Geocomputation & Modelling for Vector-borne Disease

Every Tuesday starting 11th October
4:00 - 6:45 pm Abuja, Nigeria
8:00 - 10:45 am Seattle, WA, USA
5:00 - 7:45 pm Rome, Italy

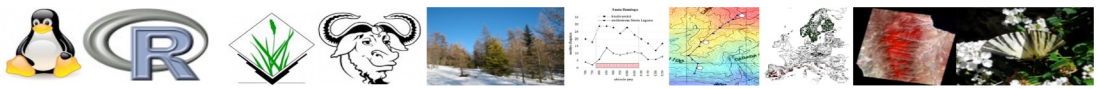
Every Thursday ending 1st December
4:00 - 6:45 pm Abuja, Nigeria
8:00 - 10:45 am Seattle, WA, USA
5:00 - 7:45 pm Rome, Italy

Giuseppe Amatulli, Instructor

Erin Stearns, Instructor

Tushar Sethi, Program Manager

MARGOSA
Environmental Solutions



SPATIAL ECOLOGY

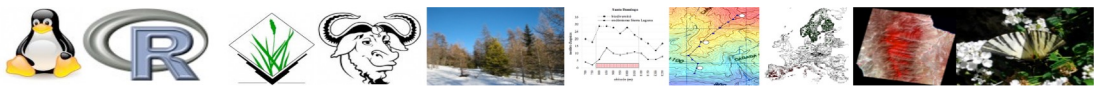
Learning objectives

- Habitat suitability model built with open source tools
  1. Scalable
  2. Adaptable

- Your job? Learn the use of:
  - Open source tools
  - Data processing
  - GIS and remote sensing applications
  - **Machine Learning**

- Varying skill levels: We are here for each one of you – there are no silly questions or answers

MARGOSA
Environmental Solutions

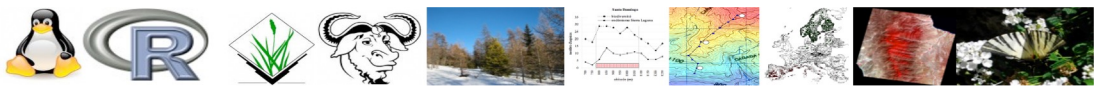


SPATIAL ECOLOGY

Qualifications, certificates & renumeration

- Learning for now and the future
- Applied skills
- Renumeration – The Carter Center
- Workshop & certificates

MARGOSA
Environmental Solutions



SPATIAL
ECOLOGY

Syllabus: Key links

Recorded lectures (#2 to #7) **Live lectures** (#8 to #16) **On-site workshop**

Class webpage

http://spatial-ecology.net/docs/build/html/COURSESAROUNDTHEWORLD/course_geocomp_modelling_10-11_2022.html

Handling scripts and data via GitHub

https://github.com/selvaje/SE_data

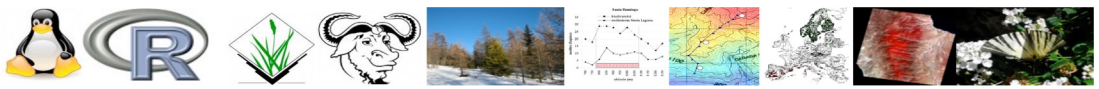
Recorded video lectures

http://spatial-ecology.net/docs/build/html/COURSESAROUNDTHEWORLD/course_geocomp_modelling_10-11_2022.html

Community support for trouble shooting

https://spatial-ecology.cloud.mattermost.com

MARGOSA Environmental Solutions

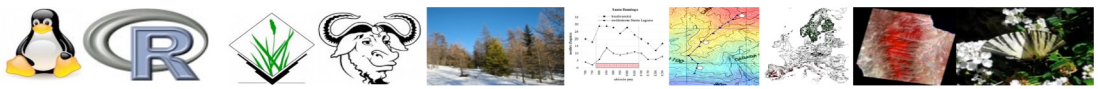


SPATIAL ECOLOGY

Introductions (<3 min each)

- Name and where you come from….
- What are your personal interests and background?
- Final project / PhD thesis objectives / keywords?
- What data are you going to analyse?
- Not sure about your plan yet… no problem
- Do you have any experience with Linux OS or open source software?
- Do you currently use any programming language?
- What are your expectations of this course?

MARGOSA Environmental Solutions



SPATIAL ECOLOGY

Learning objectives – elaborated

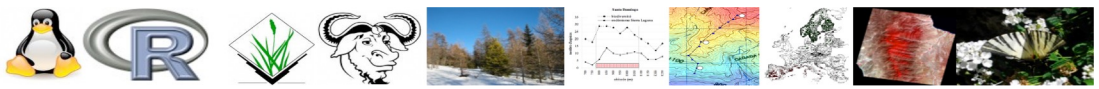
With continuous practice through the lectures, you will become familiar with new command lines and cover numerous topics, including:

- Learning open source tools for GIS and RS applications
- Acquiring command line utilities for spatial/temporal data under Linux OS
- Acquiring command line utilities and SDM theoretical foundation
- Developing data processing skills
- Independent learning, critical thinking, problem solving

Upon completion of the course, you should be able to:

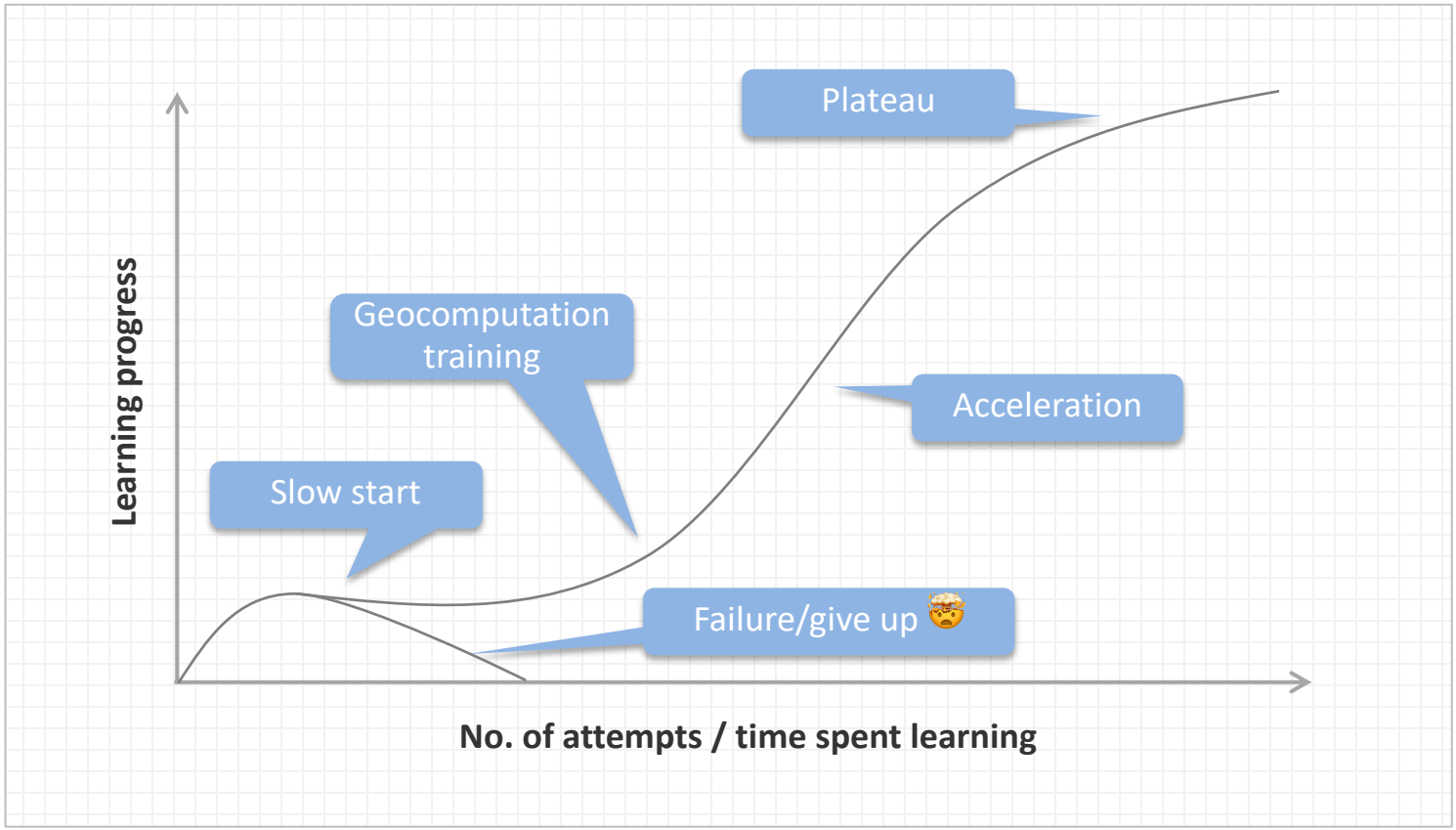
- Apply the process of science, by conducting, analyzing, and interpreting findings related to GIS & RS project in the framework of SDM
- Use quantitative reasoning for statistical/spatial analysis
- Convey your understanding of environmental phenomena

MARGOSA
Environmental Solutions



SPATIAL ECOLOGY

Learning curve



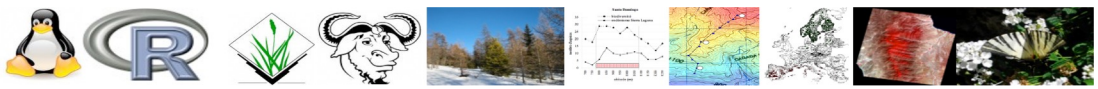
MARGOSA Environmental Solutions

SPATIAL ECOLOGY

Scientific knowledge

- Spatio-temporal analysis
- Spatio-temporal data integration
- Spatio-temporal modelling
- Geostatistics
- Species Distribution Modelling (Machine Learning)

MARGOSA
Environmental Solutions

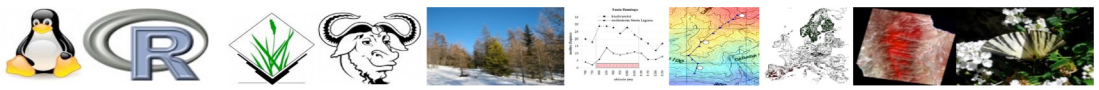


SPATIAL
ECOLOGY

Tools

Grass & QGIS:	Geographic Information Systems
R:	GIS, statistic, modeling, text manipulation
LINUX Bash:	Shell programming
AWK:	Processing text-based data
GDAL/OGR/pktools:	Geotools library for the manipulation of geospatial data

MARGOSA
Environmental Solutions



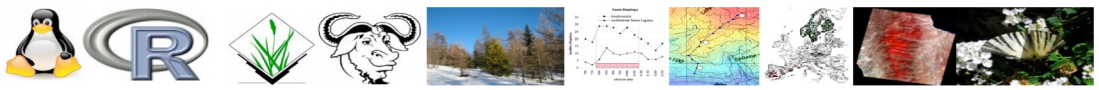
SPATIAL
ECOLOGY

Coding knowledge

Covered on the course

- AWK, GDAL, PKTOOLS, R
- Parallel processing in bash and python environment
- Species Distribution modeling (SDM): theoretical foundation and application in vector-borne disease modelling
- Supervised regression/classification
- Image processing / raster processing / large data-set processing – efficiently!
- Environmental applications (hydrology, forestry)

MARGOSA
Environmental Solutions



SPATIAL
ECOLOGY

Why use Linux/OpenSource?

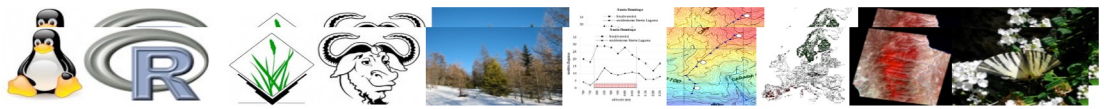
Security: extremely stable and reliable, no viruses, interoperable: Unix, Windows, Mac, Android etc.

Applications: thousands of free programs, programming languages, server services

Versatility: minimum HW requirements, extremely portable, very fast performance

Freedom: free to download / test / install / modify / configure / develop / distribute... it's fun!

MARGOSA
Environmental Solutions

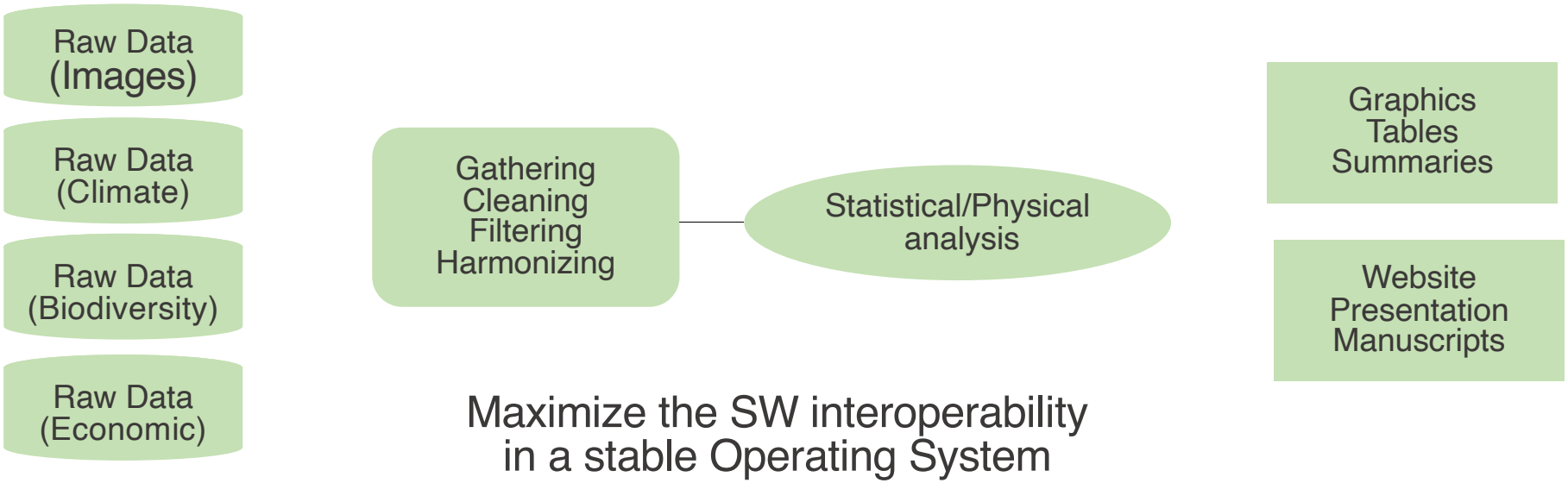


SPATIAL ECOLOGY

Reproducible research & “big data” processing

Codes that are easily published > **no license constraints**

Complex work-flows > **integrate different data analysis methods**



MARGOSA Environmental Solutions

SPATIAL ECOLOGY

Freedom? and why it's fun

Code
- Understating the code beyond a process
- Be able to modify the code
- Build up your own algorithm.
- Use all the SW that I want without license constraints

Help
- Get help from mailing list
- Keep in touch with developers for code adjustment and improvement

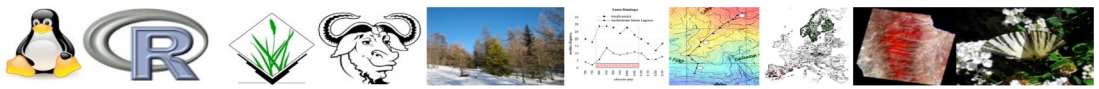
Process
- Job priority processing
- Job scheduling
- RAM management

Remote server
- Automatic connection to remote servers
- Overpassing quota issues in remote servers, by creating a folder linked to your PC

Hardware resources
- Storing temporal file in ram rather in the hard-disk, by creating a folder in the ram
- Get the best of different programing languages and create a unique work flow.

Last but not least
- Enjoy life while the PC is working for you!

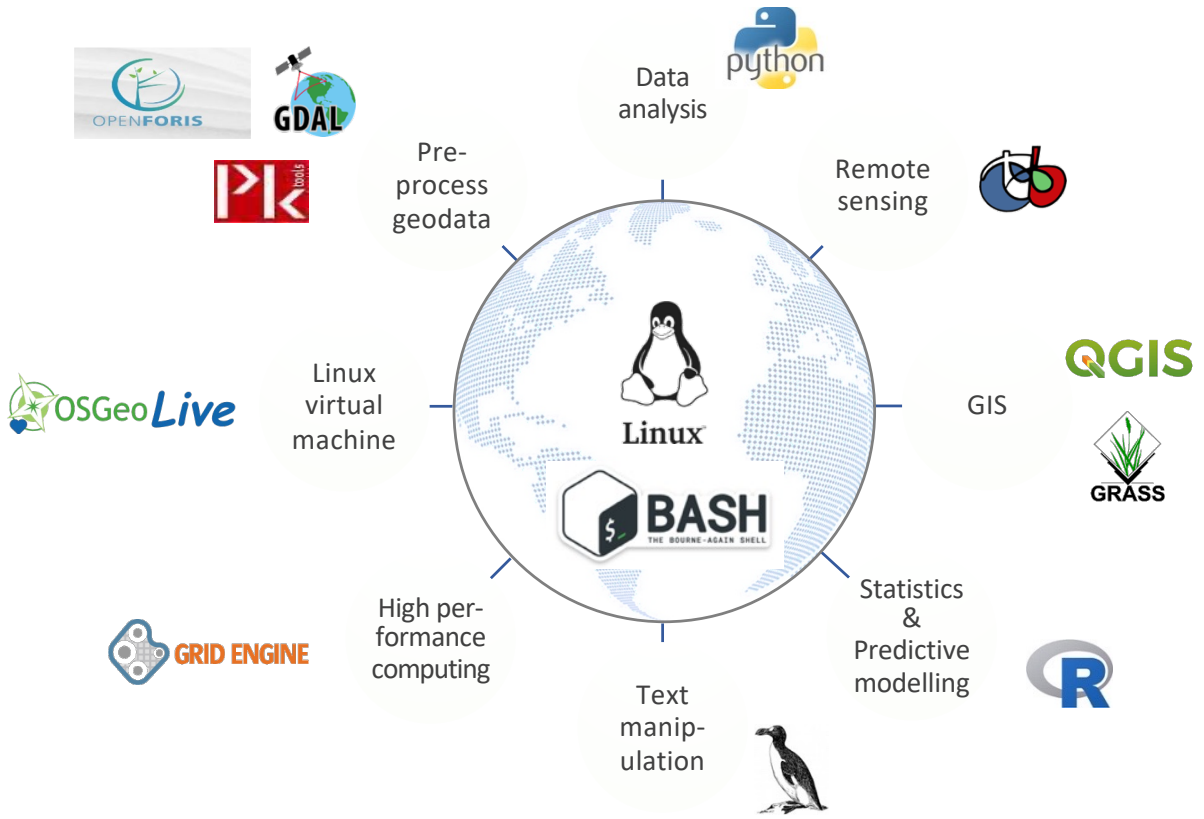
MARGOSA
Environmental Solutions



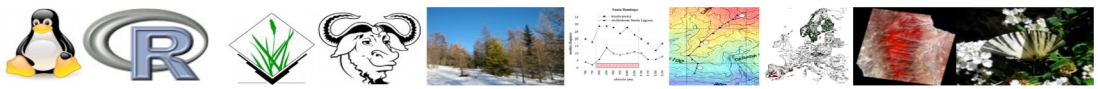
SPATIAL ECOLOGY

Ubuntu Linux operating system

Geocomputation with Open Source: Optimal latitude & interactivity



MARGOSA Environmental Solutions



SPATIAL ECOLOGY