Zentrum für Entwicklungsforschung
Center for Development Research
University of Bonn

GERMAN-UZBEK KHOREZM PROJECT

ALTERRA WAGENINGEN UR

Geostatistical monitoring of soil salinity in Uzbekistan by repeated EM surveys

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Introduction

Soil salinity in the lower reaches of Amudarya in Uzbekistan is a constant threat. The shallow groundwater table contributes to salinization of the rooting zone which is tackled by leaching at the end or beginning of the vegetation season. However, there is growing concern that the efficiency of the leaching with application of high amounts of water is very low. The objective of this study is to monitor the trend of salinity change over the three-year period from 2008 to 2010.

Data

The electromagnetic induction meter EM38 was used to assess soil salinity. Measurements in vertical dipole mode (sensing depth 1.5 m) were made at the end of the vegetation season each year.

Figure 1: *
EM-survey in 2009

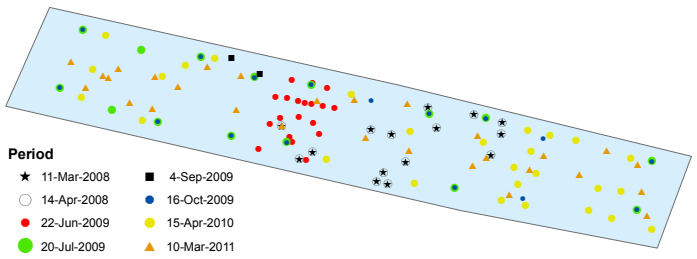
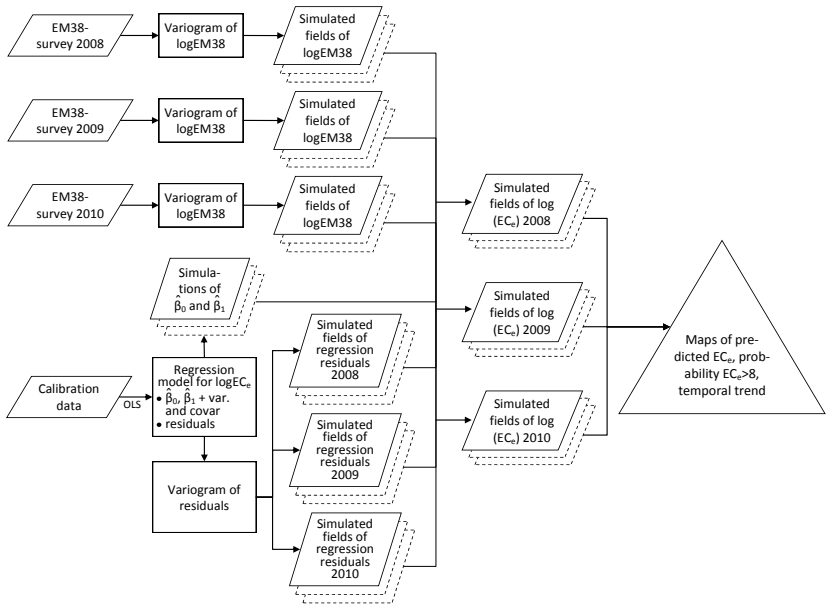


Figure 2: *
Calibration locations

Method



Results

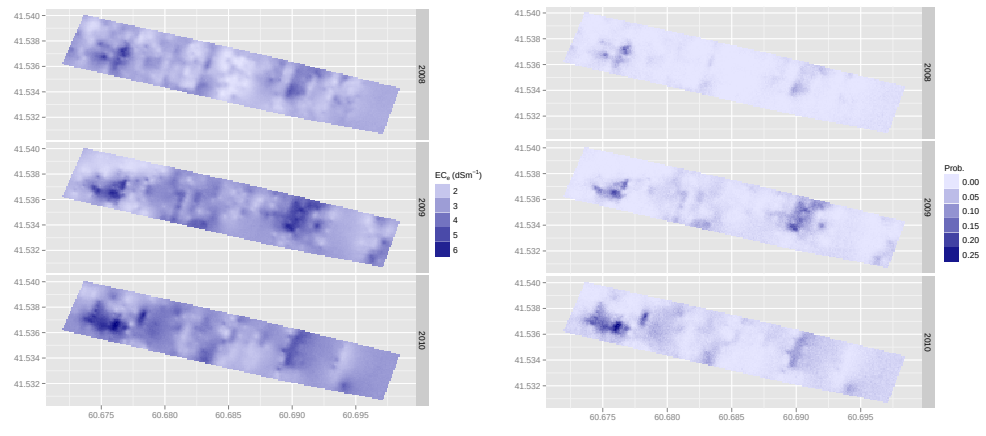
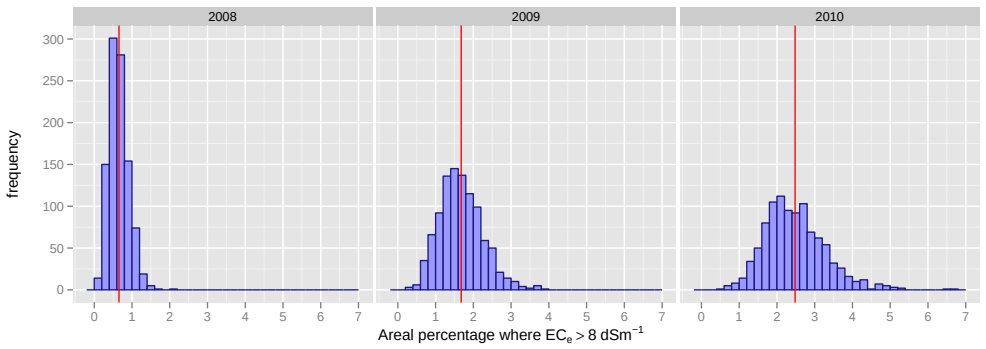


Figure 3: *
Predicted EC_e and probability that EC_e exceeds 8 dSm^{-1}



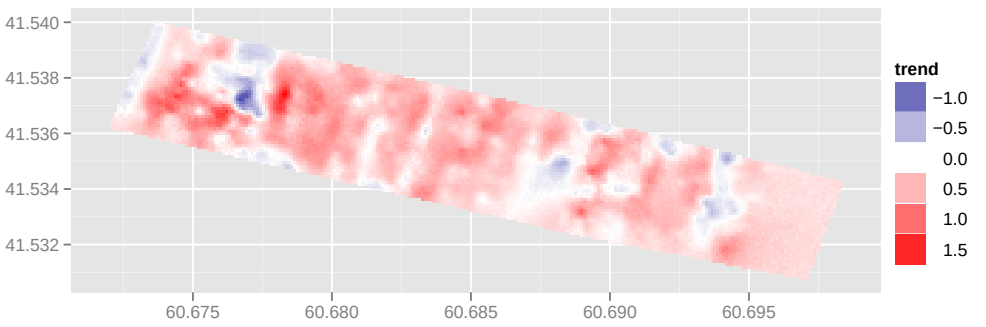


Figure 4: *
Estimated temporal trend of EC_e ($dSm^{-1}yr^{-1}$)

Conclusions

- EM-surveys can be used to obtain local predictions of EC_e and temporal changes therein
- Geostatistical simulation enables unbiased prediction of the areal percentage where EC_e exceeds 8 dSm^{-1}
- In the largest part of the area there is a slight positive time trend in EC_e

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