

# How spatial vegetation distribution affects soil erosion and sediment transport

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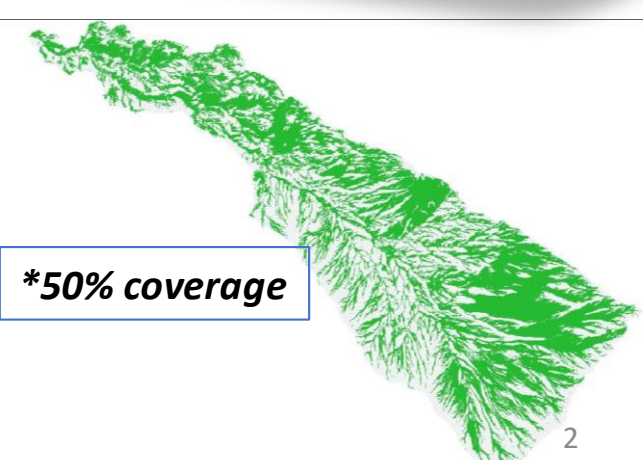
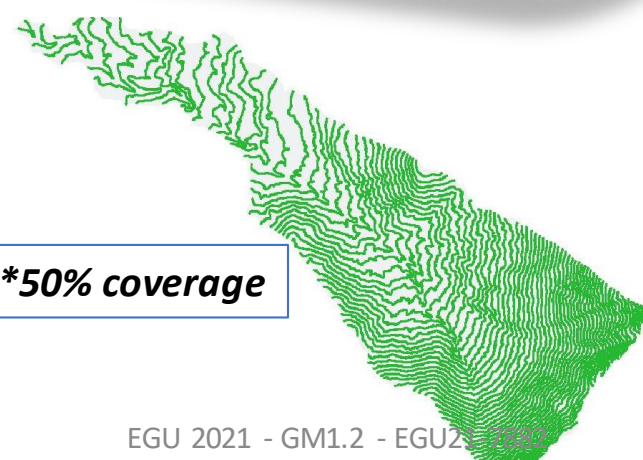
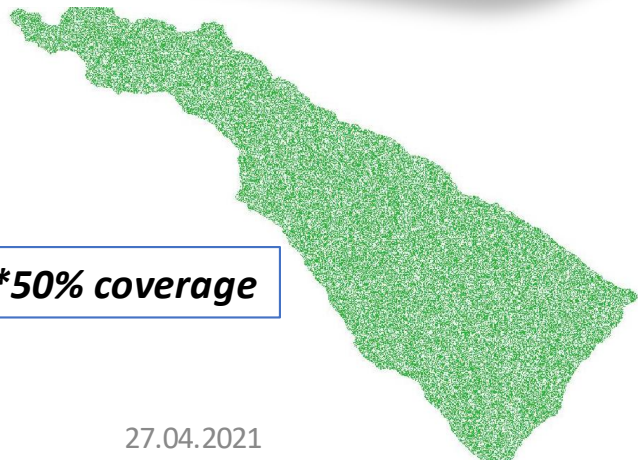
Jürgen Schmidt (Freiberg University of Mining and Technology)



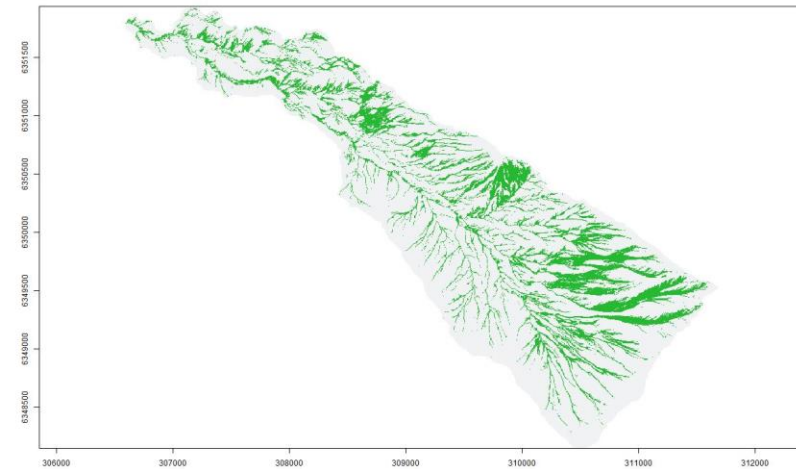
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# Research question:

Is it just the amount of vegetation/biomass which impacts soil erosion or does the spatial distribution of plants have a significant impact on erosion rates within a catchment?

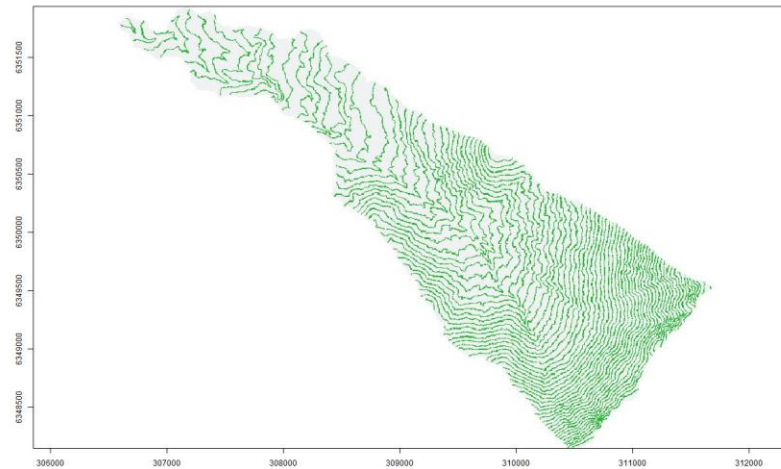


## Approach: Creation of three vegetation patterns

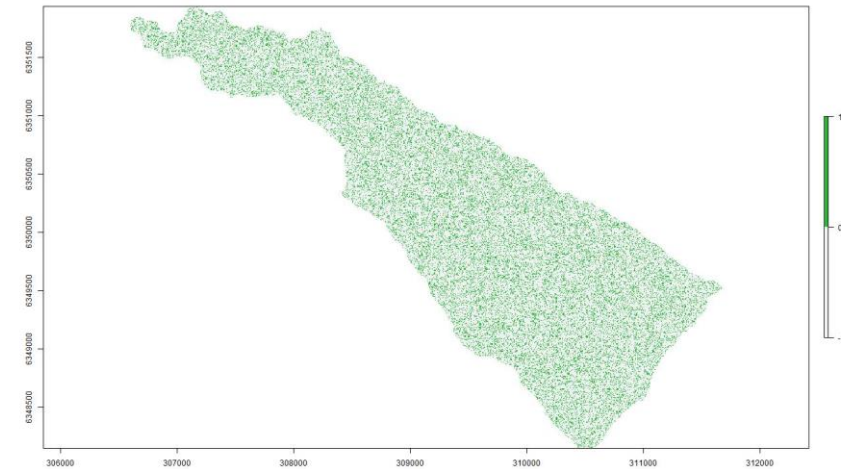


Distribution along areas  
with potential high wetness

→  $\frac{TWI \text{ (topographic wettness index)}}{IRR \text{ (solar irradiance)}}$



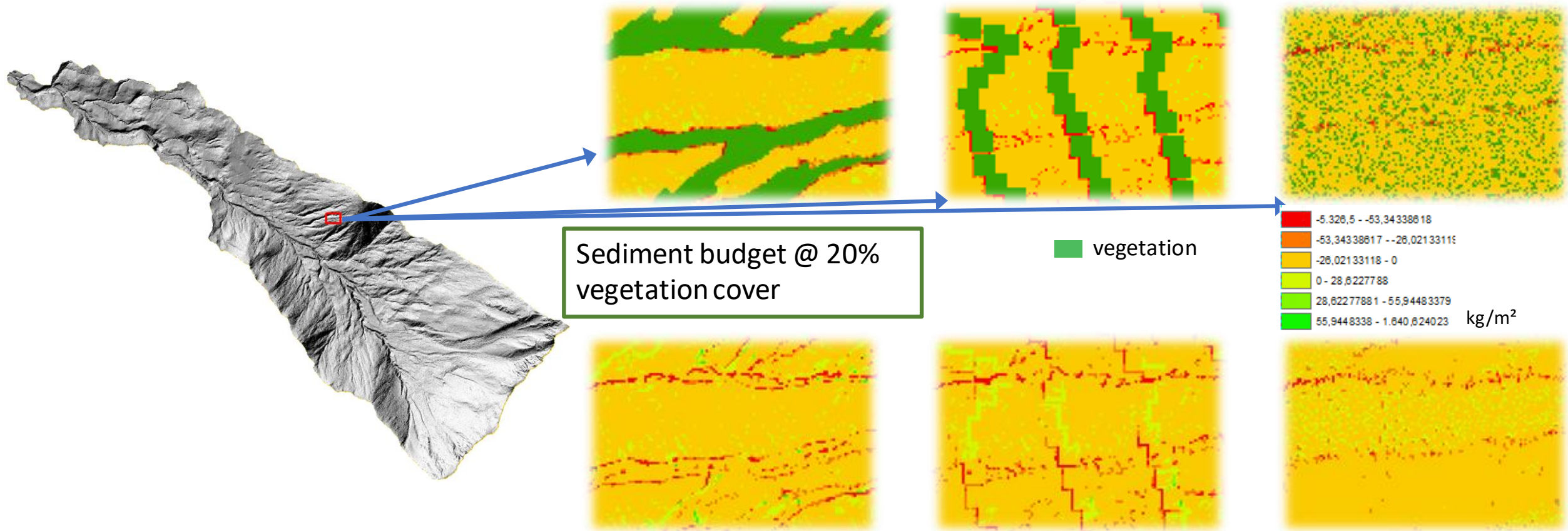
Distribution parallel  
to contour lines



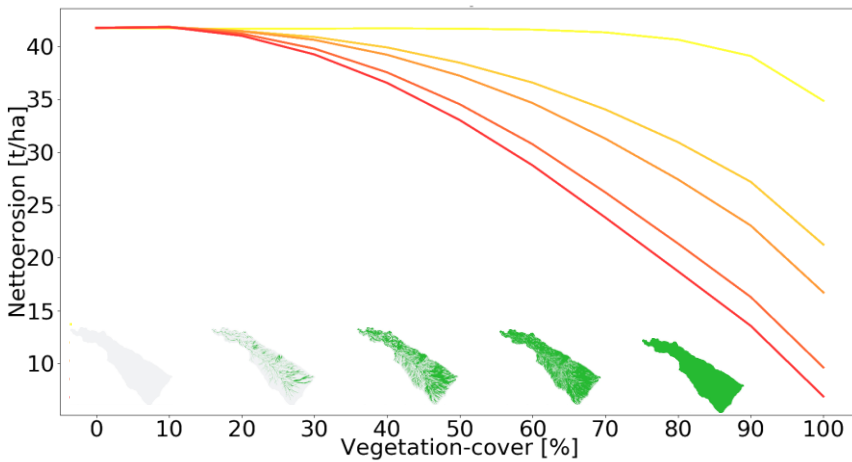
Random distribution of  
vegetation

## Methodology:

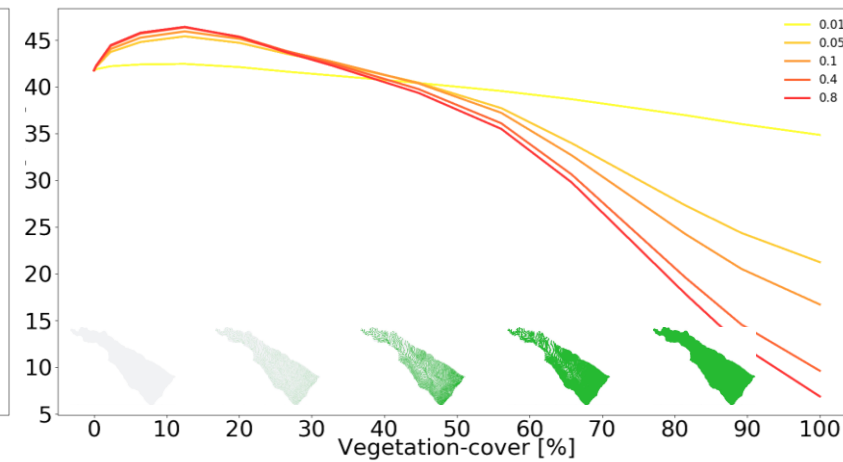
Stepwise increase of vegetation cover of the three vegetation-pattern-types within the catchment area and application of an erosion model (EROSION-3D)



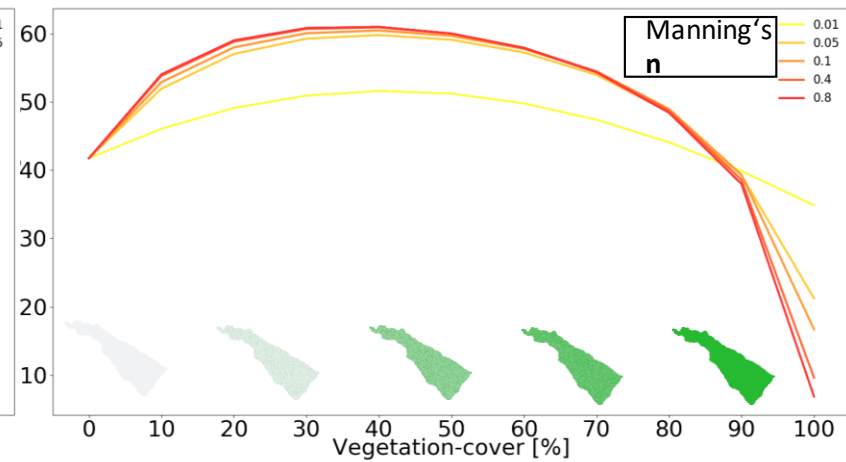
## Results



TWI-based distribution



Banded distribution



Random distribution

## In a nutshell

### How spatial vegetation distribution affects soil erosion and sediment transport

#### Research gap

Several studies deal with the correlation of vegetation cover and soil erosion, but only a few also take into account the impact of various vegetation patterns

#### Aim

Study the impact of different vegetation patterns on soil erosion

#### Approach

Erosion modelling of different vegetation patterns and degrees of coverage

#### Results

- Strong impact of vegetation pattern on erosion at catchment scale
- An increase of vegetation cover can lead to an initial increase of net erosion
- The threshold value of vegetation cover above which net erosion starts to decrease is strongly dependent on the vegetation pattern

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Biogeomorphology/Ecogeomorphology: process understanding and application

