CRC 1253 CATCHMENTS AS REACTORS
CAMPOS

Dynamics of redox potential and nutrient turnover in dry floodplain soils during a simulated rain fall event

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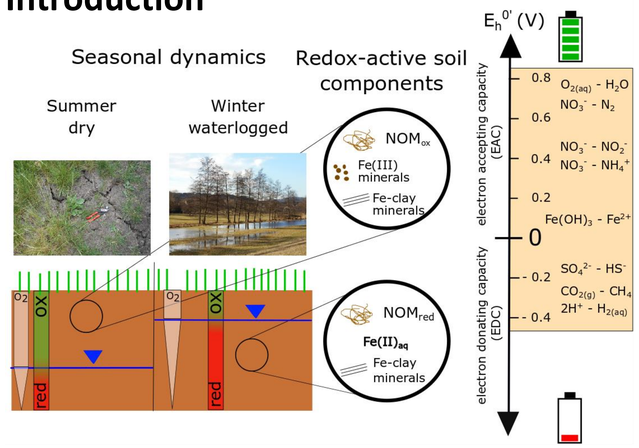
Introduction



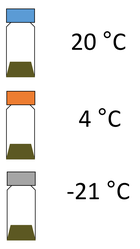
In field work and monthly soil monitoring it was difficult to observe seasonal dynamics due to very stable dry weather conditions over a period of 12 months.

Therefore it was decided to force waterlogged states by an irrigation experiment.
Additionally, batch experiments were conducted to identify appropriate storage and extraction methods for field samples.

Batch Experiments

Soil sample spiked with 3 µg NH_4NO_3/g soil to understand stability of N species during sample storage and extraction

Sample storage conditions

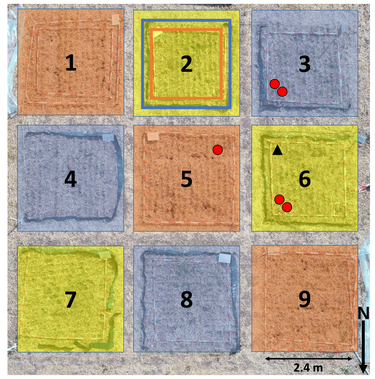


Sample extraction with 2 M KCl

Samples mixed with extractant directly after spike with NH_4NO_3

Extraction for 15, 30, 60 and 180 min was tested.

Irrigation Experiment

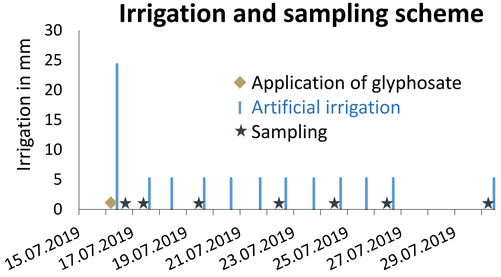


Plot dimensions
Outer dimensions: 2.4 m*2.4 m
Inner sampling area 2 m*2 m

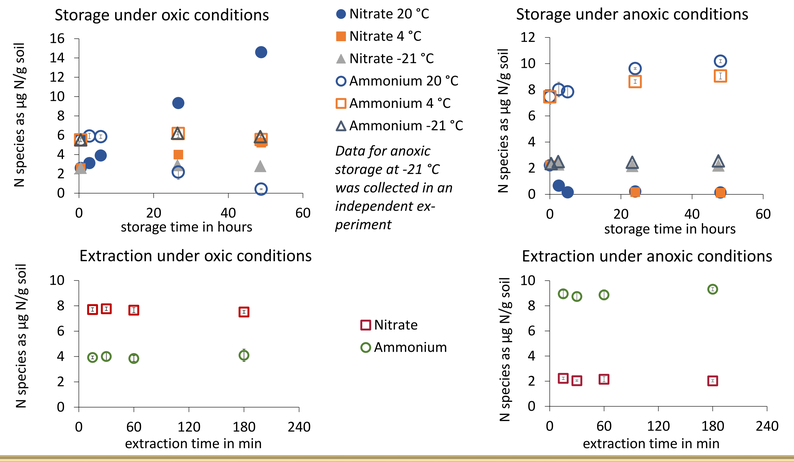
Plot treatments
- Fields 2, 6, 7: ^{13}C- and ^{15}N-labelled Glyphosate and water
- Fields 3, 4, 8: Water only
- Fields 1, 5, 9: Dry control

Installations
- Redox probe
- Reference electrode

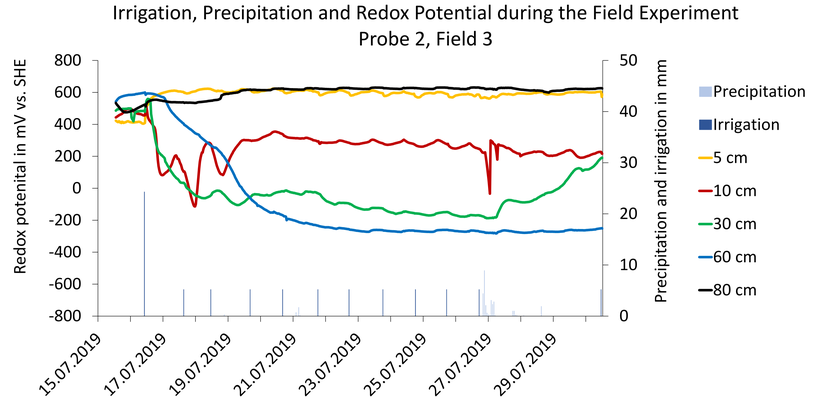
Irrigation and sampling scheme



Results Batch Experiments



Results Irrigation Experiment



- Quick response of redox potential to irrigation event in intermediate depths
- Decrease of redox potential from +600 mV to -200 mV

- Continuously high redox potential around +600 mV throughout the experiment at 5 and 80 cm depth.

Conclusions & Outlook

- The irrigation experiment showed that **upon heavy application of water** and thereby rising water saturation in the soil, the **soil redox potential decreases**.
- We assume that this also leads to a **change in redox state of redox active pore water species and soil components** and influences turnover processes of nutrients and pollutants.

- Batch experiments showed that in order to preserve their redox state, soil **samples should be stored frozen and extracted without previous thawing.**
- 2 M KCl as extractant for N_{min} species prevents turnover processes during extraction
- An extraction time of 15 minutes is already long enough for exhaustive extraction

- **In progress**: soil and pore water chemical data from the irrigation experiment soil cores

Acknowledgements
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