



# Recording History: Challenges of representing a complex phenomenon

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# GIS

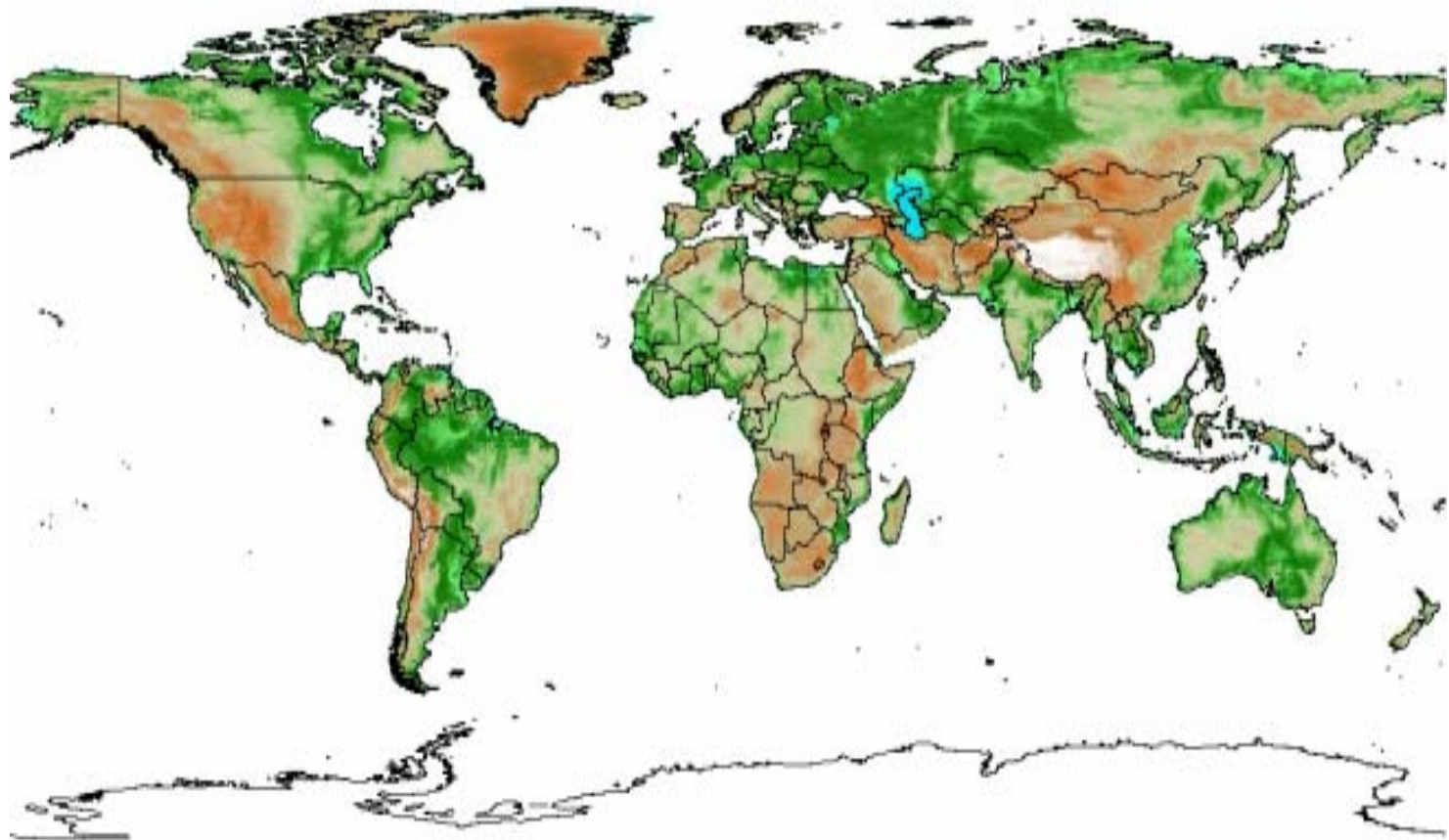
- What does it do?
  - Data collection/recording
  - Data management/manipulation
  - Visualisation/delivery
- Why do it?
  - Preservation
  - Education
  - General interest
  - Understanding the past
- Raison d'être ...



# Issues

- Complexity
- Sporadic data
- GIS data models
  - Hard outlines
  - Classification
- Cost of digitising
  - Classification/cost tradeoff

# Complexity ...



## Southeast Asia Overview



1:10 000 000 Scale WGS84 / UTM Zone 48N

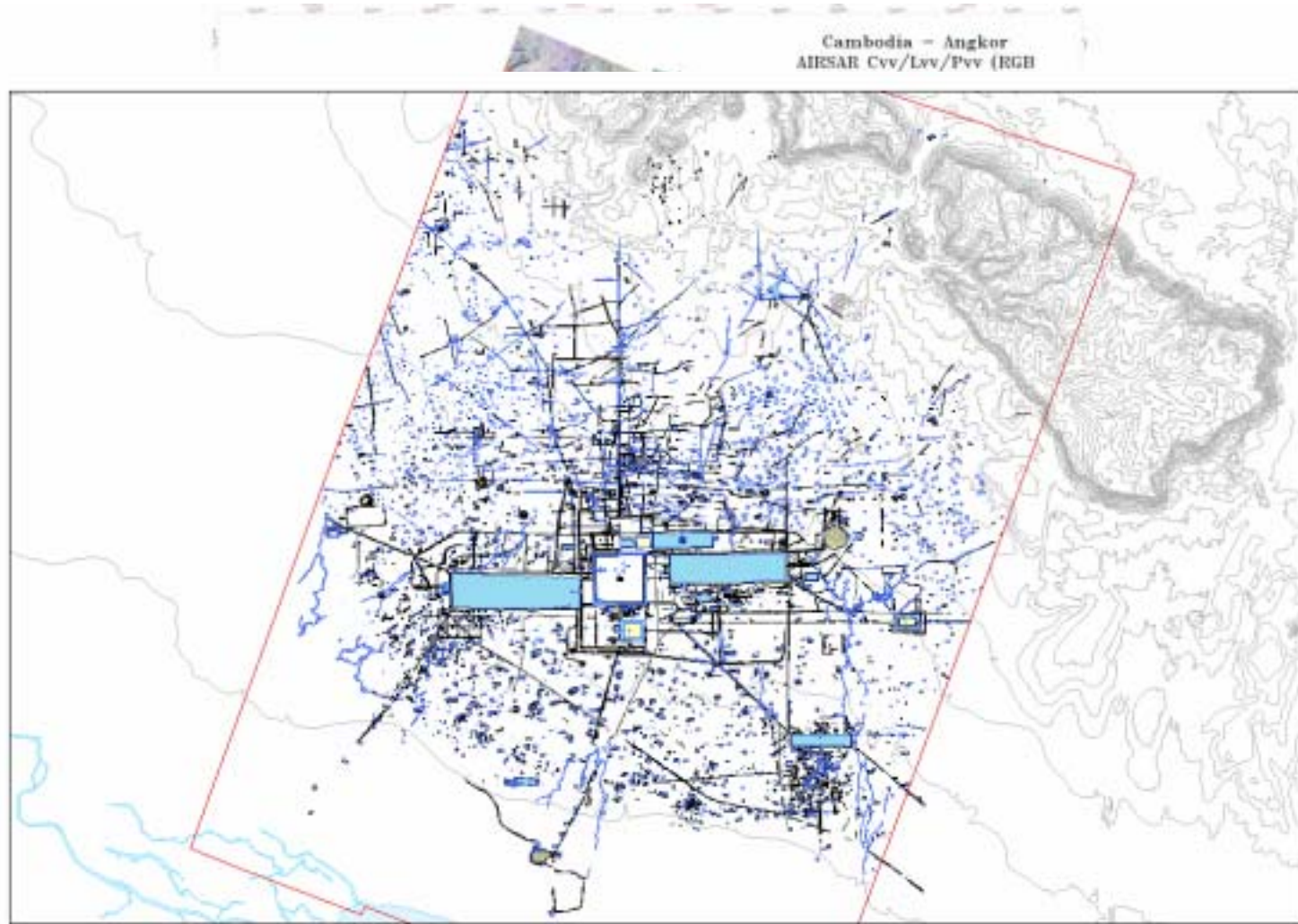
Images produced by the Archaeological Computing Laboratory, University of Sydney, 2002. Brighter areas in satellite imagery represent higher topography or 'visibility' to the imagery. Data copyright NASA/USGS, University of Sydney and the State Government of Victoria. Not for public distribution or reproduction without express permission (permissions@archaeology.usyd.edu.au)











N 0 5 10 20 Kilometers



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# Snapshots





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# Data models

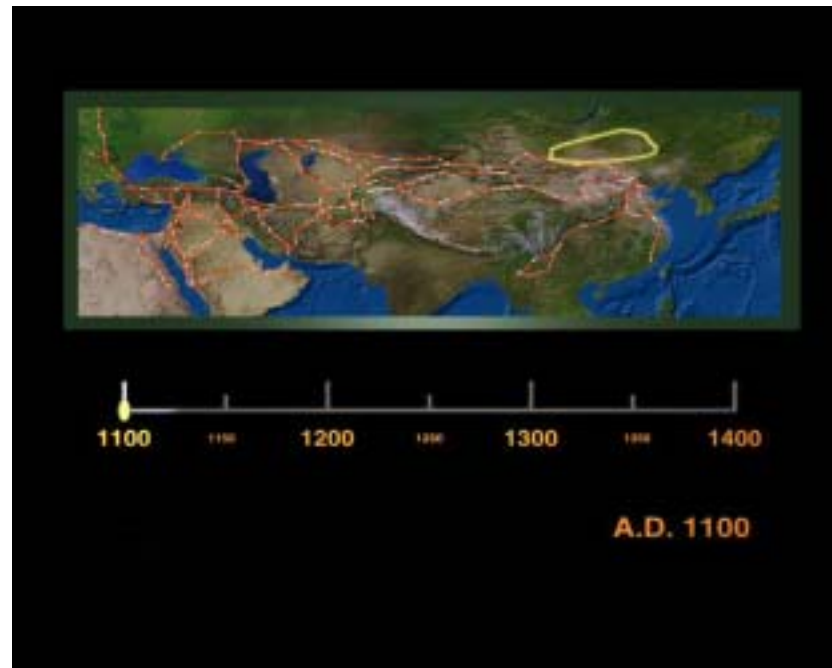
- Points/lines/polygons/images
- Grid data?

# Typical records

- Point
  - monuments, sites;
  - locations of a person, group or ship
- Polygon
  - snapshot of the Mongol or Mughal empire
  - administrative boundaries
  - census data
- Image
  - historic maps

# Spatial/attribute imprecision

- Inaccuracy
- Diffuse edges
- How Mongol is Mongol?





# Temporal imprecision

- Dating of observations
  - Is the date accurate?
  - Is the date precise?
  - Are the observations conflated?

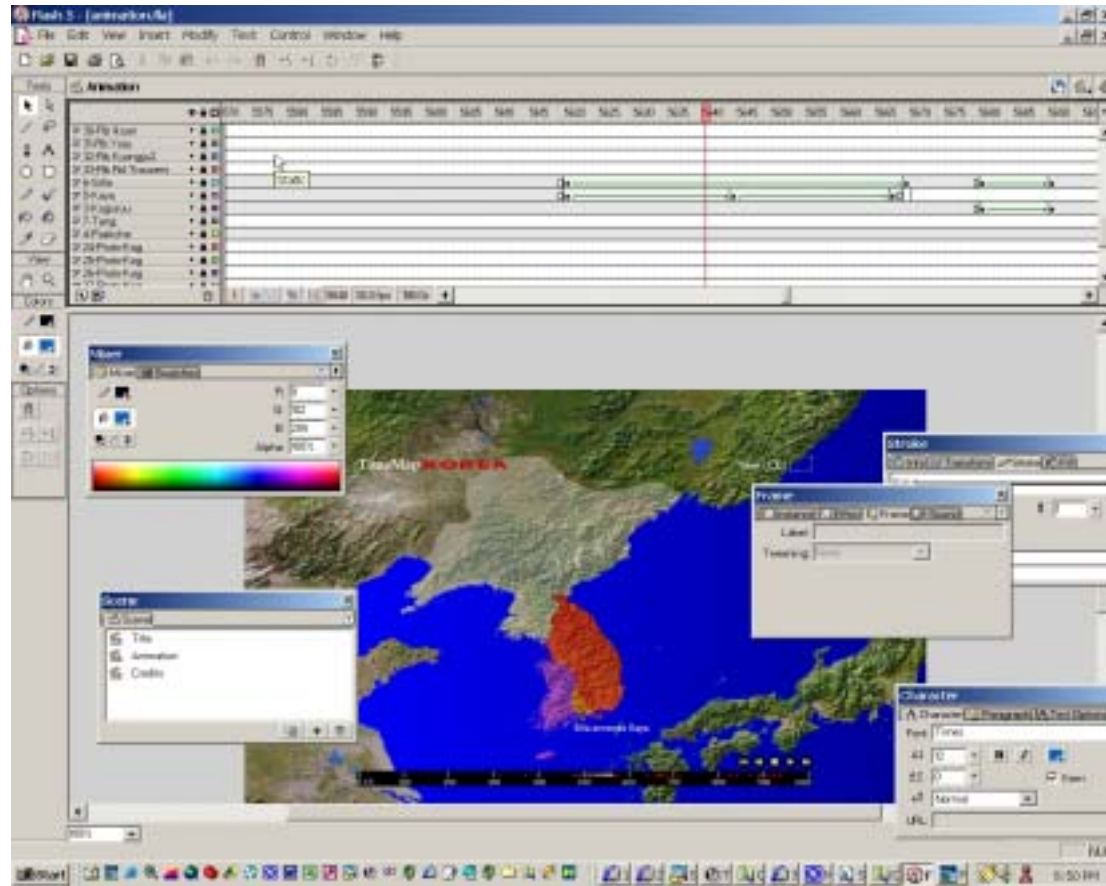


# Interpolation

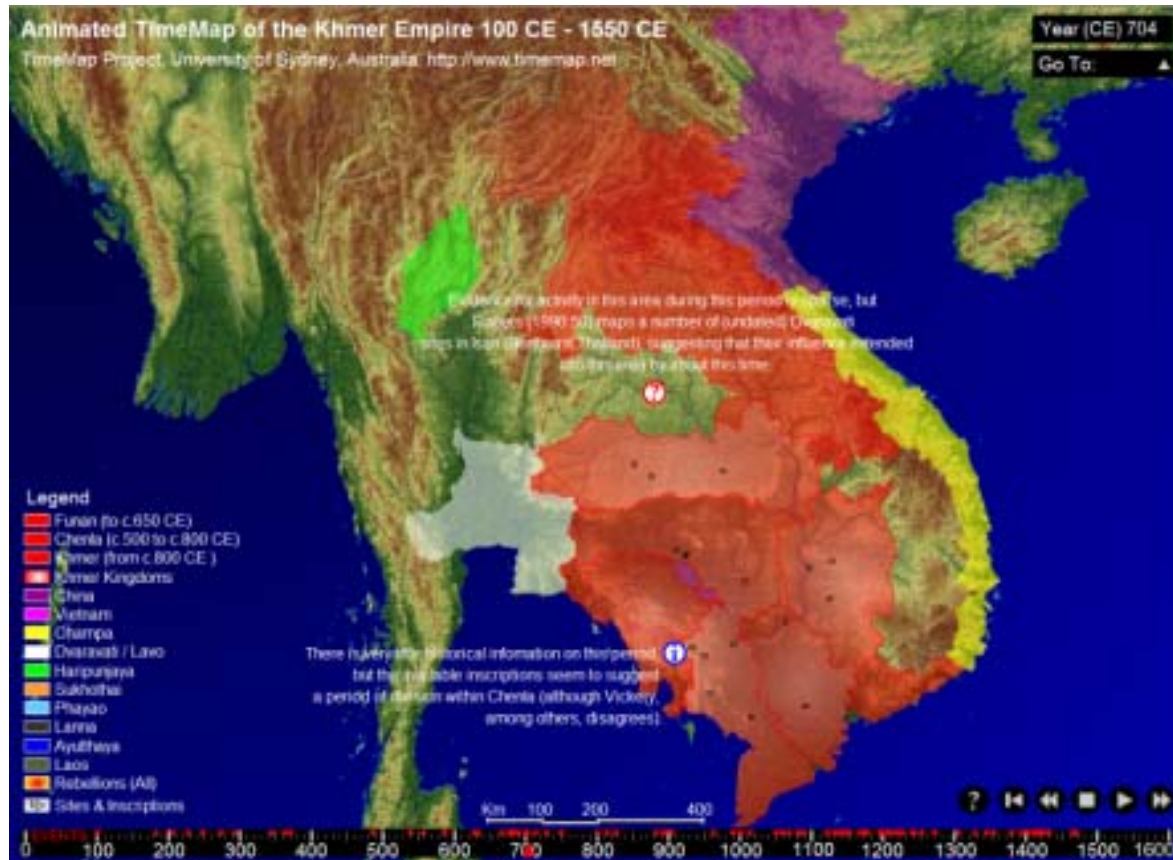
What happens in between?



# Shilla animation



# Khmer Empire animation





# Issues

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- **Cost of digitising**
  - **Classification/cost tradeoff**

# Data sources

- Classic site registers
  - accumulation by authority
- Enthusiasm-driven databases
  - e.g. mills archive, historical societies, amateur site recorders
- Academic research
  - e.g. GBHGIS
- Participatory databases/GIS
  - tapping into communities of interest
- Institutional projects
  - digitisation of collections
  - national projects



# Analysis

- Spatio-temporal analysis
  - still very poorly developed
- Simulation
  - Spatial models e.g. fluid dynamics
  - Environmental eg. cost-surface
  - Interaction e.g. gravity, communications
  - Agent-based
- How do we obtain parameters for a model?



# What can we model?

- The past is difficult to model
- We may, however, be able to address specific questions such as:
  - Colonization
  - Population growth
  - Land clearance(strong environmental or physical constraints)



# Delivery

- Static
  - Printed maps
  - CD-ROM
  - Web pages
- Dynamic
  - Interactive sites
  - Web services
    - Discovery
    - Service
    - OGC






# What do we deliver?


- Static maps
- Databases
- Interactive maps
- Map animations
- 3D interactive models



Note: If the radar imagery fails to draw correctly, please press the refresh button on your browser.




**CHOOSE AREA** Startup extent


**TOOL BOX** 

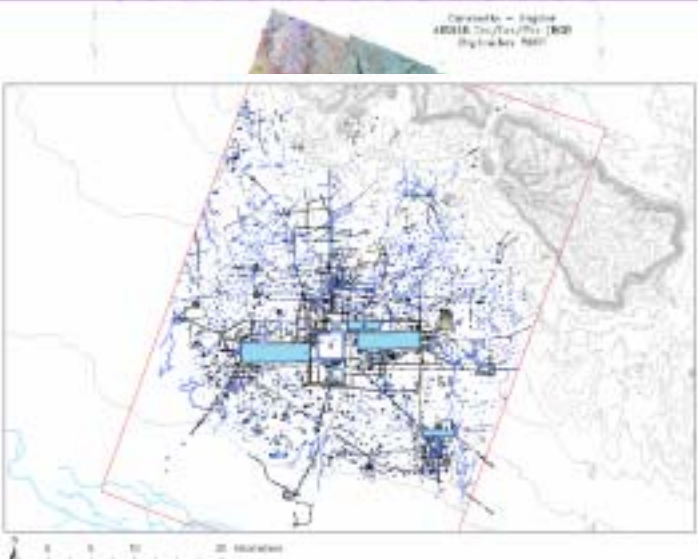
**KEY**

- Streets
- Archaeological Sites
- Modern Hydrology
- Study Areas
- Certainty
- All Features (Rocks)
- Reservoirs
- RADAR Image (L, H, L, V, P, V)
- RADAR Image (C, V, L, V, P, V)

**INSTRUCTIONS:**

1. Click on  to turn layer on/off
2. Click on a layer to search on it
3. Choose a tool from the Toolbox
4. Click on the map!

**HELP** 



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AIRSIS, The University of  
Brisbane 2007

v2.0.59e  
103.850576  
Zoom 96 km

The current theme is: unnamed

Because of differences in coordinate systems, the features data may not always overlay perfectly over the radar images. For copyright reasons, the feature inventory for the south of Angkor (belonging to the Ecole française d'Extrême Orient) cannot be displayed here.







The screenshot displays the 'TimeMap of World Heritage Sites' web application. The interface is divided into several sections:

- Top Navigation:** A dark blue bar with links for 'news', 'sites', 'convention', 'participate', and 'just for kids'.
- Header:** The title 'TimeMap of World Heritage Sites' is prominently displayed in red.
- Left Sidebar:** A dark blue sidebar containing a search bar and a list of navigation links:
  - WH Objectives
  - Convention Details
  - WH List
  - WH List in Danger
  - States Parties
  - What's Who
  - Global Strategy
  - Nominating Process
  - WH Fund
  - Operational Guidelines
  - Forms
  - Official Records
  - Bookstore
  - Convention Text
  - Periodic Reports
  - SEARCH
- Main Content Area:**
  - Top Image:** A satellite map view of a site with various layers overlaid. The layers list includes: Site Plans, Site boundaries, World Heritage Sites, Tentative List Sites, and Cultural and Natural Heritage Sites.
  - Bottom Image:** A detailed architectural site plan of the same site, showing buildings, courtyards, and other structures. The layers list for this view includes: Site Plans, Site plan labels (Baphoon), Site boundaries, World Heritage Sites, Tentative List Sites, and specific site names like 'India, Fatehpur Sikri, Plots' and 'India, Fatehpur Sikri, Harar'.
- Map Controls:** A toolbar with icons for zooming, panning, and other map functions.
- Footer:** A scale bar at the bottom indicates a distance of 100 meters.



Archaeological Computing Laboratory



- It's going to be a real challenge modeling human society, social interactions and so forth.
- General models such as Roland's limits on settlement growth are one thing because they deal with the nature of interactions as a statistical phenomenon, not the actuality of individual interactions.
- Where environmental factors do not overwhelm social and cultural factors, individual choice, our predictions are necessarily at a general rather than specific level. We can only predict broad patterns not individual detail.
- The cutoff between generality/pattern and specific events/detail will depend on the phenomena and the relative strength of individual decisions vs group dynamics vs environmental and practical determinism.