Leibniz Centre for Agricultural Landscape Research (ZALF)





# Agricultural N<sub>2</sub>O emission is strongly influenced by N fertilization form and landscape position

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### Nitrous Oxide (N<sub>2</sub>O)....



- Potent greenhouse gas with high global warming potential
- Agriculture accounting 60% of total emission
- Influence mainly by different **fertilizer** form and amount
- Additionally, influence by soil characteristics (eg; pH, SOC, N content, etc)
- Influence of each of these factor on N<sub>2</sub>O emission is limited for erosion-affected arable soils



- To investigate the influence of N-fertilization form on N<sub>2</sub>O emission
- To determine the relative importance of factor like soil characteristics induced by soil erosion on N<sub>2</sub>O emission







### Study Design.....

- **Study area**: Arable landscape in NE of Germany
- **Study period**: 01.05.2010 01.05.2013

<u>Sites</u>	Soil erosion stages	Fertilization form
1. Albic Luvisols (LL)	Non-eroded	100% ORG
2. Albic Luvisols (LL)	Non-eroded	100% MIN
3. Albic Luvisols (LL)	Non-eroded	50% MIN+50%ORG
4. Calcaric Regosols (RZ)	Extremely eroded	100% MIN
5. Endogleyic Colluvic Regosols (YK)	Deposited	100% MIN









### Energy crop rotation – identical for all sites



### N<sub>2</sub>O measurements





- Instrument: Opaque closed chambers
- **Sampling**: 20 min interval time
- Measurement frequency: biweekly and frequently (upto 6 days) after fertilization
- Analyse N<sub>2</sub>O concentration: gas chromatography
- N<sub>2</sub>O fluxes: linear regression



### **Results: Temporal dynamics**







#### **Fertilization Form**



### **Results: Temporal dynamics**







### Results: Cumulated N<sub>2</sub>O emission



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### Conclusion



- Our results show that the N<sub>2</sub>O emission exhibited temporal and spatial variability and is mainly influenced by fertilization form and soil erosion stages
- In general, our results suggest a stronger influence of N fertilization form than erosion affected arable soil on  $N_2O$  emission

## Thankyou very much for your time !



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