



5e colloque des Zones Ateliers-CNRS

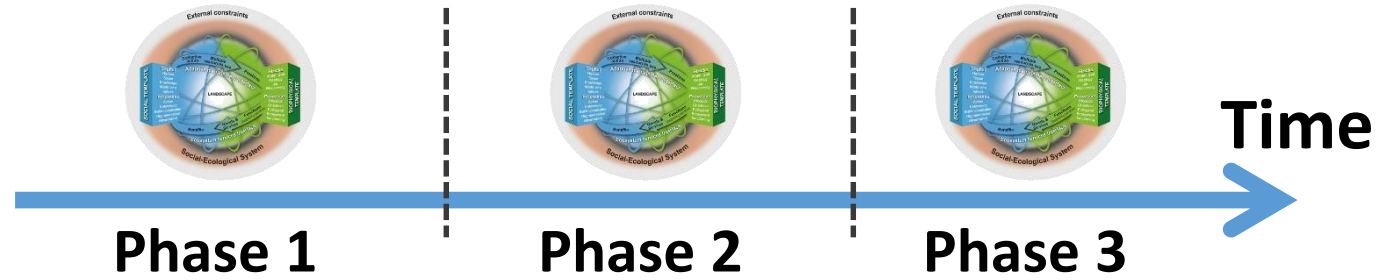
2000-2020, 20 ans de recherche du Réseau des Zones Ateliers

3 au 5 novembre 2020

## ZATimeline: Visualizing SES trajectory data on a timeline

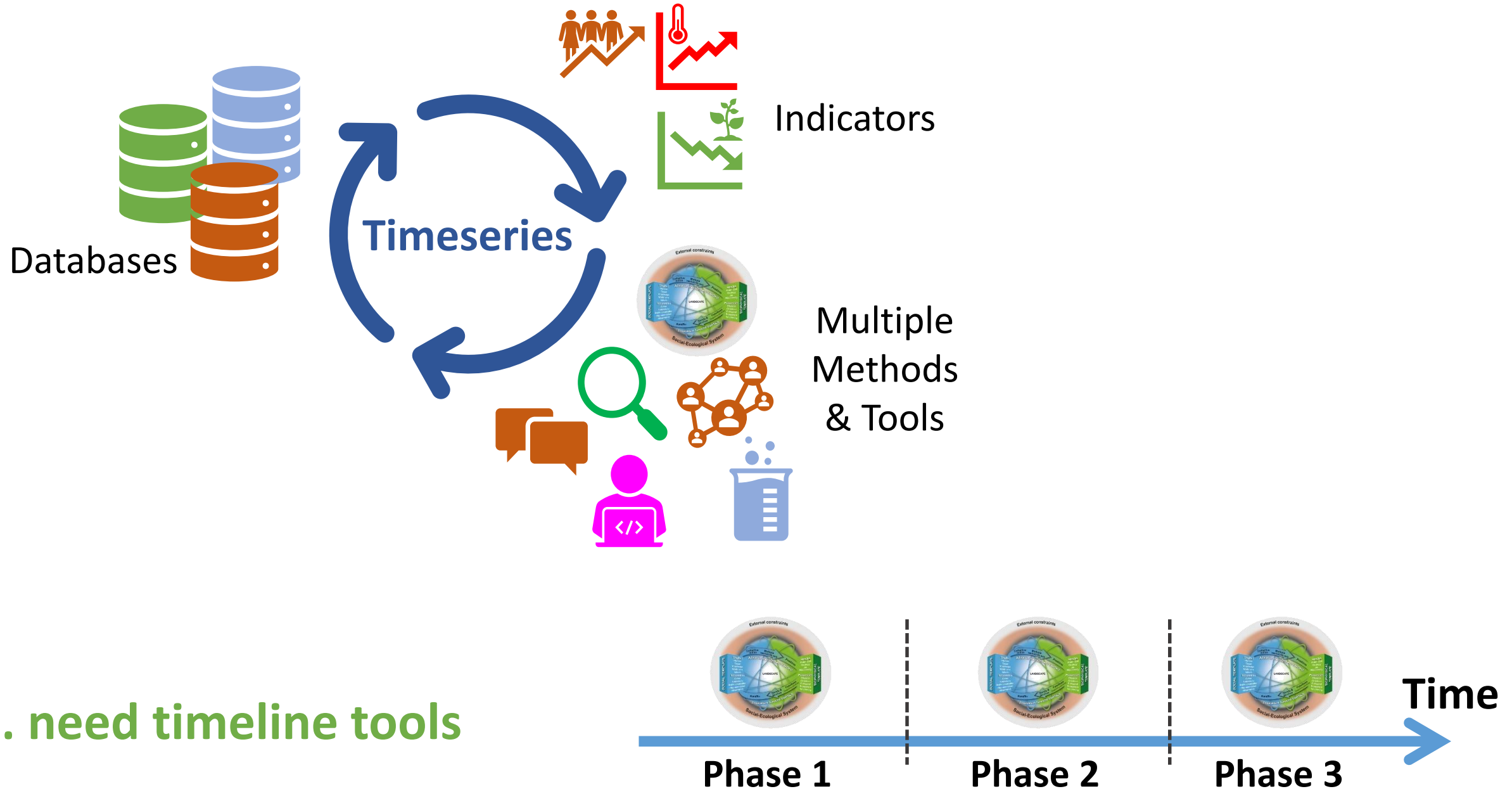
Isabelle Charpentier  
ZAEU / ICUBE

# Outline



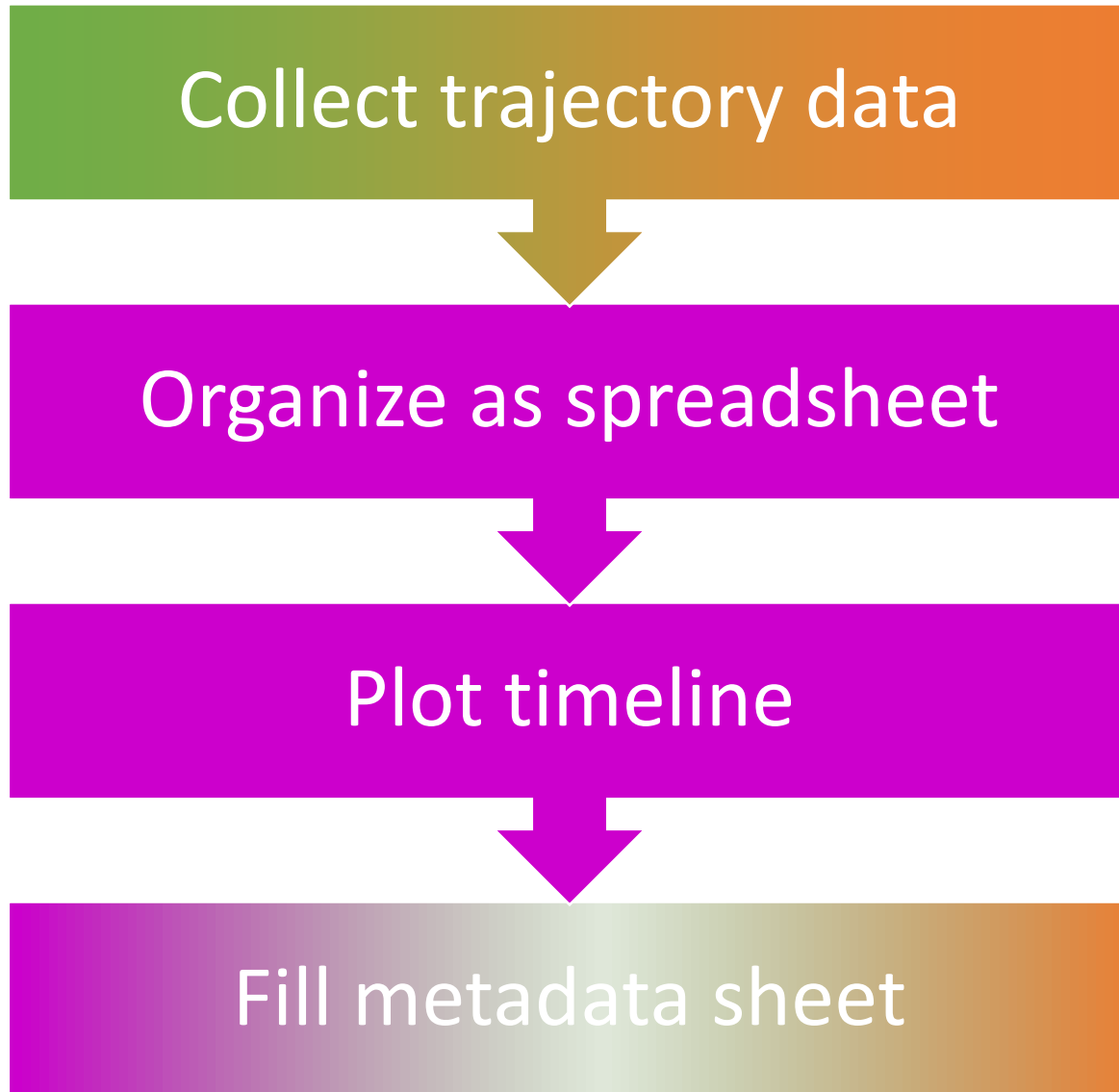
1. Motivations
2. ZAtimeline in a nutshell
3. SES timeline for Rapa Nui
4. Conclusions

# Long Term modeling of Socio-Ecological Systems...



... need timeline tools

# ZAtimeline workflow in a nutshell



- External constraints
- Social and biophysical models
- Practices
- Eco. services and diservices



Timeseries  
Indicators  
Trends

- Excel (.xls, .csv) / Libreoffice
- Names, Start/End dates
- Styles



ZAtimeline

- Graphical user interface

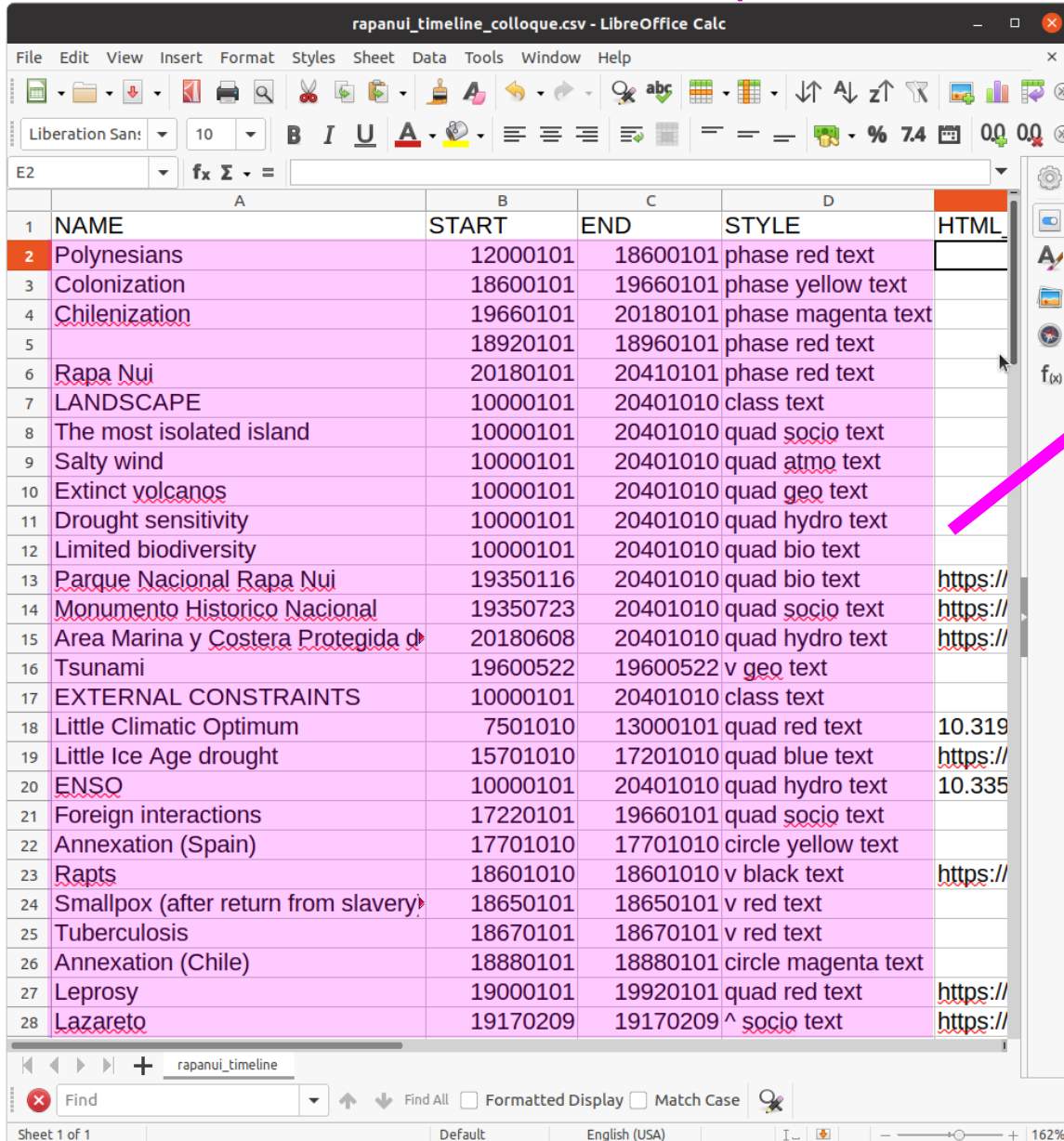
- Trajectory data
- Timeline plot  
(can be performed using Geoflow)



BED

# Zatimeline's key features

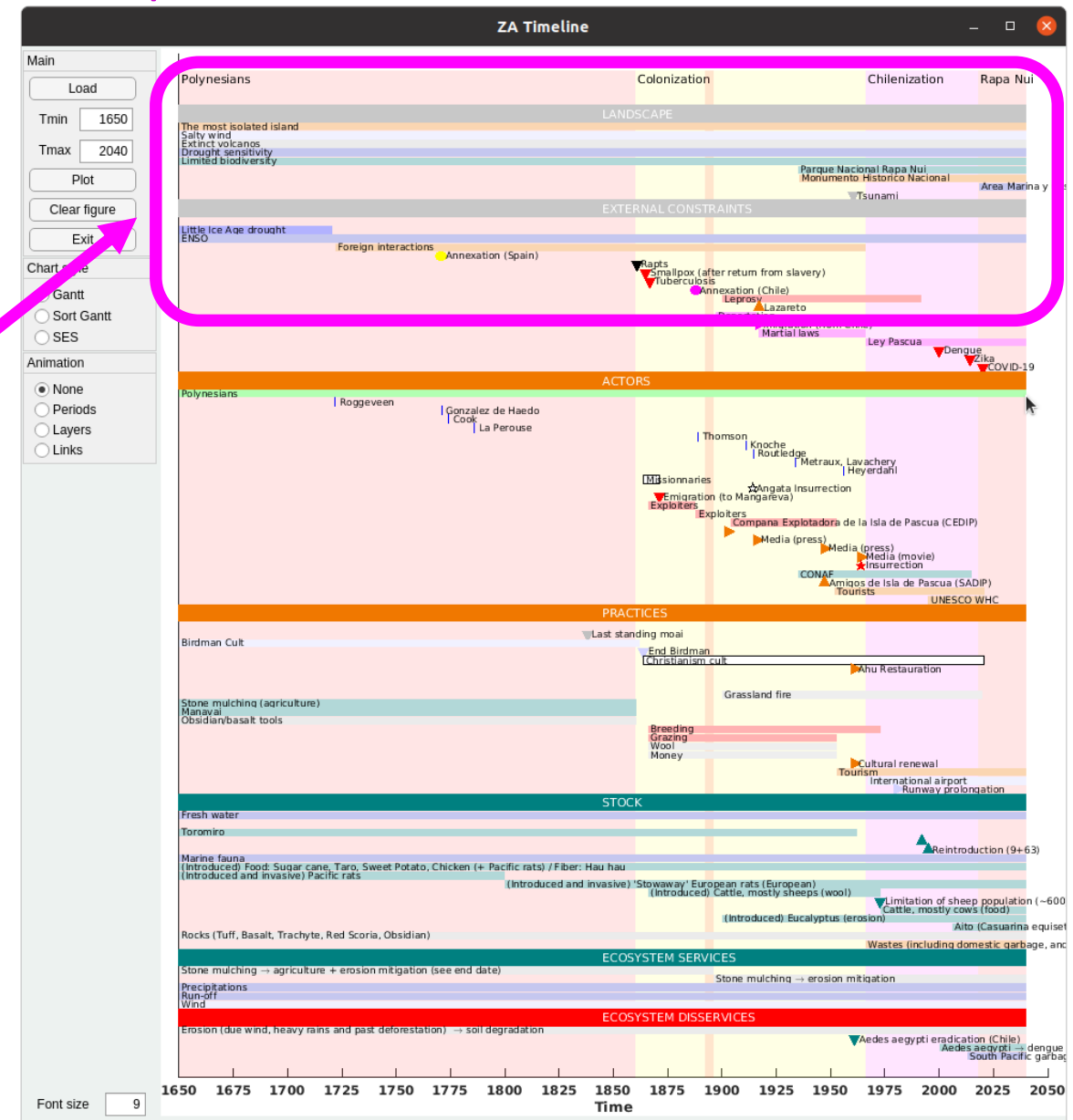
## Spreadsheet



The spreadsheet displays a table with columns for NAME, START, END, STYLE, and HTML. The data is organized into rows corresponding to the timeline's categories and specific events.

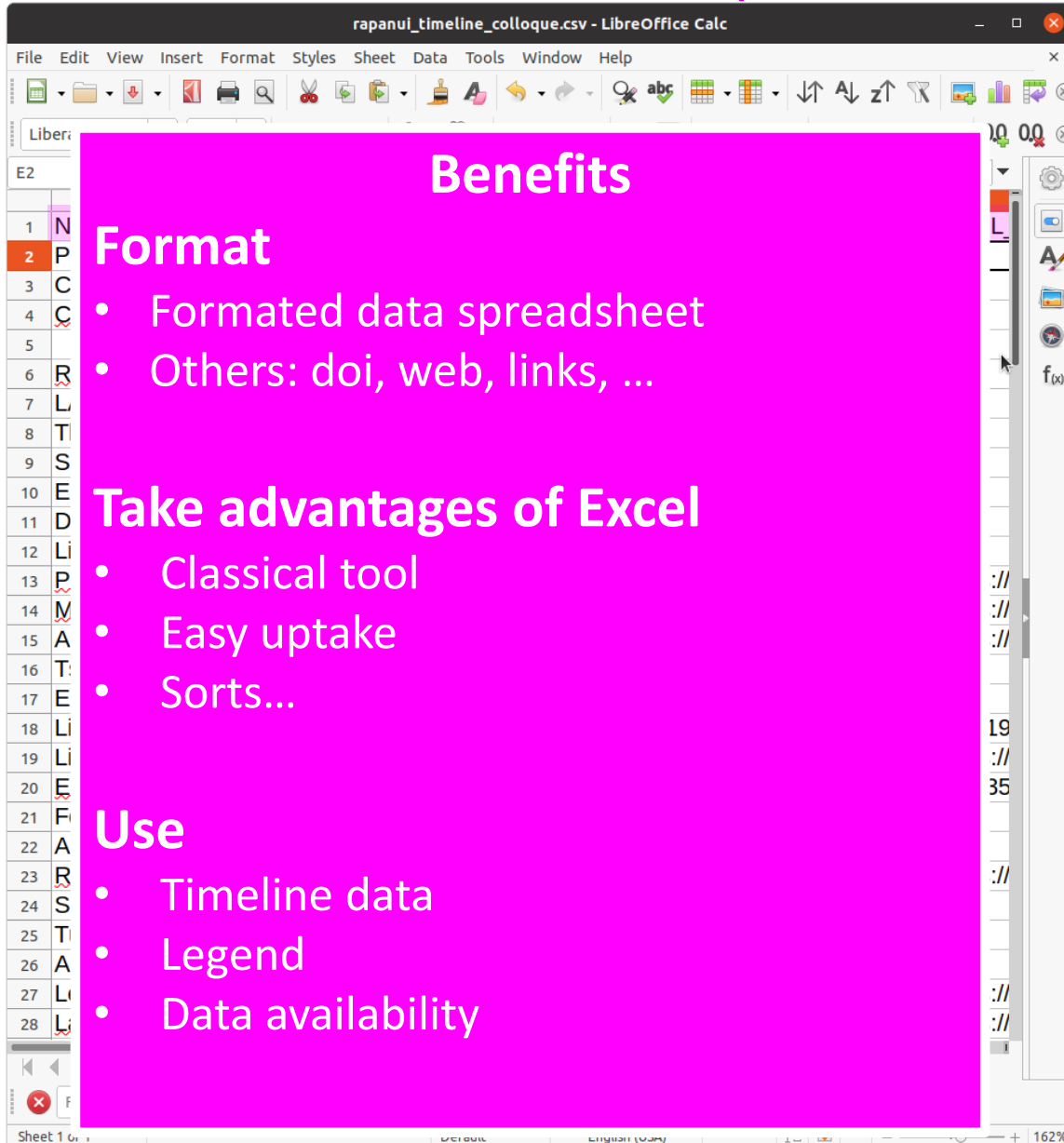
	A	B	C	D	E
	NAME	START	END	STYLE	HTML
1					
2	Polynesians	12000101	18600101	phase red text	
3	Colonization	18600101	19660101	phase yellow text	
4	Chilenization	19660101	20180101	phase magenta text	
5		18920101	18960101	phase red text	
6	Rapa Nui	20180101	20410101	phase red text	
7	LANDSCAPE	10000101	20401010	class text	
8	The most isolated island	10000101	20401010	quad socio text	
9	Salty wind	10000101	20401010	quad atmo text	
10	Extinct volcanos	10000101	20401010	quad geo text	
11	Drought sensitivity	10000101	20401010	quad hydro text	
12	Limited biodiversity	10000101	20401010	quad bio text	
13	Parque Nacional Rapa Nui	19350116	20401010	quad bio text	<a href="https://">https://</a>
14	Monumento Historico Nacional	19350723	20401010	quad socio text	<a href="https://">https://</a>
15	Area Marina y Costera Protegida d	20180608	20401010	quad hydro text	<a href="https://">https://</a>
16	Tsunami	19600522	19600522	v geo text	
17	EXTERNAL CONSTRAINTS	10000101	20401010	class text	
18	Little Climatic Optimum	7501010	13000101	quad red text	10.319
19	Little Ice Age drought	15701010	17201010	quad blue text	<a href="https://">https://</a>
20	ENSO	10000101	20401010	quad hydro text	10.335
21	Foreign interactions	17220101	19660101	quad socio text	
22	Annexation (Spain)	17701010	17701010	circle yellow text	
23	Rapts	18601010	18601010	v black text	<a href="https://">https://</a>
24	Smallpox (after return from slavery)	18650101	18650101	v red text	
25	Tuberculosis	18670101	18670101	v red text	
26	Annexation (Chile)	18880101	18880101	circle magenta text	
27	Leprosy	19000101	19920101	quad red text	<a href="https://">https://</a>
28	Lazareto	19170209	19170209	^ socio text	<a href="https://">https://</a>

## Graphical User Interface



# Zatimeline's key features

## Spreadsheet



rapanui\_timeline\_colloque.csv - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

LibreOffice

### Benefits

### Format

- Formated data spreadsheet
- Others: doi, web, links, ...

### Take advantages of Excel

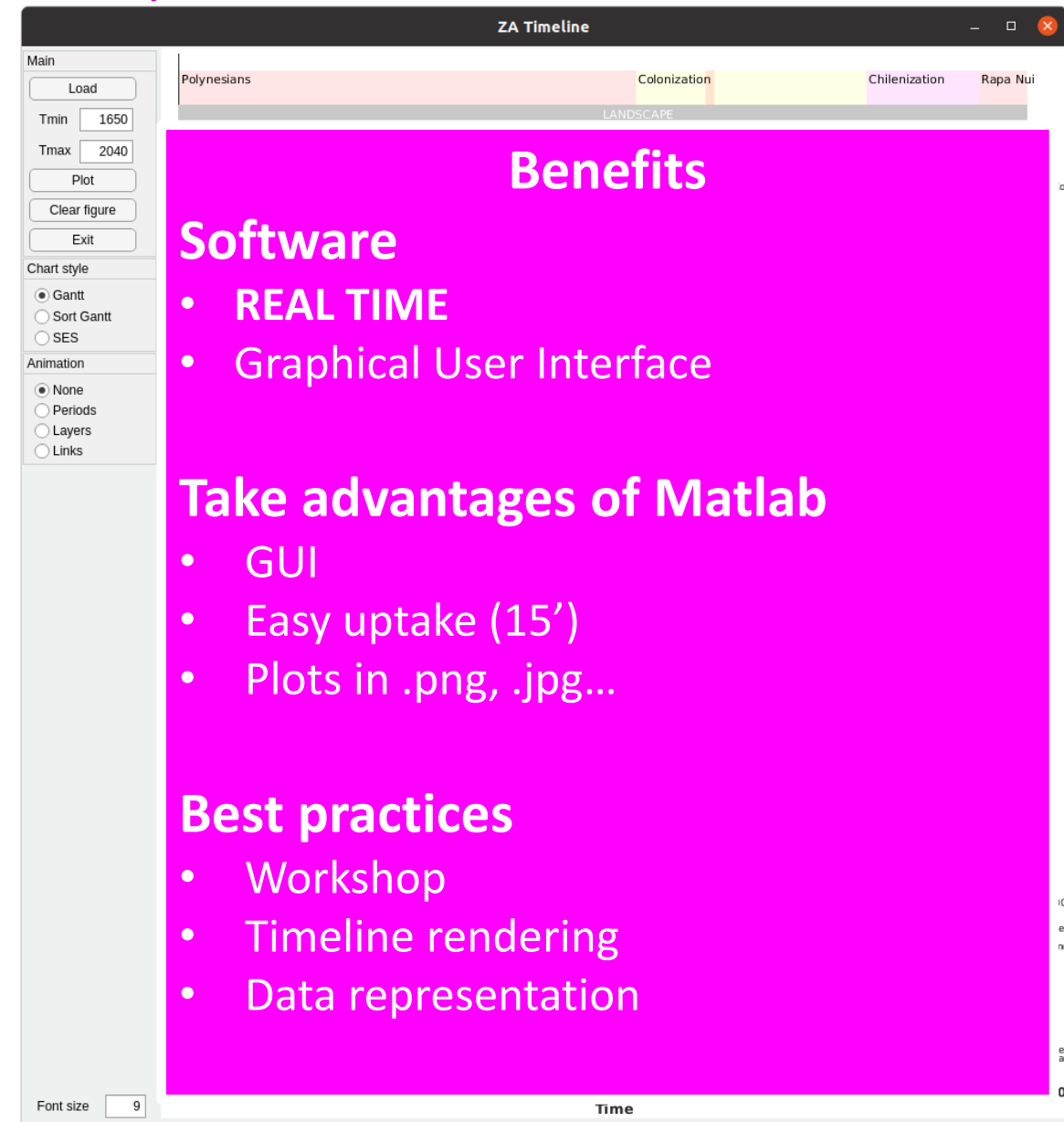
- Classical tool
- Easy uptake
- Sorts...

### Use

- Timeline data
- Legend
- Data availability

Sheet 1

## Graphical User Interface



ZA Timeline

Polynesiens Colonization Chilenization Rapa Nui

LANDSCAPE

### Benefits

### Software

- REAL TIME
- Graphical User Interface

### Take advantages of Matlab

- GUI
- Easy uptake (15')
- Plots in .png, .jpg...

### Best practices

- Workshop
- Timeline rendering
- Data representation

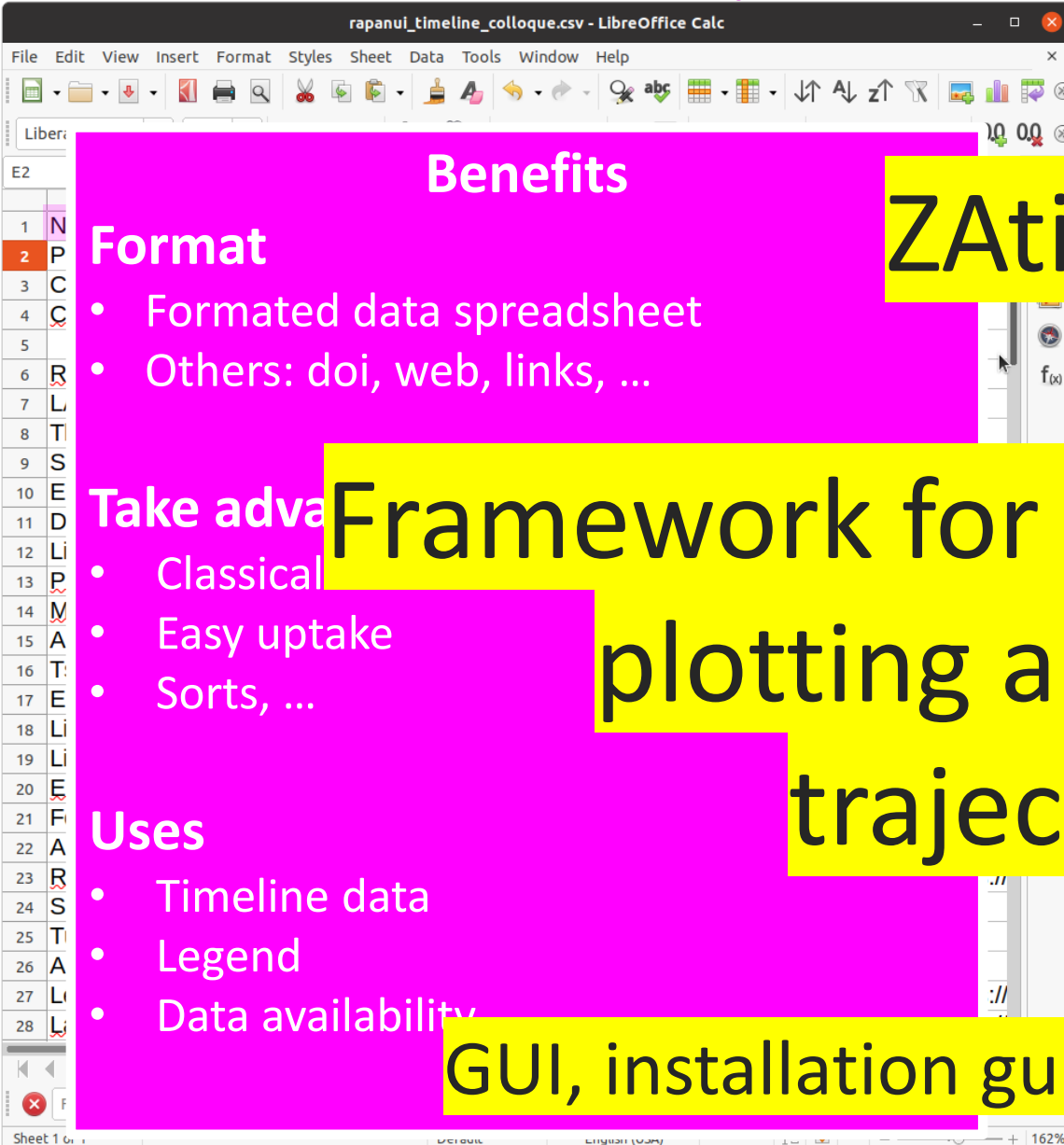
Font size 9

Time

# Zatimeline's key features

Spreadsheet

Graphical User Interface



rapanui\_timeline\_colloque.csv - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

LibreOffice

E2

1 N  
2 P  
3 C  
4 C  
5  
6 R  
7 L  
8 T  
9 S  
10 E  
11 D  
12 L  
13 P  
14 M  
15 A  
16 T  
17 E  
18 L  
19 L  
20 E  
21 F  
22 A  
23 R  
24 S  
25 T  
26 A  
27 L  
28 L

## Benefits

### Format

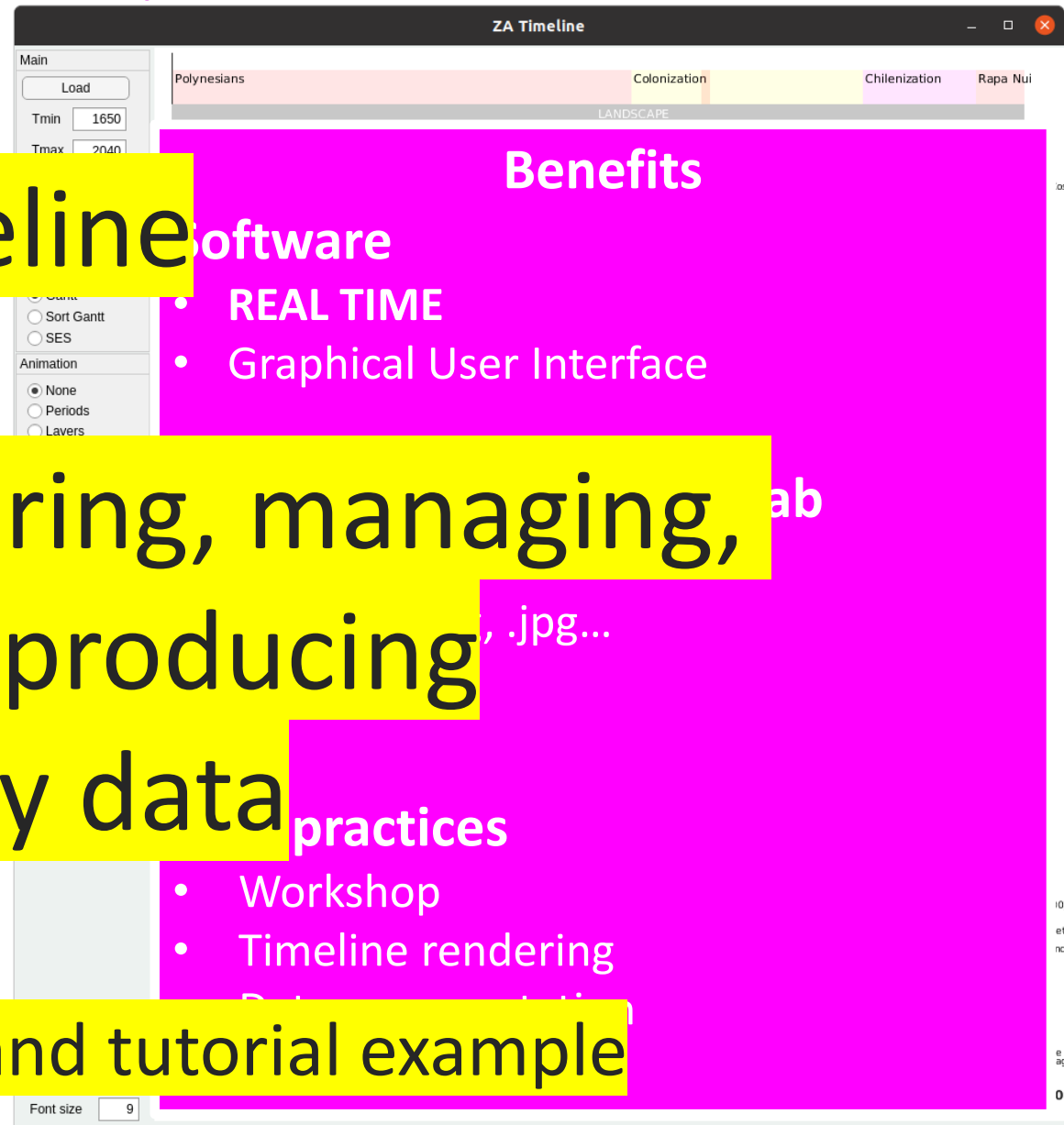
- Formated data spreadsheet
- Others: doi, web, links, ...

### Take advantage

- Classical
- Easy uptake
- Sorts, ...

### Uses

- Timeline data
- Legend
- Data availability



ZA Timeline

Main

Load

Polynesiens Colonization Chilenization Rapa Nui

LANDSCAPE

Tmin 1650  
Tmax 2040

Animation

- Gantt
- Sort Gantt
- SES

Animation

- None
- Periods
- Layers

## Benefits

### Software

- REAL TIME
- Graphical User Interface

### practices

- Workshop
- Timeline rendering

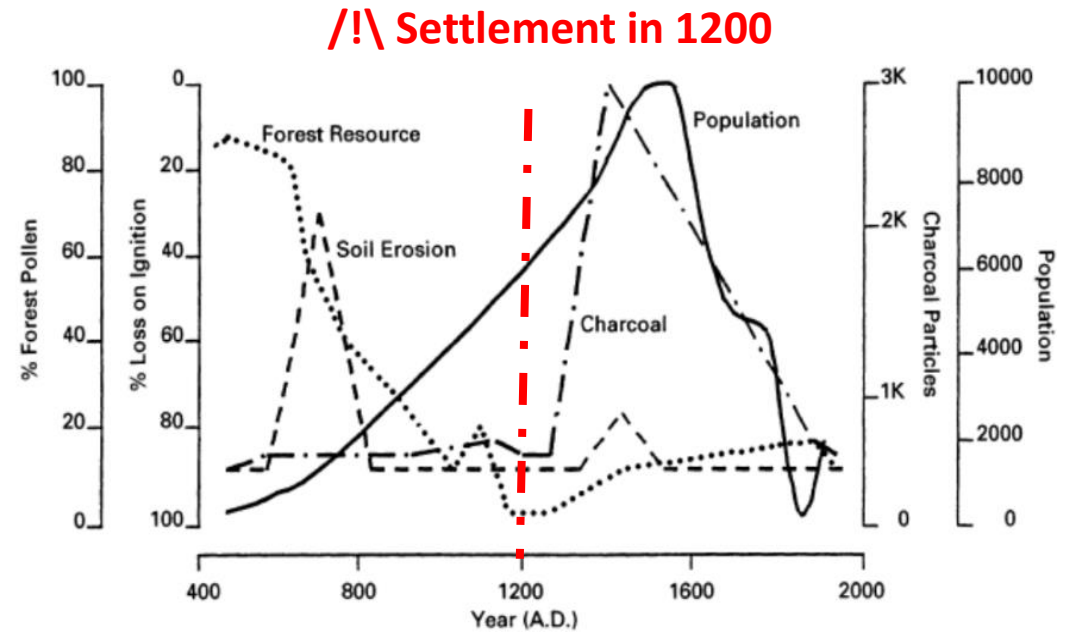
# ZAtimeline

# Framework for storing, managing, plotting and producing trajectory data

## GUI, installation guide and tutorial example

# Easter Island, a very common case study...

- Mysteries of Easter Island
- Ecocide controversy
  - Diamond\*, 2005
  - Peiser\*\*, 2005
- Human-Nature dynamical systems
  - Brander&Taylor, 1998
  - Motescharrei et al., 2014
- Conceptual frameworks



Key indicators according to Bahn&Fenley, 1992

**... but often limited to precontact**

*\*Collapse: How Societies Choose to Fail or Succeed ; \*\*From Genocide to Ecocide: The Rape of Rapa Nui*



# Rapa Nui

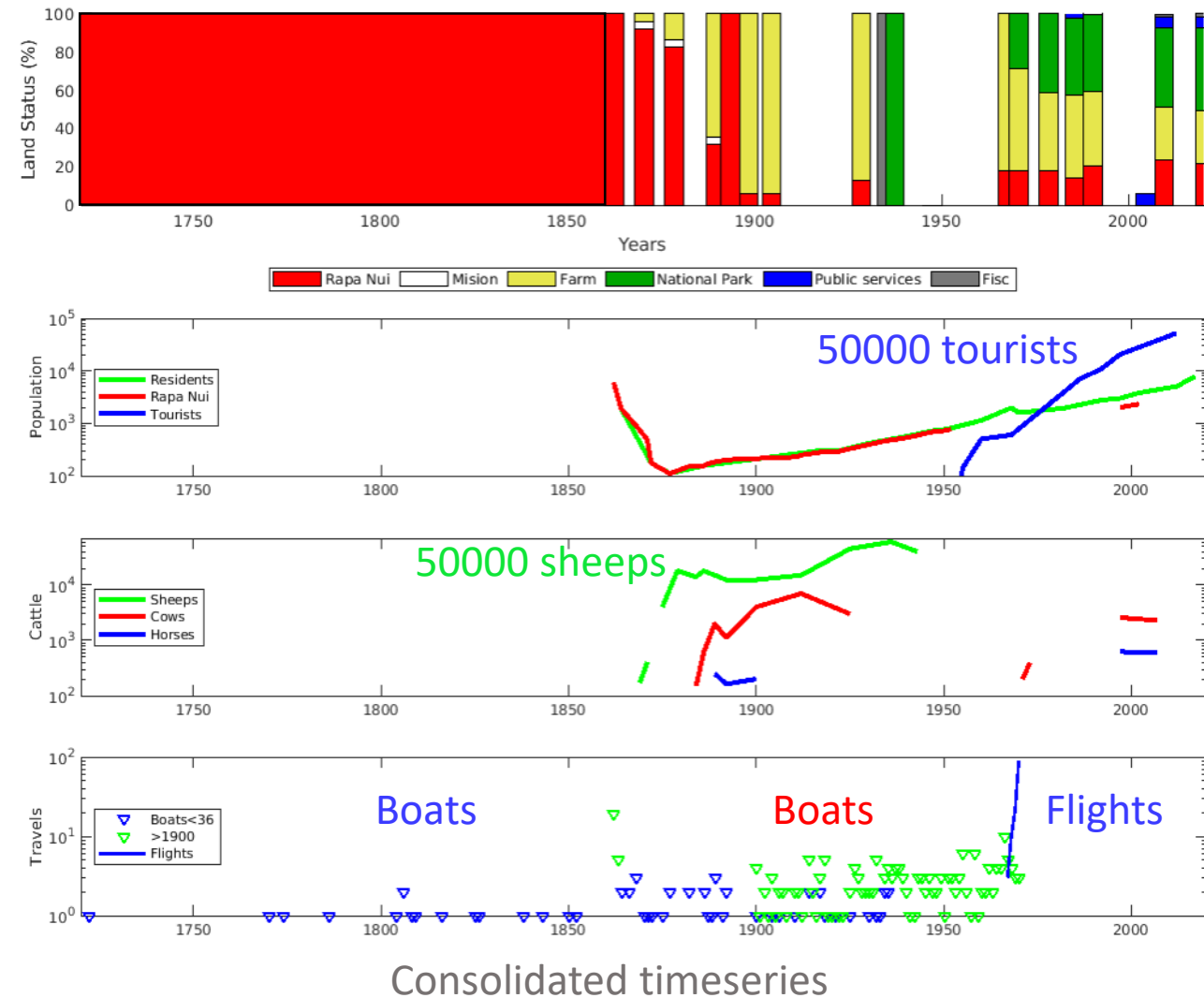
## 1. Magnify the case from 1200 to 2020

- Settlement
- Colonization
- Chilenization
- Rapa Nui

## 2. A number of data

- Inventories (species, practices)
- Timeseries
- Exploration's log books, early scientists books
- Laws, decrees, judgments, property acts
- Scientific papers
- Bibliography in English, Spanish and French

that can be gathered in timeseries



# Rapa Nui's timeline

ZA Timeline

Main

Load

Tmin 1100

Tmax 2100

Plot

Clear figure

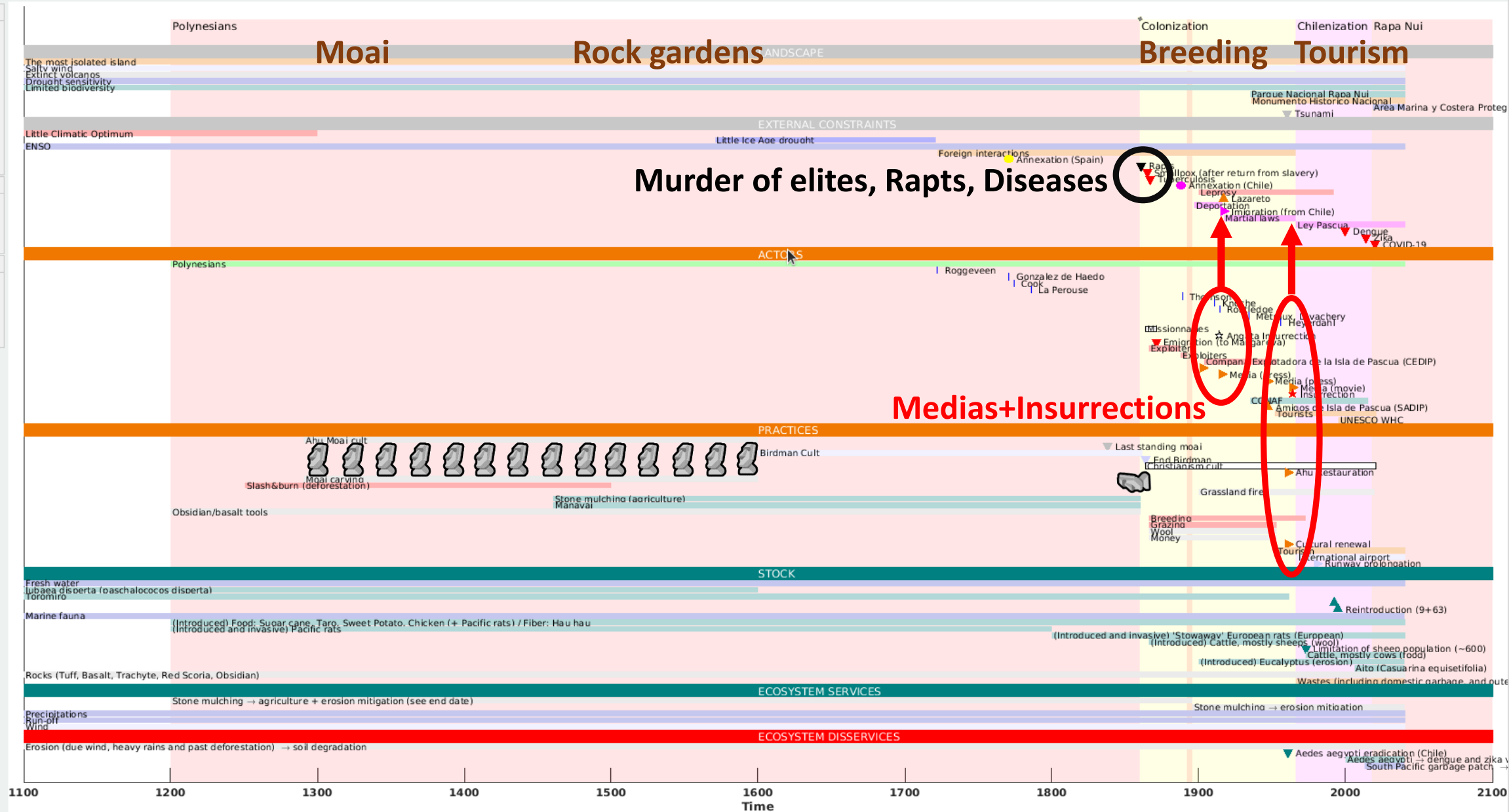
Exit

Chart style

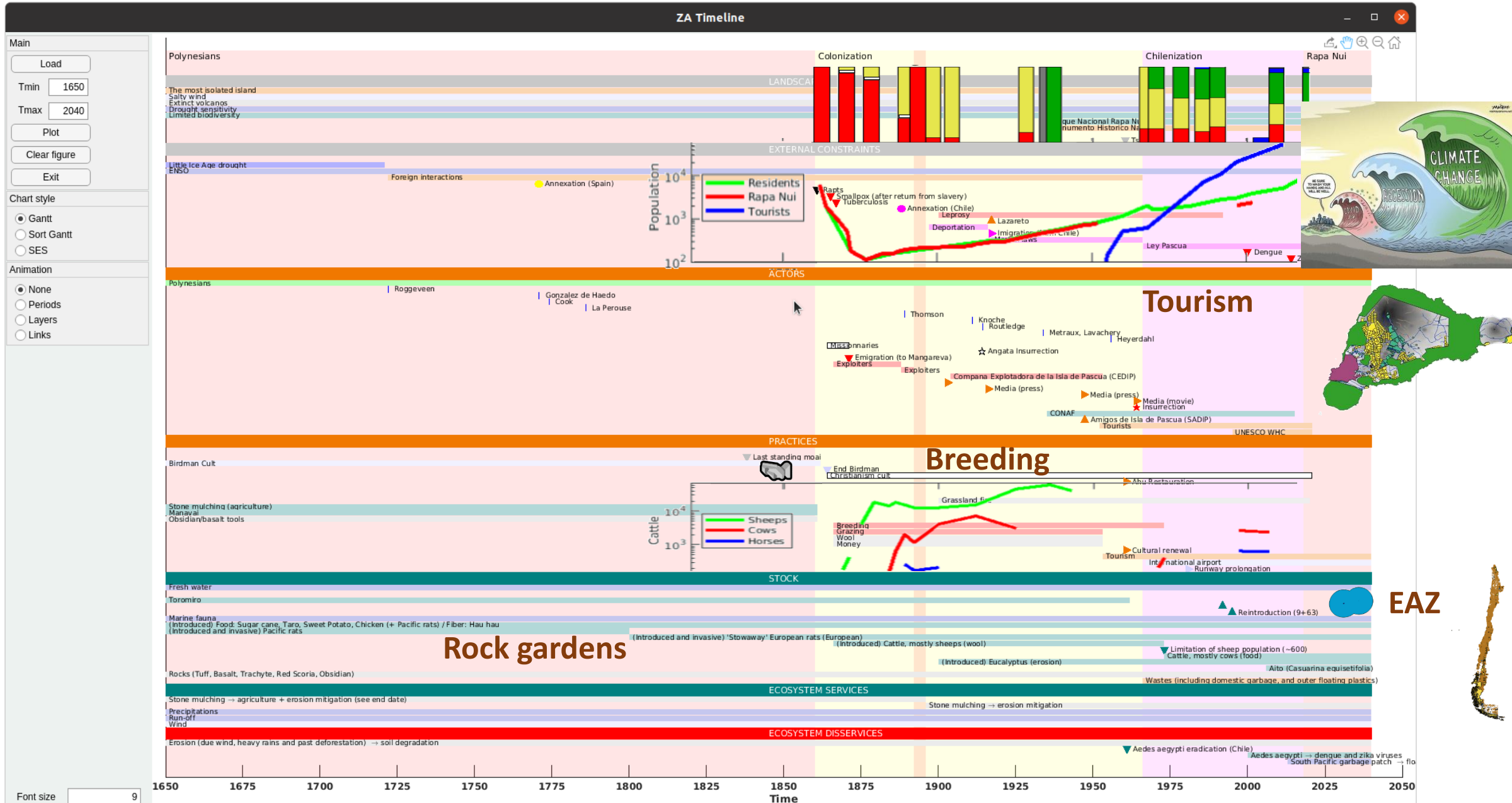
- Gantt
- Sort Gantt
- SES

Animation

- None
- Periods
- Layers
- Links



# Rapa Nui's timeline and indicators



# Conclusions

ATHN2 : Trajectories of Human-Nature interactions

## ZAtimeline tested by several ZAs

- Master students
- Research workshops
- Others

Easy uptake

Positive feedbacks

Timeline products (plots, data files, metadata...)

Coming soon

Metadata sheets filled using GEOFLOW (BED action)

