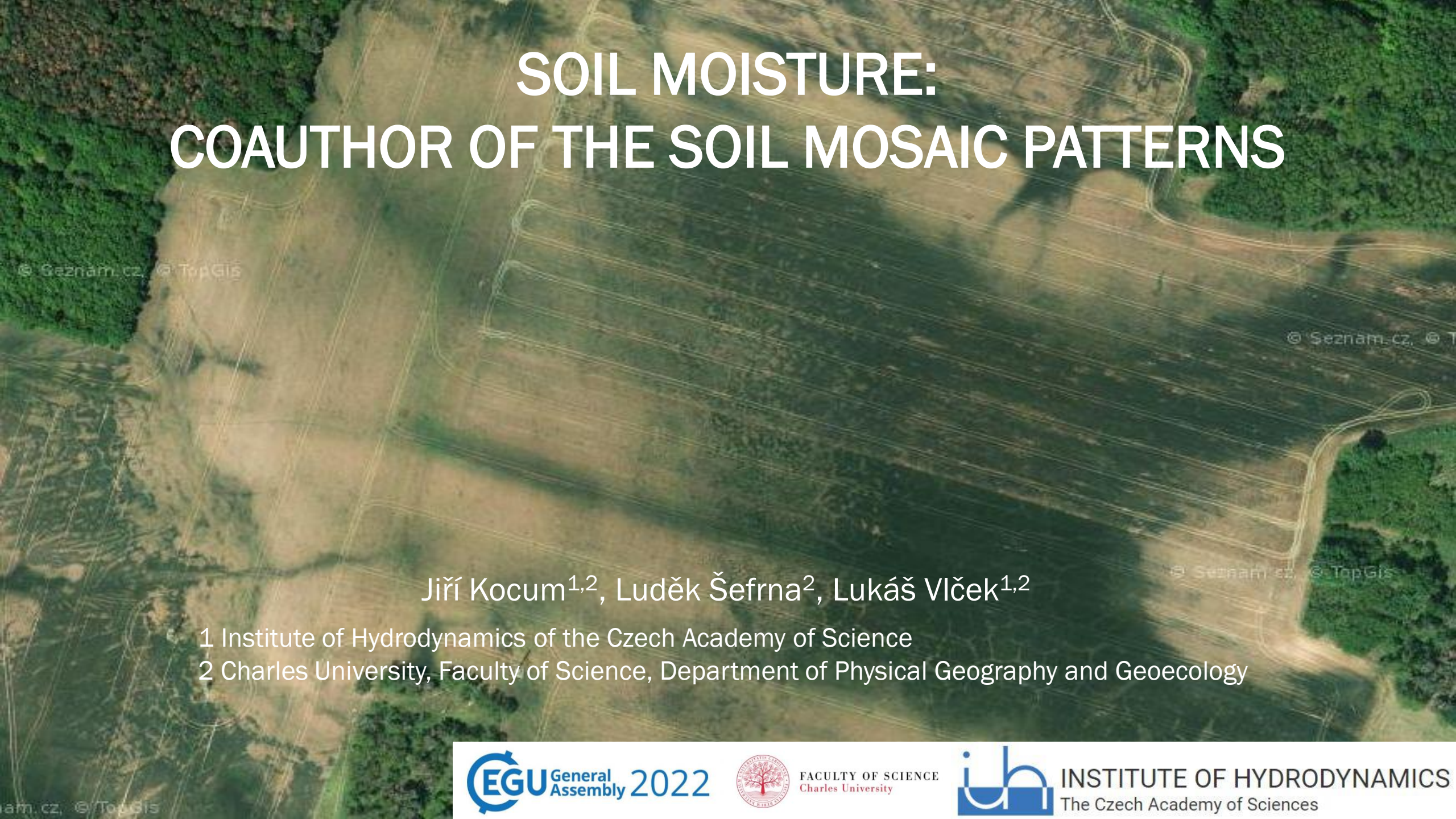

SOIL MOISTURE: COAUTHOR OF THE SOIL MOSAIC PATTERNS

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FACULTY OF SCIENCE
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INSTITUTE OF HYDRODYNAMICS
The Czech Academy of Sciences

MAIN OBJECTIVES

- Soil mosaic classification according to its origin.
- Classification according to fractal dimension of the soil mosaics.
  - H_0: Mosaics of the same origin will create similar shapes.
- To use only freely available data.

AREAS OF INTEREST

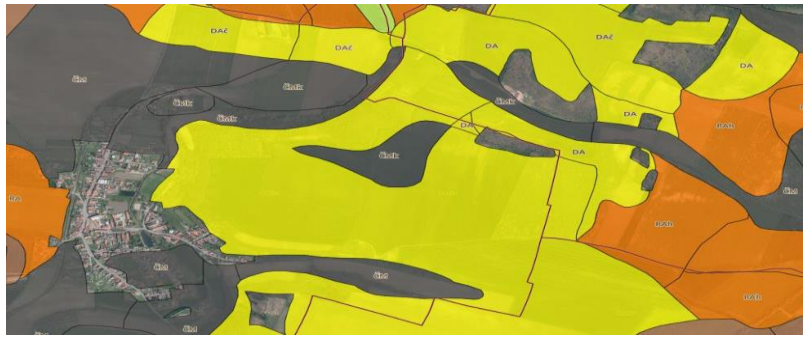
- 50 locations in Czechia
- Mosaics with different:
  - Shape
  - Origin
  - Scale
  - Soil type
  - Degree of development

Source: https://www.mapy.cz

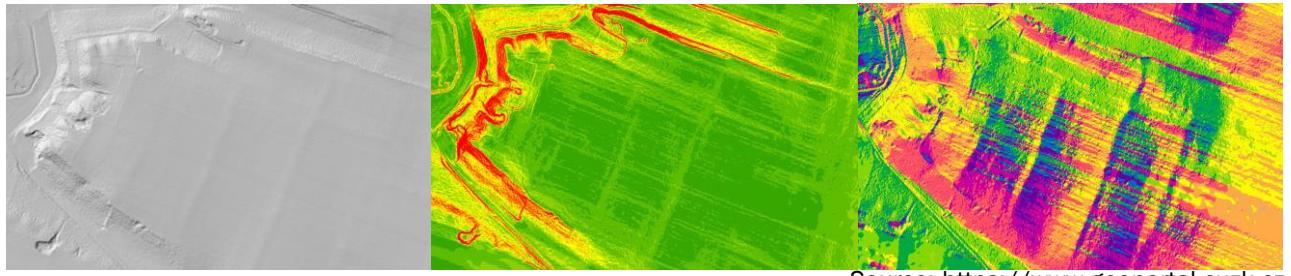
DATA

- Aerial photographs
  - www.mapy.cz
- Complete Soil Survey (CSS) maps
  - www.kpp.vumop.cz
- DTM 5G (lidar scanning)
  - www.geoportal.cuzk.cz

Source: https://www.mapy.cz



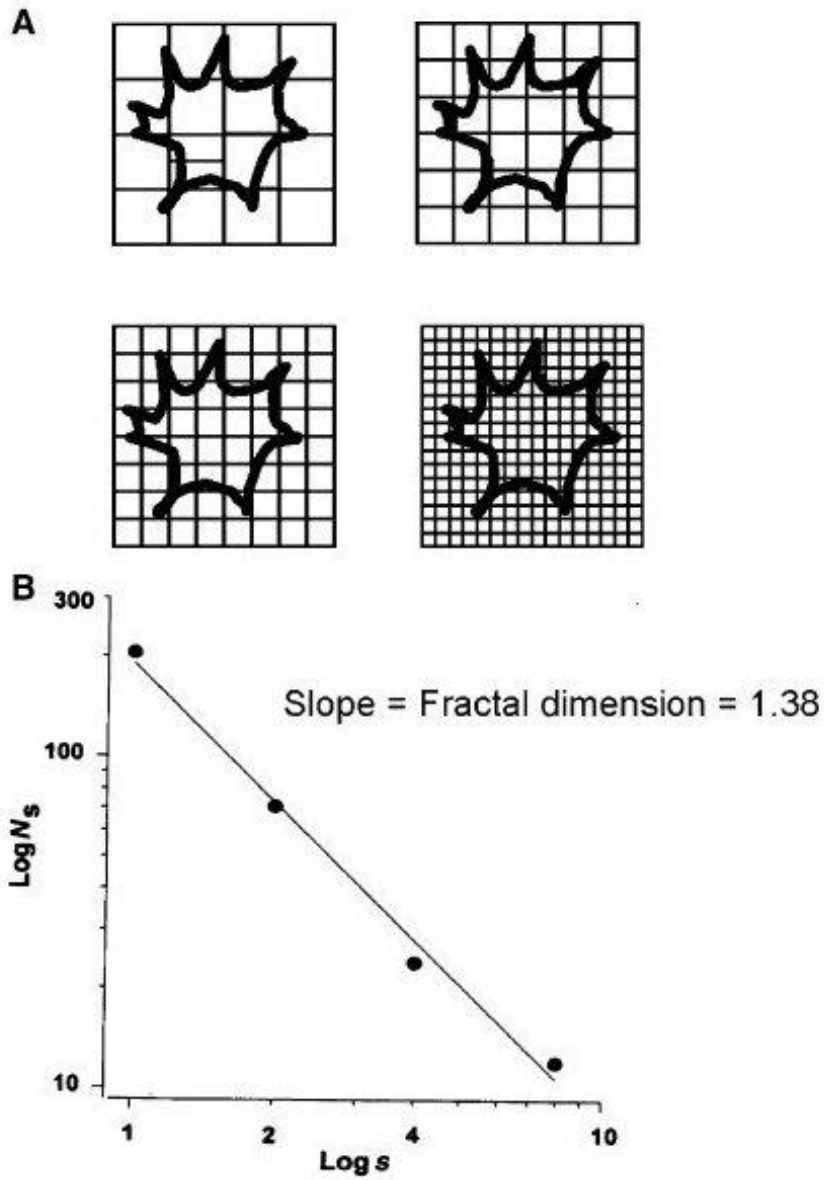
Source: https://www.kpp.vumop.cz



Source: https://www.geoportal.cuzk.cz

METHODS

- Minkowski-Boulingad dimension
  - 1 = line
  - 2 = area
- Free software
  - ImageJ
  - V-Late 2.0

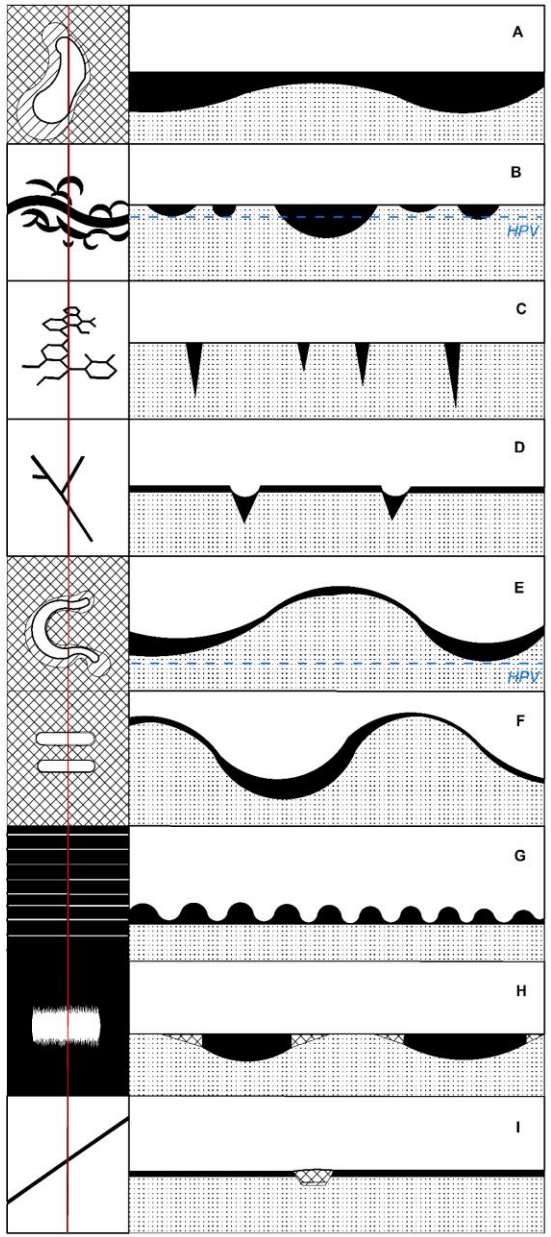


Kimler et al., 2004

RESULTS

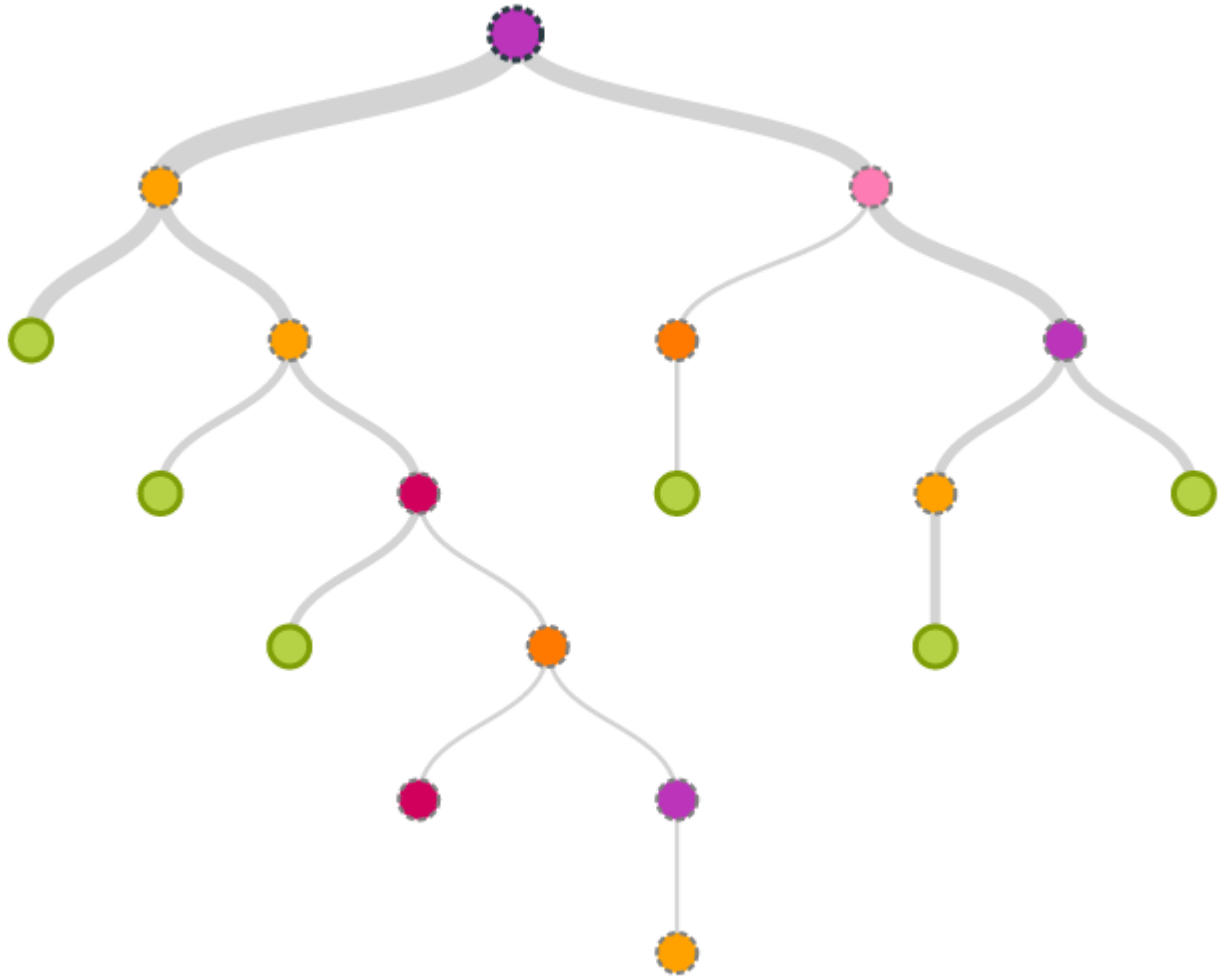
- 3 Groups
  - 9 Categories
- Simple X Compound mosaics
- Main factors:
  - Depth of soil profile
  - Soil texture, structure
  - Δ organic matter content
  - Δ soil moisture

- **Different depth, thicknes and properties of parent material**
  - A – different depth of PM
  - B – different fluvial sediments
  - C – pseudomorphosis of frost wdges
- **Relief shape effect**
  - D – concentrated erosion
  - E – sheet erosion
  - F – wind erosion
- **Current and relict anthropogenic influence**
  - G – effect of ploughing
  - H – mixing due to ploughing
  - I – relict anthropogenic shapes



DECISION TREE

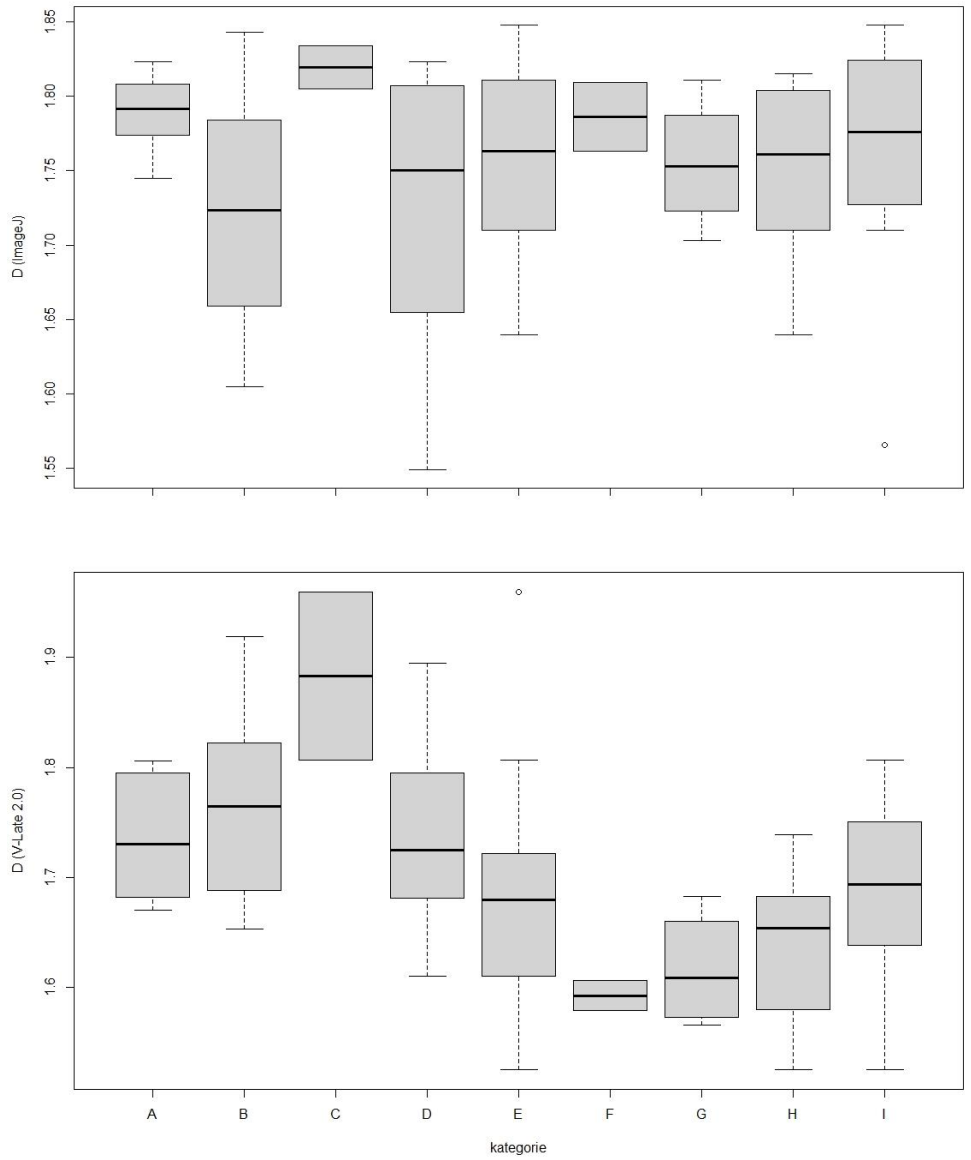
- Yes / No
- Shape
  - Linear X Rounded
- Border type
  - Sharp X Gradual
- Position in terrain, …

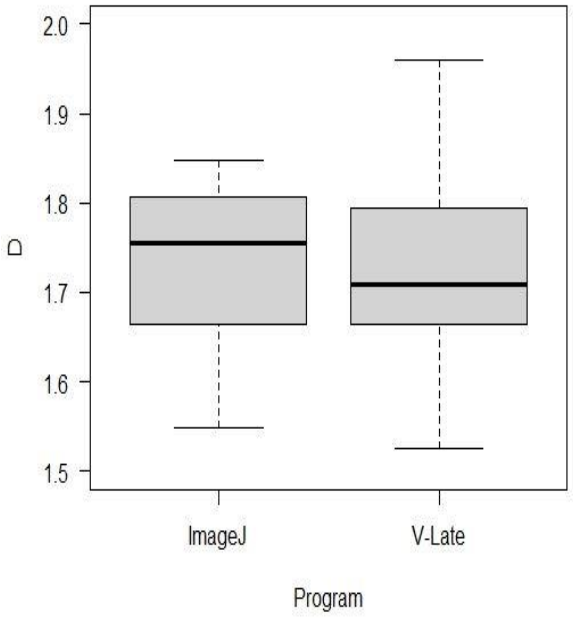


Source: https://blog.bigml.com/2013/04/19/a-new-way-to-visualize-decision-trees/

RESULTS

- Different results from both programs
- No distinct group
- Many problems
  - Scale of the mosaics
  - Boundaries determination





CONCLUSION

- Successful clasification attempt
  - Classification according its origin
  - Utilization in: precision agriculture, map improving, better estimation of K factor in USLE
- Box-counting method is probably not suitable for this problem
- Use of satelite images?

Thank you for you attention!

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