

OpenSpat, spread the spatial wor(l)d

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June 2017

The project

OPEN SPAT



Erasmus+



INSTITUTO
SUPERIOR DE
AGRONOMIA
Instituto Superior de
Universidade de Lisboa

SupAgro
Montpellier

- Building a learning module on spatial data analysis, based on open and freely available tools
- Focus on practice and peer-learning

The project

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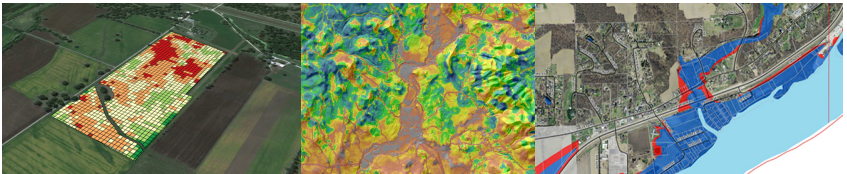
- Three partners
 - Liege University
 - Montpellier SupAgro
 - University of Lisboa
- Funded by
 - Erasmus+ Key Action 2
 - Strategic Partnerships for adult education

Why ?

- Increasing availability of data



- Growing set of applications



Need for skills

Need for skills and tools to

- access
- extract
- explore
- analyse such data.

Choice of open-source and freely available dedicated tools

- R
- QGIS

⇒ increase the potential impact and ease the spreading

Learning modules

Goal : analyze and interpret spatial data

1. Online prequel module
2. Face to face sessions
 - Access and manipulate spatial data
 - Spatial autocorrelation - variogram - variance estimation
 - Introduction to linear model
 - Regression over spatially autocorrelated variables
 - Variogramme - Kriging
 - Pattern recognition with spatial constraints: clustering and classification

Prequel Online Course

The screenshot shows the homepage of the OpenSpat website. At the top, there is a browser address bar with the URL www.openspat.eu/training-courses/online-courses/ and a search bar containing the word "Rechercher". Below the address bar is a navigation menu with links for MYSPAT, PRESSE, PUBLICATIONS, OFFRES D'EMPLOI, AGENDA, RÉPERTOIRE, CONTACT, and ACCÈS. The main content area features the text "OPEN SPAT" in large, bold, pink letters. Below this text are three logos: LIÈGE université Gembloux Agro-Bio Tech, INSTITUTO SUPERIOR DE AGRONOMIA Universidade de Lisboa, and Montpellier SupAgro. At the bottom, there is a navigation bar with links for PRESENTATION, PROGRAM, PARTNERS, TRAINING COURSES, and INFORMATIONS & CONTACT.

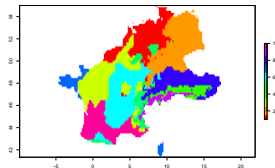
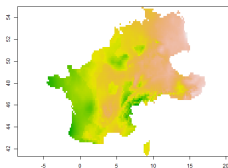
- Introduction for the OpenSpat project
- Overview of the contents of the face to face sessions
- Link with QGIS community (exchanges between QGIS and R)

Face to face sessions

- Standard day schedule
 - AM : background theory and technical introduction to the associated tools with small examples



- PM : real-size case studies in peer learning



Tools

- R markdown documents
 - illustrated with examples, *R* commands and *R* outputs

Calibration of the Model Variogram

To choose the best model between the list of possible models, a visual inspection is often enough but some statistical criteria like AIC or the weighted Sum of Squares (WSS) are also used.

to go further, **WSS mathematical definition:**

$$WSS = \sum_{k=1}^K w(h_k) [\hat{\gamma}(h_k) - \gamma(h_k)]^2$$

where $2\hat{\gamma}(h_k)$ and $2\gamma(h_k)$ are respectively the experimental and the model variogram values for sites separated by a lag/distance h_k . The weight, $w(h_k)$, is usually proportional to the number of site pairs at lag h_k .

```
n.fit <- fit.variogram(v, vgm("Sph"))
n.fit
```

```
## model psill range
## 1 Nug 0.00 0.00
## 2 Sph 15292.38 82946.36
```

```
plot(v,n.fit)
```

- add interactivity in the provided support documents for future reference and reproductibility

Tools

- Implementation of the course with free software **scenari**



- Plickers: create interactivity during the lesson



Test drive and evaluation

On this first session, 14 participants were chosen from the three different partners (young researchers and PhD students)

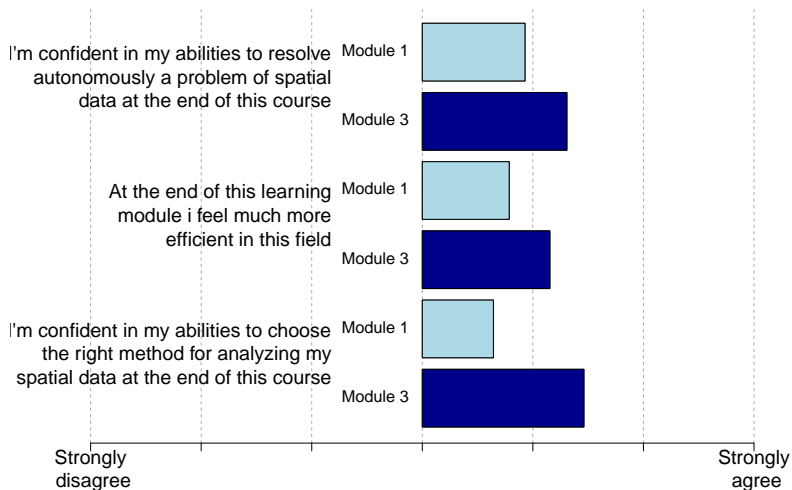
- different countries (France, Portugal, Belgium)
- different backgrounds (geomatics, agronomy, forestry, . . .)

They were assigned surveys about

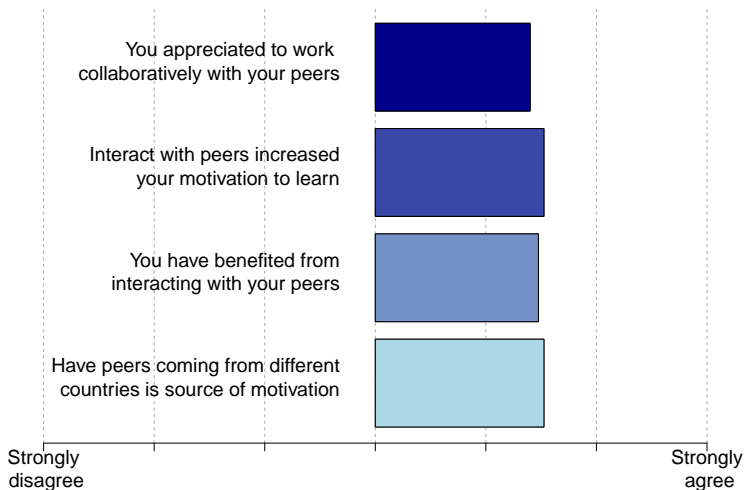
- contents and organisation of the courses
- motivation and self-efficacy

after the prequel online module and the 3 face to face modules.


Student self-efficacy



Student heterogeneity as an asset



Open source tools

Open source and/or freely available tools like 

- facilitate the delimitation of technical prerequisites (as everybody can install and learn the basics before the course)
- ease the exchange between participants
- tons of dedicated packages (sometimes confusing)
- lead to a better take home follow up (as everybody will be able to practice the tools once the course is over)

What's next

- Improvement of the content and organisation based on 1st session surveys
 - Clearer outline of the prequel module
 - Reorganisation of the content sequence
 - Update of the written supports
- Next year session
 - held in one place (Gembloux Agro-Bio Tech, Belgium)
 - two weeks session
 - blended learning (online support and free group work assignments)

More information on the dedicated website

<http://www.openspat.eu>