



ForSEAdiscovery

FOREST RESOURCES FOR IBERIAN EMPIRES:
ECOLOGY AND GLOBALIZATION IN THE AGE OF DISCOVERY

WP3 – Dendro-provenancing

ESR9 - Development and implementation of a tree-ring data network for the assessment of the date and provenance of Iberian ship-timbers



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ForSEAdiscovery Network meeting Madrid 12-16 Jan 2015



Dendrochronology

Most exact dating method



Spring 2009

60 50 40 30 20 10

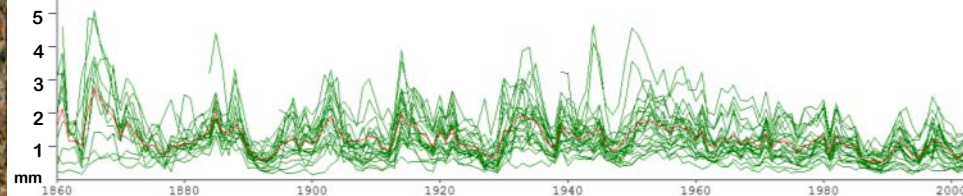
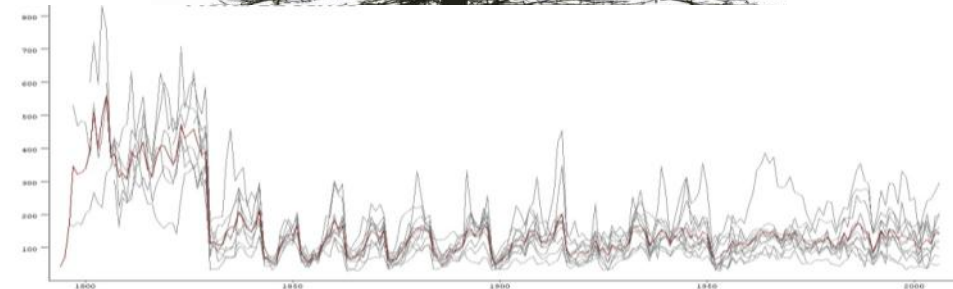
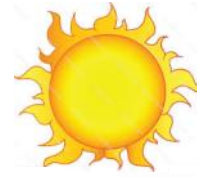


AD 1950

AD 1970

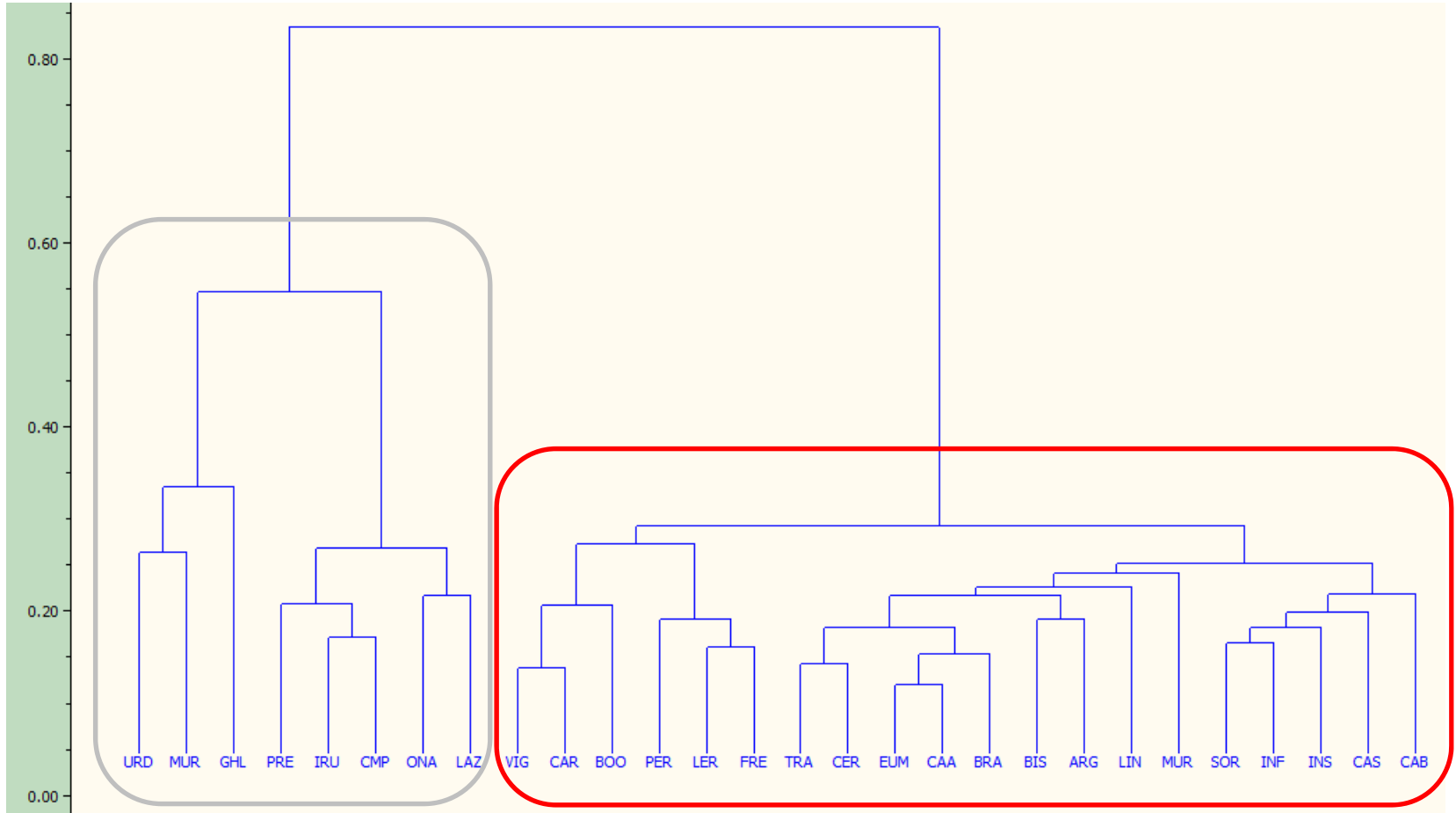
AD 1990

AD 2008



Reference chronology
for a specific site and species

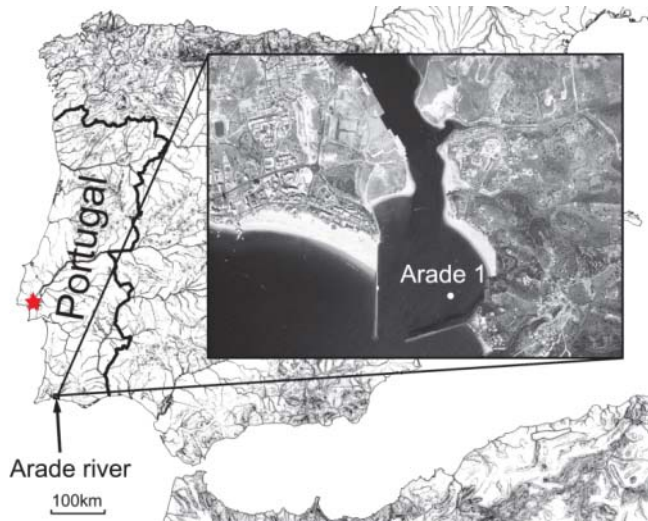
Dendrochronology



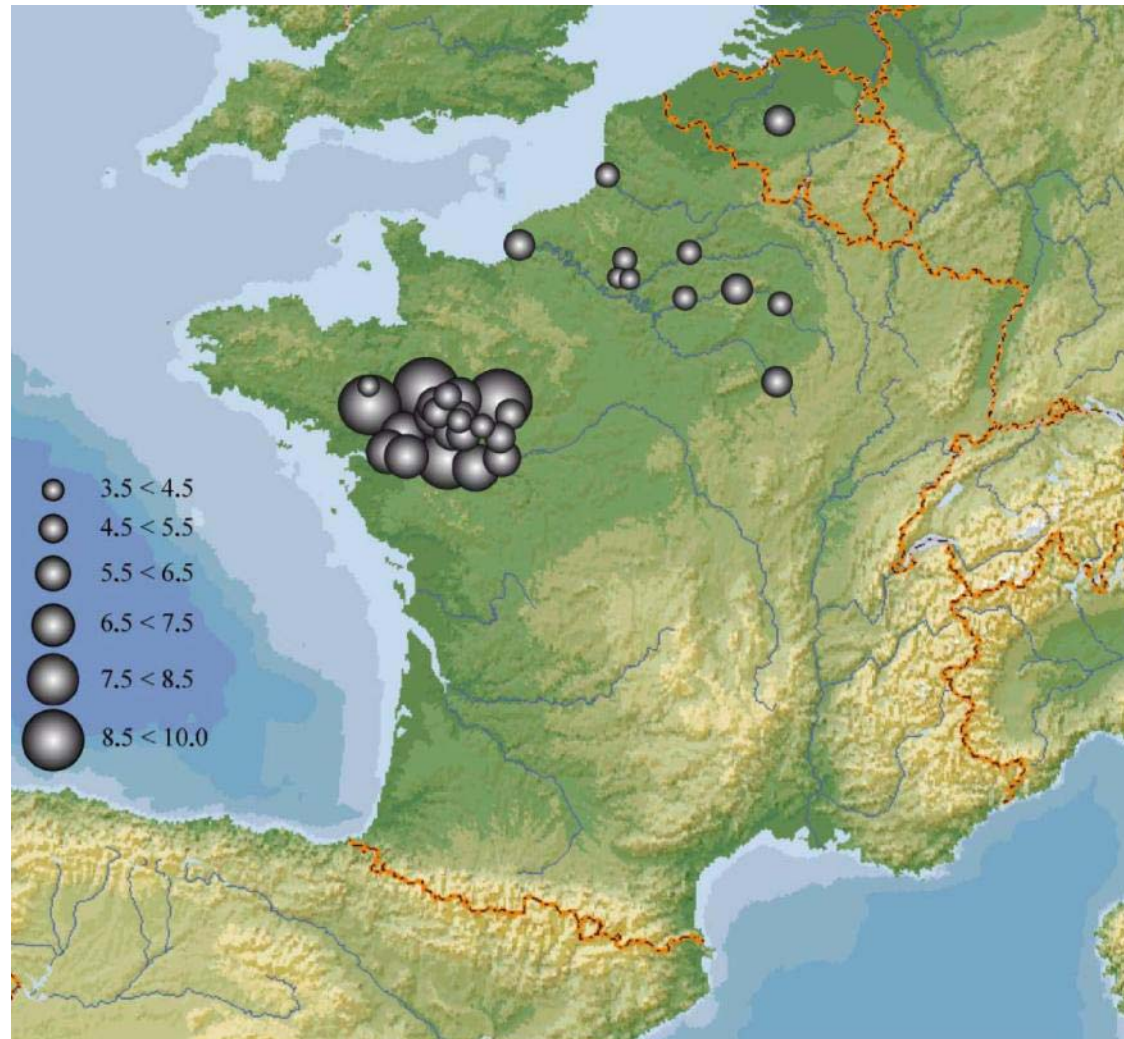
**Basque Country
Data Arkeolan**

**Galicia
Data USC**

Dendro-provenancing

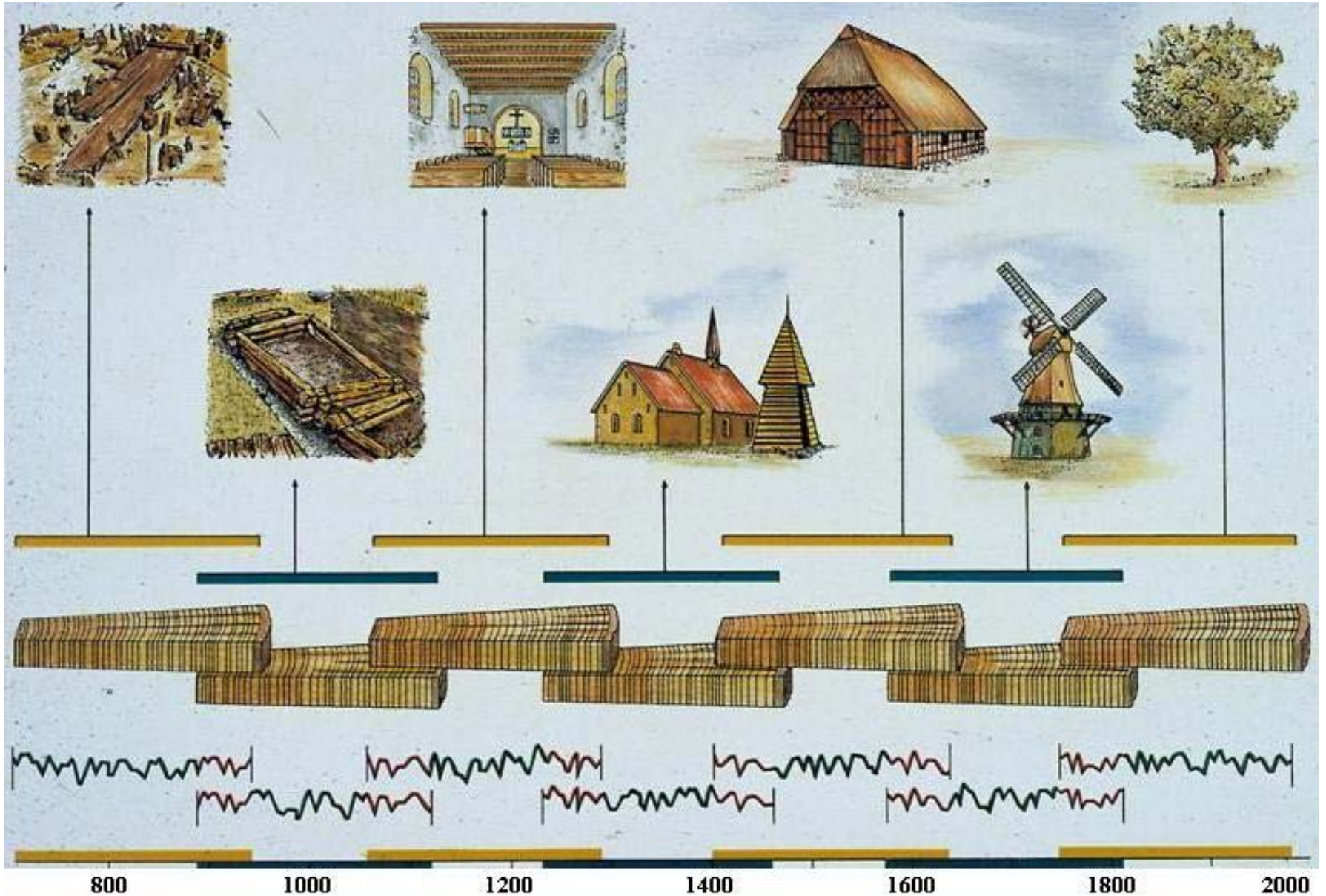


- Reference chronologies for the source area
- Relative uncertain accuracy



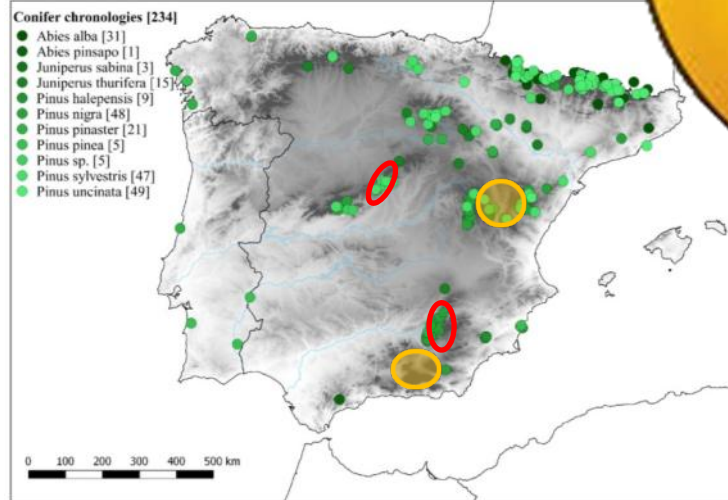
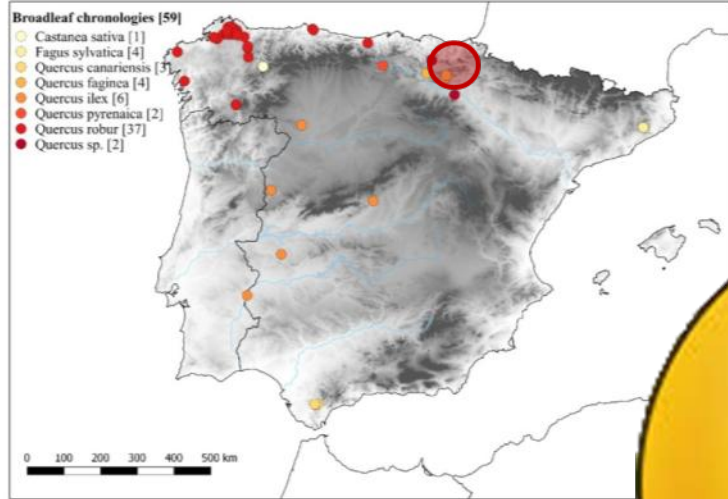
Domínguez-Delmás et al. 2013. Dendrochronological dating and provenancing of timbers from the *Arade 1* wreck, Portugal. *International Journal of Nautical Archaeology*

Retrospective extension of chronologies

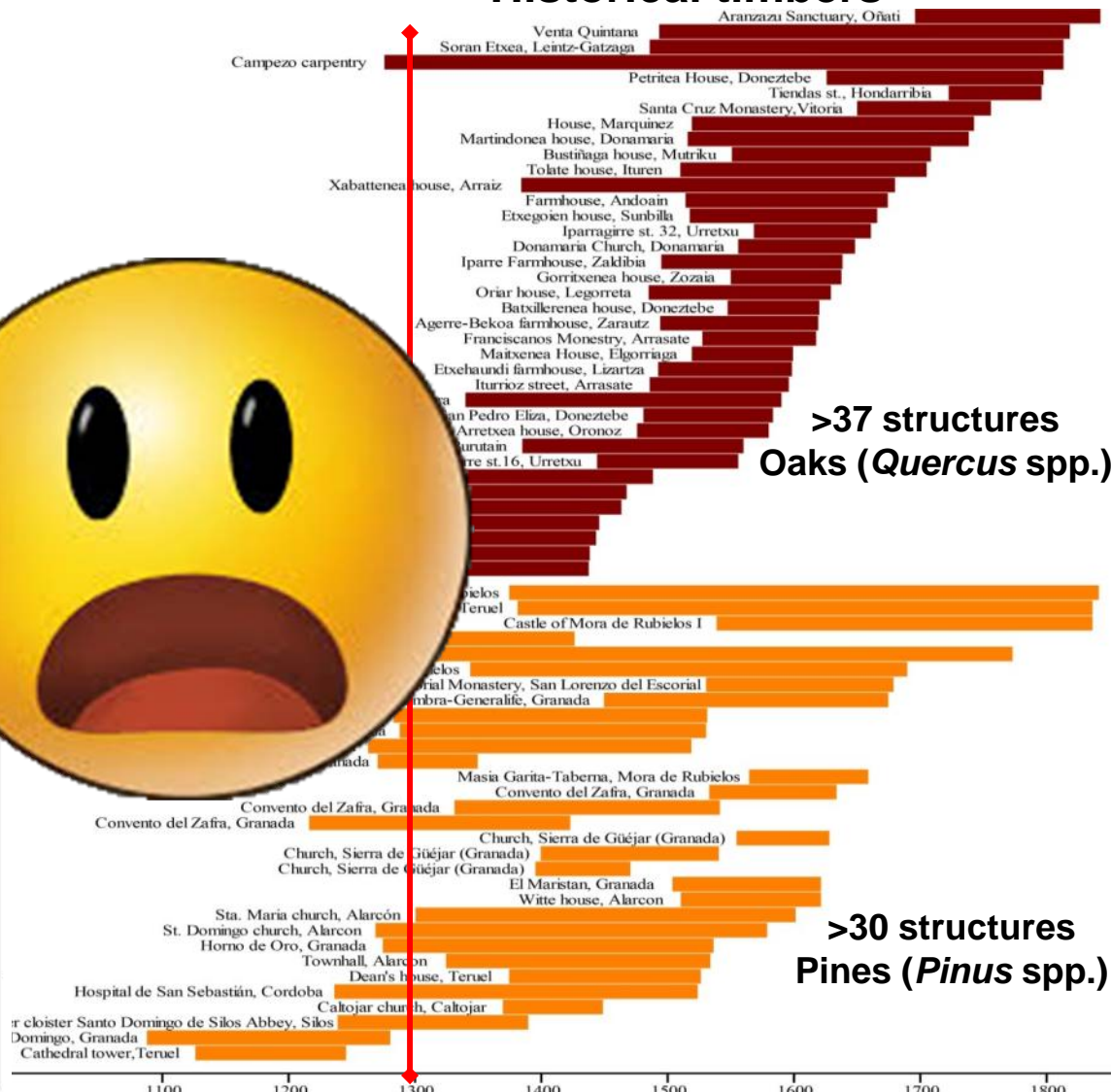


Current state dendrochronology in the IP

Living trees



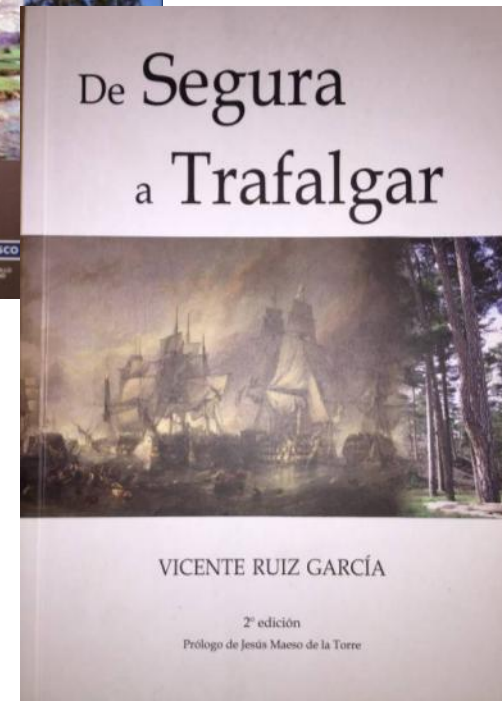
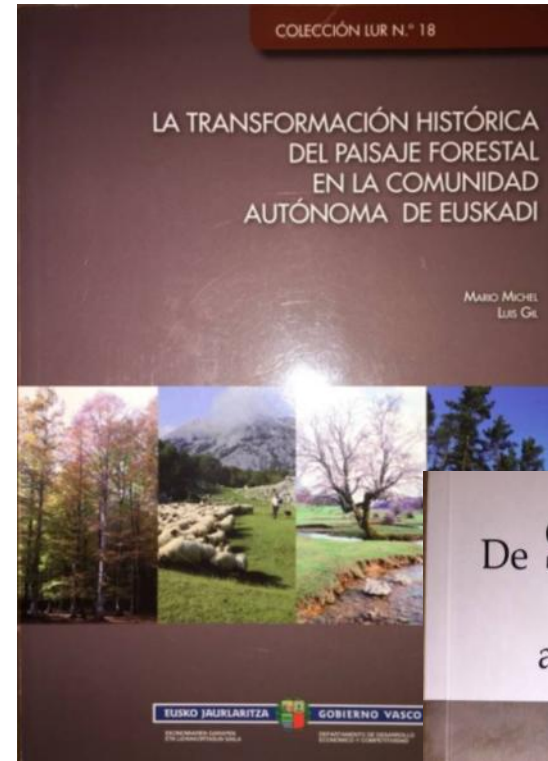
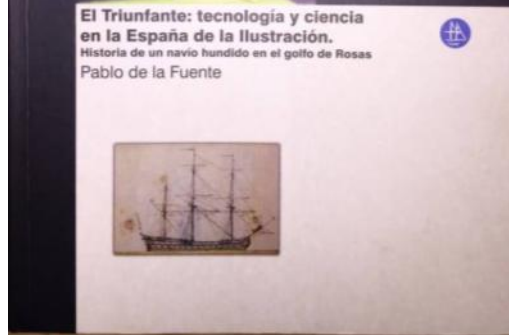
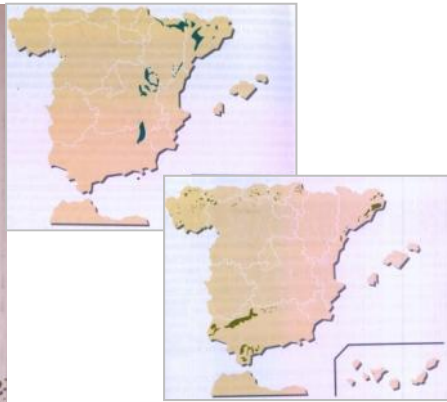
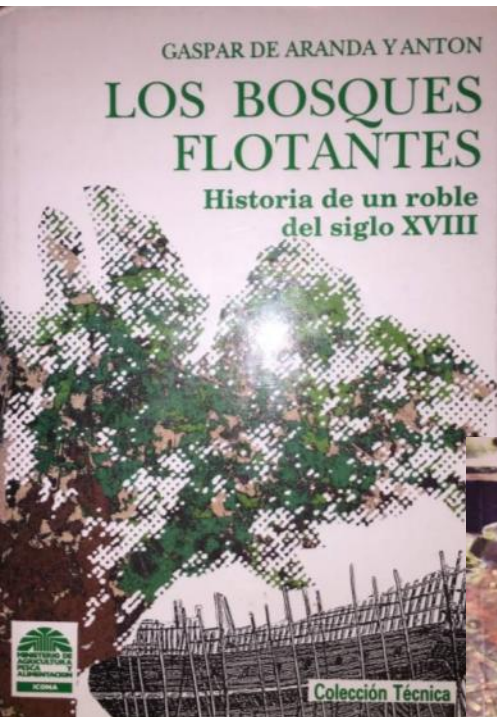
Historical timbers



Domínguez-Delmás *et al.*, in revision. Forests, tree-rings and Cultural Heritage: current state and future prospects of dendroarchaeology in the Iberian Peninsula. *Journal of Archaeological Science*

Approach

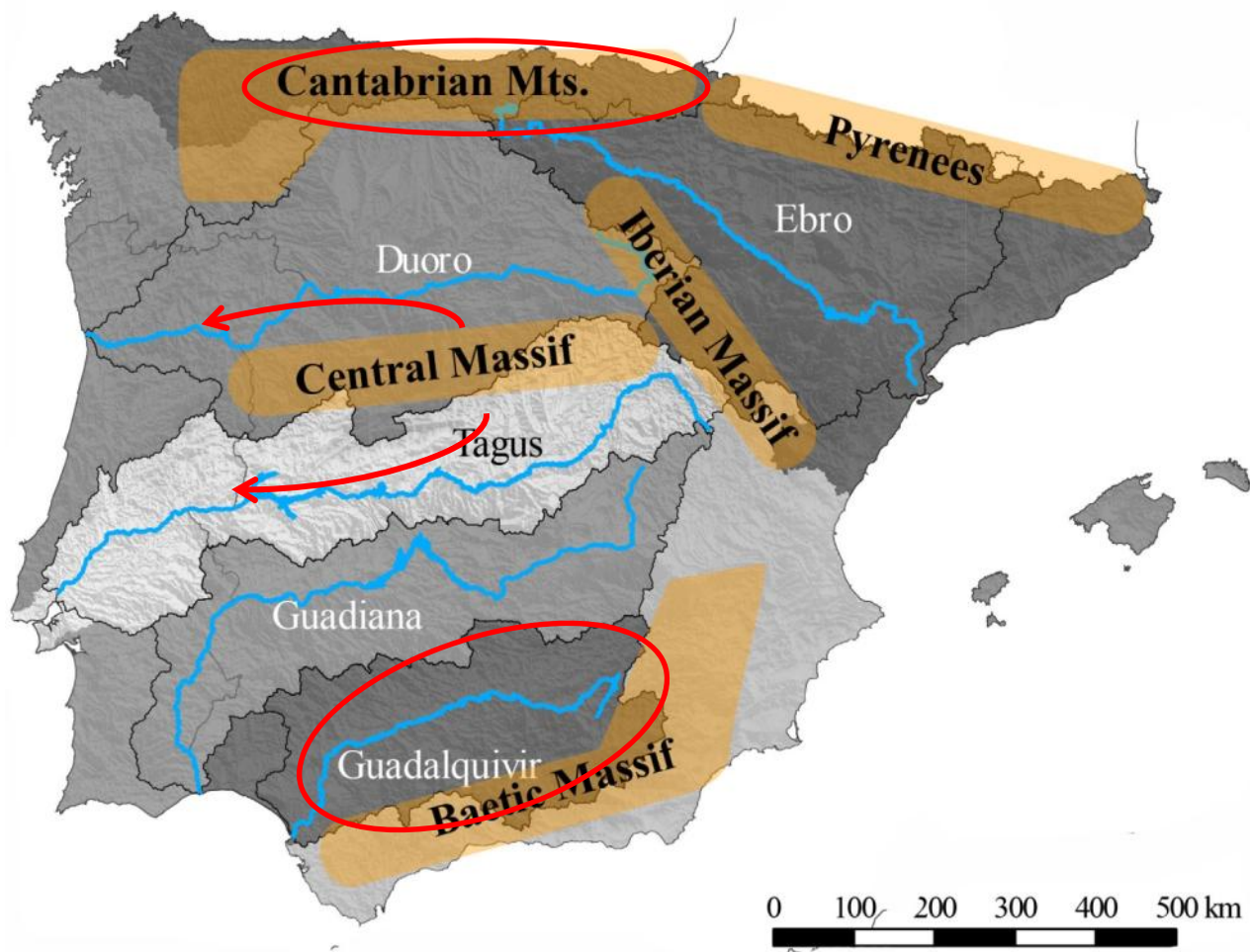
1. Timber resources for shipbuilding in literature



- Mid 18th-century
- *Motrico* shipyard supplied by *Deva* forests
 - *Orio* by *Zarauz* forests
 - *Ugarrice (Pasajes)* by *Irun* (100 oaks) and *Rentería* (300 coppiced oaks) forests

Approach

2. Division of the Peninsula in watersheds



Approach

3. Selection of forests, major buildings, sawmills and renovation companies in the selected areas within the watersheds

Approach

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Segovia cathedral
(16th-18th century)



Approach

3. Selection of forests, major buildings, sawmills and renovation companies in the selected areas within the watersheds

Segovia cathedral
(16th-18th century)



Church and convent Santo Domingo Huescar, Granada
(16th century)



Hospital Real Granada
(16th-18th century)



Approach

3. Selection of forests, major buildings, sawmills and renovation companies in the selected areas within the watersheds



Approach

3. Selection of forests, major buildings, sawmills and renovation companies in the selected areas within the watersheds



Shipwrecks researched by dendrochronology 2009-2013

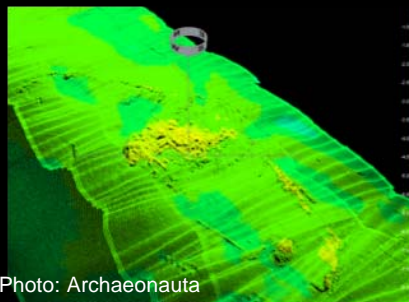


Photo: Archaeonauta



Photo: SEAS

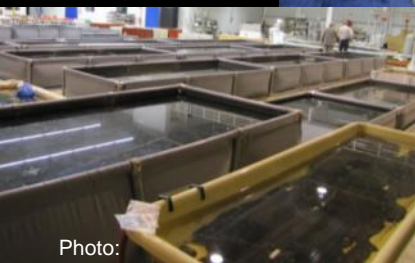


Photo: RING



Photo: CASC



Photo: CODEX AiP

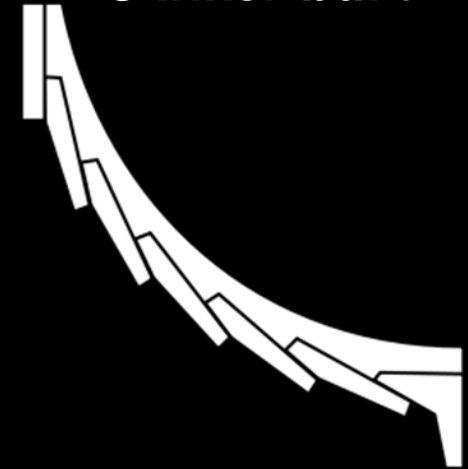


Photo: M. Soberon, CODEX Arqueologia i Patrimoni



Barceloneta I shipwreck

Clinker-built



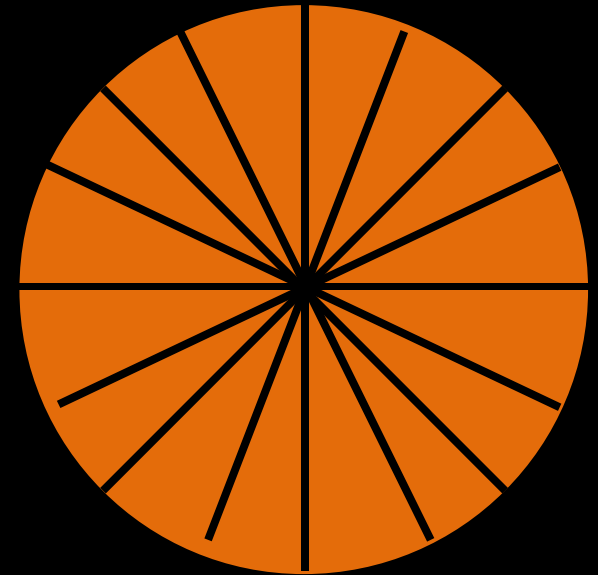
**Relative date by stratigraphy
in mid-15th century**

Soberón Rodríguez *et al.* 2012. El
Barceloneta I. Una embarcación medieval a
tingladillo en Barcelona. *ITSAS Memoria 7*

Barceloneta I – hull planks

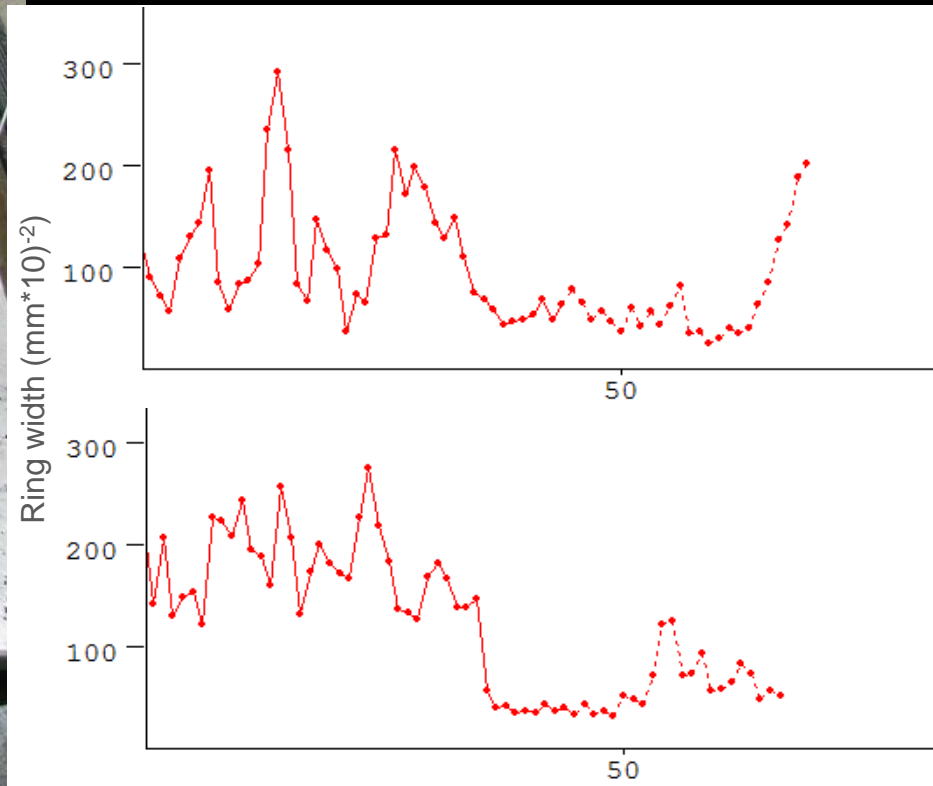


- Radially split
- 2-3 cm thick
- Slow grown trees



Barceloneta 1 – Framing elements

- **Fast grown trees in juvenile period**
- **Drastic growth suppression afterwards**
- **Trees selected by shape and diameter**









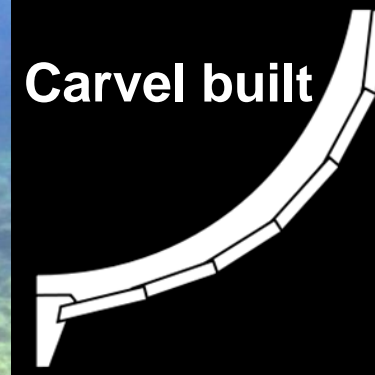
From De Aranda y Antón (1990)

El Triunfante

Built in El Ferrol, Spain 1754-56

Sunk in Cabo de Rosas 1793

(De la Fuente 2006)

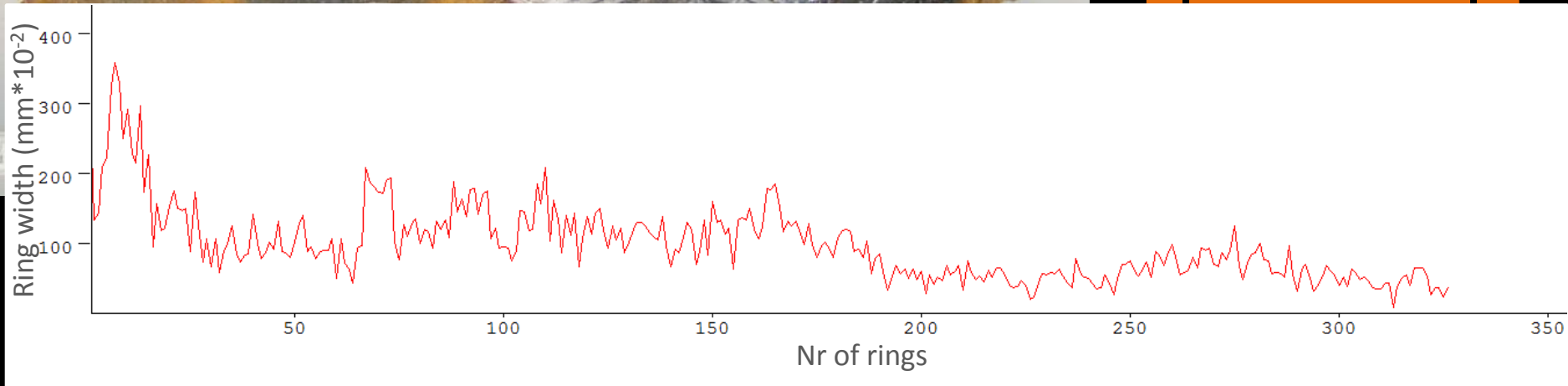
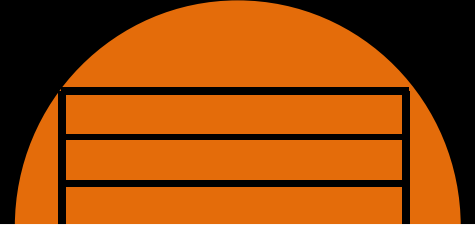


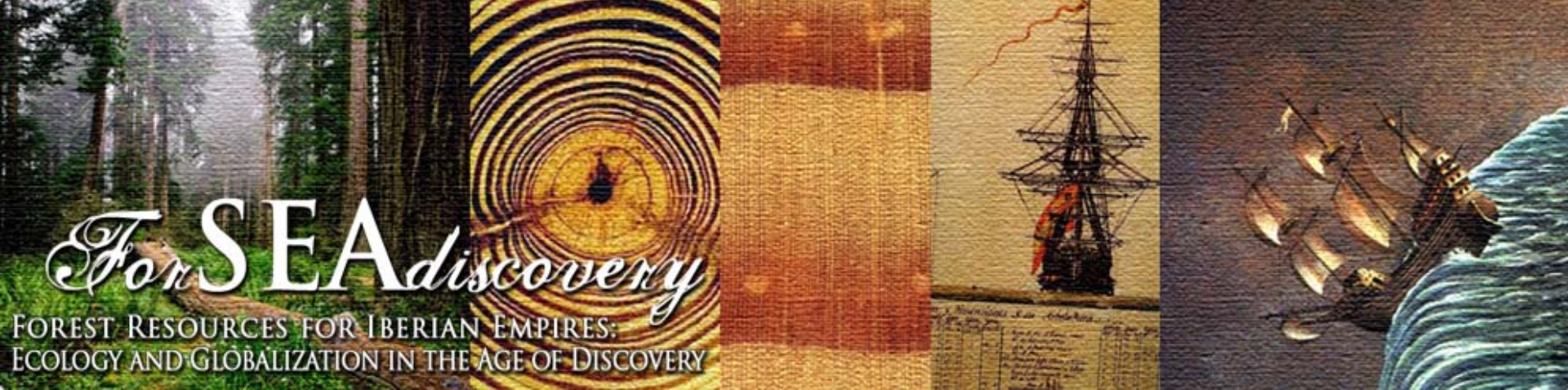
El Triunfante: tecnología y ciencia en la España de la Ilustración.
Historia de un navío hundido en el golfo de Rosas
Pablo de la Fuente



Hull planks

- *Pinus* sp.
- Tangential





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FIRST RESOURCES FOR IBERIAN EMPIRES:
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Thank you!



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