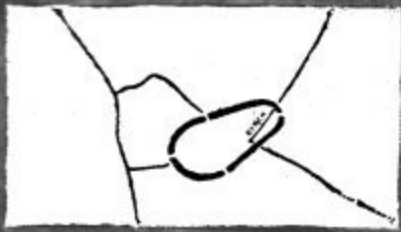


Beyond point clouds: developing a workflow for volumetric data capture

A case study from Archaeology



Aerial Photography

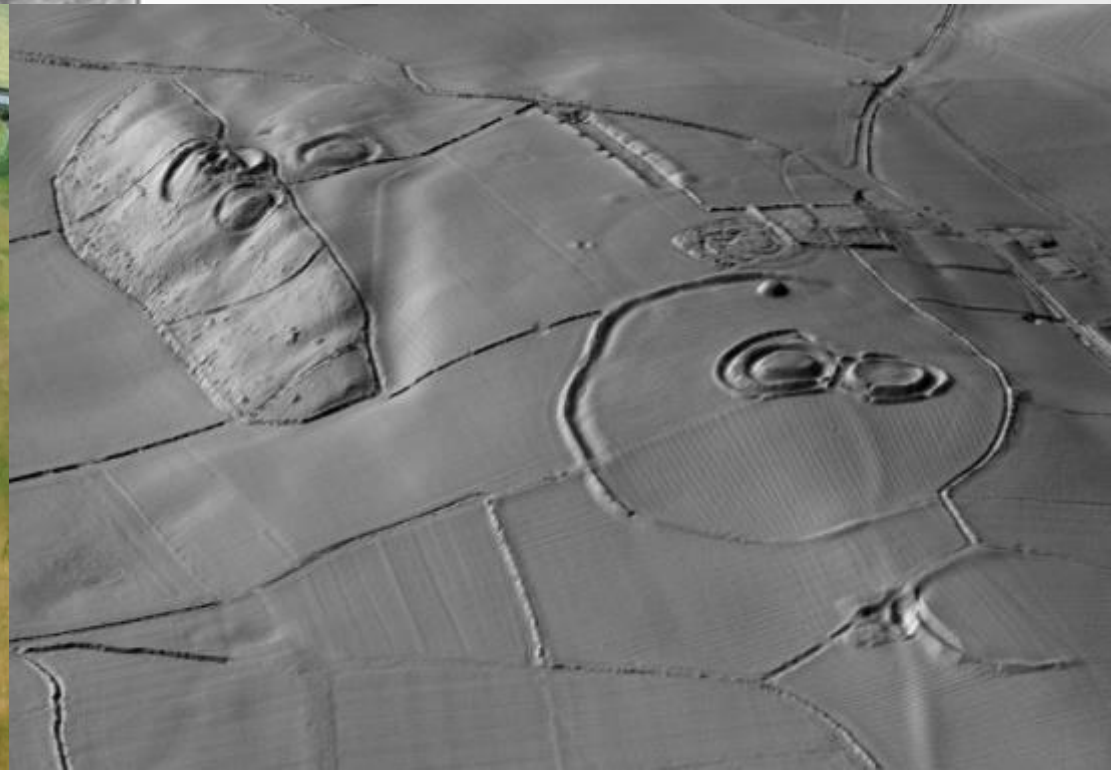
Satellite Imagery

Geophysics

Laser scanning (LiDAR, etc.)

Photogrammetry (Structure from Motion)

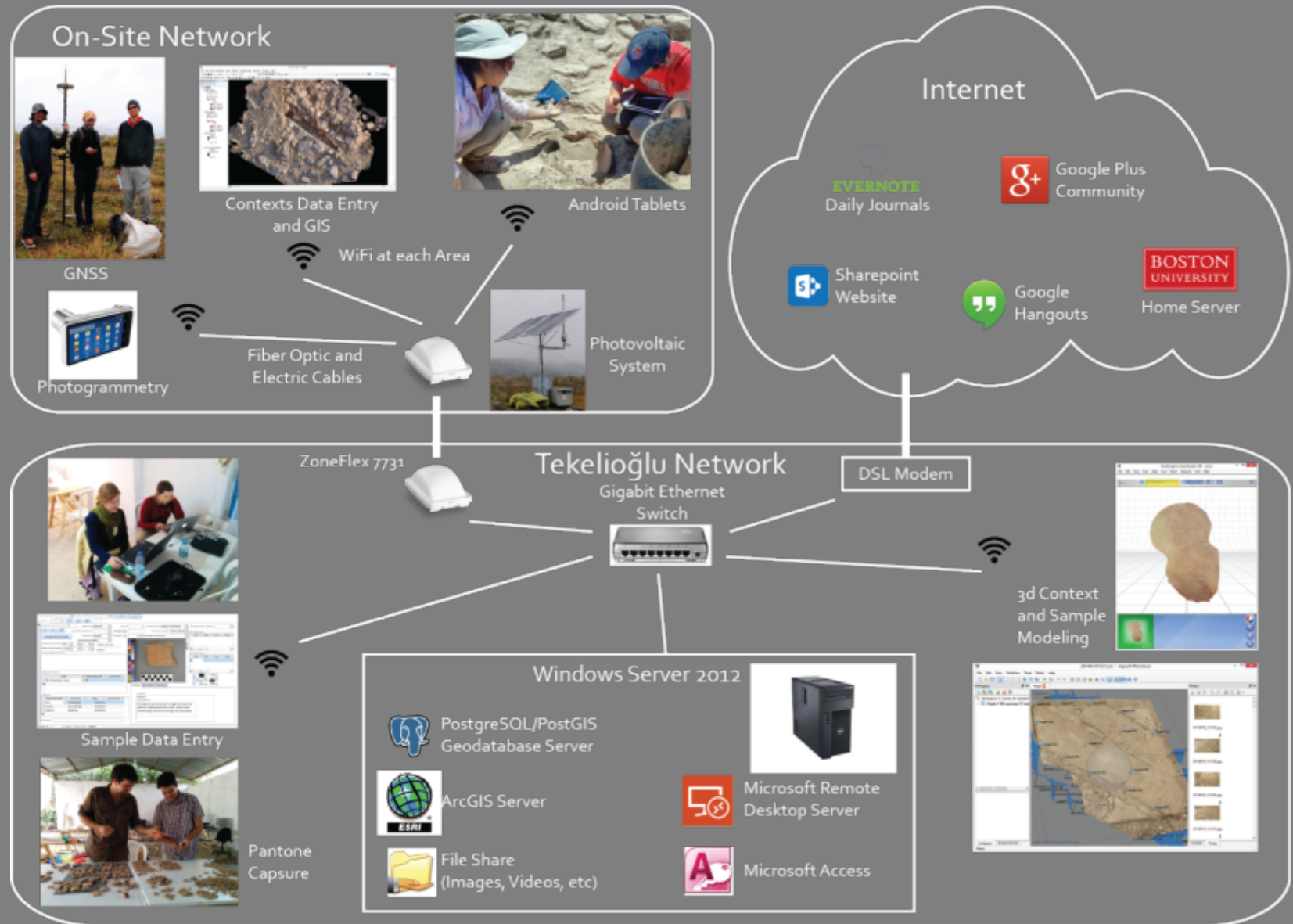
Planes, Satelites, Drones... Ladders,
balloons, kites





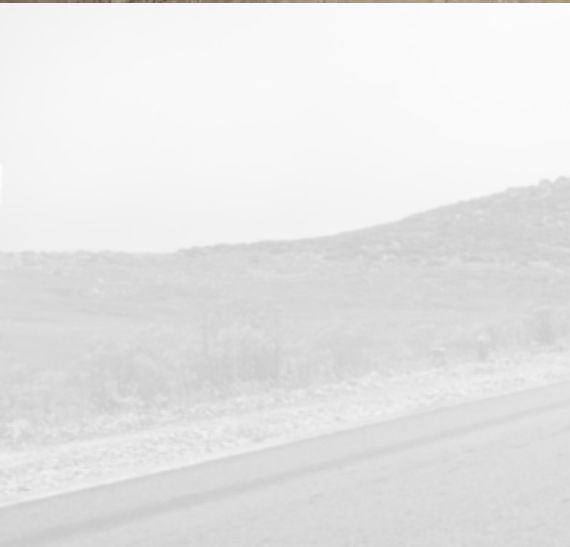
Kaymakçı Archaeological Project

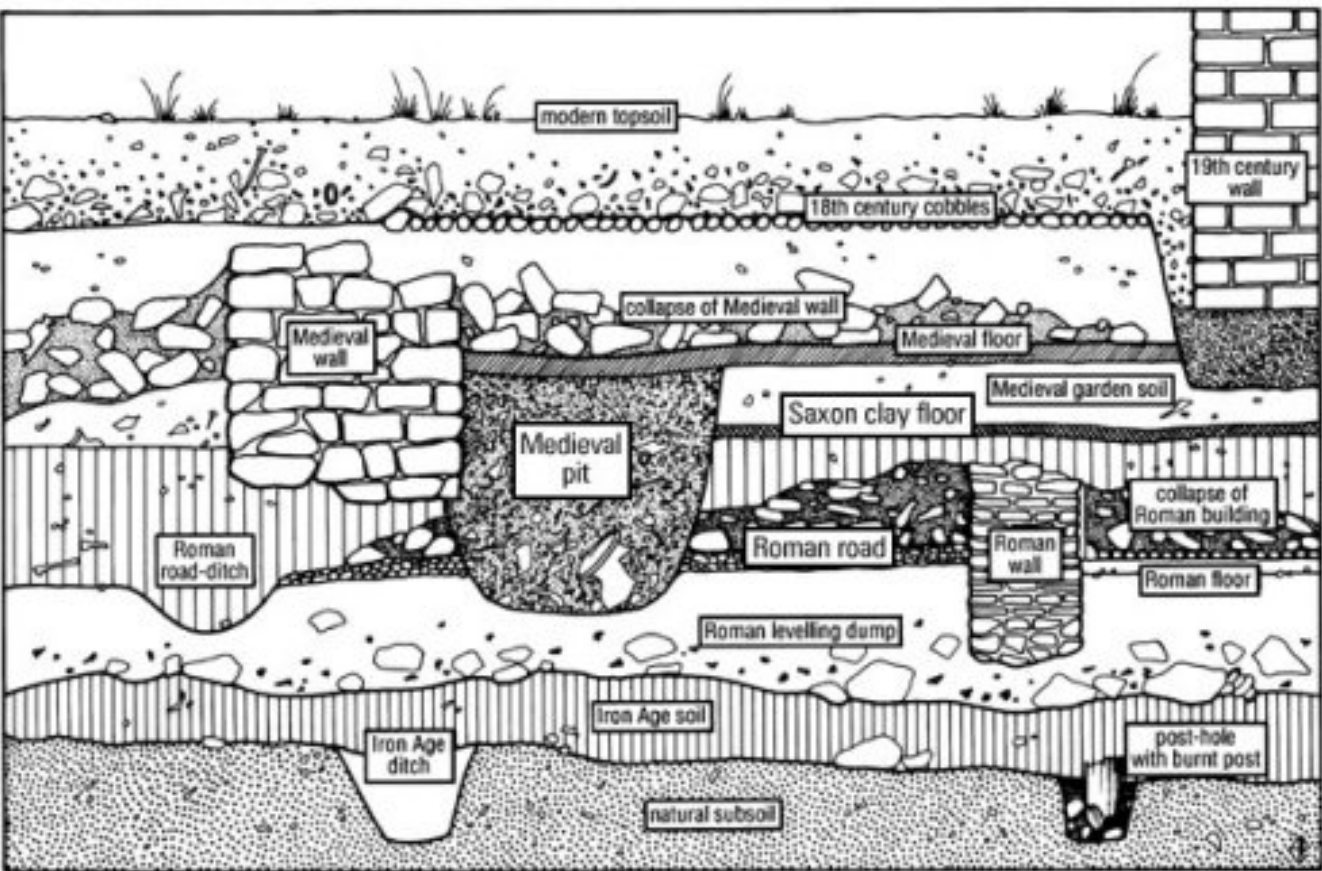
Kaymakçı Archaeological Project

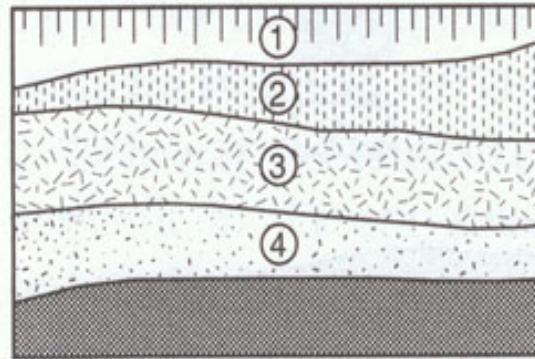




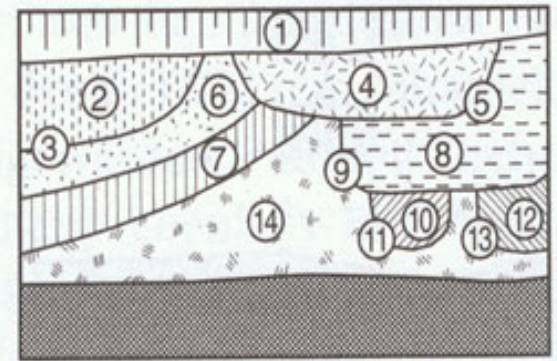




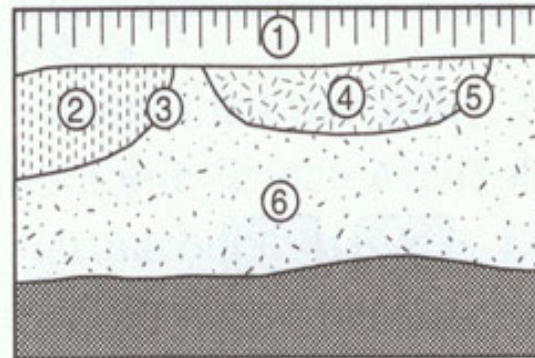




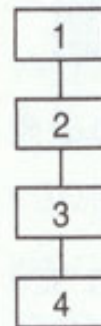
A



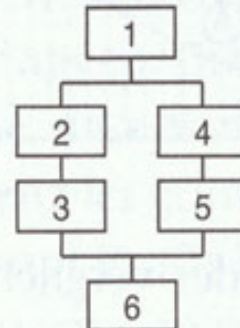
C



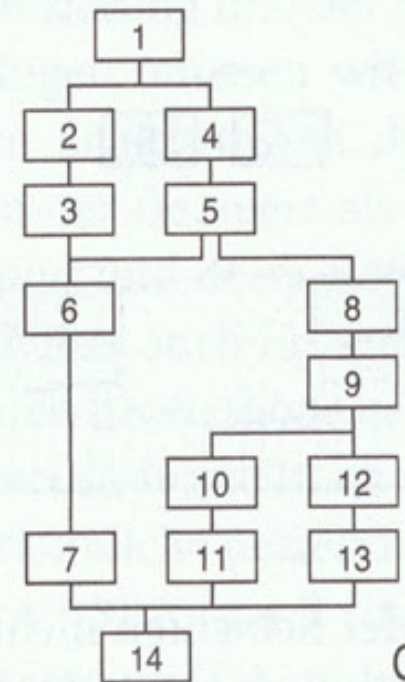
B



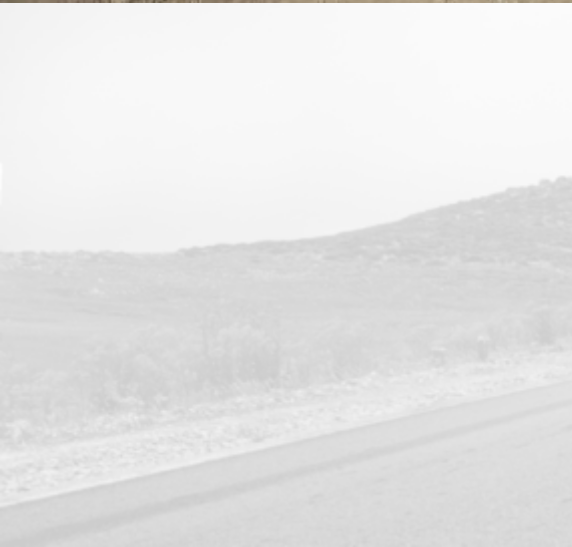
A



B



C

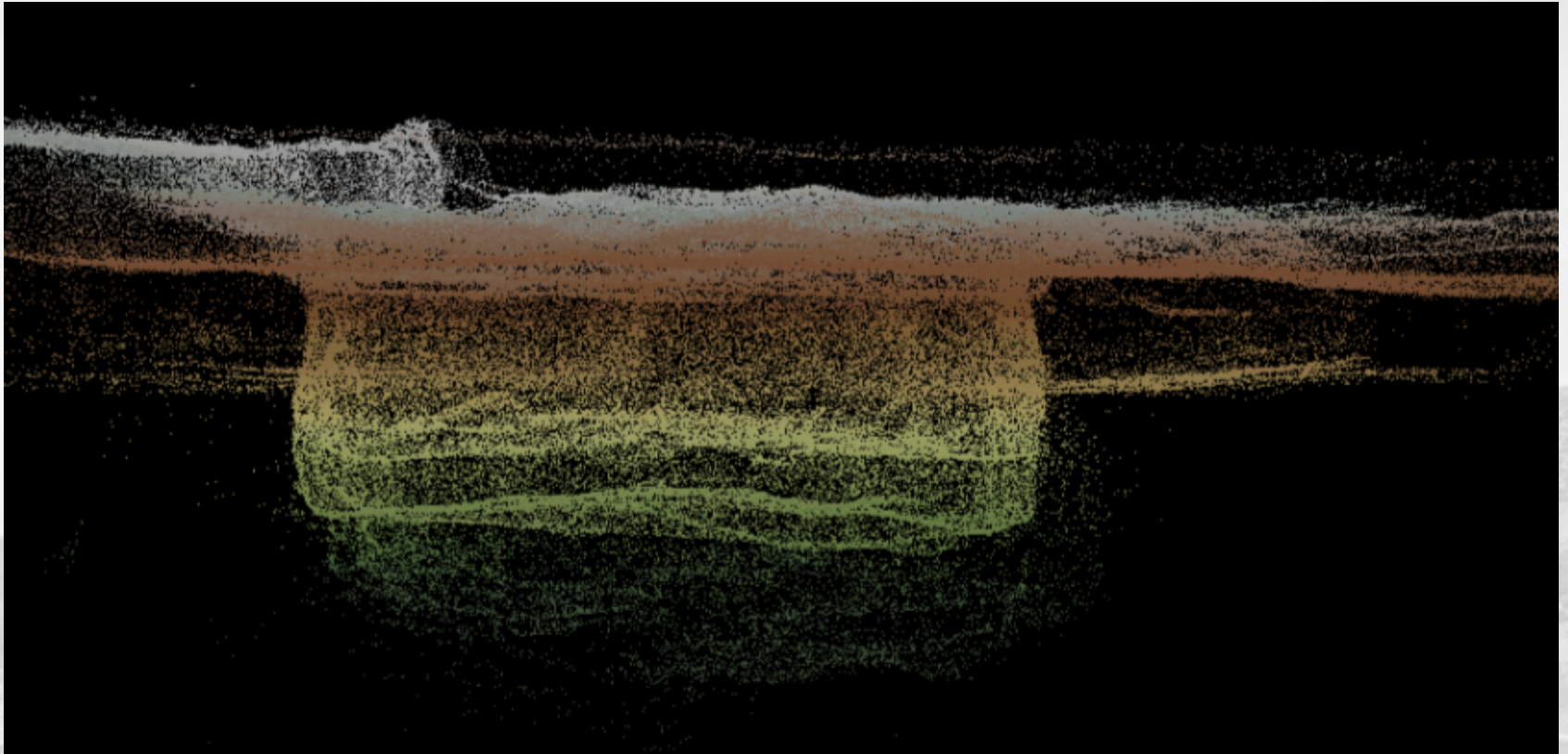


The problem with stratigraphy and point clouds

A single point is a **vector**, it has x,y,z values as a coordinate but it lacks volume. If we say a square is 2-dimensional because it has area, then for something to be 3D it must have volume.

Therefore a 3D point being a vector cannot be conceived as a 3-dimensional object in itself.

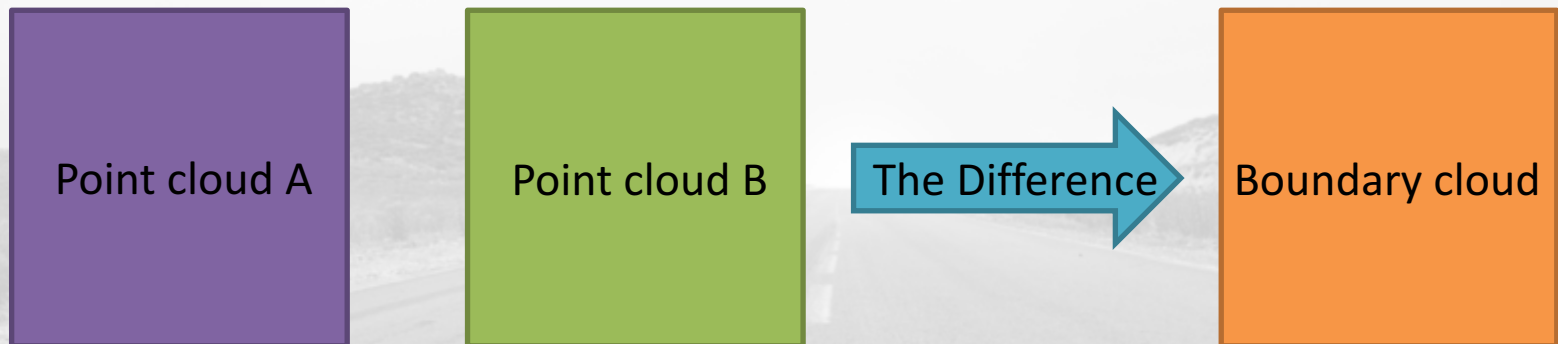
A 3D point cloud cannot be a 3D object but it can be used to represent a 3D space.



From points to volumes

A theoretical workflow

- Get the difference between two point clouds
- Return only those points which are not within a set distance (e.g. 1 cm)

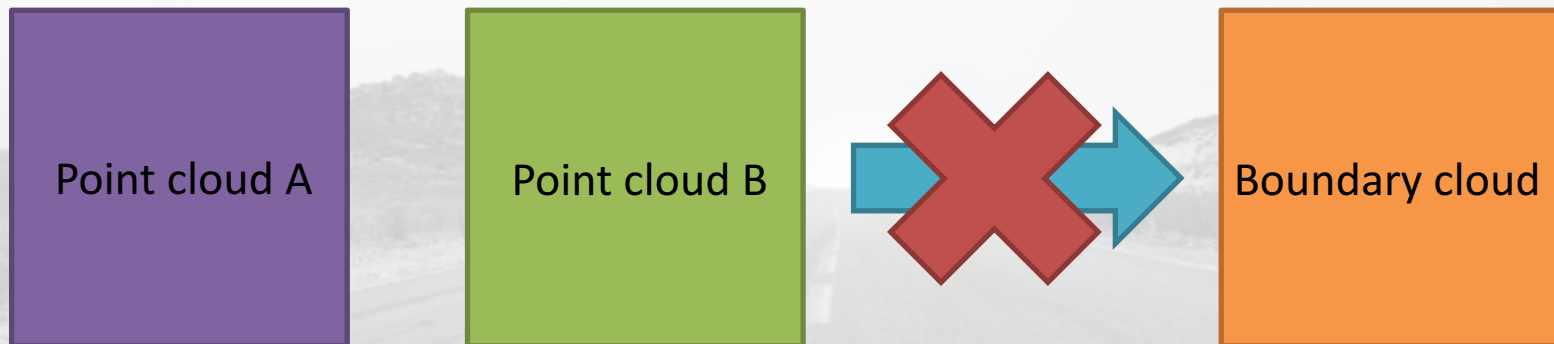


From points to volumes

From theory to practice

Incorporating the Point Data Abstraction Library

- Get the difference between two point clouds
- Return only those points which are not within a set distance (e.g. 1 cm)

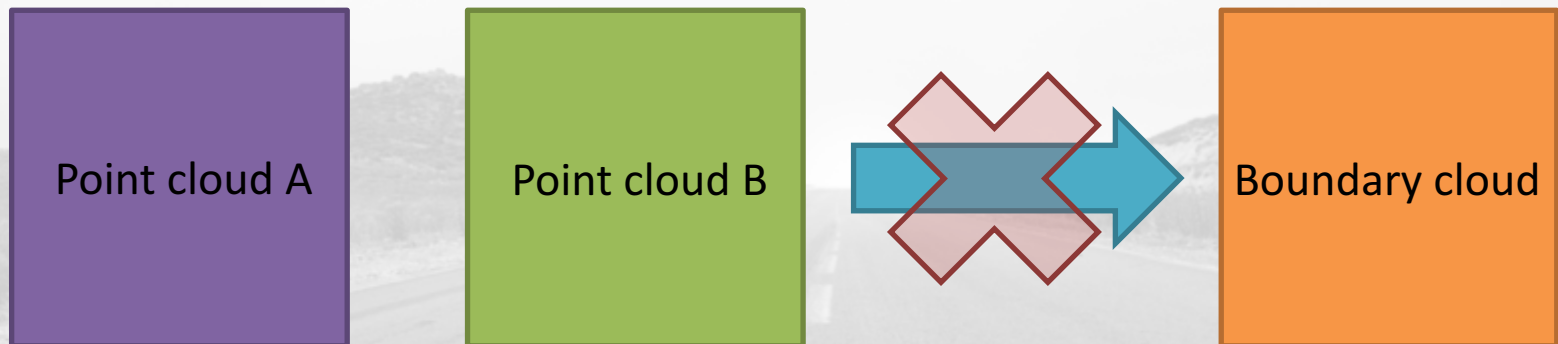


From points to volumes

From theory to practice

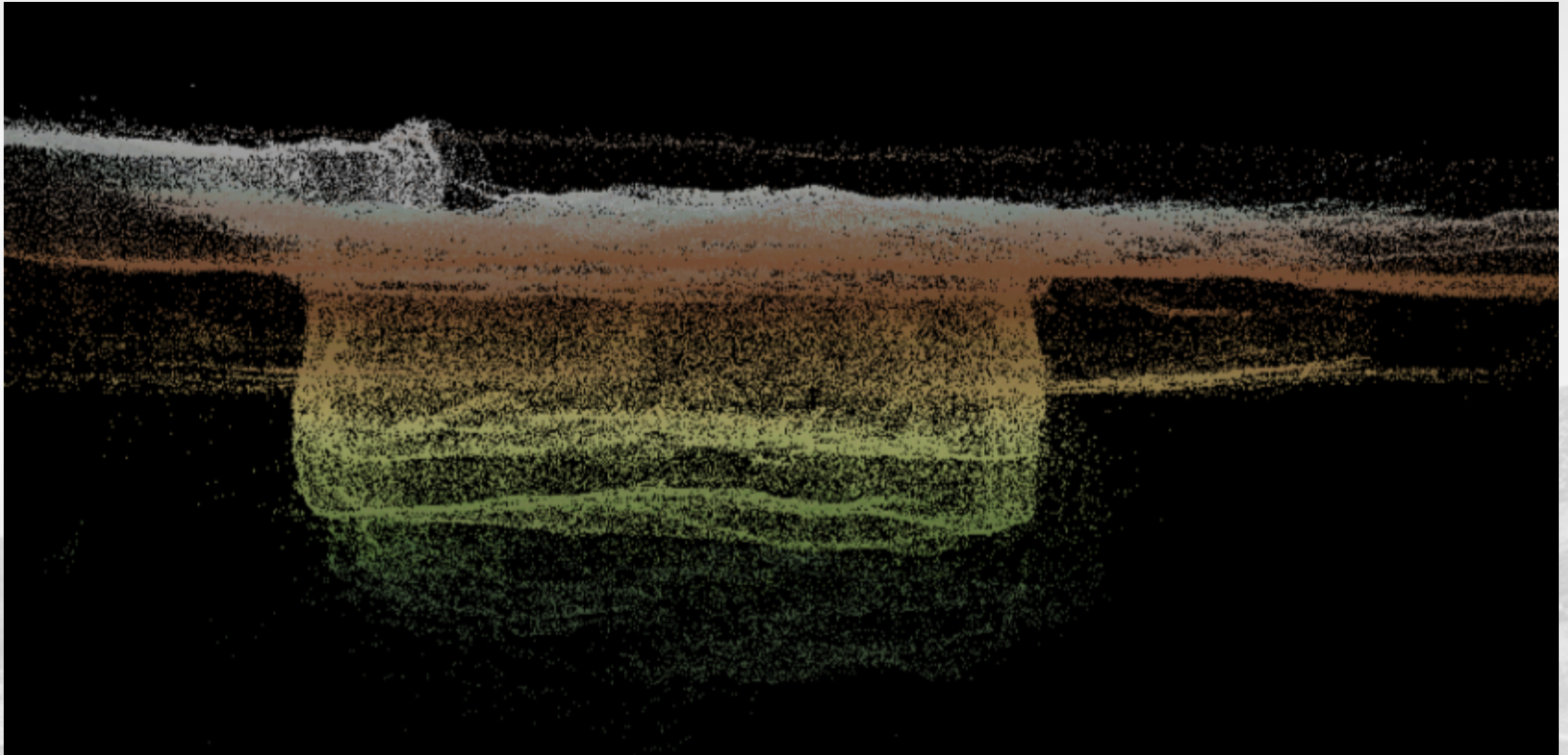
Incorporating the Point Data Abstraction Library

- Get the difference between two point clouds
- Return only those points which are not within a set distance (e.g. 1 cm)



From points to volumes

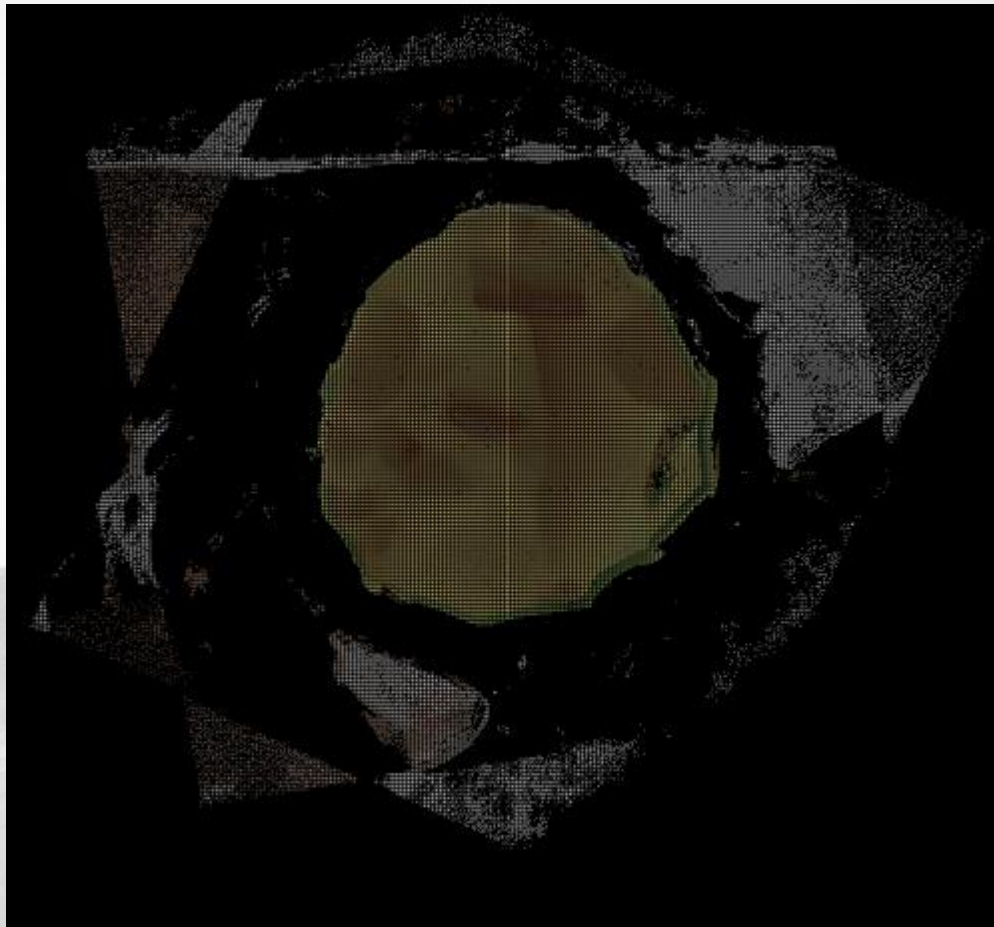
From theory to practice



From points to volumes

From theory to practice

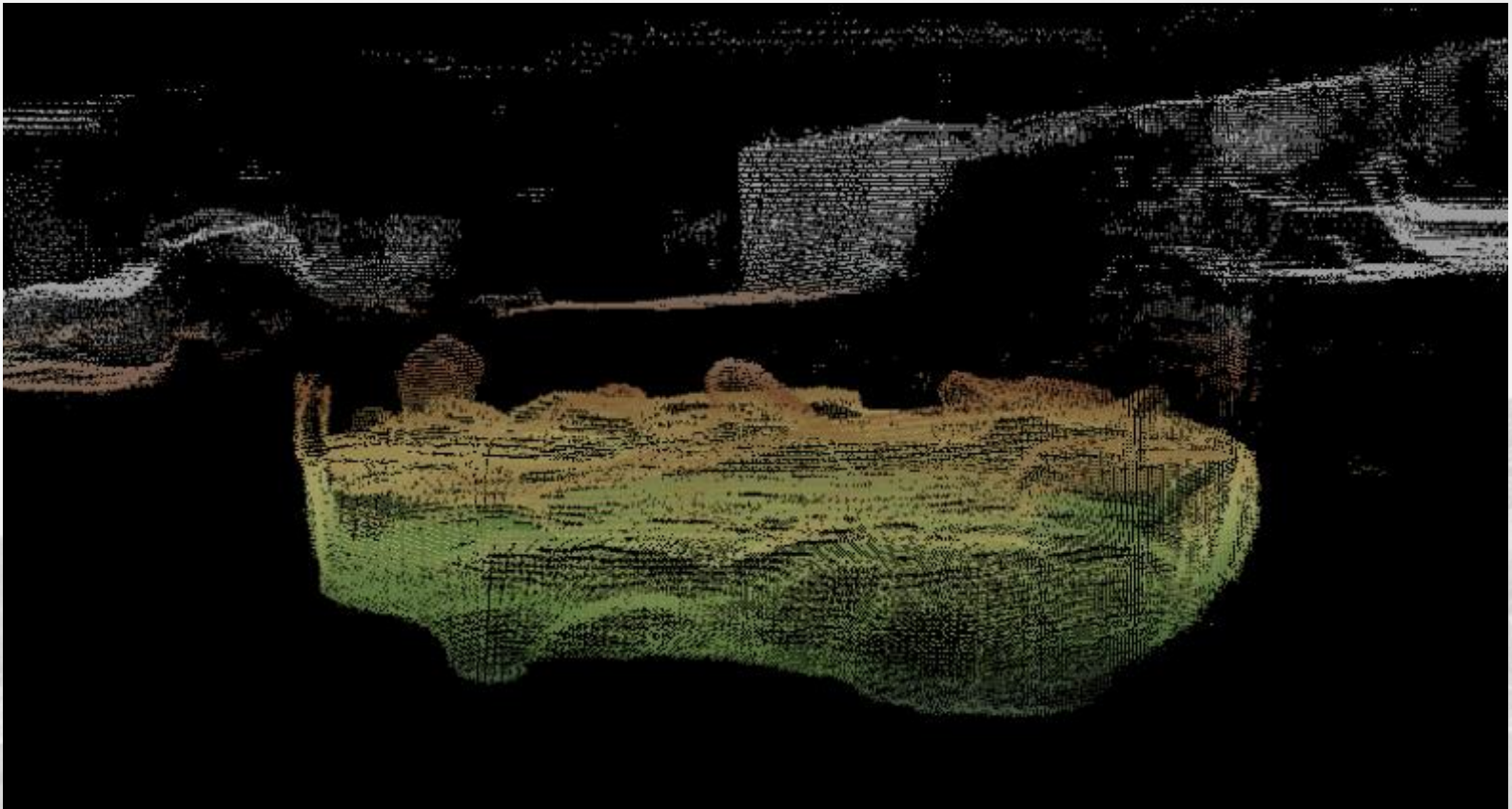
A boundary cloud (nearly)



From points to volumes

From theory to practice

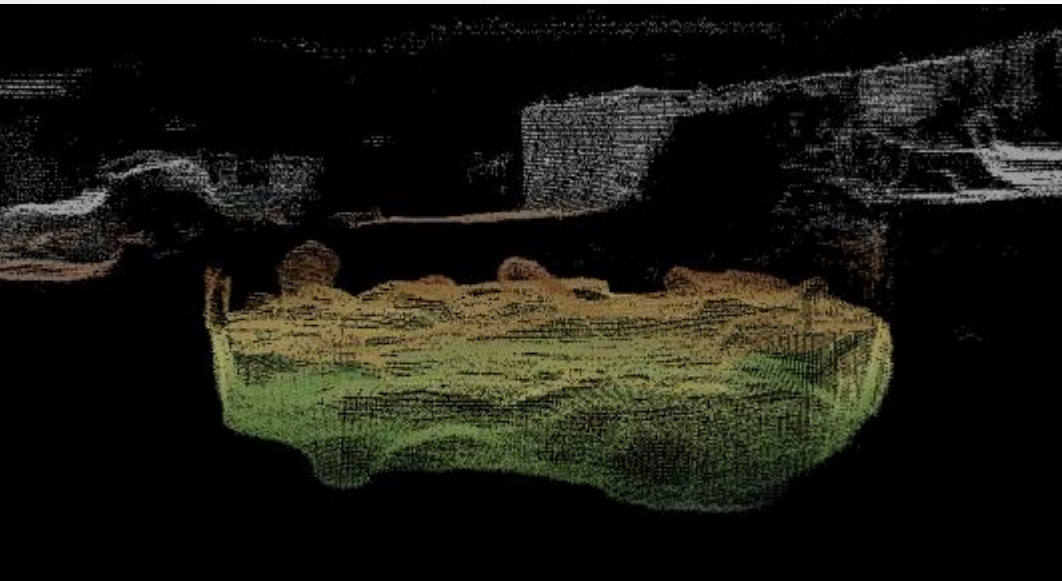
A boundary cloud (nearly)



From points to volumes

Further development

Boundary clouds to volumes



Roosevelt 2015

Gygaia Projects

Sponsors

Boston University
Koç University
Institute for Aegean Prehistory
Loeb Classical Library Foundation
Merops Foundation
National Endowment for the Humanities (US)
National Science Foundation (US)
Panasonic
Vecchiotti Archaeology Fund
Many Private Donors

Co-Directors

C. Luke – C. H. Roosevelt

Supporters

Kültür Varlıkları ve Müzeler Genel Müdürlüğü
Manisa Müze Müdürlüğü
American Research Institute in Turkey (ARIT)

Special thanks to:

Manny Moss
Bradley Chambers

KAP Field Team

Thank you for your attention

Gary Nobles

g.r.nobles@rug.nl

Groningen Institute of Archaeology, the Netherlands



university of
groningen

faculty of arts