Using R for time series analysis and spatial-temporal distribution of global burnt surface multi-year product

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Problem

R vs GIS

Methods

Further works

The need for global burnt area product

Fires: a significant component of global ecosystem

Influence on climate, carbon cycle, pollution... Climate change?

The need for global burnt area product

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PROBLEM
Lack of an exhaustive base of past fires activities!

The need for global burnt area product

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TO DO
Concatenation of two existing databases:
GBS and L_3JRC

GBS and L$_3$JRC

	GBS	L$_3$JRC
time range	1982–1999	2000–2007
input data	NOAA/AVHRR	SPOT VEGETATION
temporal resolution	1 week	1 day
spatial resolution	approx 8 km	approx 1 km
advantages	seasonality!	area estimates!

Why R and not GIS?

Wide functionality

Import of all data formats

Easy data manipulation

Statistical and geostatistical analysis

Graph plotting

Map plotting

Results into LaTeX code

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AUTOMATION!

Methods

- ▶ Data import
- ▶ Data manipulation
- ▶ Time series analysis
- ▶ Regression modeling
- ▶ Principal components analysis & 3D visualization
- ▶ Spatial temporal distribution visualization technique

Data import and storage
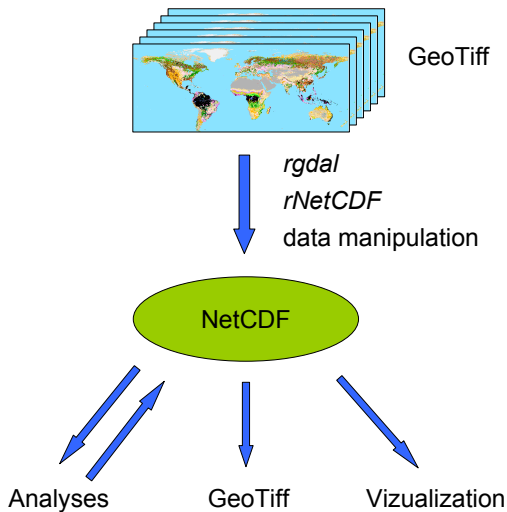
Generalization
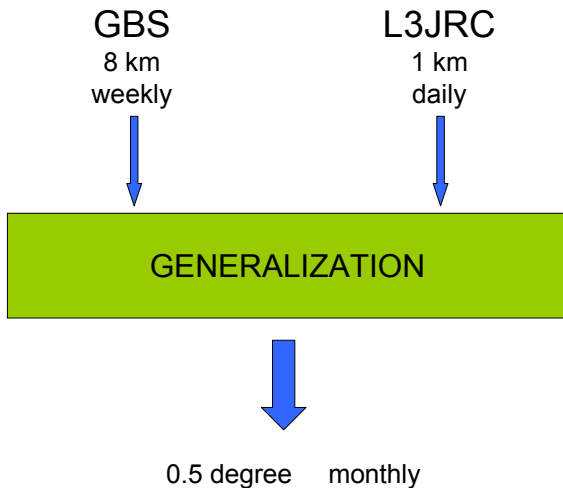
Time series
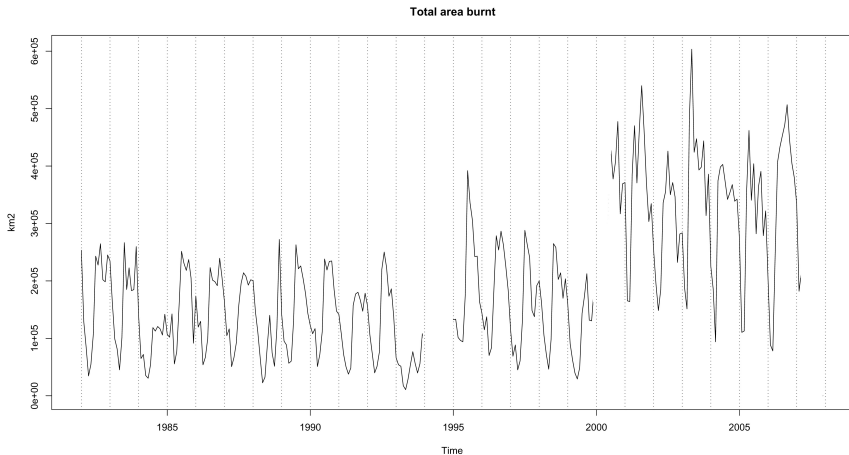
Seasonality shift

Time series for Kazahstan
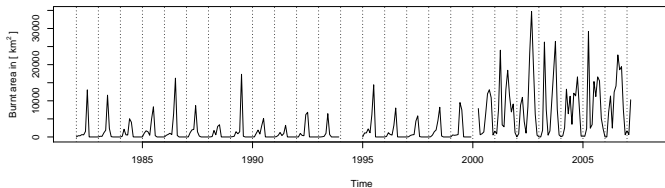
Area burnt in months in GBS
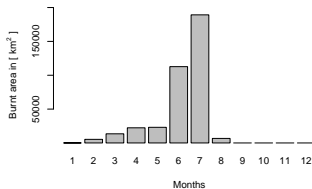
Area burnt in months in L3JRC
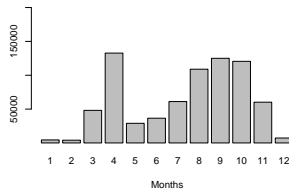
Area estimation
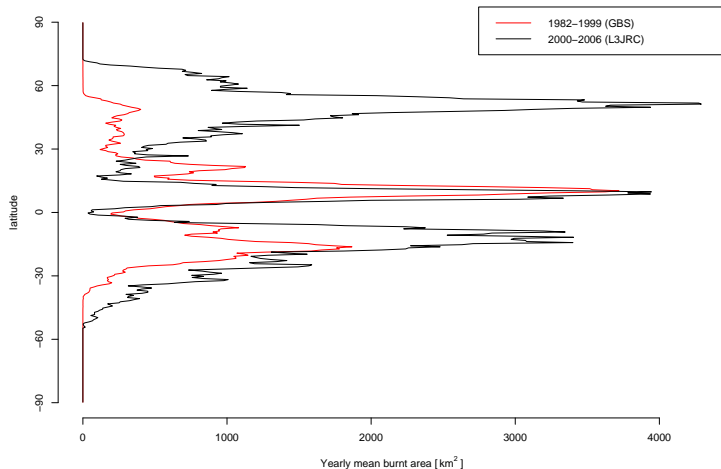
Probability map

GBS − Fire monthly probability in July
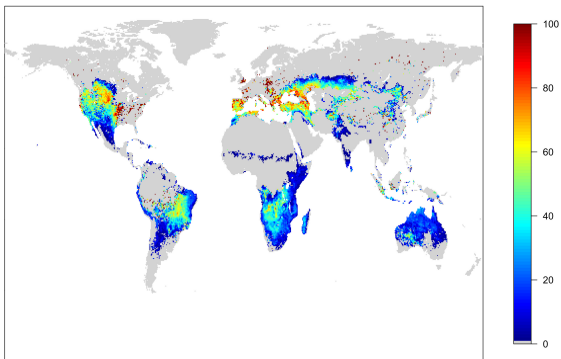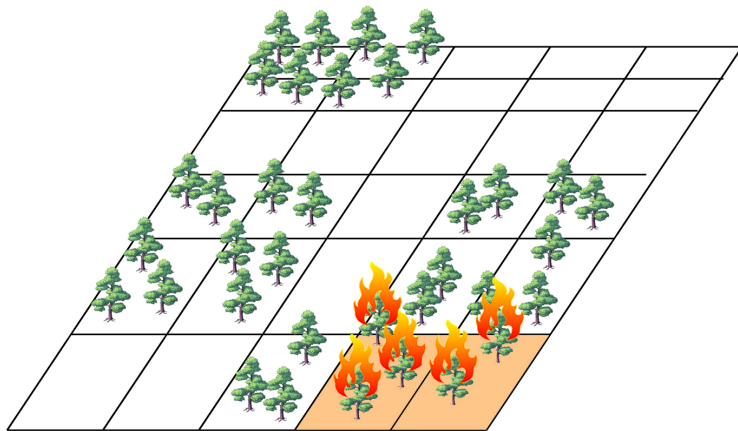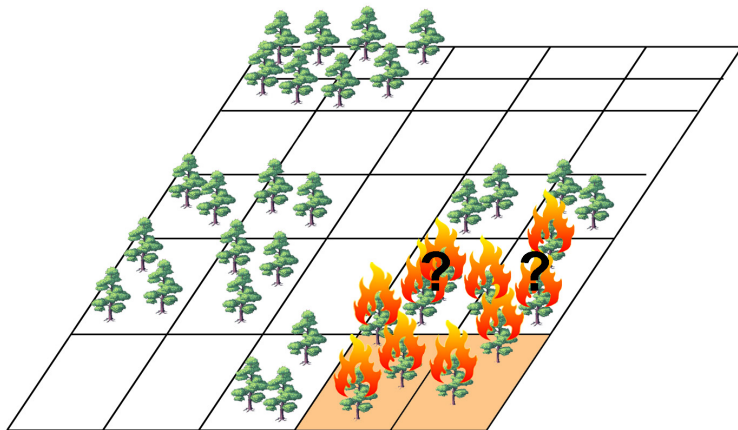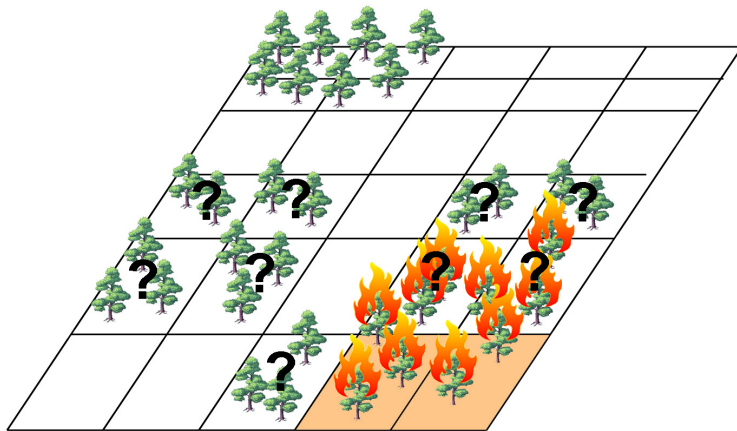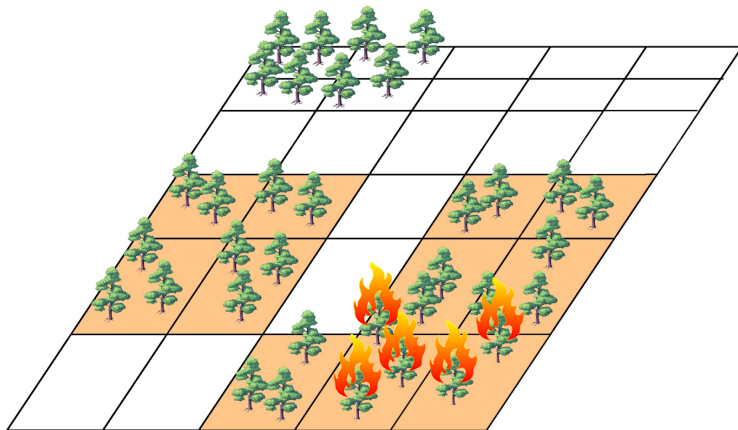
Probability extension algorithm
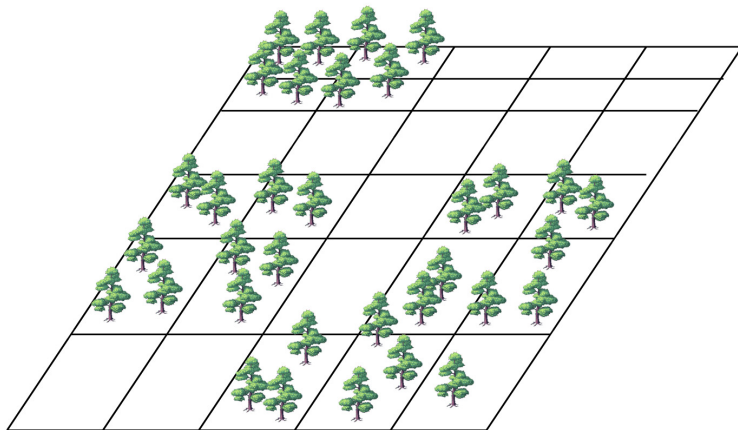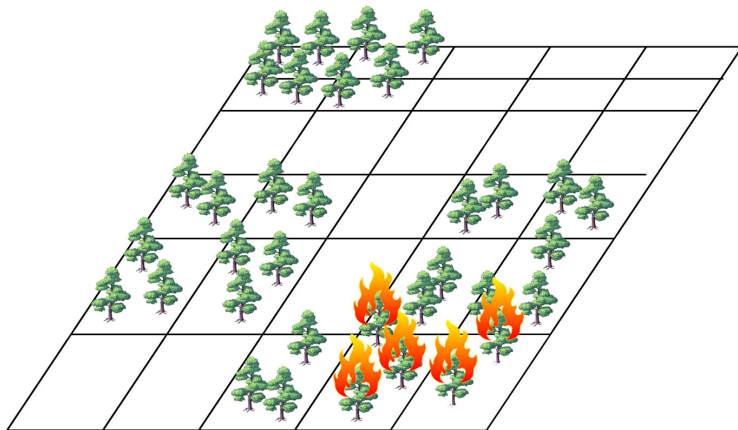
Probability extension algorithm

Probability extension algorithm

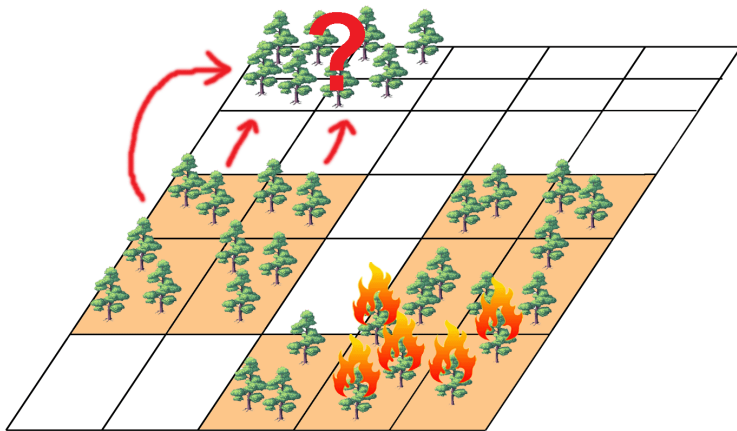# Probability extension algorithm

Probability extension algorithm
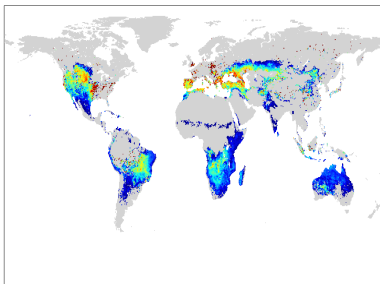
Probability extension algorithm

Probability extension algorithm

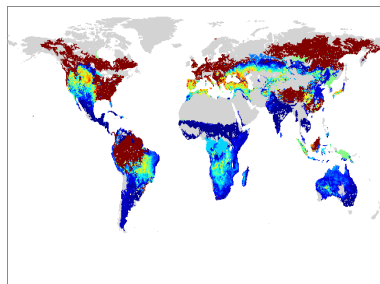# Probability map after extension
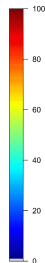

GBS – Fire monthly probability in July

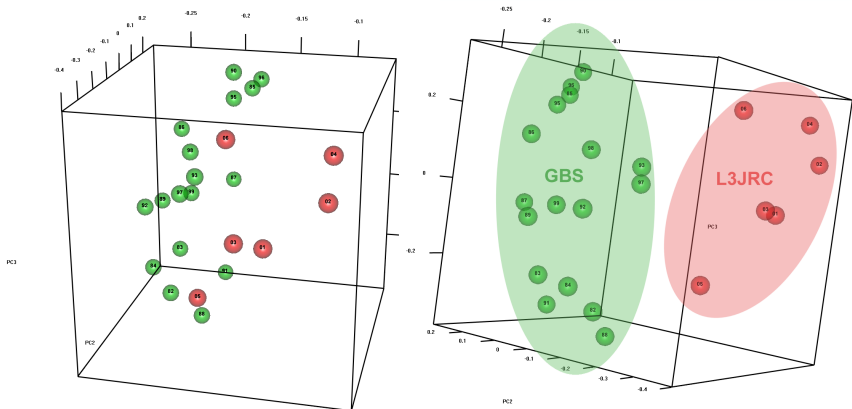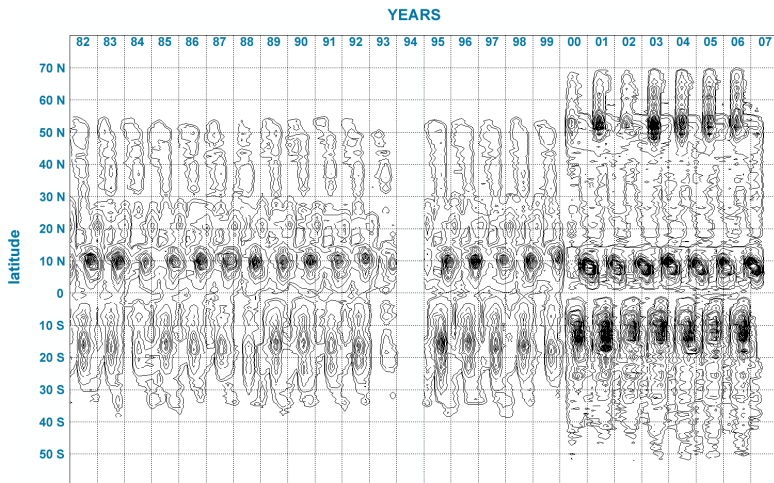**B E F O R E**

A F T E R

Principal Components & 3D interactive visualization
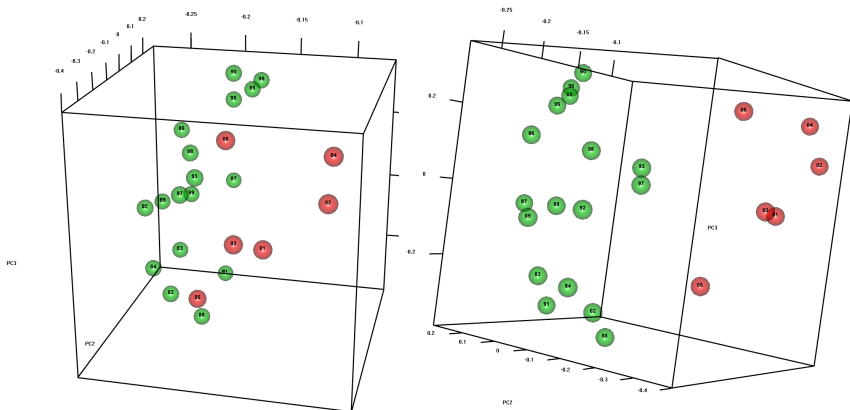
Principal Components & 3D interactive visualization

Spatial-temporal distribution

YEARS

Conclusion

- ▶ Probability extension algorithm
- ▶ PCA with 3D interactive visualization
- ▶ Map of spatial-temporal distribution of global data

Conclusion

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rgdal	data import
RNetCDF	data storage
zoo	time series analysis
rgl	3D interactive plots
spatial	interpolation
PET	image rotation
fields	raster maps plotting

THANK YOU FOR YOUR ATTENTION!