Spatial variability of soil properties in the floodplain of a river oasis in the Mongolian Altay Mountains

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Introduction & Objectives

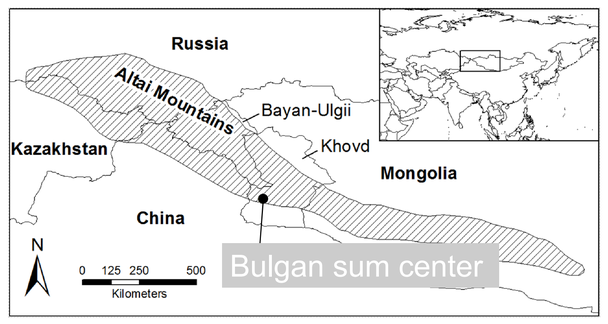
- Easy access to water in the floodplains allow the small-scaled cultivation of crops and hay even under the arid climate conditions of the river oasis Bulgan sum center located in the foothills of the Altay Mountains, Western Mongolia.
- Previous studies in this river oasis suggested a negative effect of agricultural land use on soil quality as indicated by soil biological parameters which, however, were characterized by high spatial heterogeneity.
- This study aimed at
  - ➡ a characterization of the spatial variability of major soil properties within the floodplain of Bulgan sum center and
  - ➡ the determination of factors which were responsible for the variation of soil biological properties.

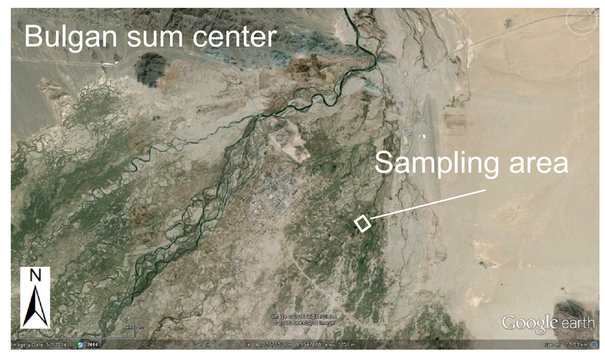
Conclusions

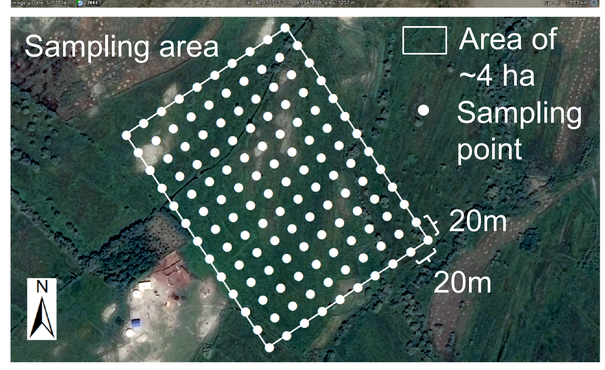
- Presented variabilities confirm previous observations and are comparable to further floodplain studies.
- Results underline the significance of organic carbon to preserve the scarce and susceptible agroecological resources of river oases in Central Asia.

Materials & Methods

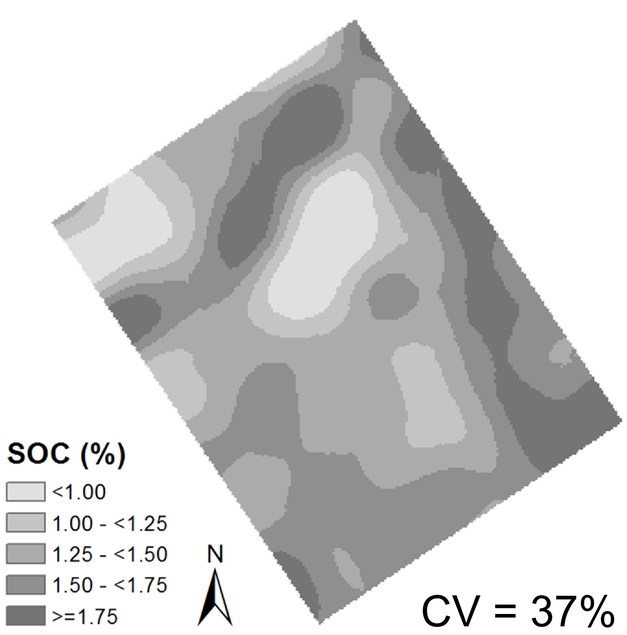
- 130 topsoil samples were taken within an cultivated area of about 4 ha within the floodplain.
- Topsoil samples were analyzed for physico-chemical and biological soil properties (texture, soil organic carbon SOC, pH, electrical conductivity EC, microbial biomass C, ergosterol).
- Assessment of spatial variability by kriging and calculation of the coefficient of variation for each variable (% CV).
- Multiple regressions were calculated between soil microbial properties and in-dependent variables that were selected (stepwise forward) from physico-chemical soil properties.



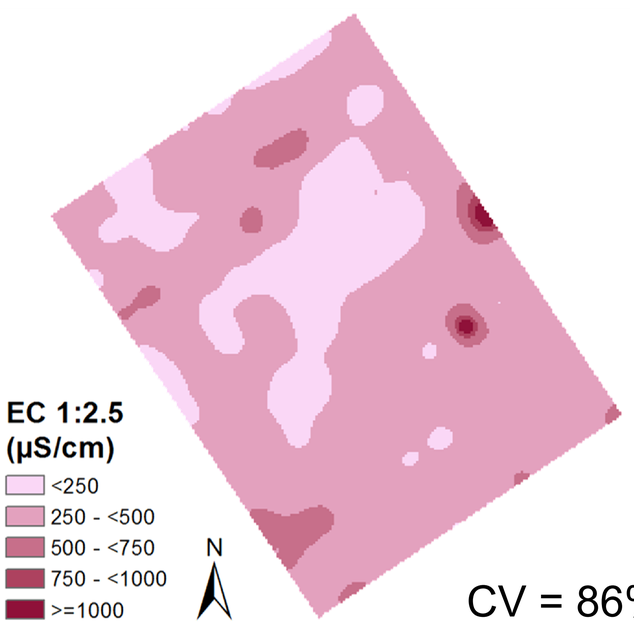




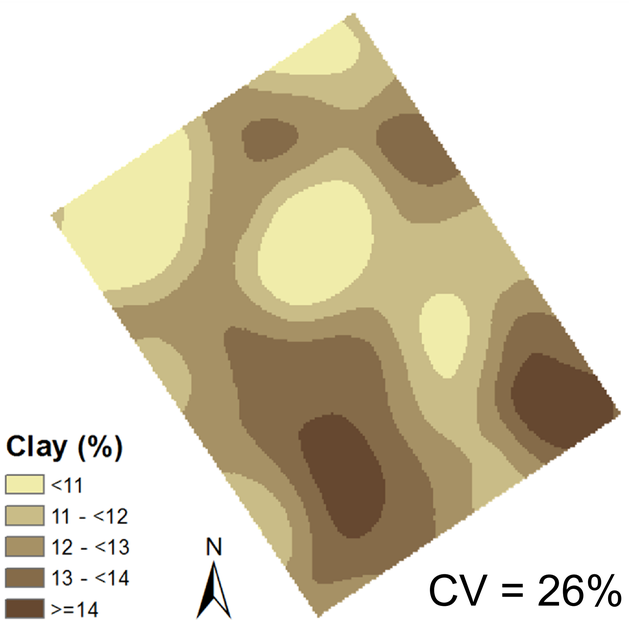
Results



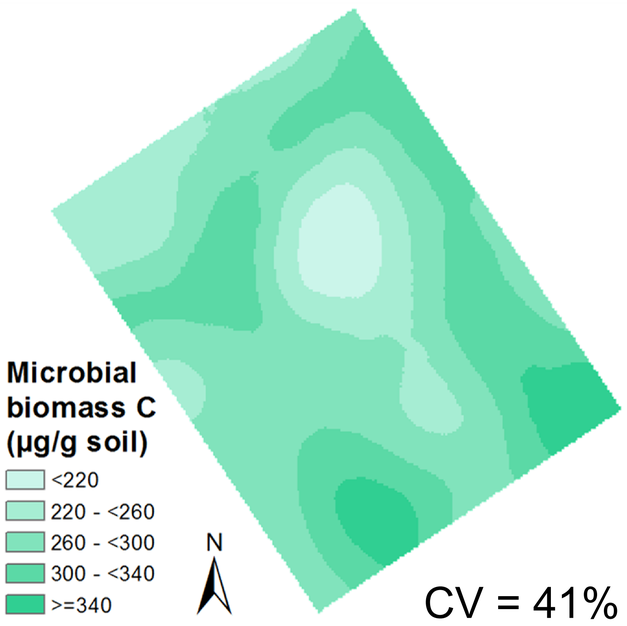
CV = 37%



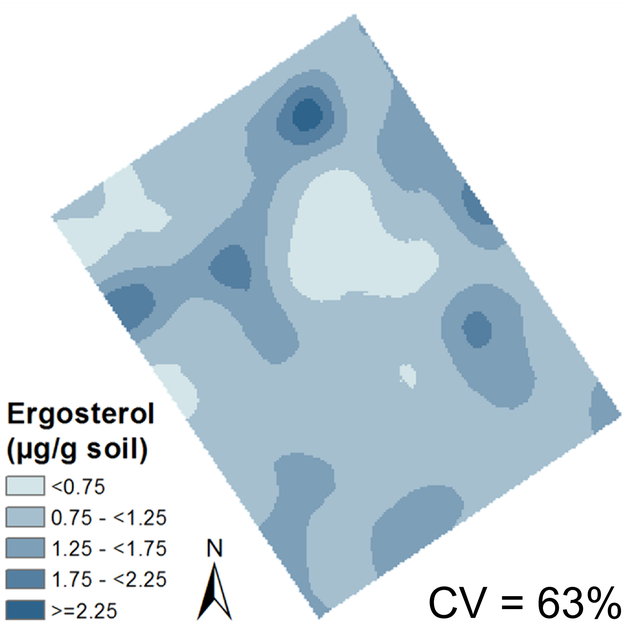
CV = 86%



CV = 26%



CV = 41%



CV = 63%

Table 1. Multiple regression models (stepwise forward selection)

	Microbial biomass C	Ergosterol
Variable 1	104.07 SOC	0.93 SOC
Variable 2	11.39 clay	-0.03 clay
Variable 3	—	0.0009 EC
Constant	1.47	0.06
R^2 (%)	0.50	0.63

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