# Tools to realize spatiotemporal analysis in the humanities

## SEKINO, Tatsuki

### (Research Institute for Humanity and Nature)
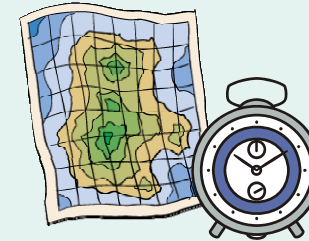
# Spatiotemporal ?

## Spatiotemporal analysis tools

### Spatial information
There are visual analysis tools such as GIS

### Temporal information
Although there are tools for chronological tables and time series analysis, there are few tools for visual analysis like GIS

TimeMap, ArcGIS Tracking Analyst ➡️ for spatial information with temporal data

## To realize spatiotemporal analysis…
Analysis method for temporal information must be improved at the same level of GIS
Visual analysis tool for temporal information is required

### HuTime
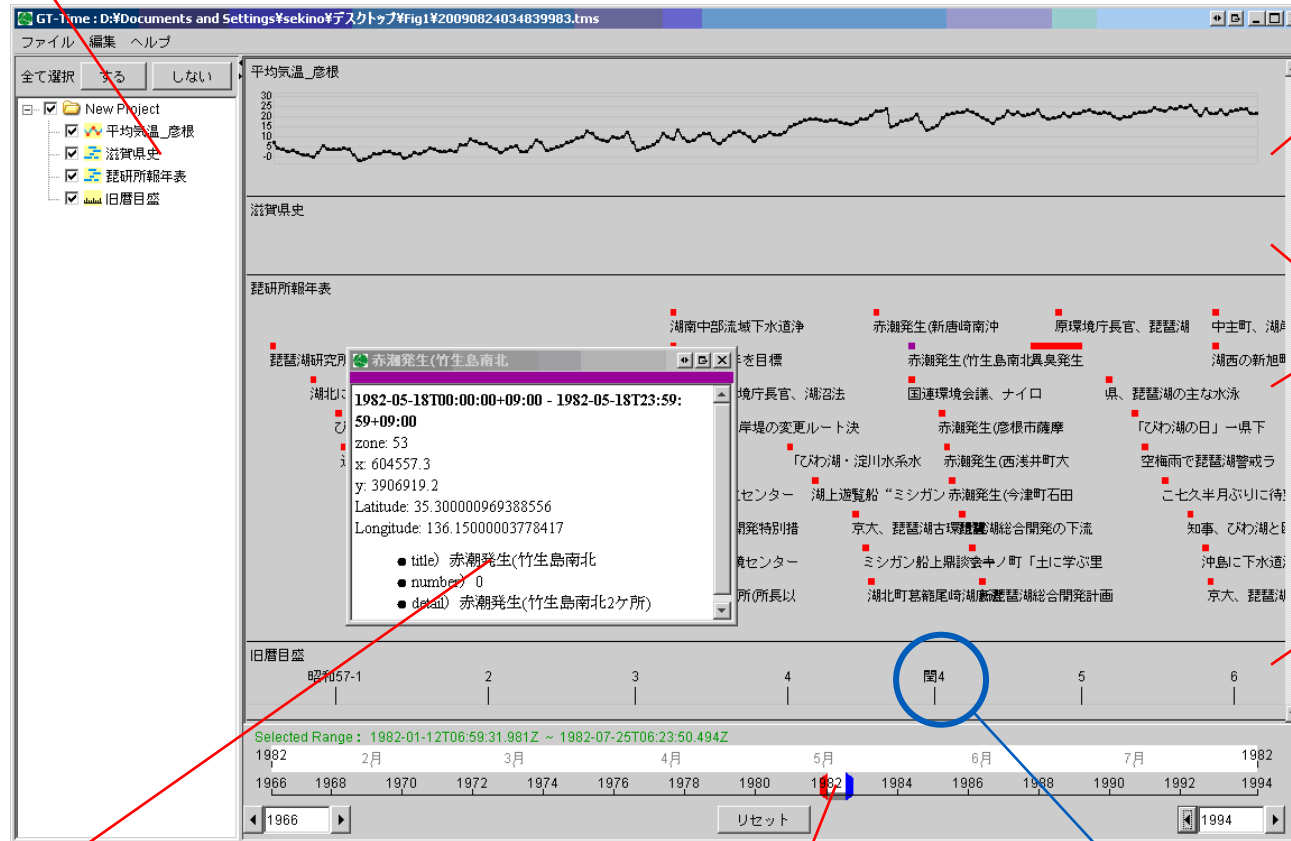(developed by Humanity GIS Research Group)

## In this presentation
### Introduction of
•Outline of HuTime
•Its cooperative capabilities with GIS tool (HuMap)

# HuTime – A tool for visual analysis of temporal information



List of Layers

Layer of Line Chart

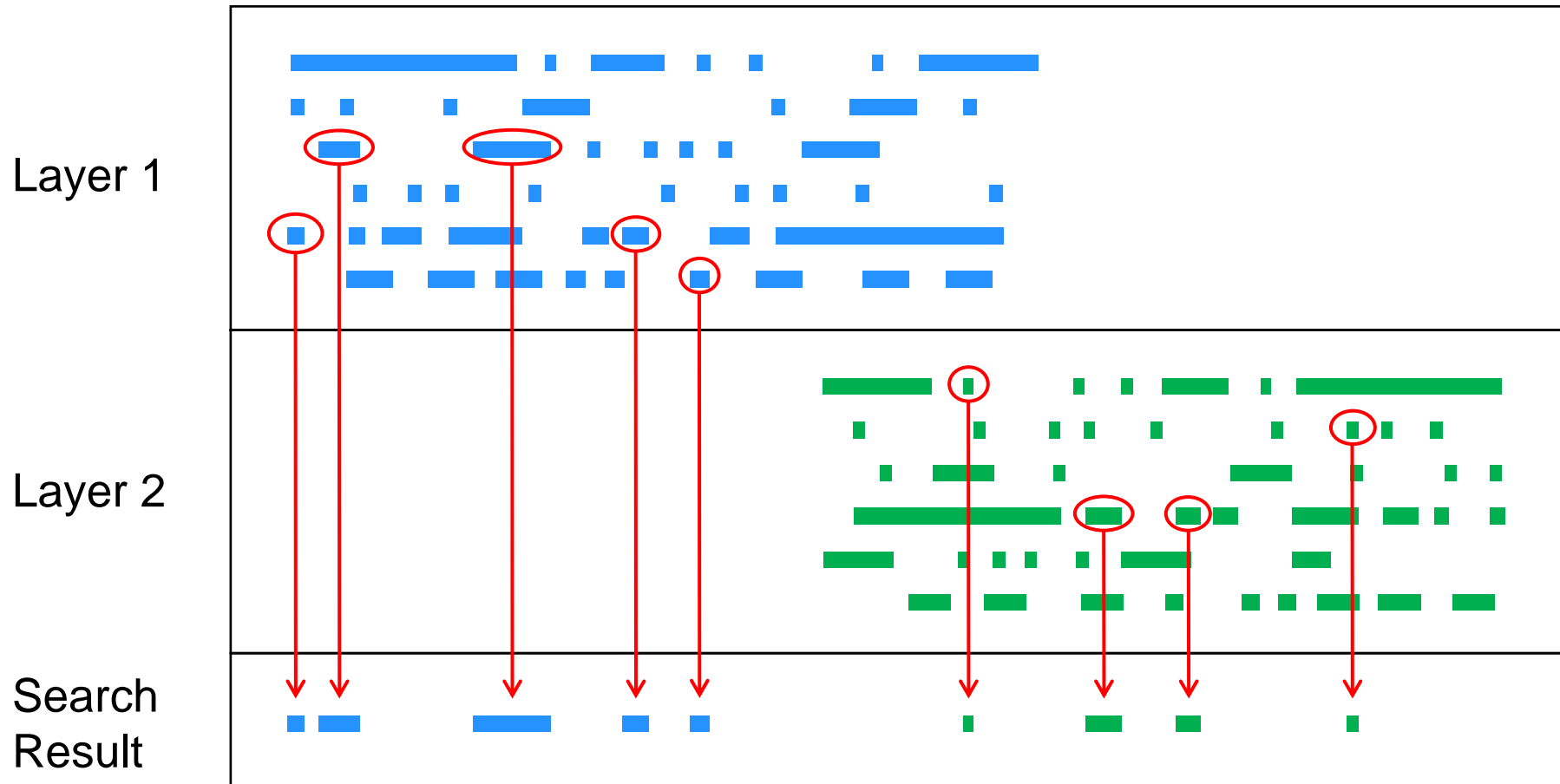Layer of Chronological Tables

Layer of Time Scale

Popup Window (to show detail of an event)
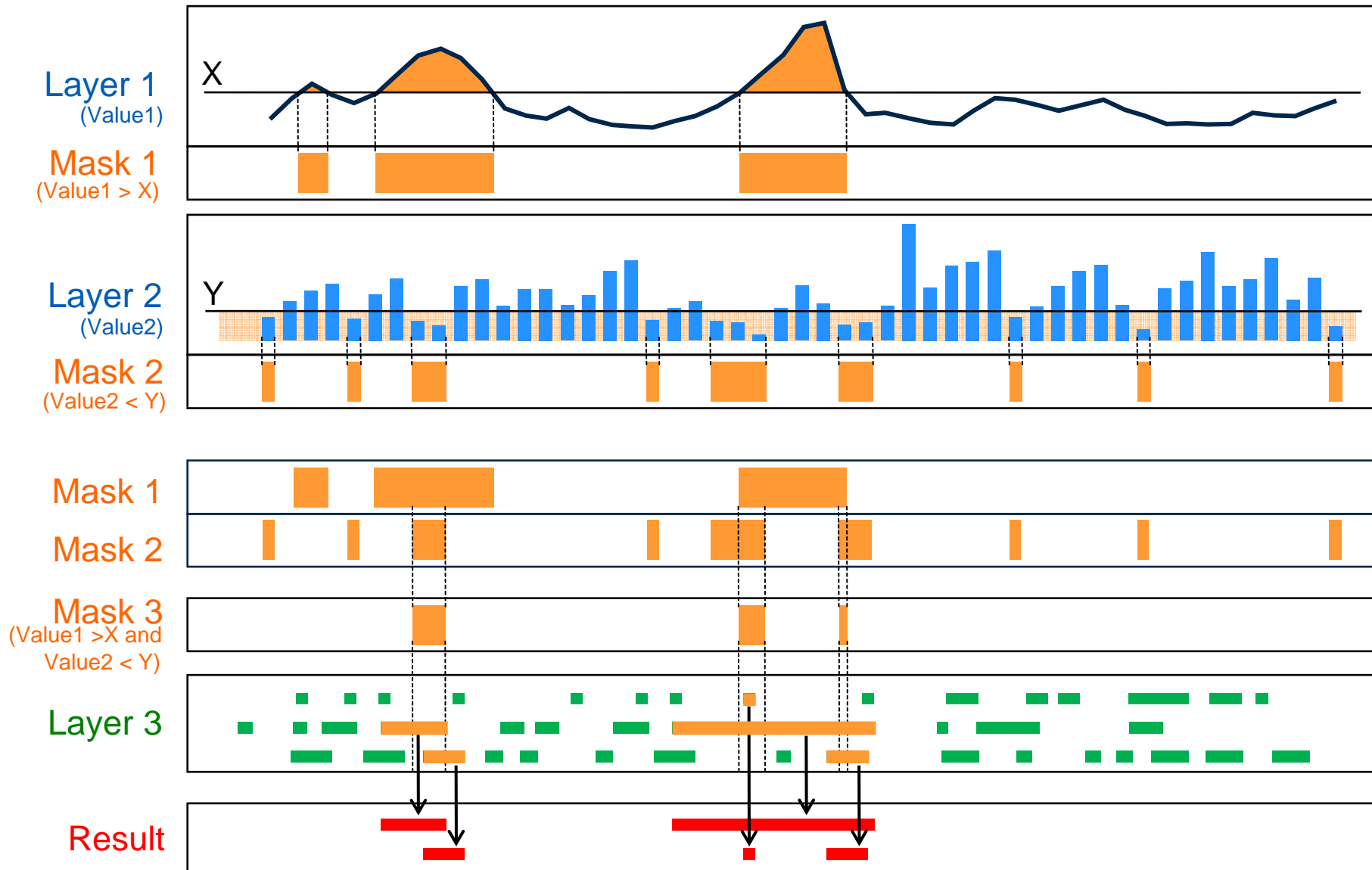
Time Slider (GUI to change displayed temporal range)

leap month

Layer 1

Layer 2

Search
Result

# Temporal information analysis using masks in HuTime



Layer 1 (Value1)
X
Mask 1 (Value1 > X)

Layer 2 (Value2)
Y
Mask 2 (Value2 < Y)

Mask 1

Mask 2

Mask 3 (Value1 >X and Value2 < Y)

Layer 3

Result

# Example of temporal analysis using masks in HuTime



**What kind of disasters were occurred during heavy rain fall and strong wind?** (Shiga Prefecture, Japan)
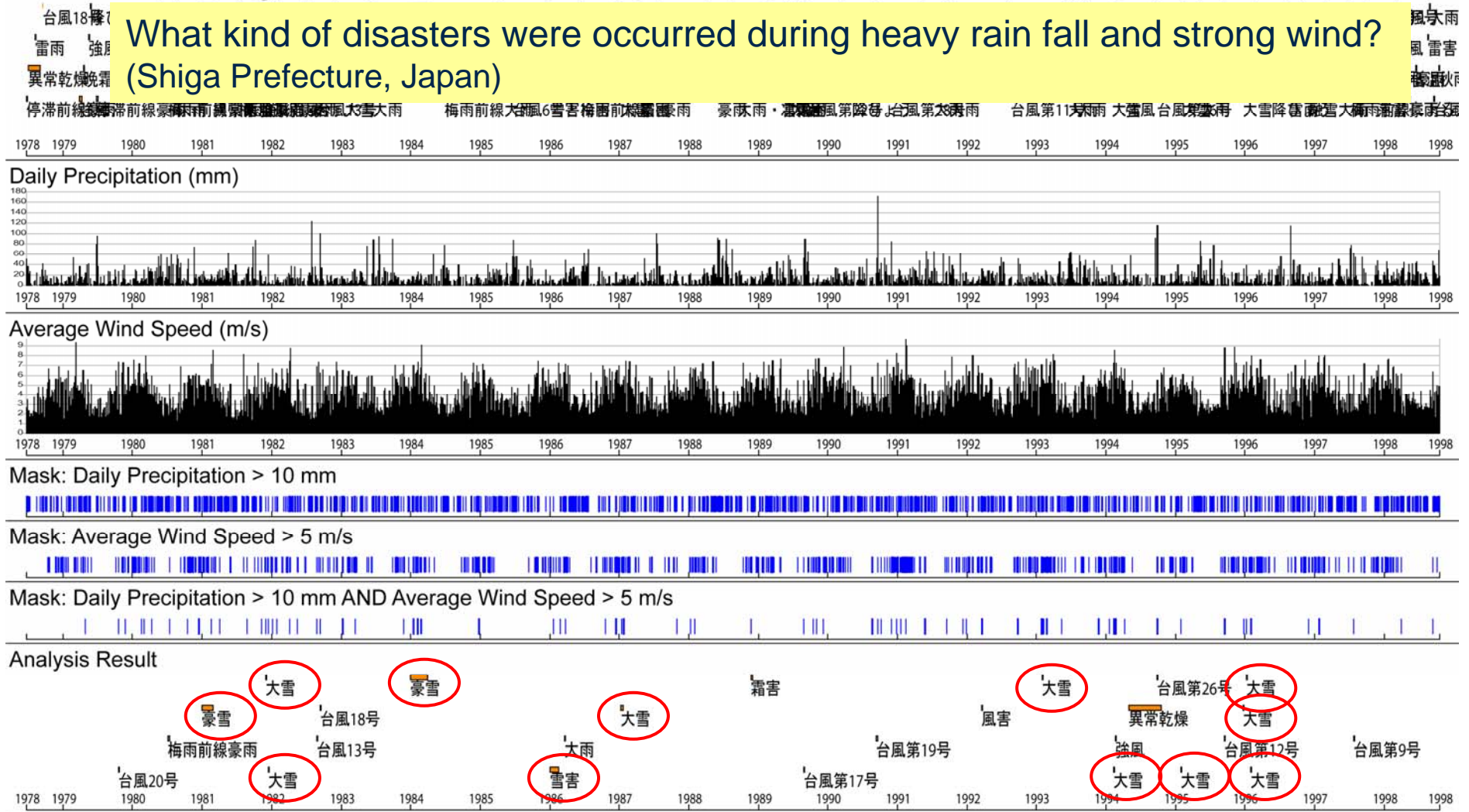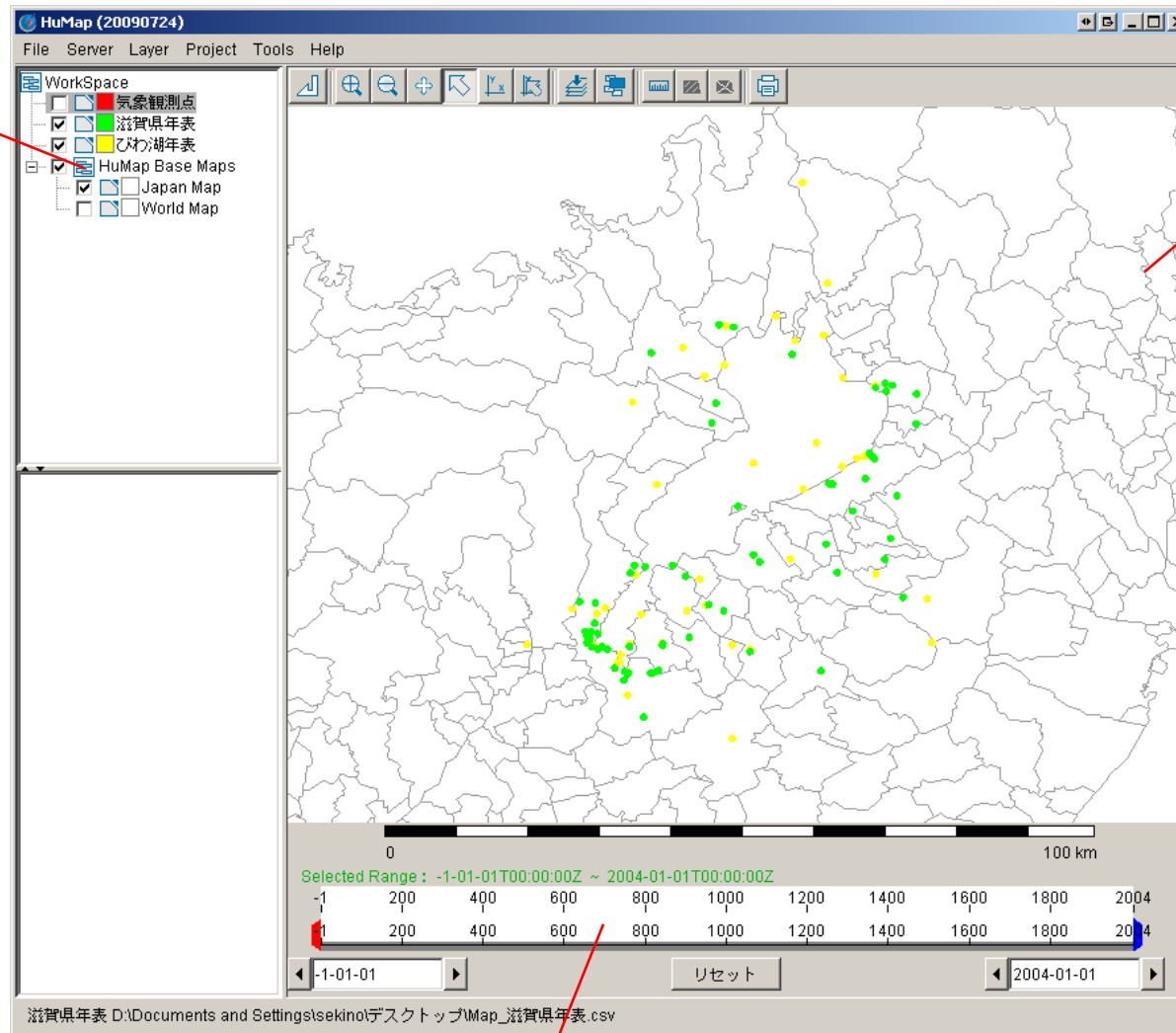
⭕ Disasters of snow

# HuMap – A tool for spatial information analysis
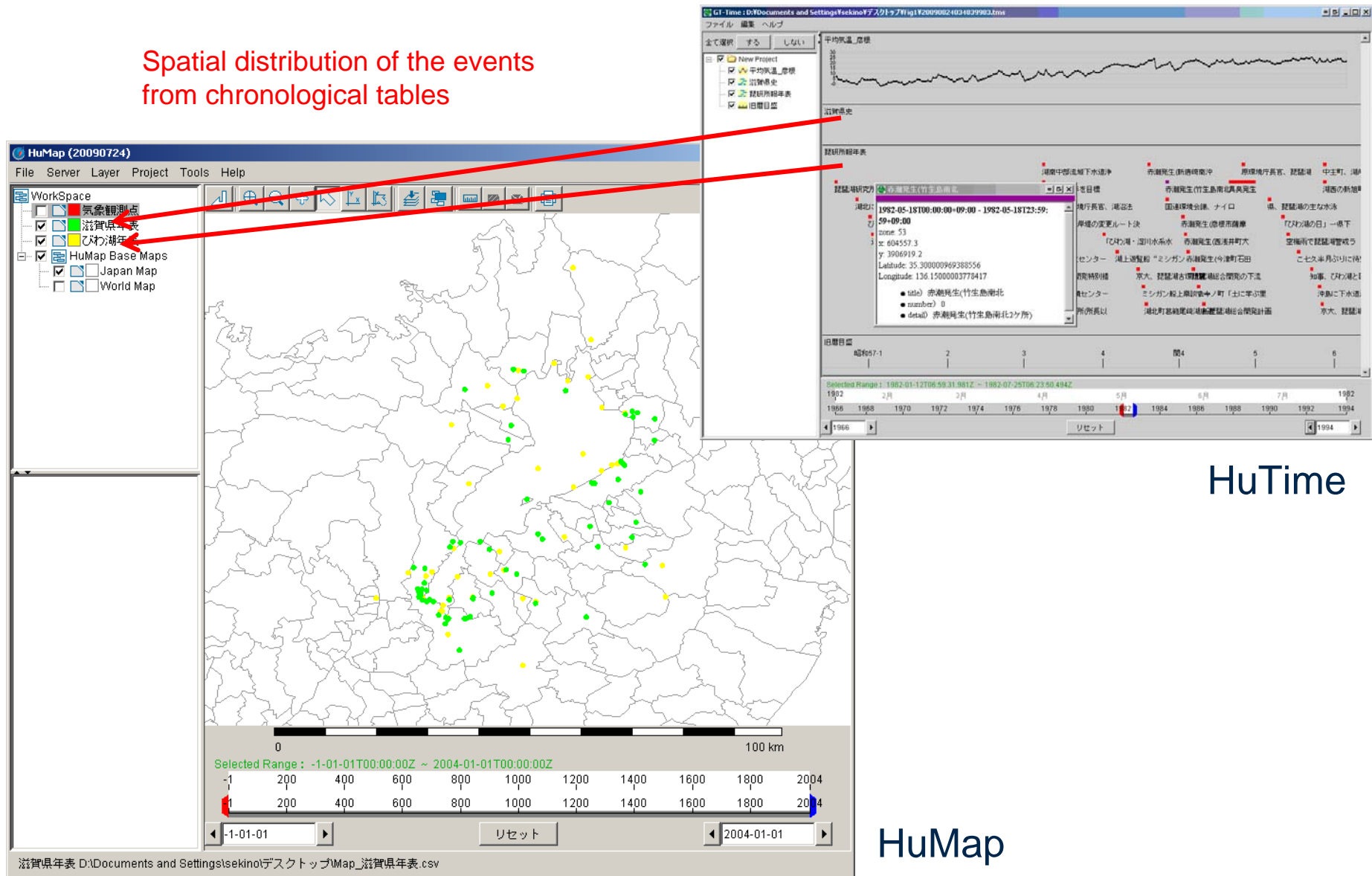


List of Layers

Layer of Map

Time Slider
(GUI  to change displayed temporal range)

# Cooperative capabilities of HuTime and HuMap

Spatial distribution of the events
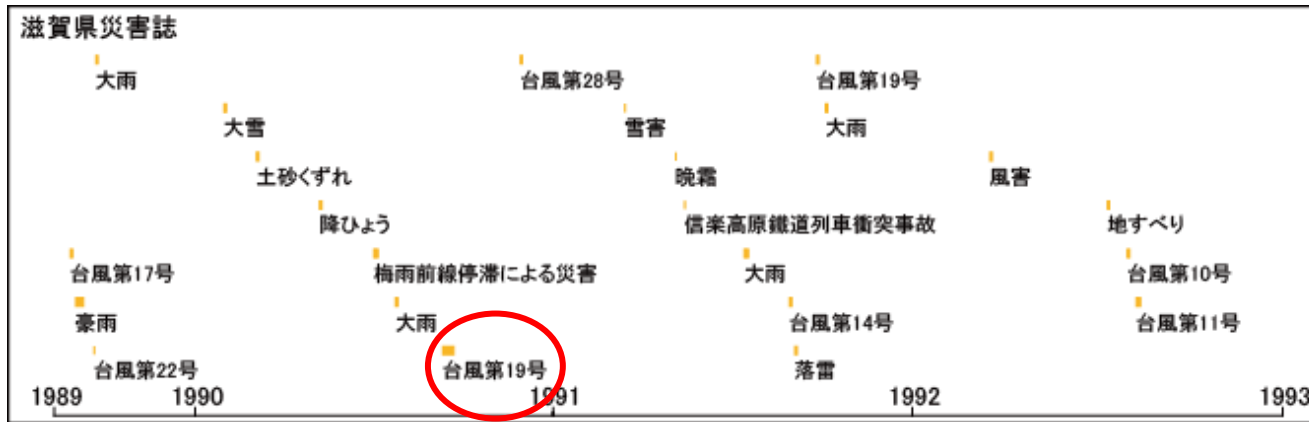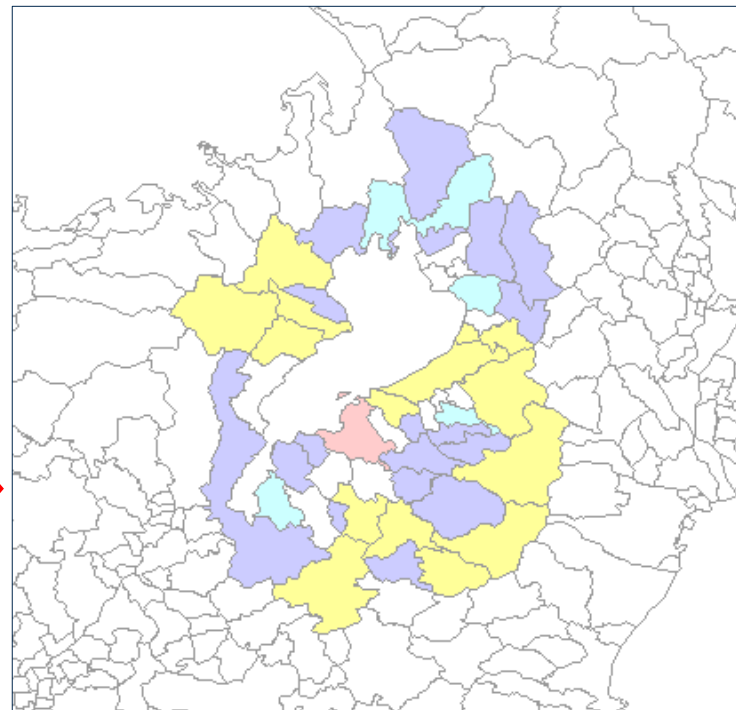from chronological tables



HuTime

HuMap

# Linkage between temporal and spatial information in HuTime and HuMap



**HuTime**

Chronological Table of Disasters in Shiga Prefecture, Japan
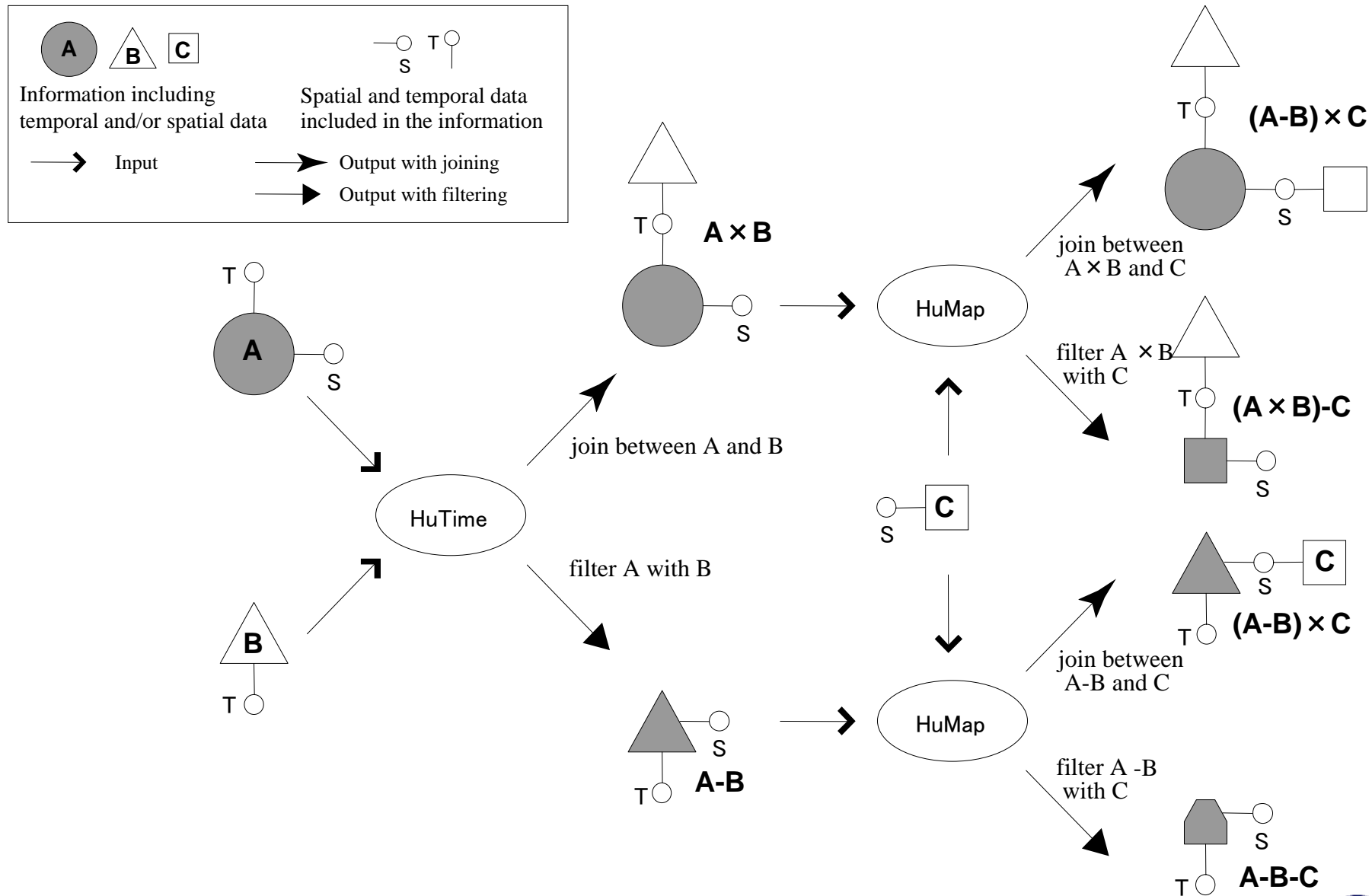
Disaster of Typhoon (11-20 Sep 1990)

**HuMap**

Spatial Distribution of Damages

Amount of damages to rivers (million yen)

- 0-10
- 10-100
- 100-1,000
- 1,000-10,000
- no data

# The use of HuTime conjunction with HuMap

Information including temporal and/or spatial data

Spatial and temporal data included in the information

Input

Output with joining

Output with filtering

A × B

A

join between A and B

HuTime

filter A with B

B

C

A-B

HuMap

join between A × B and C

(A-B) × C

filter A × B with C

(A × B)-C

HuMap

join between A-B and C

(A-B) × C

filter A -B with C

A-B-C

# Conclusion and future issues

**HuTime**

- Visual analysis for temporal information
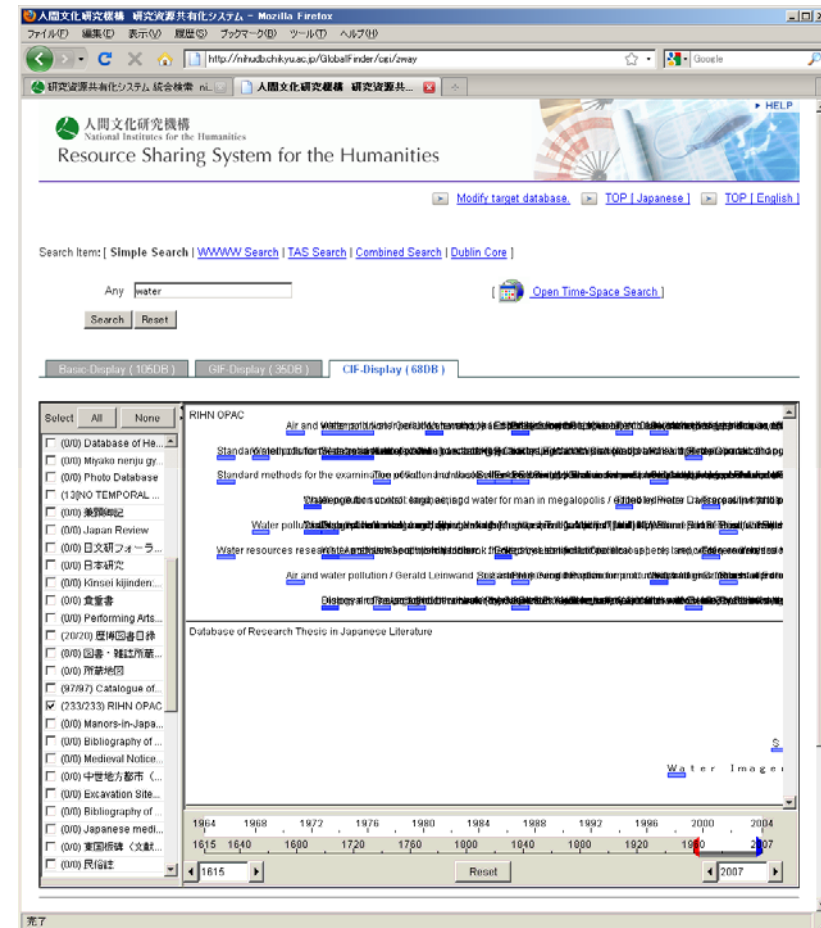- Spatiotemporal analysis by its cooperative capabilities with HuMap

**Usage of HuTime and HuMap**

- Spatiotemporal analysis tool
- Data finding aid

**Future issues**

Accumulation of basic temporal data

- Basic chronological tables
  (= basic maps for spatial information)

- Dictionary of common event names
  (= gazetteer for spatial information)



An example for function of HuTime as an data finding aid

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# Thank you for your attention

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