M.Sc. Environmental Hazards and Risks Management

Direction:

Dennis FOX: *Geography, UMR ESPACE*

Frédéric GROGNARD: *INRIA*

Stéphane PIEROTTI: *THALES Alenia Space*

Yael BRADBURY: *Administrative assistant*

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https://univ-cotedazur.eu/msc/environmental-hazards-and-risks-management

Bridging the gap

1) A practical and integrated understanding of risk management:

- Impacts
- Fundamental processes
- Mitigation strategies
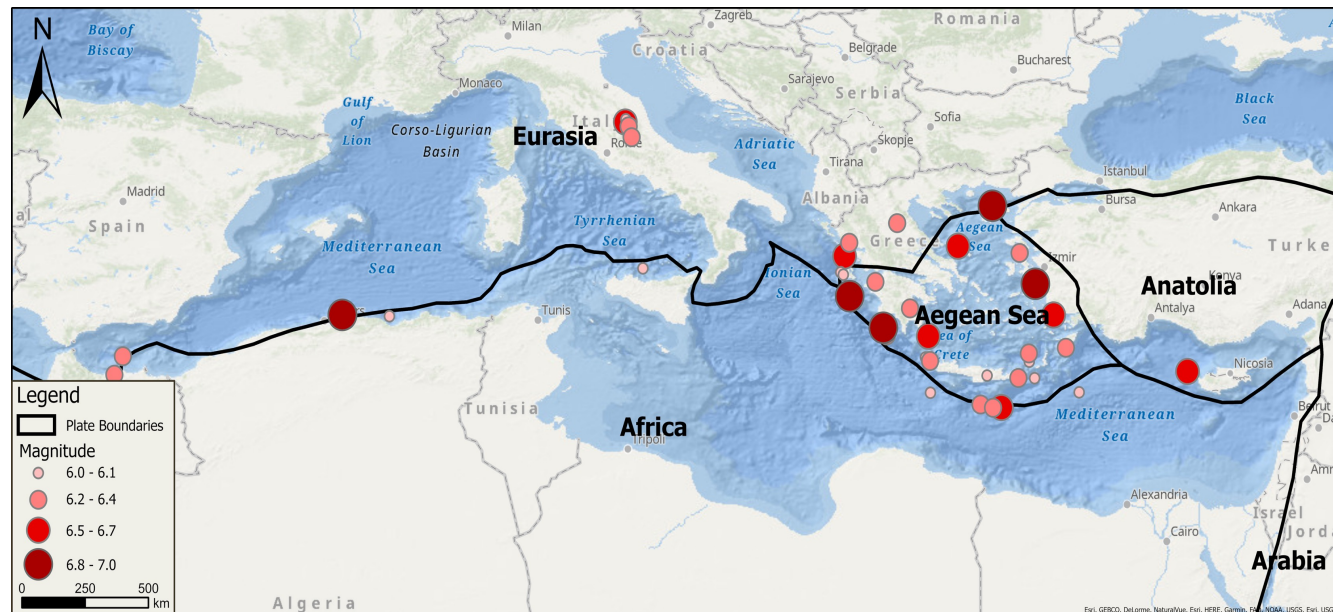
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2) Skills in modeling processes & scenarios:

- Geographic Information Systems
- Remote sensing
- Scenario modeling

A MODULE-BASED APPROACH TO RISK MANAGEMENT/MODELING

Risk Modules

Earthquakes and Tsunamis

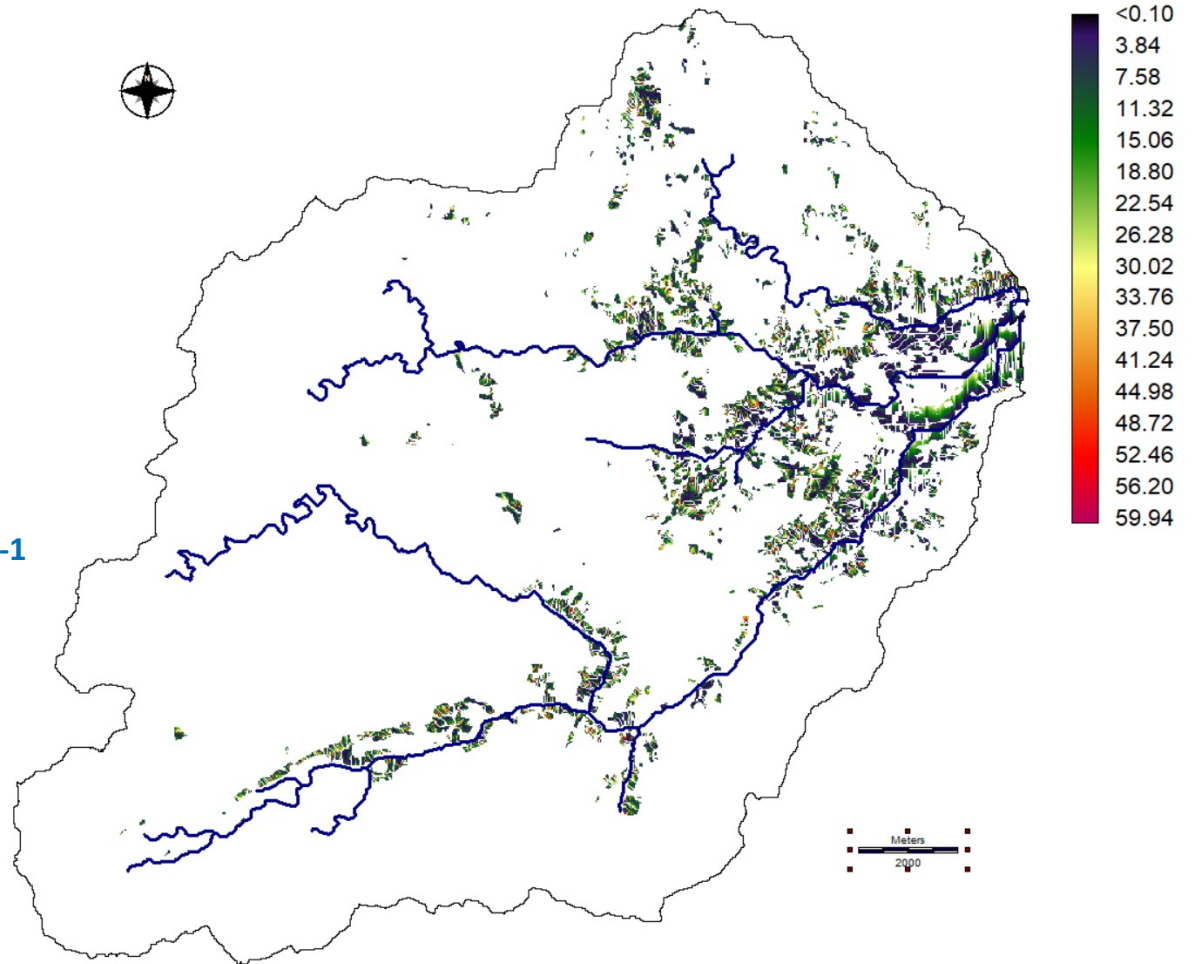**Overview of $M_w \geq 6.0$ earthquakes in the Mediterranean since the year 2000 (J. Wegner).**

Risk Modules

Earthquakes and Tsunamis

Soil degradation

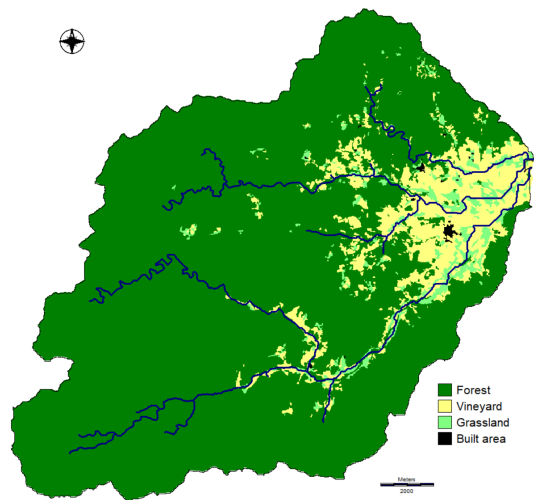**RUSLE soil erosion values in T ha^{-1} (Giscle catchment, SE France)**
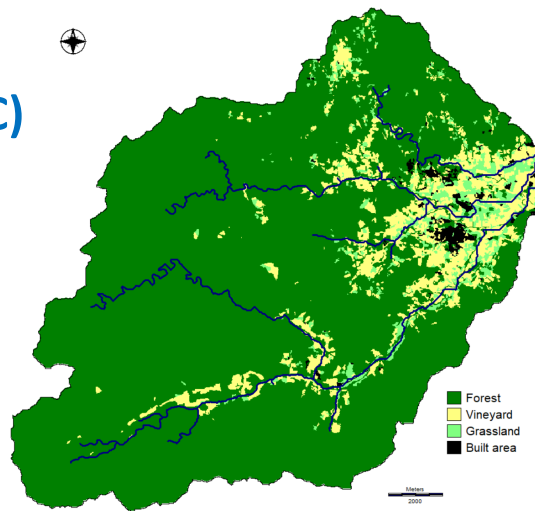
Risk modules

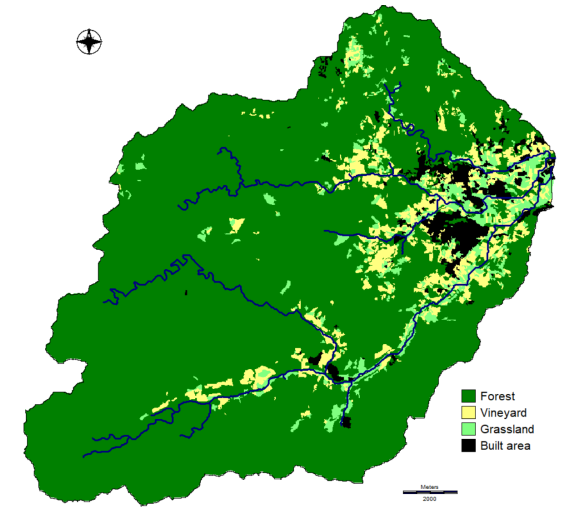**Risk Modules**

Earthquakes and Tsunamis

Soil degradation

Land Use/Cover Change (LUCC)

Landcover 1950

Landcover 1982

Landcover 2011

Land Change Modeler (LCM)
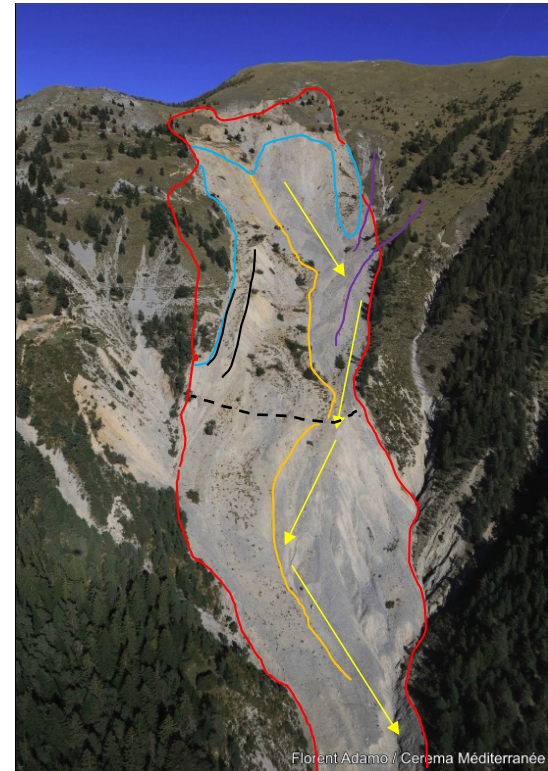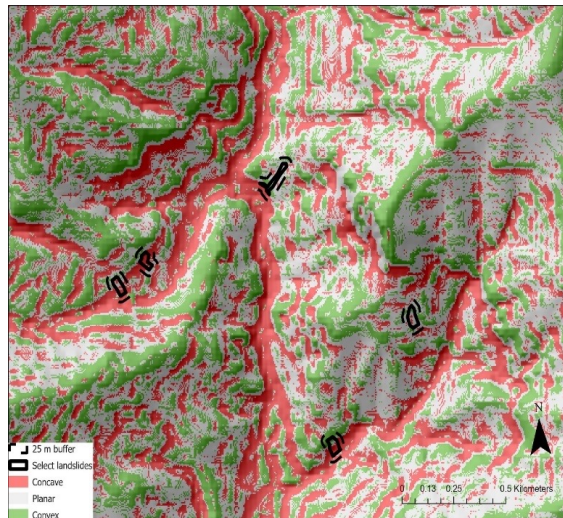
Risk Modules

Earthquakes and Tsunamis

Soil degradation

Land Use/Cover Change (LUCC)

Mass movements

Map of tangential curvature where green is convex, grey is planar, and red is concave (C. Campo)

Red = movement boundary; Orange = beige internal boundary with vegetation remnant / grey disorganized / fragmented; Blue = internal boundary between landslide extension zones and the main movement; Black = '' land bulge; Dotted black = jutting out; Purple = pre-existing ridge ; Yellow = "bobsled" flow path. Figure adapted by C. Campo from M. Asadova (2021); interpretation by P. Azemard, Cerema, 2021.
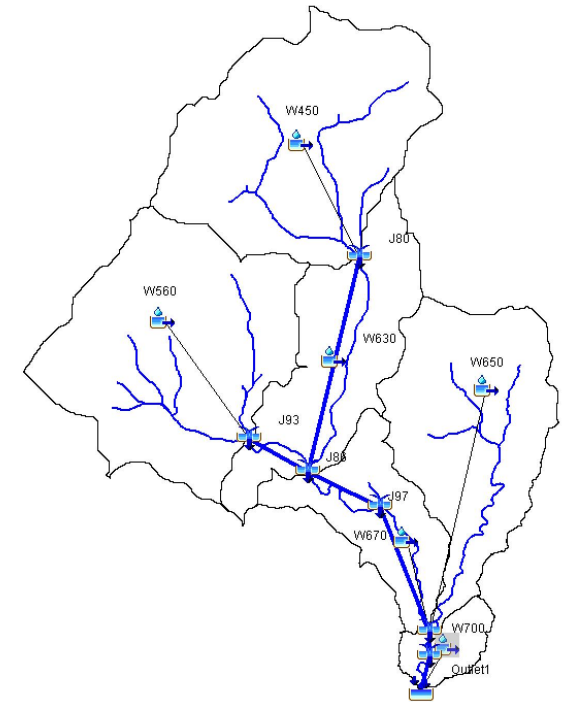
Risk Modules

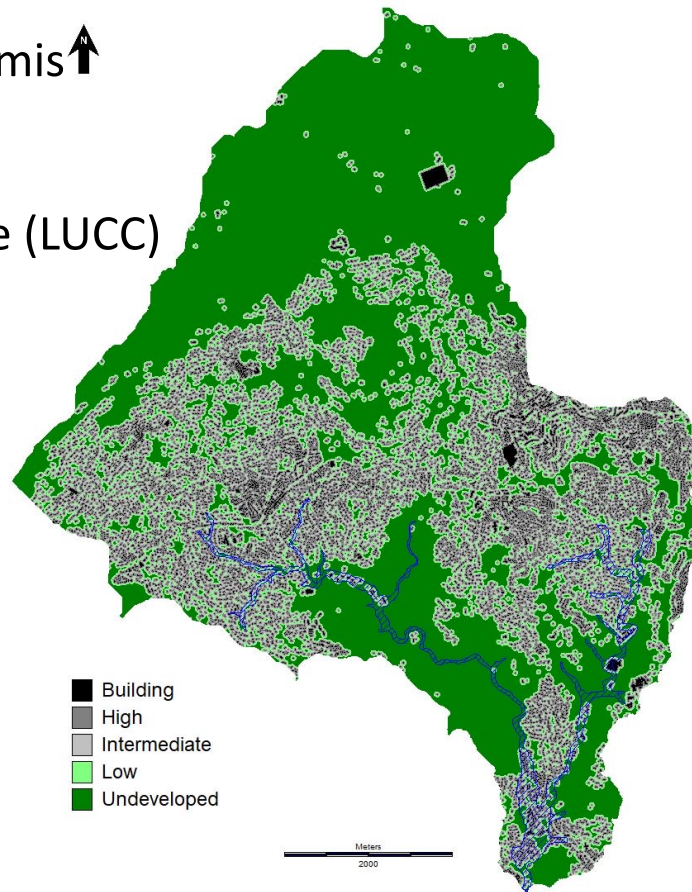Earthquakes and Tsunamis

Soil degradation

Land Use/Cover Change (LUCC)

Mass movements

Floods

Building
High
Intermediate
Low
Undeveloped

Meters
2000

Simulating discharge in the Frayere catchment, SE France.

Risk Modules

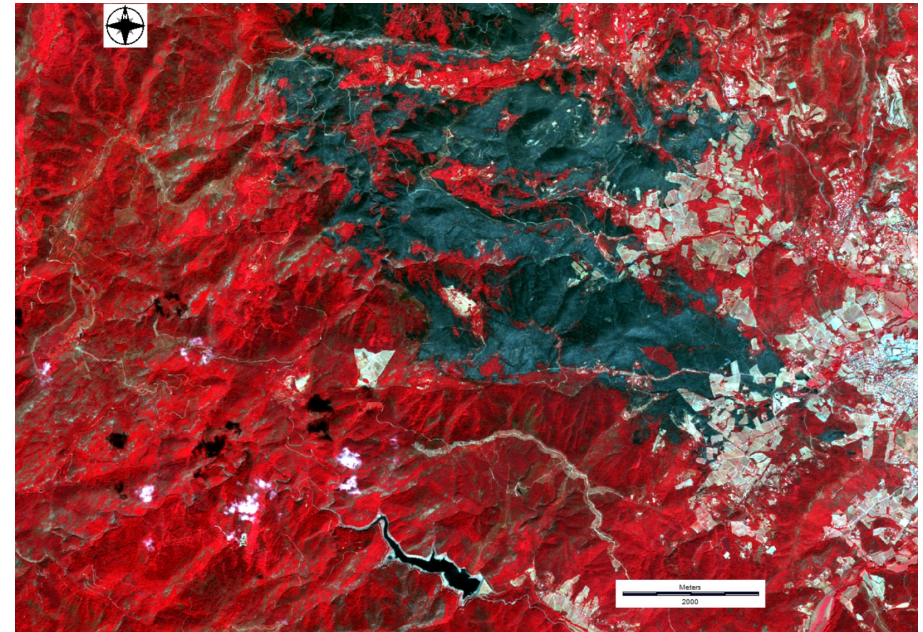Earthquakes and Tsunamis

Soil degradation

Land Use/Cover Change (LUCC)

Mass movements

Floods

Forest fires

Mapping the forest fire burn scar to predict post-fire runoff risks

Risk Modules

Earthquakes and Tsunamis
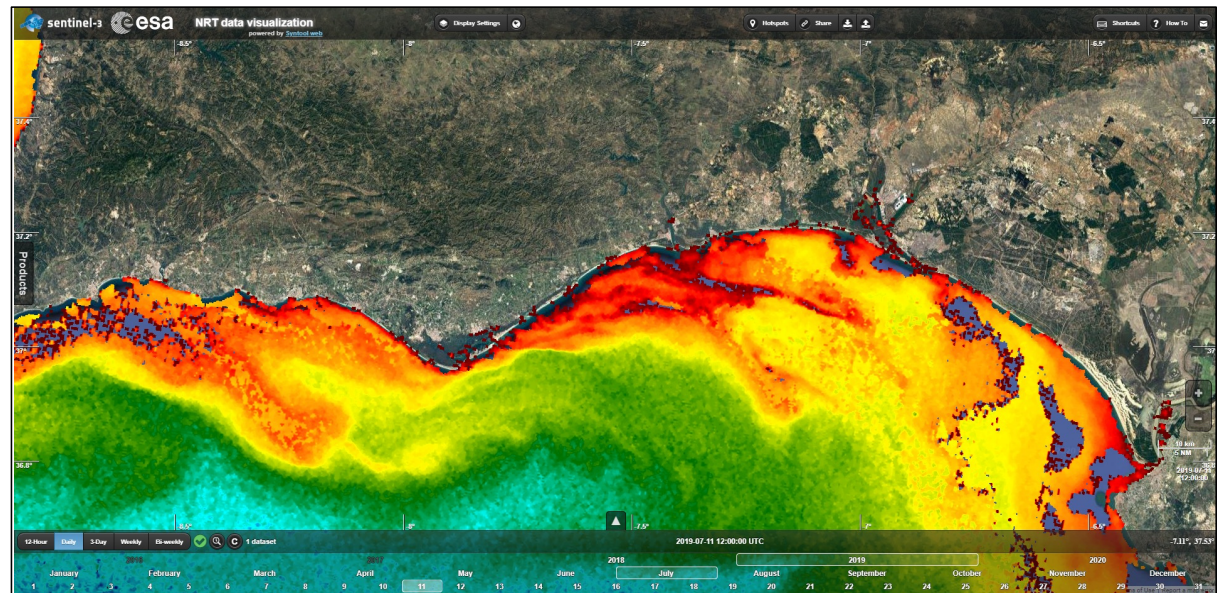
Soil degradation

Land Use/Cover Change (LUCC)

Mass movements

Floods

Forest fires

Marine ecology

Characterizing the 2019 Harmful Algal Bloom (HAB) in Southern Portugal using High Resolution Sentinel-2 images (G. Ilunga)

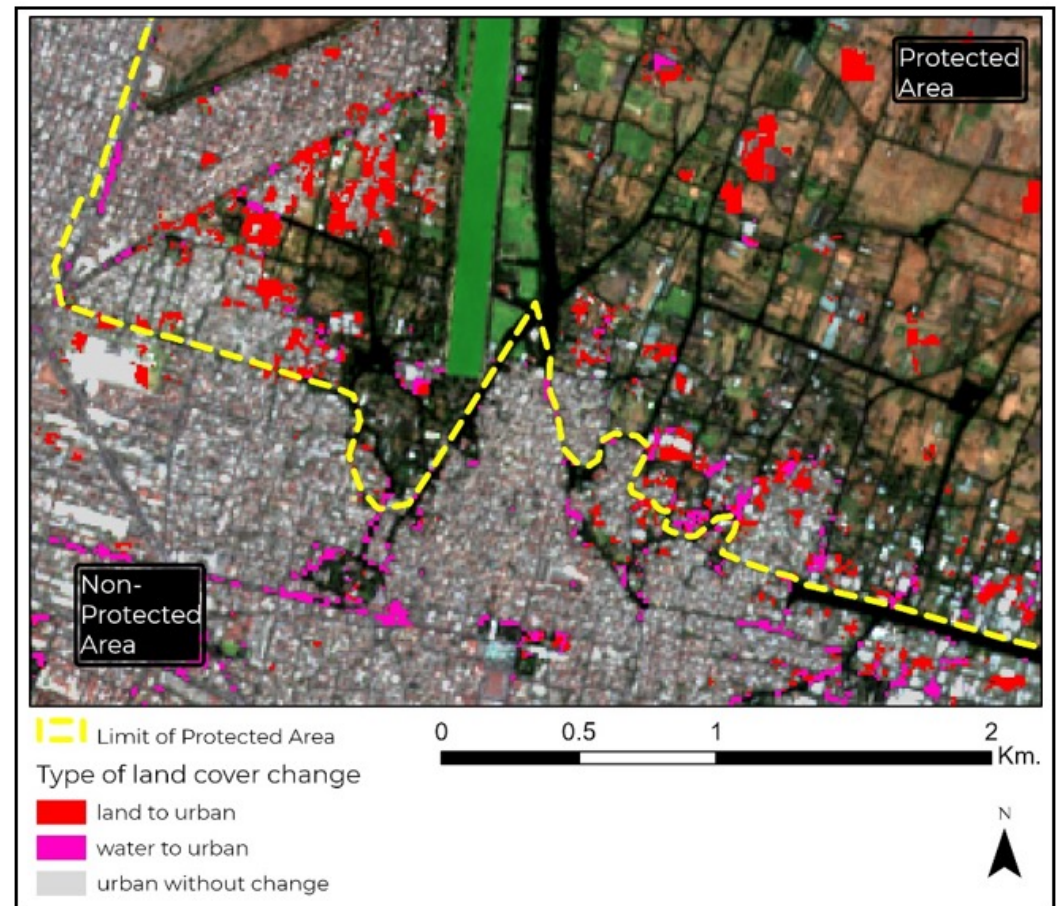**Technical Skills**

GIS (ESRI & QGIS)

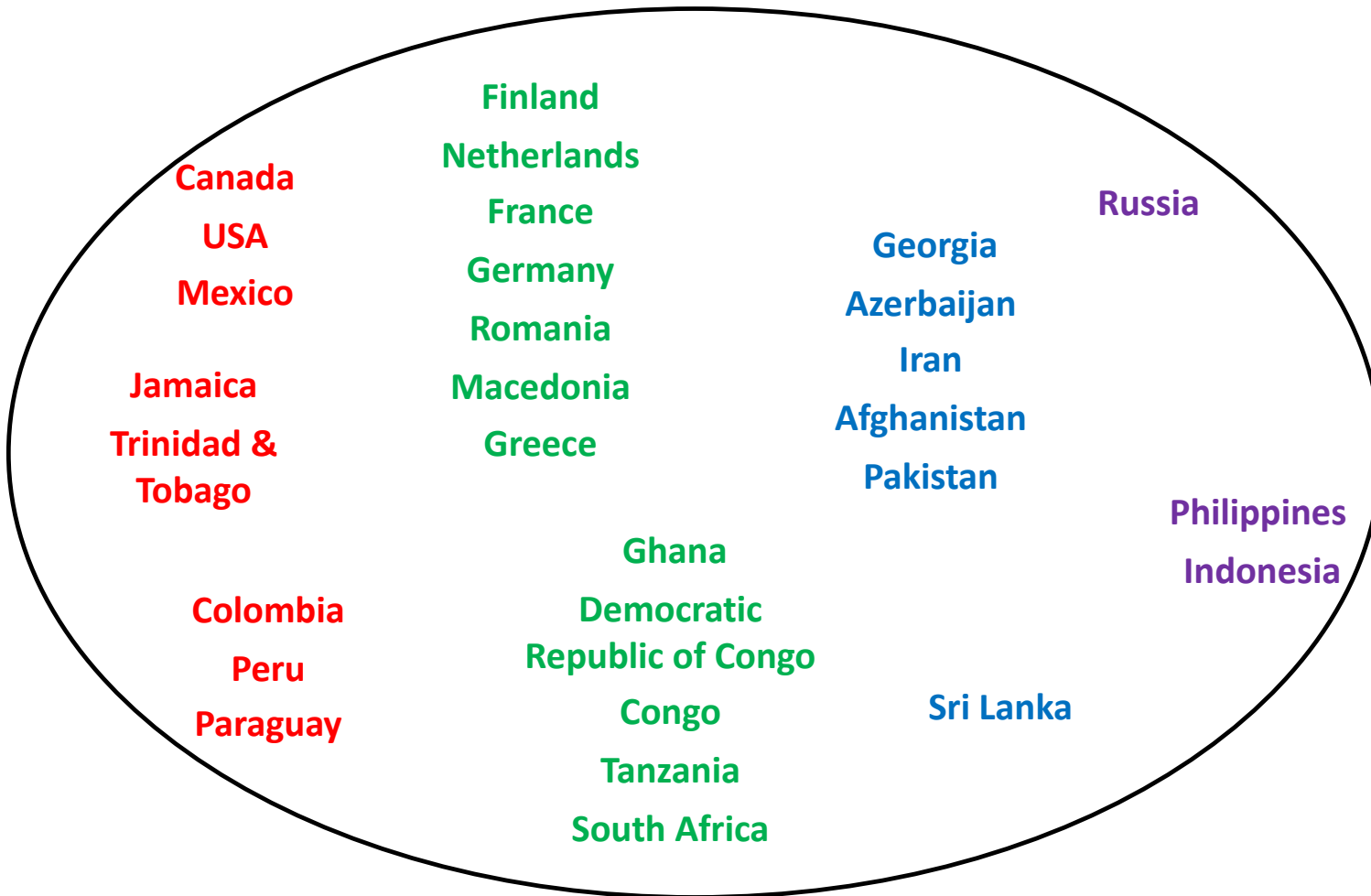Remote Sensing (SNAP, Terrset, QGIS)

Programming

- ➢ Python

- ➢ R / R-Studio

Illegal land development in a Conservation area, Mexico (A. Verde)

Increase·in·urban·land·cover·between·2017·to·2021.¶

Finland
Netherlands
France
Germany
Romania
Macedonia
Greece

Canada
USA
Mexico

Jamaica
Trinidad & Tobago

Russia

Georgia
Azerbaijan
Iran
Afghanistan
Pakistan

Philippines
Indonesia

Ghana
Democratic Republic of Congo
Congo
Tanzania
South Africa

Colombia
Peru
Paraguay

Sri Lanka

Year 4 of Program:
➢ 30 countries

Background (B.Sc.)
- Geology
- Geography
- Ecology
- Environmental Science
- Engineering
- Computer science
- Chemistry...

Internships

Internships

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Internships

- **3-month internship in M1 (April-June)**

  - **6-month internship in M2 (February-July)**

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Thank you for your attention

(Dennis.Fox@univ-cotedazur.fr)

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