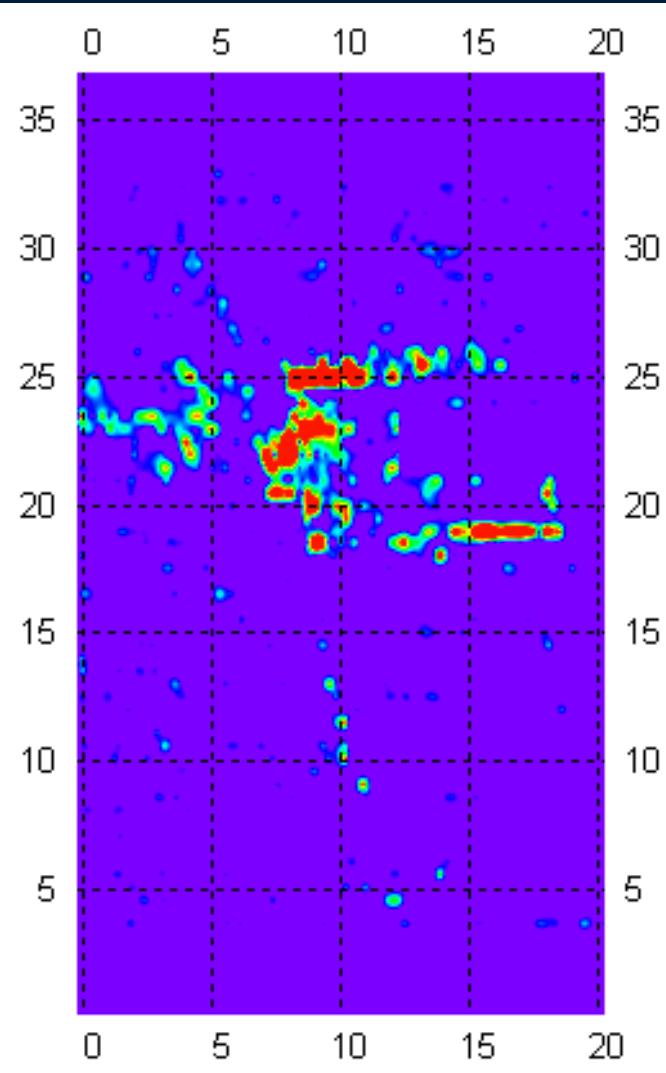
Nikos Papadopoulos, Jamie Donati, Apostolos Sarris, Tuna Kalayci, Carmen Cuenca-García, Gianluca Cantoro, Nasos Argyriou, Kayt Armstrong, Evita Kalogiropoulou, Meropi Manataki, François-Xavier Simon, Anna-Vasiliki Karapanagiotou & Georgia Hadji-Spiliopoulou

# “Traditional” Archaeology



- Focus of archaeological excavation is on detailed investigation rather than site coverage
- Decision on where to locate excavation units is often arbitrary
- Surface survey is a poor predictor of the location of sub-surface material

# Archaeological Geophysics



- Traditionally “Archaeological Prospection”
- Small areas, well defined targets
- Little funding, antiquated instruments
- Geophysical methods are often poorly understood by archaeologists

# The problem is....

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# Geophysics on a Landscape Scale

How do we bring  
them together?



# High Quality Positioning



# Multi-Sensor



# Multi-Method



# Case Study: Ancient Greek Cities

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- Spatial organization of urbanism in Ancient Greece is poorly understood
- Traditional archaeological excavation can only investigate a small fraction of these spatially extensive sites.
- Geophysics and remote sensing facilitates the analysis of the spatial organization of urban settlements outside of the central core.
- Ancient Cities project ([ancientcity.ims.forth.gr](http://ancientcity.ims.forth.gr)) takes a multi-settlement and multi-instrument approach

# Case Studies: Elis and Mantinea

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# Mantinea

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Established in mid 6<sup>th</sup>- mid 5<sup>th</sup> century B.C.E.

Destroyed by Spartans in 385 B.C.E. and Antigonos Doson in 222  
B.C.E.

Major excavations 1887-1889 by French School at Athens

Elliptical shape defined by defensive walls

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# Elis

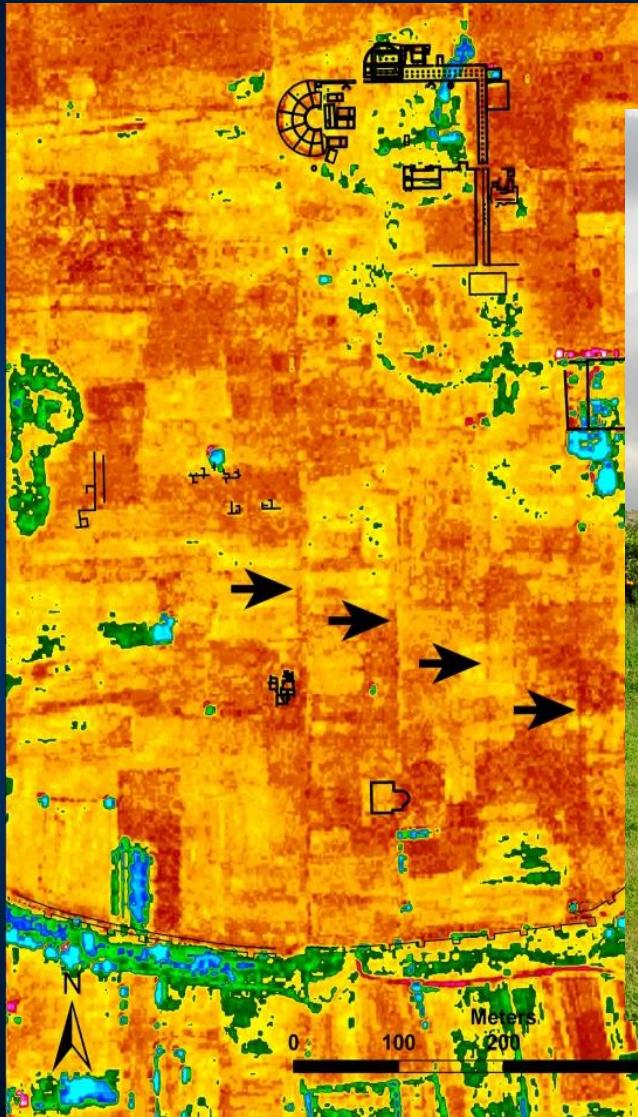
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Formed by the amalgamation of small villages in 471 B.C.E.  
Overseer of the Sanctuary of Zeus at Olympia and the administrator of the Ancient Olympic Games  
Major excavations 1910-1914 and 1960-1990 by Austrian Archaeological Institute

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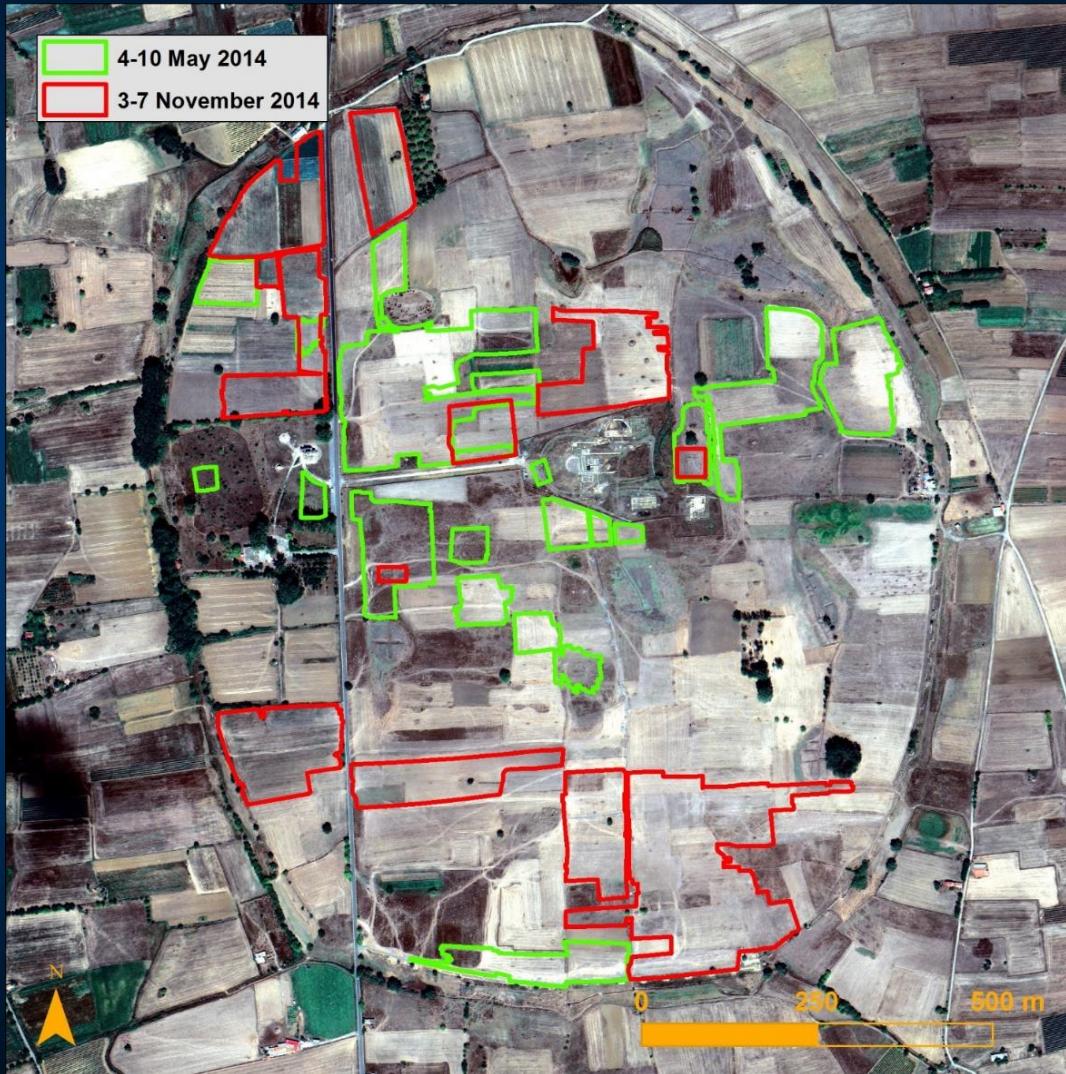
# Satellite, UAV and Positioning



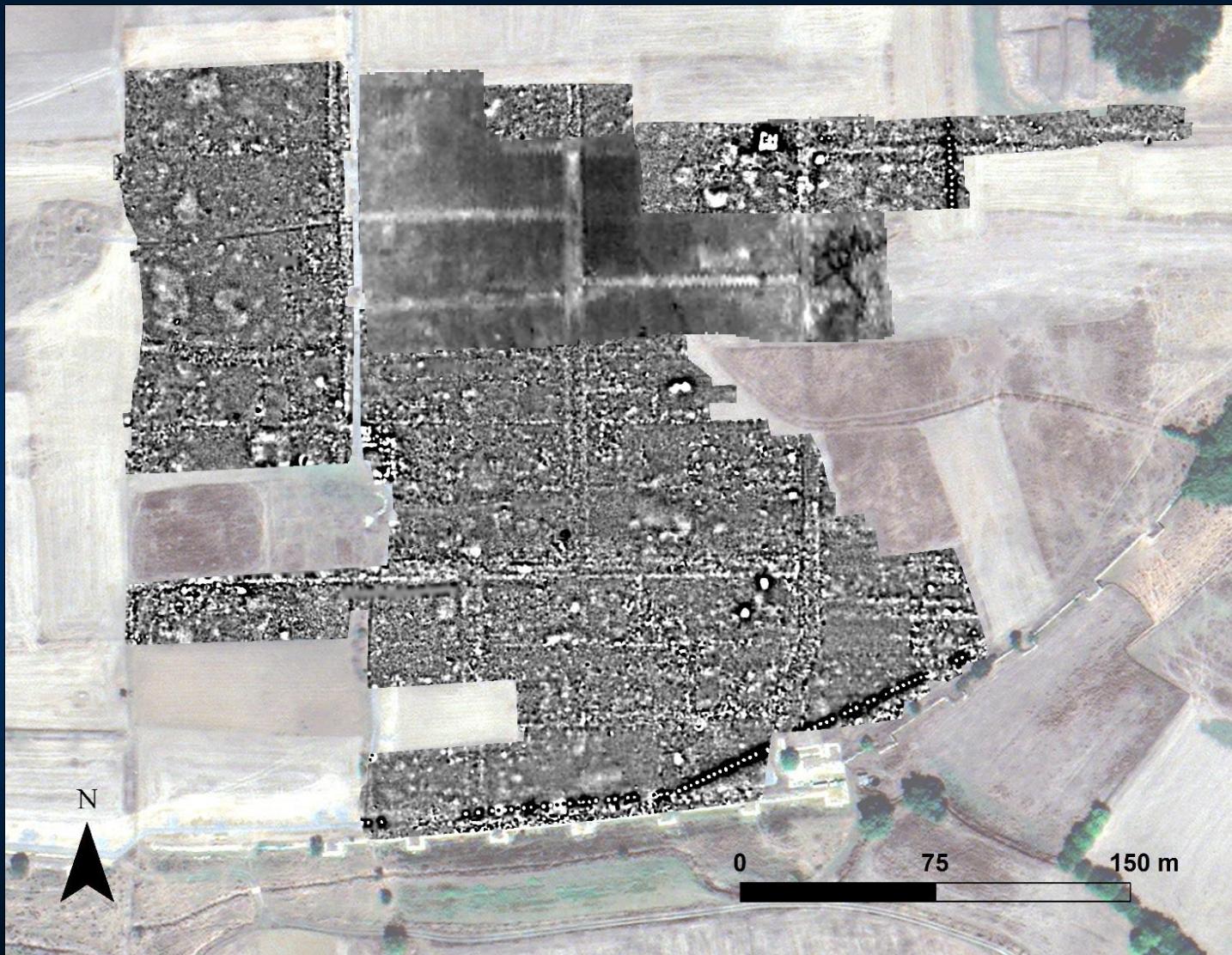
# Geophysical Techniques



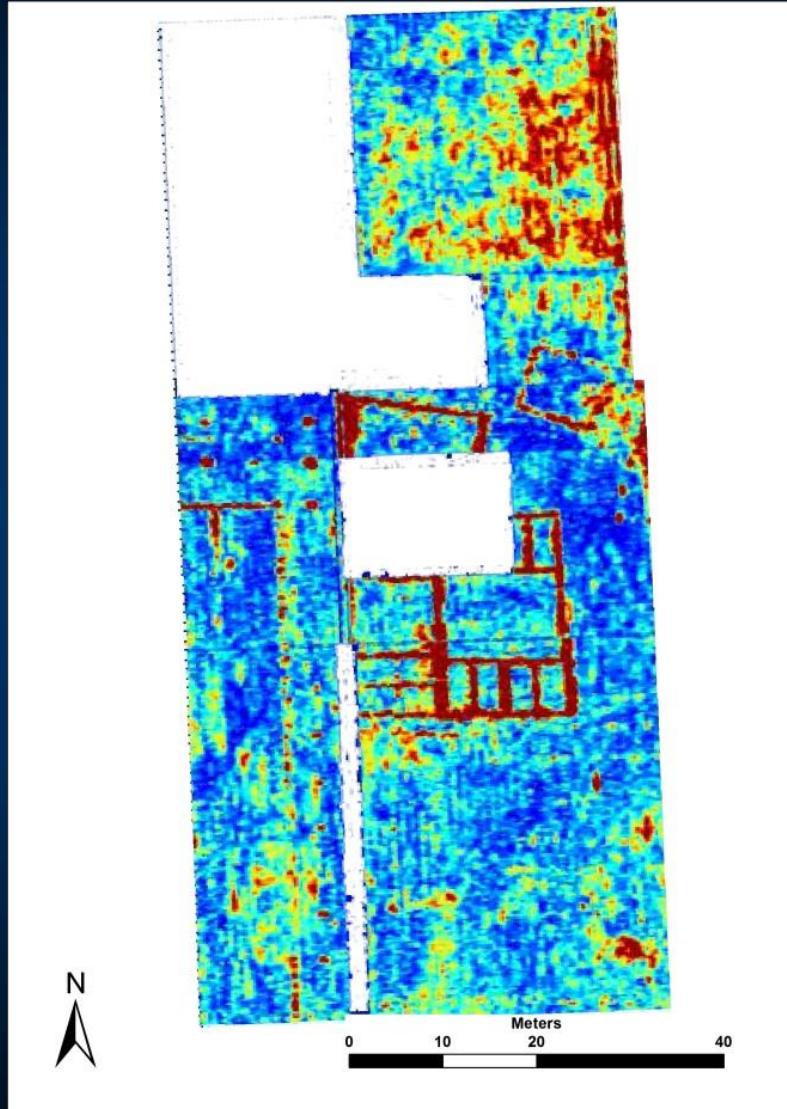
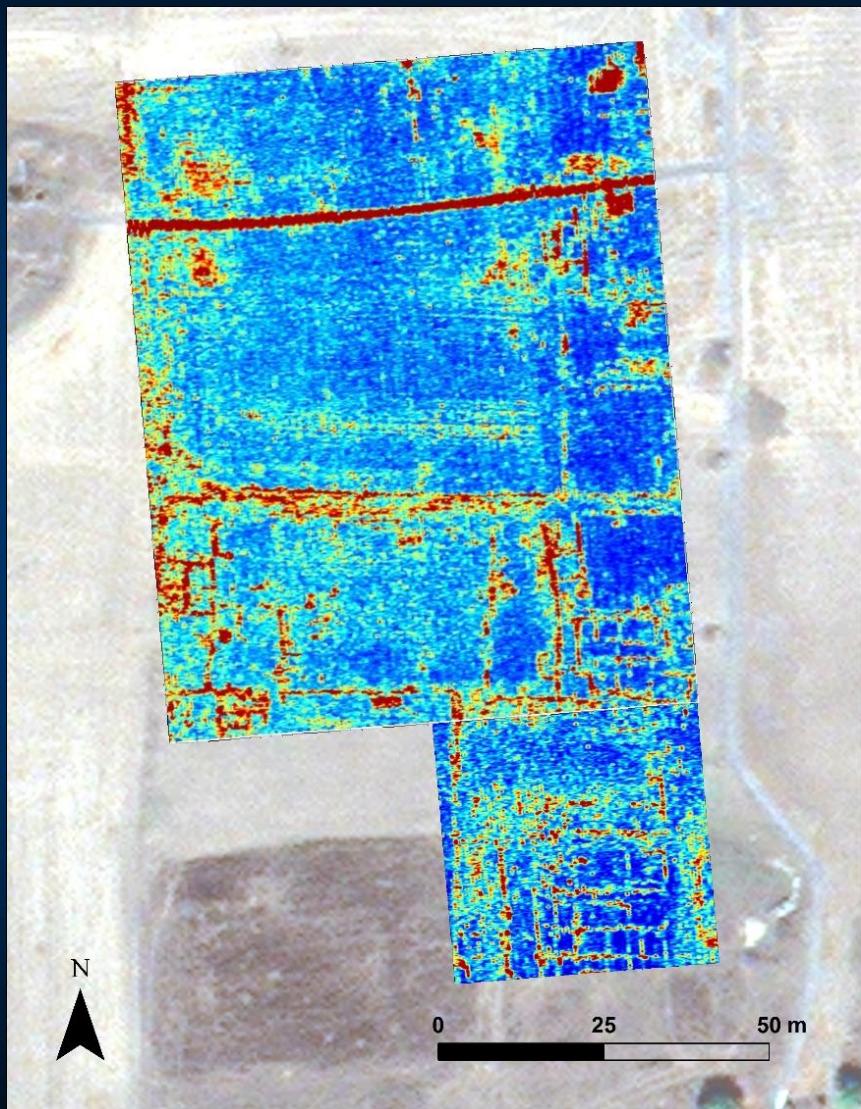
# Mantinea Survey



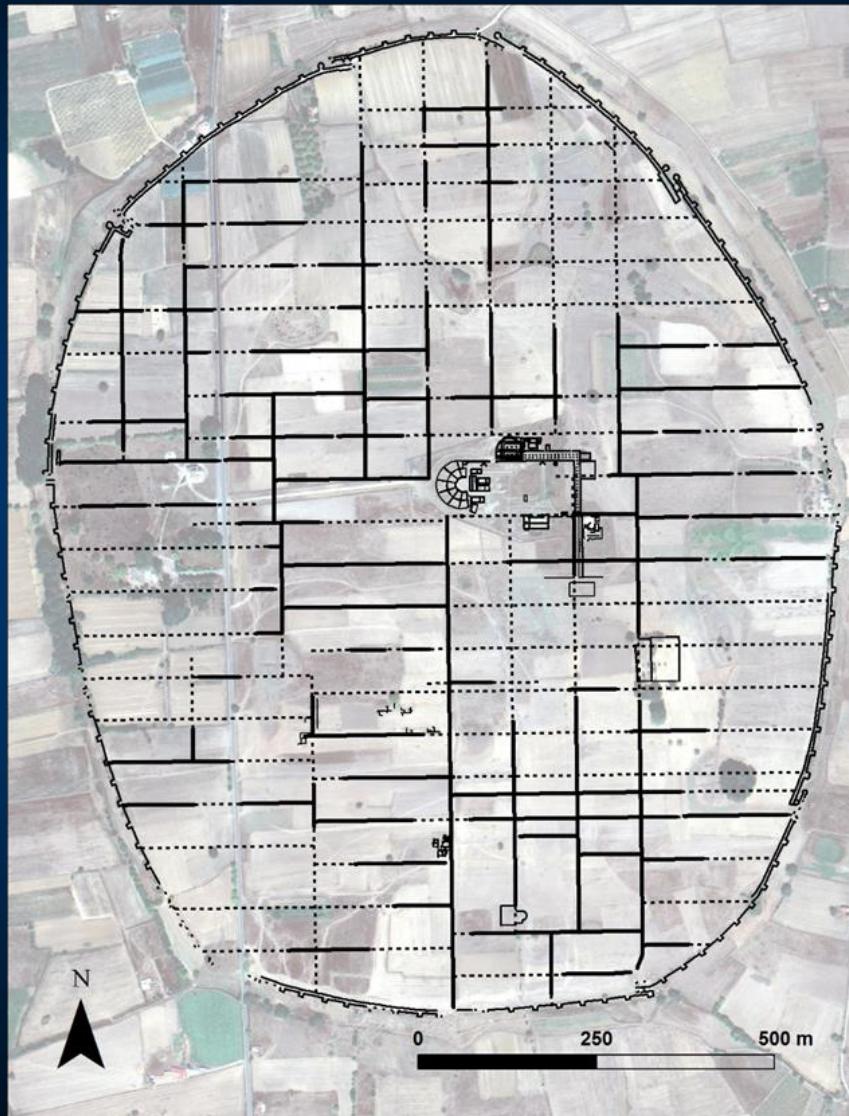
# Mantinea EMI and Magnetics Results



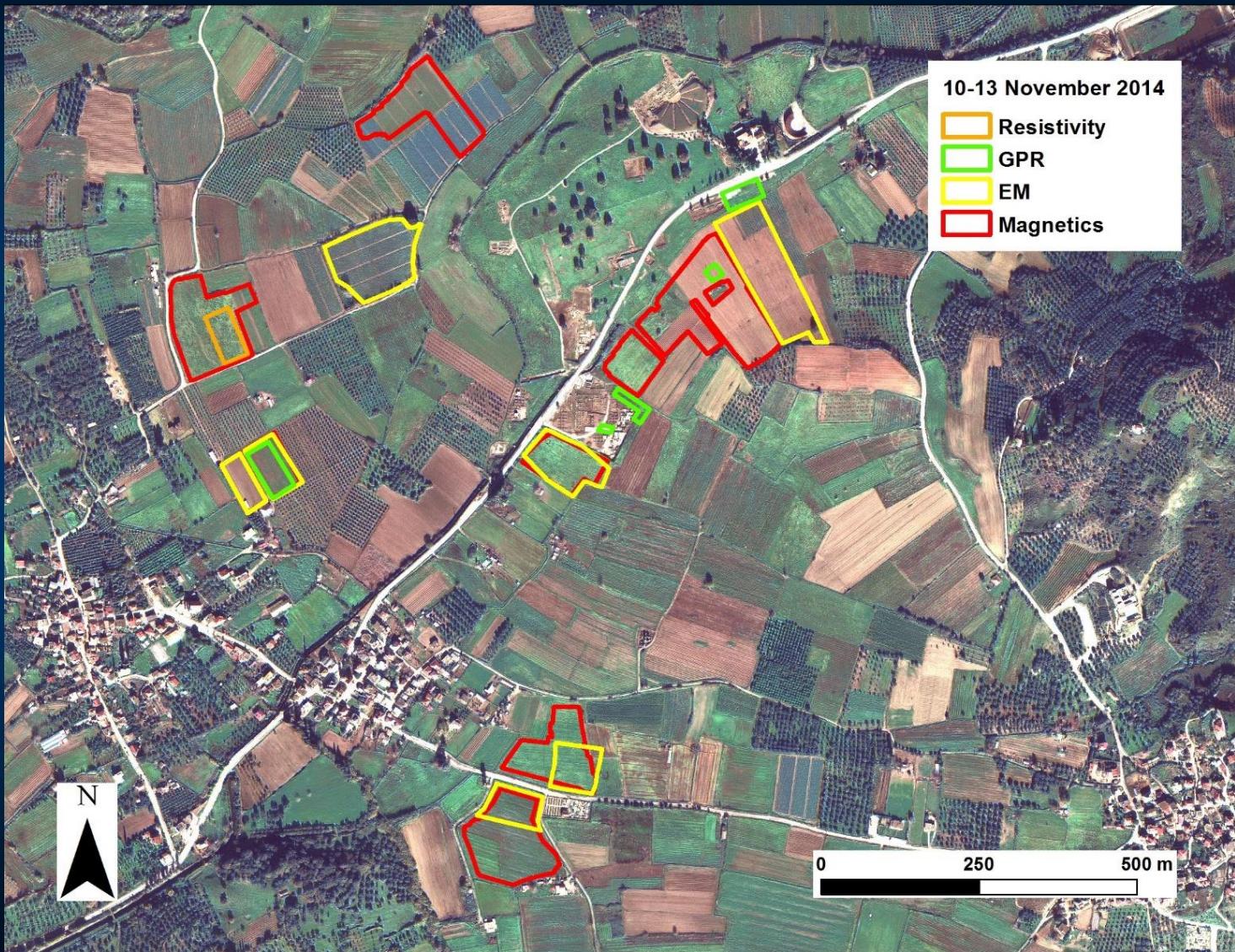
# Mantinea GPR Results



# Mantinea Combined Interpretation



# Elis Survey

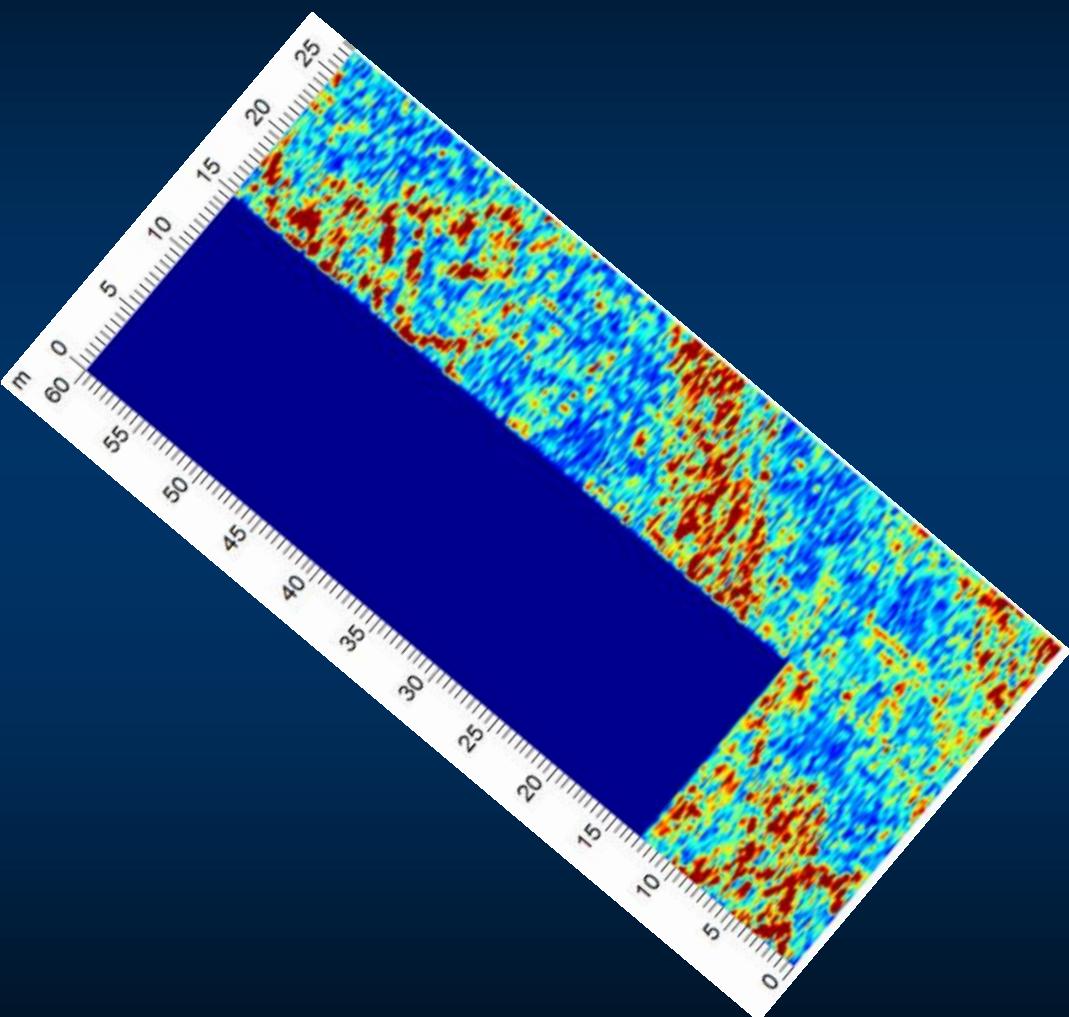


# Elis EMI and Mag

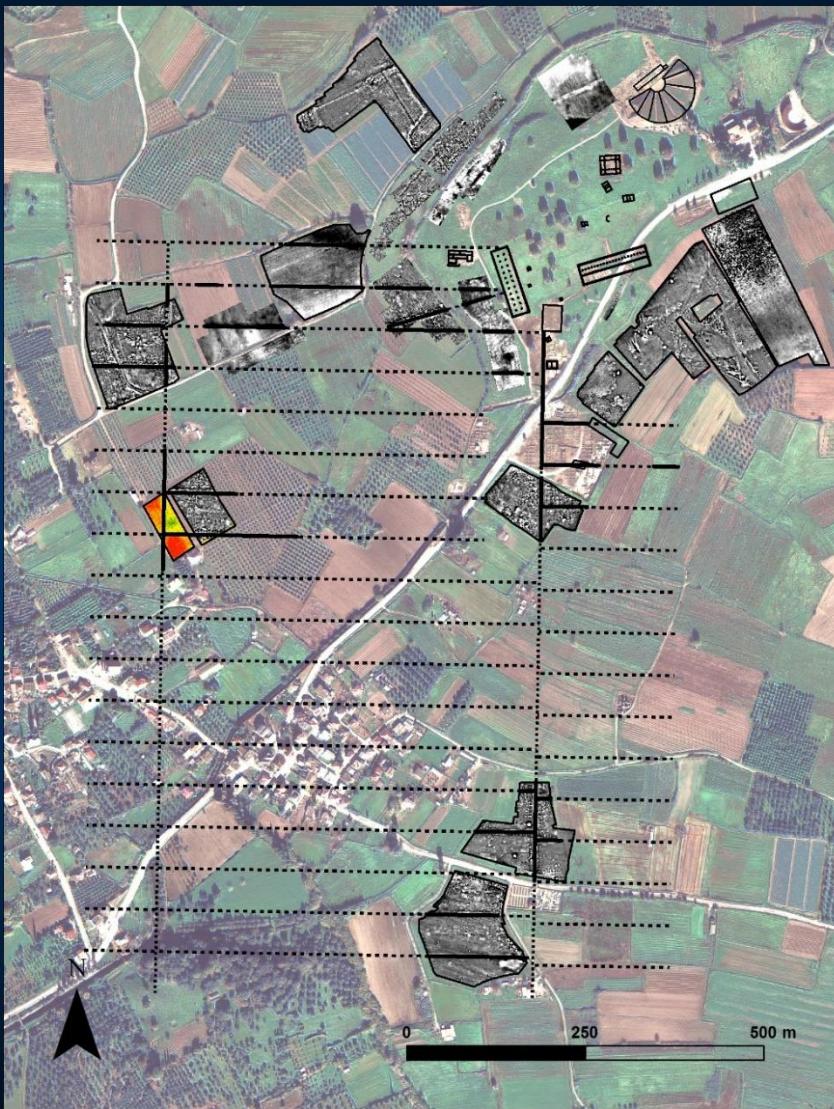
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# Elis GPR

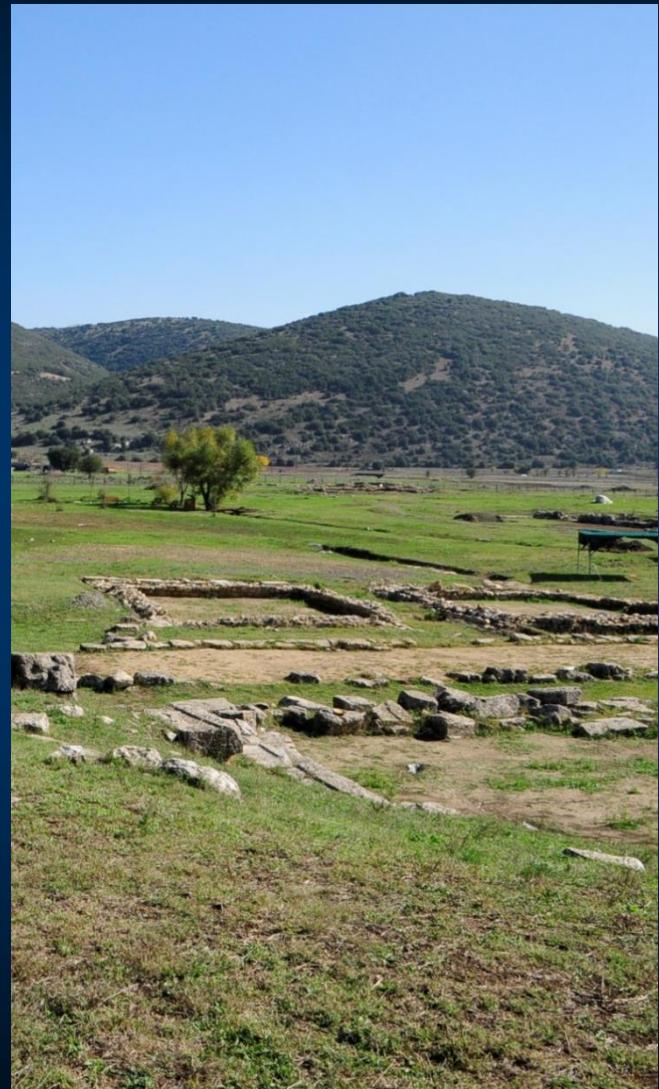


# Elis Combined Interpretation



# Mantinea and Elis Conclusions

- Both cities are significantly larger than previously revealed through excavations
- Both cities have extensive orthogonal street networks
- The entire walled area of Mantinea appears to be full of streets
- The extent of Elis is undefined to the south or the west including under the modern town of Kalivia



# A Bigger Picture

## Beyond Archaeological Prospection



to Geophysical Archaeology

# Not Enough Archaeological Geophysics?

Moffat, I., Papadopoulos, N., Donati, J., Sarris, A., Kalayci, T., Cuenca-García, C., Cantoro, G., Argyriou, N., Armstrong, K., Kalogiropoulou, E., Manataki, M., Simon, F-X., Karapanagiotou, A-V. and Hadji-Spiliopoulou, G., 2015, *Multi-Component Geophysical Survey at the Classical Greek Cities of Mantinea and Elis*, Antiquity (Project Gallery), 89 (345).

and

Donati, J.C., Sarris, A., Papadopoulos, N., Kalayci, T., Simon, F-X., Manataki, M., **Moffat, I.** and Cuenca-Garcia, C., 2017, *A Regional Approach to Greek Urban Studies Through Multi-Settlement Geophysical Survey*, Journal of Field Archaeology, 42(5), 450-467

