# Dependencies between soil animal activity and vegetation distribution along a climate gradient in Chile

EarthShape – Earth Surface Shaping by Biota

Project IV. – Linking bioturbation with fluxes
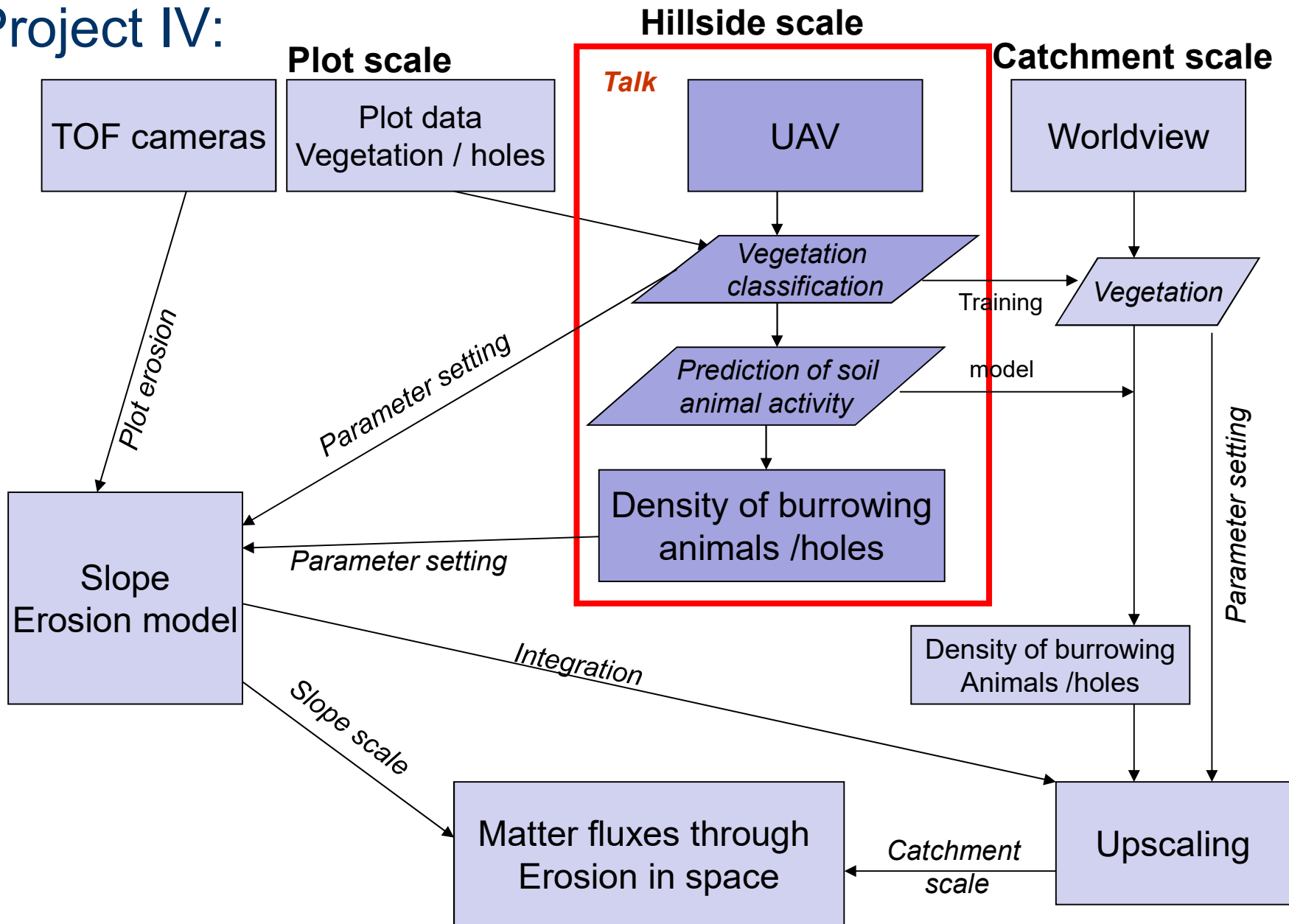
Paulina Grigusova

Philipps-University Marburg, Department of Geography

AG Bendix, Laboratory for Climatology and Remote Sensing

CoAuthors: Prof. Dr. J. Bendix, Prof. Dr. N. Farwig, Dr. A. Larsen, D. Kraus, A. Klug, R. Fischer, S. Achilles
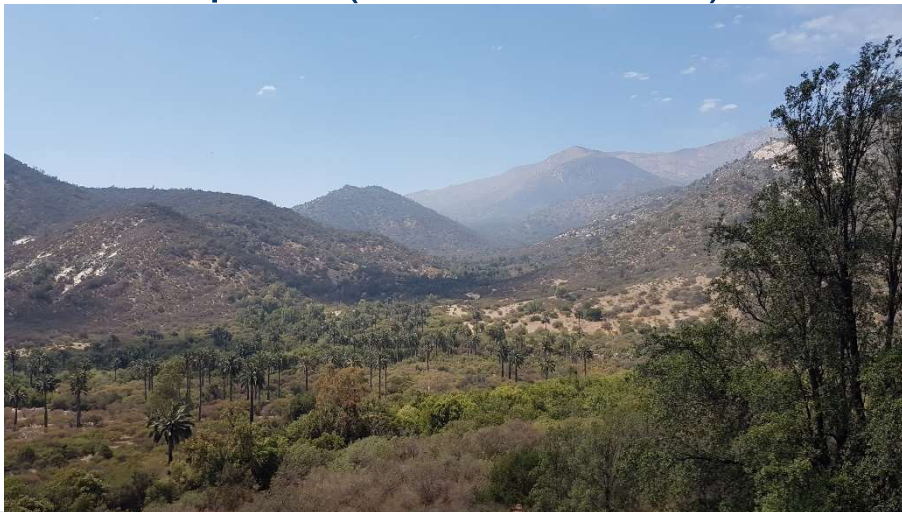
# Project IV:

**Plot scale**

**Hillside scale**

**Catchment scale**

TOF cameras

Plot data
Vegetation / holes

*Talk*

UAV

Worldview

*Vegetation classification*

*Vegetation*

Training

*Prediction of soil animal activity*

model

Slope
Erosion model

Density of burrowing animals /holes

*Plot erosion*

*Parameter setting*

*Parameter setting*

*Parameter setting*

Density of burrowing Animals /holes

*Integration*

*Slope scale*

Matter fluxes through Erosion in space

*Catchment scale*

Upscaling

Philipps Universität Marburg

# 1.Study areas

## Pan de Azúcar (arid zone)



## Santa Gracia (transition zone)



## La Campana (semi arid zone)



## Nahuelbuta (humid zone)



Philipps Universität Marburg

# 2. Methodology



Drone flights

2 hillsides/site

Height: 20m-40m

Area: 1km$^2$/site

Orthophotos
Landscape model

Predictors

RGB bands

Indices

Pixel heterogeneity

Elevation

Land cover
classification

Upscaling of the
soil animal activity

Vegetation
mapping

Plot data

Amount and
size of holes

20 plots/site

Philipps Universität Marburg

# Land cover classification

Predictors → Polygons ← Vegetation mapping

Predictors → (Polygons) → Random forest model → Classification → Devision of the study areas in 10m x 10m tiles → Percentage of each land cover type within the tiles

| Site | | PdA | SG | LC | NA |
|---|---|---|---|---|---|
| Model | Kappa | 0.78 | 0.73 | 0.67 | 0.89 |
| Trees | Single trees | | | X | X |
| | Forest | | | | X |
| Shrubs | Cactus | X | X | | |
| | Bush | | | X | |
| | Shrub | X | | X | X |
| Soil | Bare soil | X | X | X | X |
| | Rocks | | X | X | |
| | Soil crusts | X | | | |

Images source: pixabay.com, available for free download
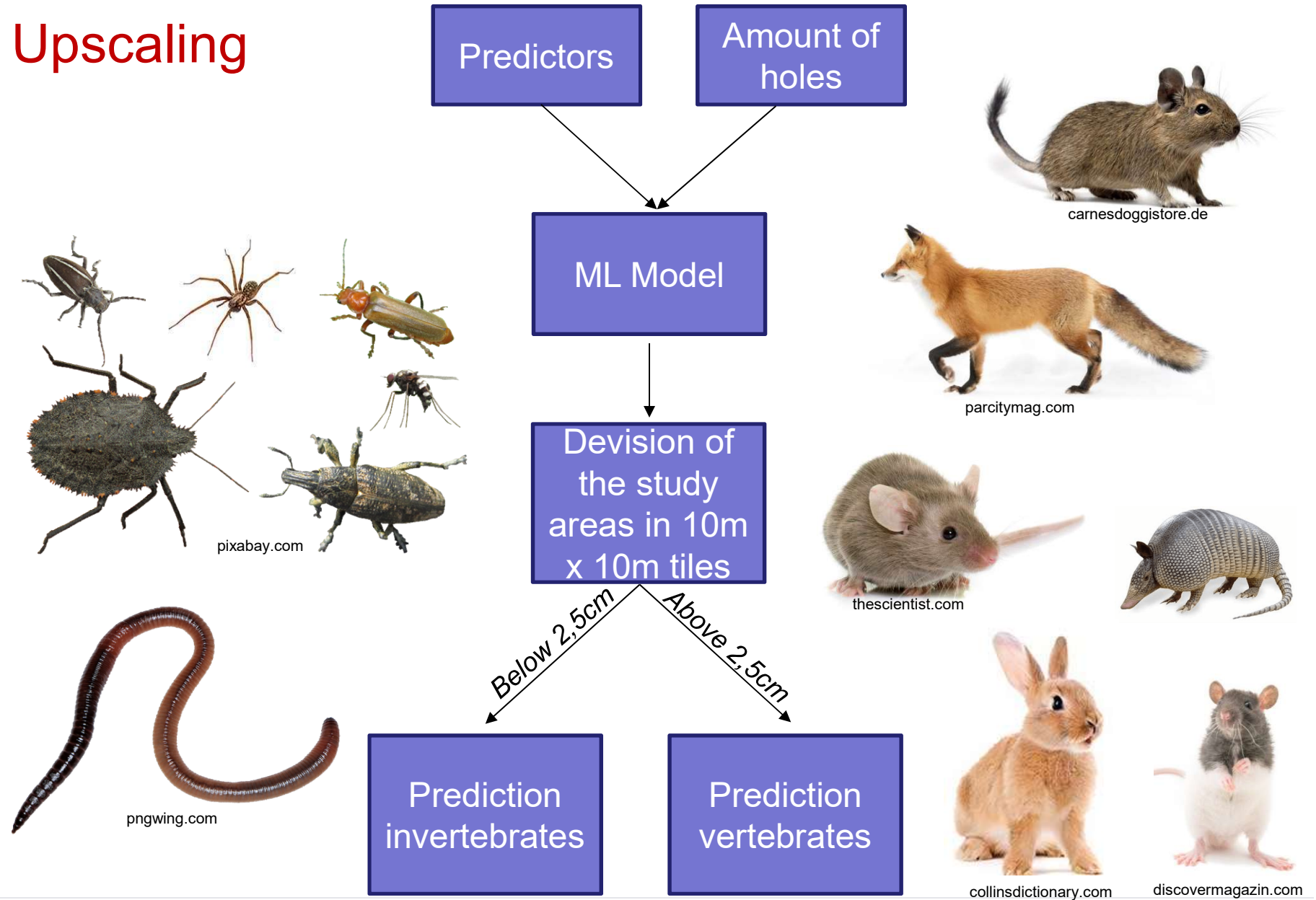
Philipps Universität Marburg

Upscaling

3. Results – Pan de Azúcar
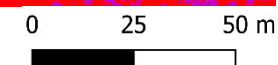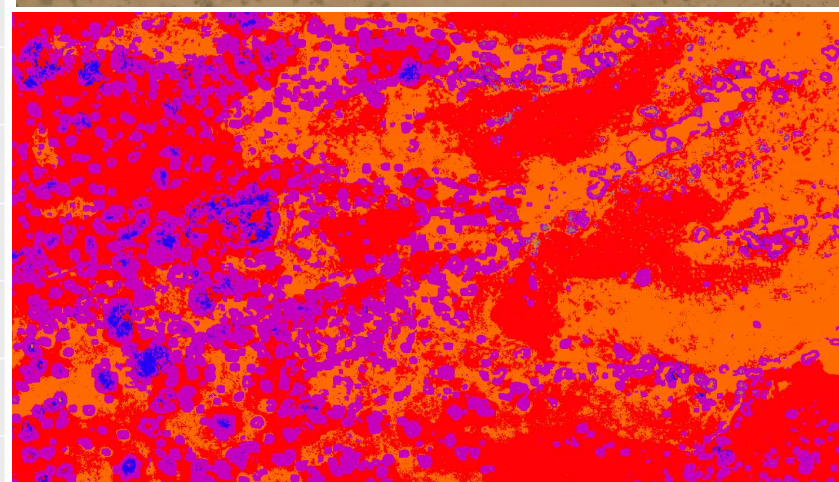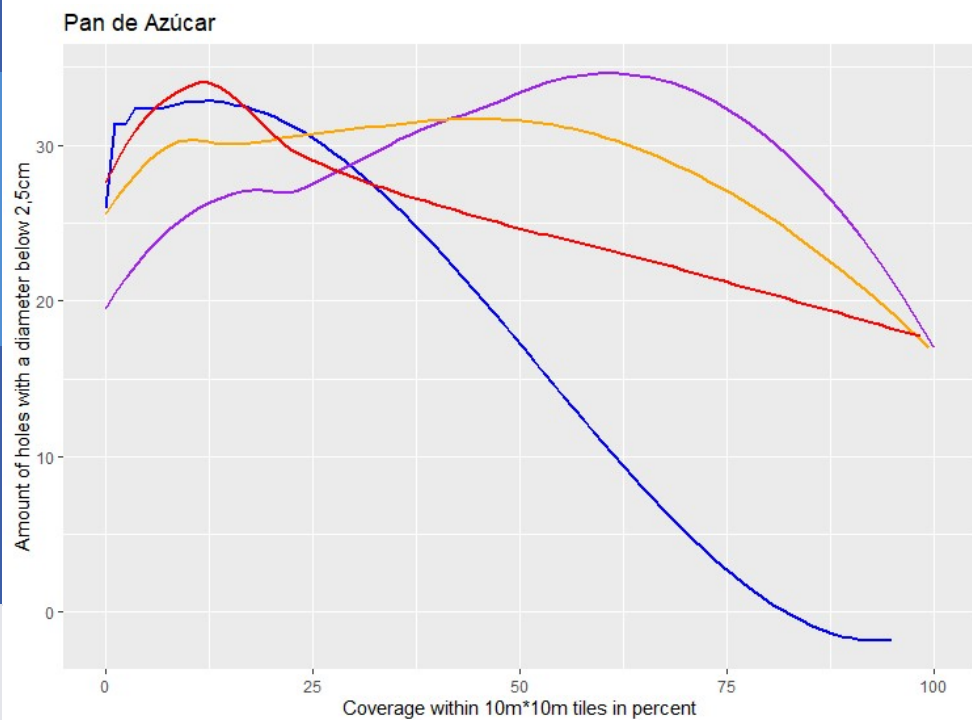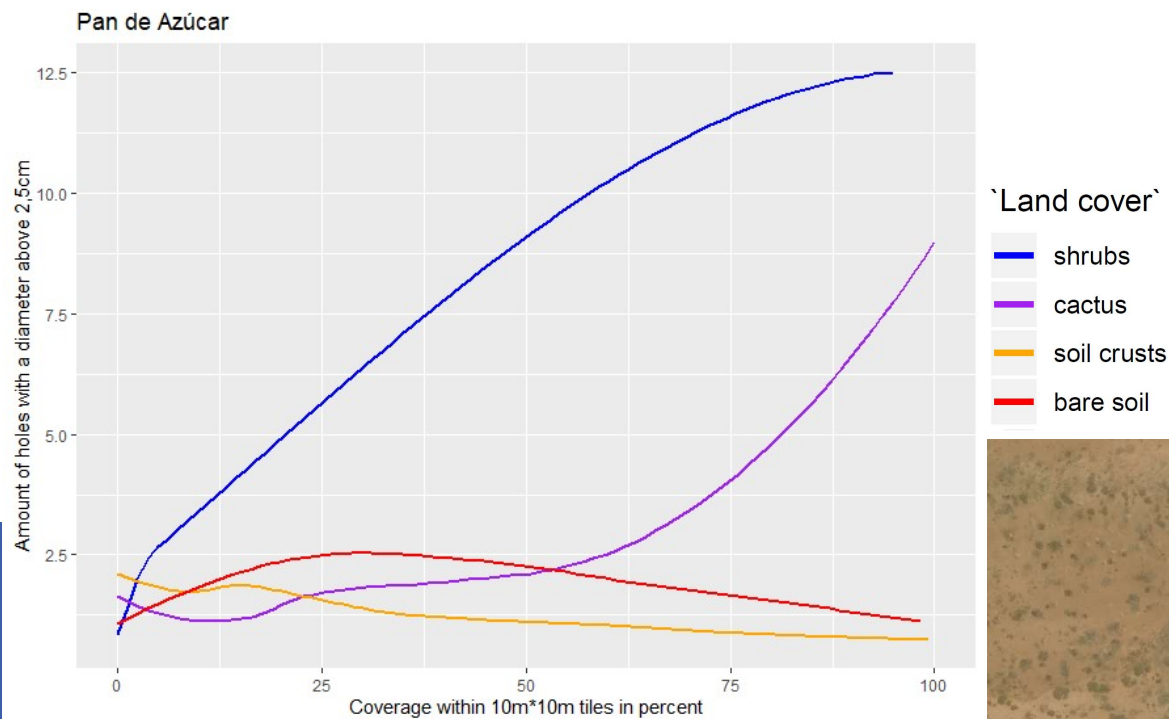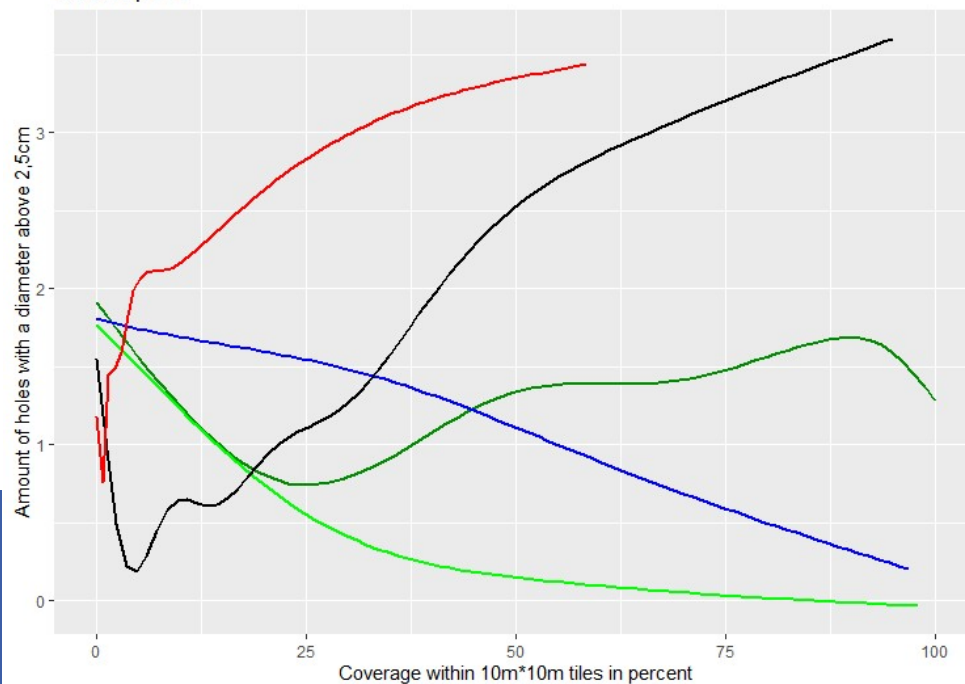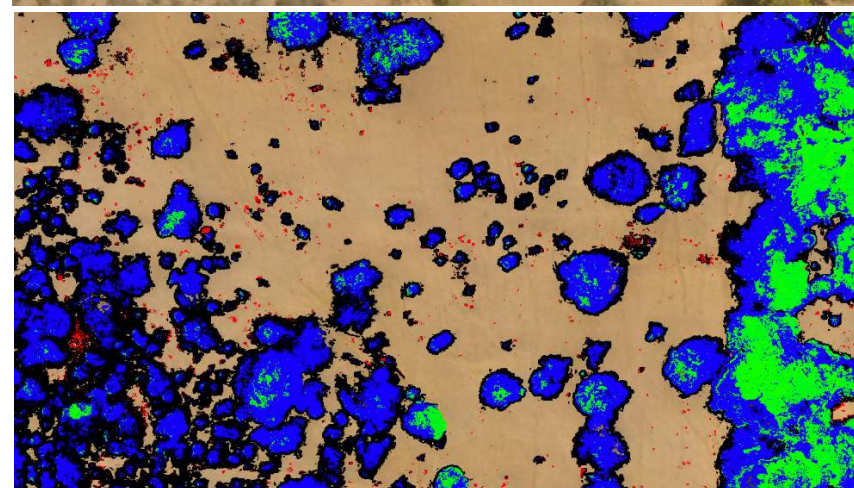
3. Results – La Campana
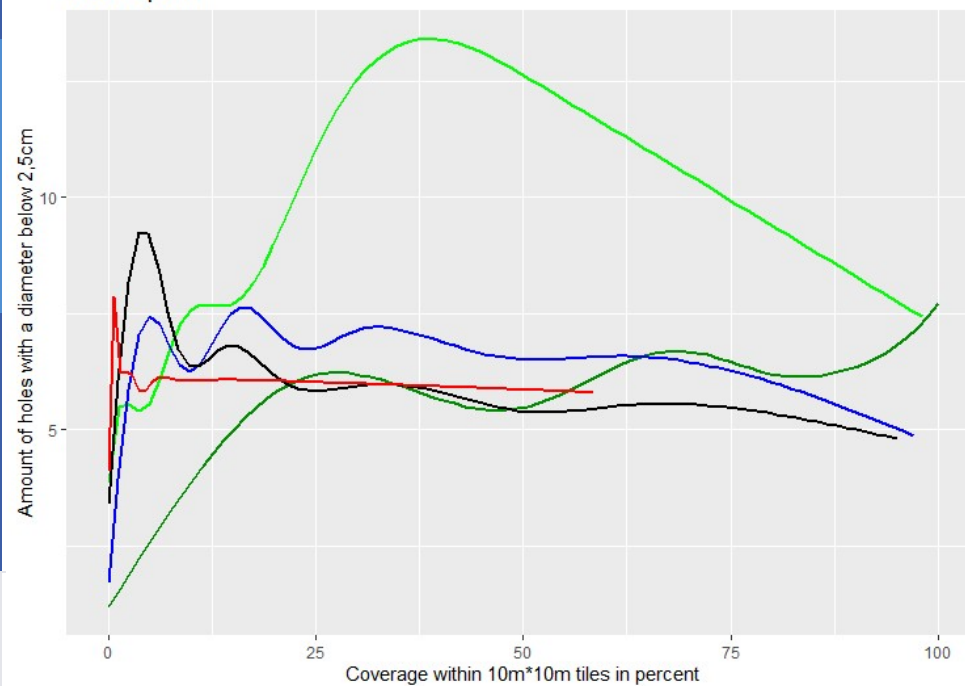
# 4. Summary – at which vegetation cover maximum amount of soil animal activity can be expected?

| | | Trees | | Shrub | | | Soil | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tree | Forest | Shrub | Cactus | Bush | Soil | Rocks | crusts |
| PdA | 🪱 | | | 12% | 60% | | 11% | | 40% |
| | 🐭 | | | 95% | 100% | | 30% | | 15% |
| LC | 🪱 | 32% | | 14% | | 5% | | 1% | |
| | 🐭 | 0% | | 0% | | 85% | | 55% | |

carnesdoggistore.de    pngwing.com    pixabay.com

Philipps Universität Marburg

# 5. Acknowledgments