



Cultural, Artistic and Scientific knowledge  
for Preservation, Access and Retrieval

# The challenges of preserving digital data for World Heritage sites

DPE Planets and Caspar  
'Wepreserve'  
3<sup>rd</sup> annual Conference

**UNESCO**

United Nations Educational, Scientific and Cultural Organization

Mario Hernandez

Nice, France October 29-30 2008



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Cultural, Artistic and Scientific knowledge  
for Preservation, Access and Retrieval

UNESCO is a UN Specialized Agency

**U**nited  
**N**ations  
**E**ducation  
**S**cience  
**C**ulture  
**O**rganization



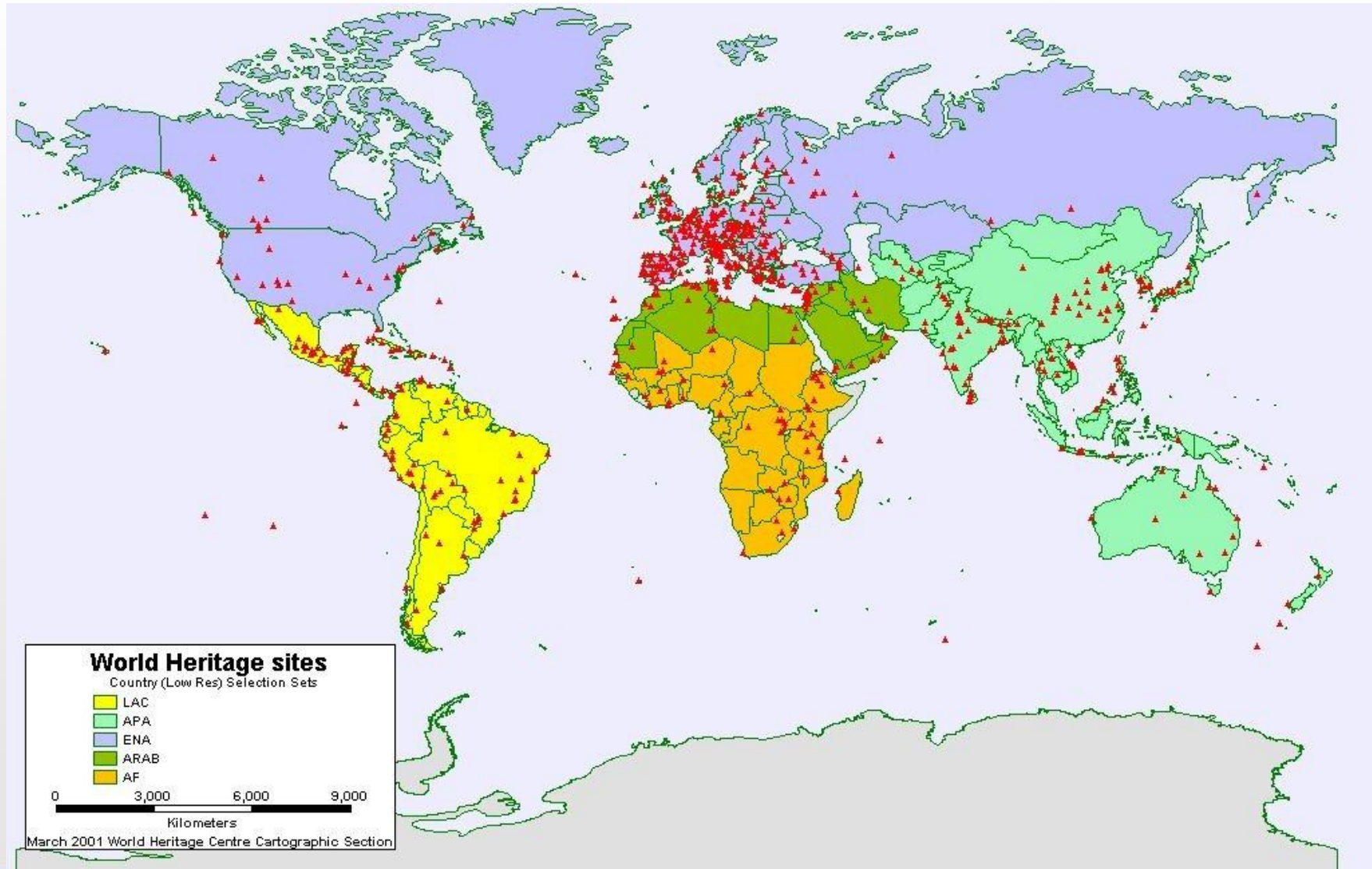
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for Preservation, Access and Retrieval

# World Heritage Convention



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M.Hernandez.





## 878 World Heritage sites (as per July 2008)



Great wall, China



Taj Mahal, India



Machu Picchu, Peru



Palenque, Mexico



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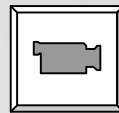




## adopted the **UNESCO Charter on Preservation of Digital Cultural Heritage** (17 Oct 2003)

**“....Recognizing that such resources of information and creative expression are increasingly produced, distributed, accessed and maintained in digital form, creating a new legacy – the digital heritage,**

**....Understanding that this digital heritage is at risk of being lost and that its preservation for the benefit of present and future generations is an urgent issue of worldwide concern, ...”**





# Overall environment



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**Data is very important**

**data management not a main priority**

**Data storage is very important**

**data storage structure low as far as  
budget priority**

**Data preservation**

**limited to back-up(s)**





# Environment – User audience(s)







UNESCO



Heritage conservation community





**UNESCO**



**Cultural heritage conservation community**

**Data is originated at any of the 193 Member States (countries)**

**Data is received at UNESCO**

**Data creation process is unknown**

**Data is stored**

**Data is used only when necessary**

**Data preservation is not a big concern**

**Data is generated**

**Whole process is well known but not documented**

**Data is stored**

**Data is daily used, transformed, processed, etc**

**Emerging technology:**

- data processing is main focus,
- data preservation is not a concern





# UNESCO as a CASPAR user



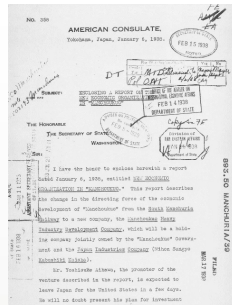
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# A process



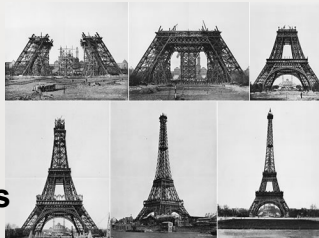
Legal documents



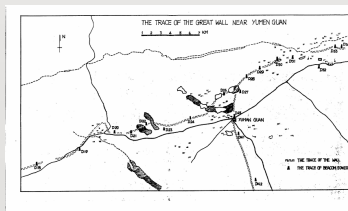
Paper documents



Old photographs



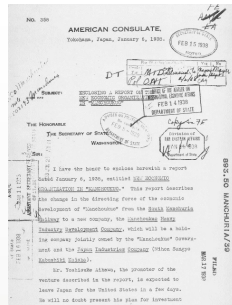
Paper maps



# A process



Legal documents



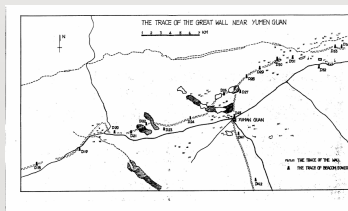
Paper documents



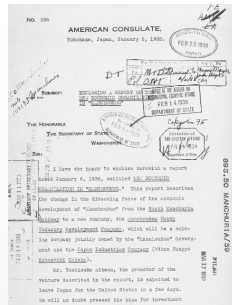
Old photographs



Paper maps







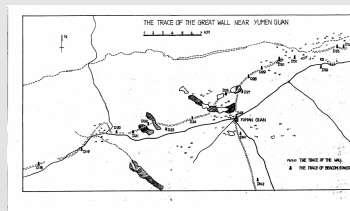
Legal documents



Paper documents

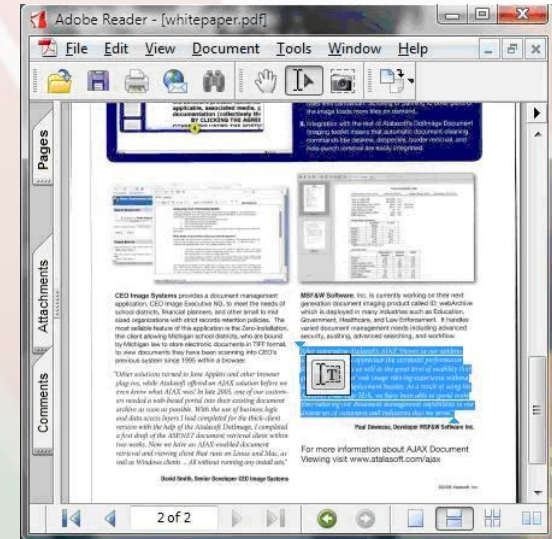


Old photographs



Paper maps

# A process



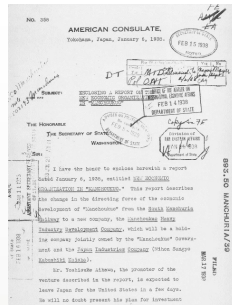
Final PDF





# A process; the end-result

Legal documents



✓

**Staff changes (process involves deep personal knowledge). The chain of evidence is lost!**

Paper documents



X

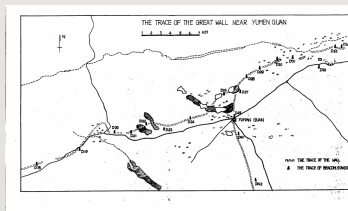
Old photographs



X

**Inputs used not documented**

Paper maps



X





## Before

Paper documents

Paper maps

Paper photos

Books

Etc.



Year +/- 2000

**The use of PC becomes popular**

## After

Digital documents

Digital maps

Digital pictures

Digital DVDs

Etc.





# The heritage conservation community as a CASPAR user



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# Digital Cultural Heritage

- The ontology of digital heritage (“computer-assisted cultural heritage”) refers to the relationships between: data acquisition, processing, and visualization
- For the end user, this complex process has to be unified into a single experience: 3D exploration
- In this way 3D creates interaction between the end user, the research group that collected the data, and the cultural landscape







# Description of the data objects





Machu Picchu, Peru



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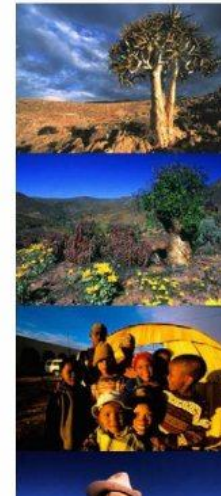


Machu Picchu, Peru

- Nomination Text
- Contents
- Executive Summary
  - Map
- Identification
- Description
- Justification
- Factors Affecting the Property
- Management
- Monitoring
- Documentation
- Contact Information
- Signature
- Appendix A - Maps
- Appendix B - A Feasibility Study
- Appendix C - The transitional Architecture of the N
- Appendix D - Management Plan
- Appendix E - Legislation
- Appendix F - List of Plant Species
- Integrated Development Plan
- Letter - explanation of the buffer zone
- ICOMOS Evaluation
  - English
  - Français

# THE RICHTERSVELD CULTURAL AND BOTANICAL LANDSCAPE

APPLICATION FOR  
INCLUSION ON THE  
WORLD HERITAGE LIST



Data object: TEXT (PDF)

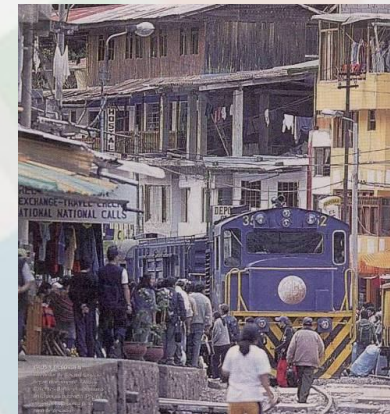


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**Machu Picchu, Peru**

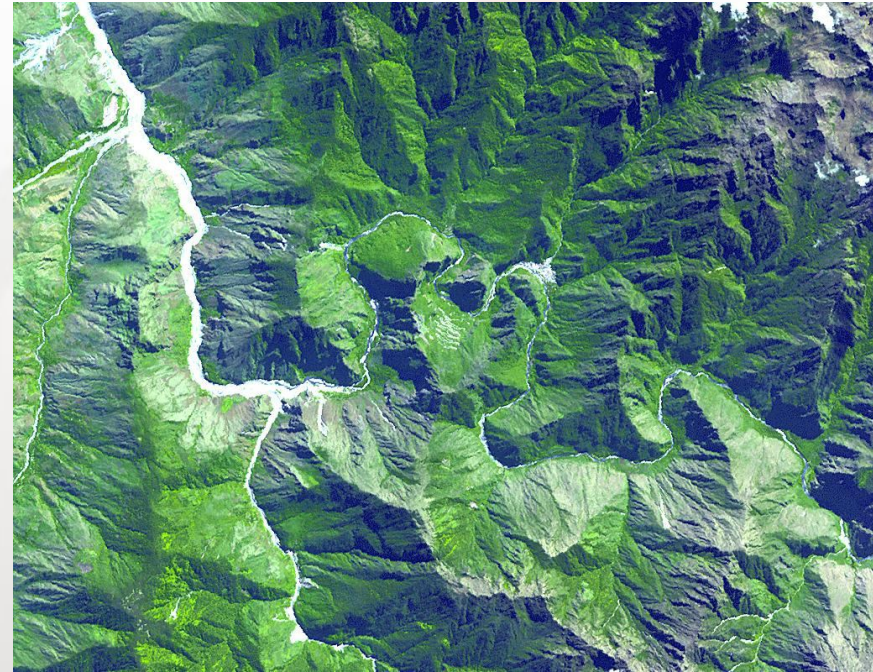


**Data object: Images**





**Machu Picchu, Peru**



**Data object: Satellite images**



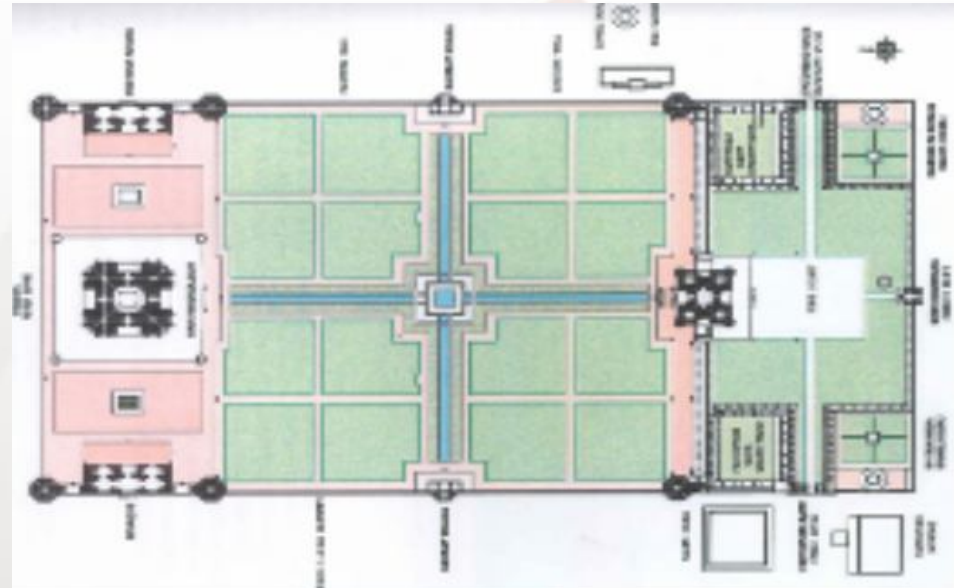
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Data object: digital GIS layers



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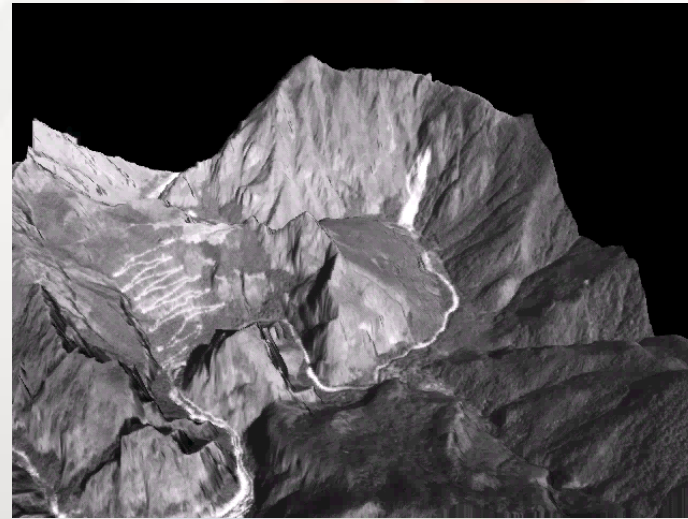




- Description of the data objects



Machu Picchu, Peru



Data object: 3D models



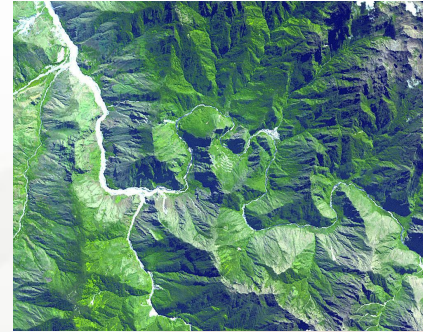


# The cultural heritage data challenges

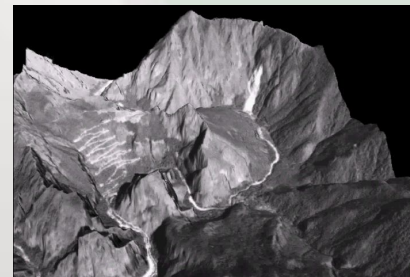




# The process: known and/or unknown



Satellite data



Data object: 3D models



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# Representation information

- The RepInfo not available

- xxx.doc
- xxx.pdf
- xxx.jpeg
- Satellite images
- xxx.shp
- Laser cloud points
- xxx.mpeg (3D models)



Timbuktu (real picture)



Timbuktu virtual 3D model)







# Preservation Challenges

Entire UNESCO heritage archive needs to be preserved

Typical of the type of data that UNESCO encounters:

- Proprietary file formats no longer recognized
- File format inconsistencies
- Changes in implicit team knowledge

A UNESCO specific challenge:

- Organizational changes, e.g. ex-USSR





# UNESCO and ASEMANTICS

## Cultural heritage ReplInfo

### UNESCO data objects do not have 'complete' ReplInfo

- **Testbed:** tests the automatic extraction of ReplInfo
- **But:** need to create additional ReplInfo
- **Tools:** to assist in the completion of ReplInfo under development (after Pisa meeting): UNESCO + ASEMANTICS





UNESCO  
selected  
Data  
holdings

Tool for  
jpeg repinfo

Tool for  
GIS repinfo

Tool for  
pdf repinfo

Tool for  
3D repinfo

CASPAR  
FIND, PDS,  
KM, etc





UNESCO  
selected  
Data  
holdings

UNESCO  
RepInfo

Tool for  
jpeg repinfo

Tool for  
GIS repinfo

Tool for  
pdf repinfo

Tool for  
3D repinfo

CASPAR  
FIND, PDS,  
KM, etc





# Creation of the Representation Information

- The user interacts with the RepInfo tool
- Existing RepInfo is extracted (automatic) and presented to the user
- The user is requested to enter additional 'mandatory' fields
- The information is submitted and associated RepInfo is created





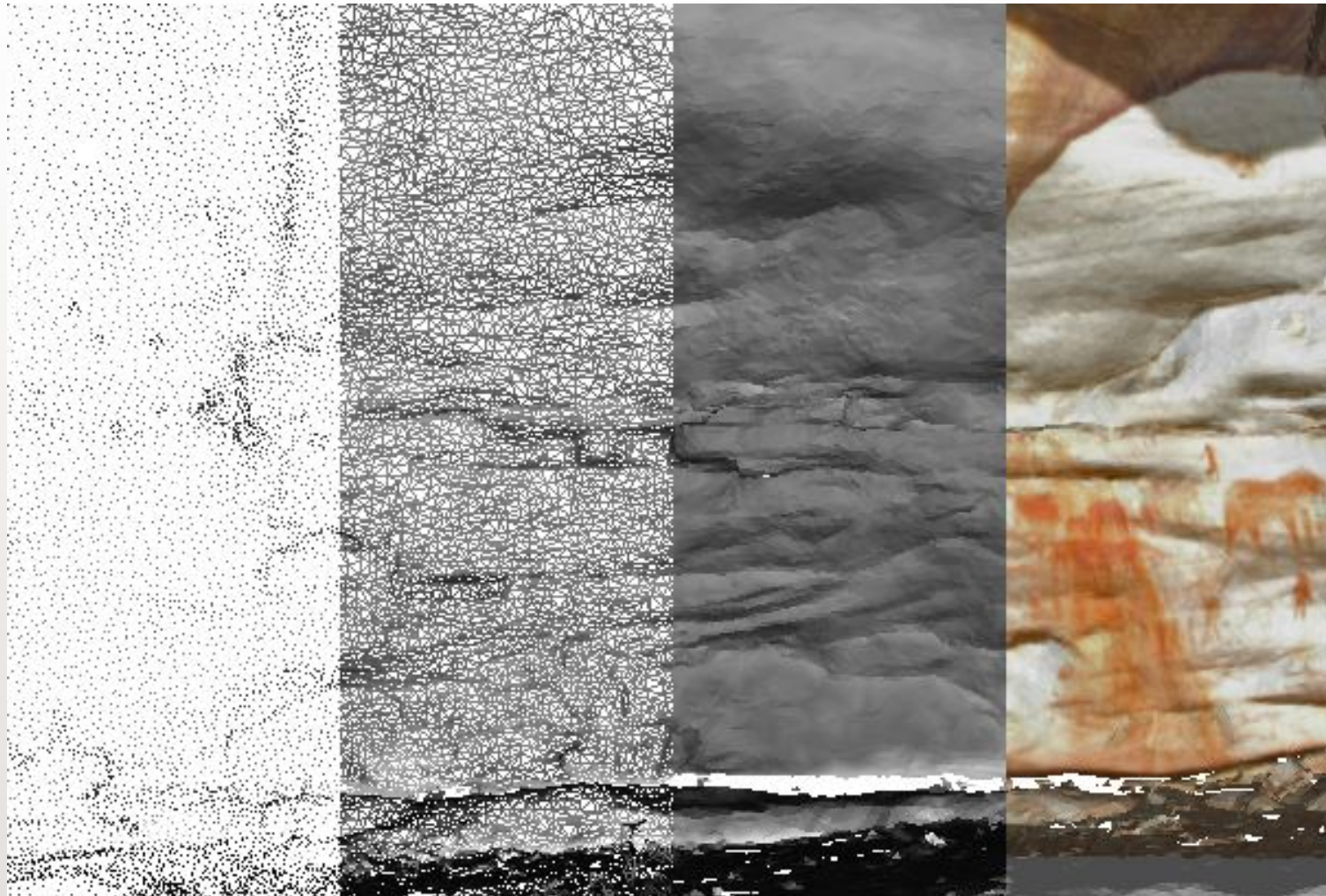


# Documenting a process Laser scanning ASEMANTICS + UNESCO





# Laser points



Laser scanning

Wire frame  
Triangulation

Artifiical shading

Texture



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Greece



Indonesia



Brazil



Japan



Laos

..... Thank you



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