Emissions of CH4 from interfluvial savanna wetlands bordering the upper Negro River.

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Introduction

- Amazon wetlands:
  - globally significant source of methane
  - not all wetlands adequately characterized
- Savanna wetlands bordering Negro River:
  - Seasonally flooded hydromorphic podsols
  - Shallow environments (< 2m)
  - covered by grasses, shrubs and palms (Buriti).
  - regionally important but as yet unstudied wetland habitat.

Study sites

- Measurements were made at two sites: RNL and Itu.
- Interfluvial savanna wetlands bordering the upper Negro River
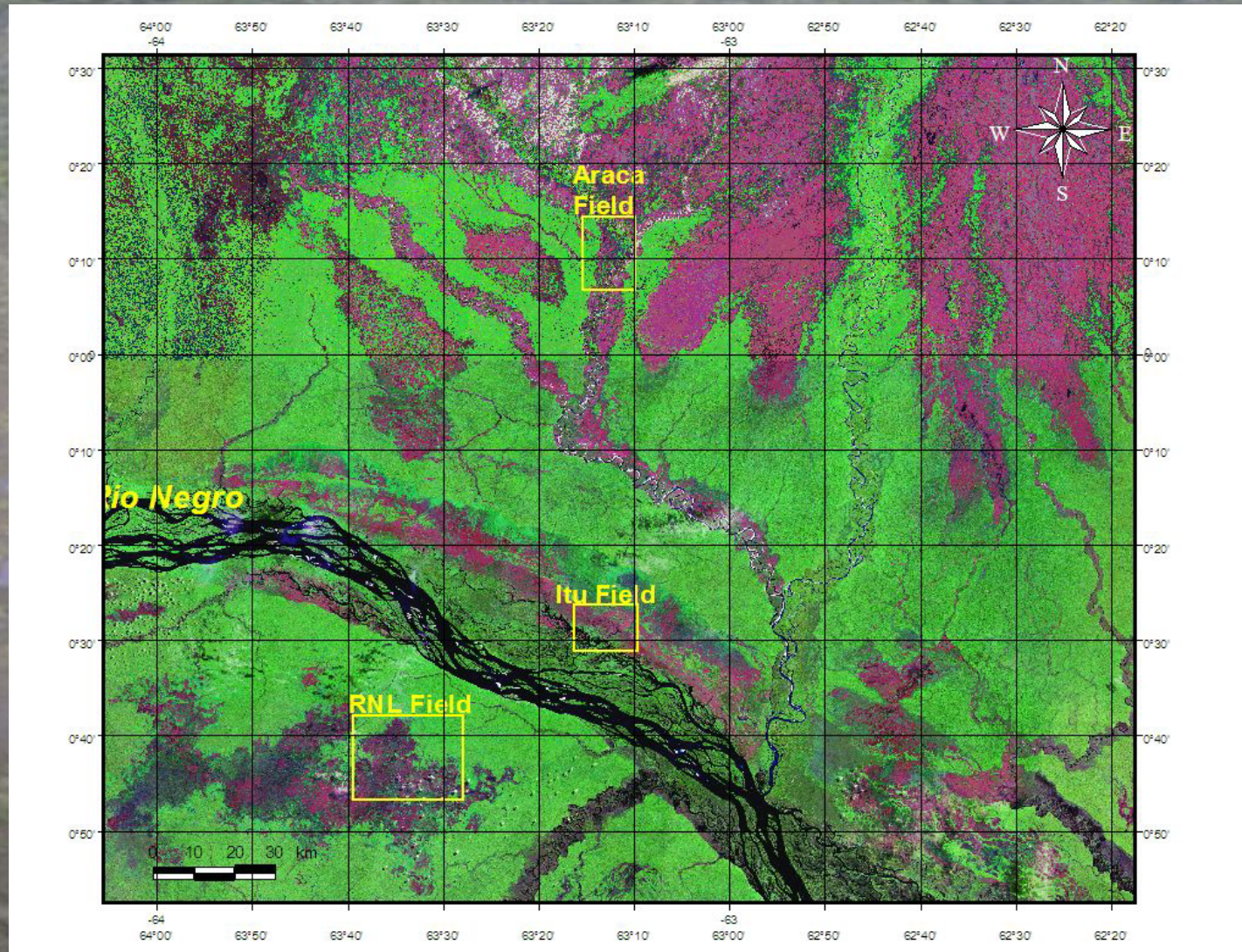
Rio Negro Lodge site

flooded

dry

Material and Methods

- Water levels and rainfall were measured continuously at both study sites from December 2004 to august of 2005. Level of Negro river was also monitored.

Levelogger installed at RLN site

Pluviometer being downloaded

Negro river gaging station

Collecting methane samples

- Diffusive emissions and surface water concentrations of CH_4 were measured monthly at both sites during the same period.

Diffusive emissions were measured during short-term incubations with a static chamber

Surface concentrations were estimated with the "headspace method".
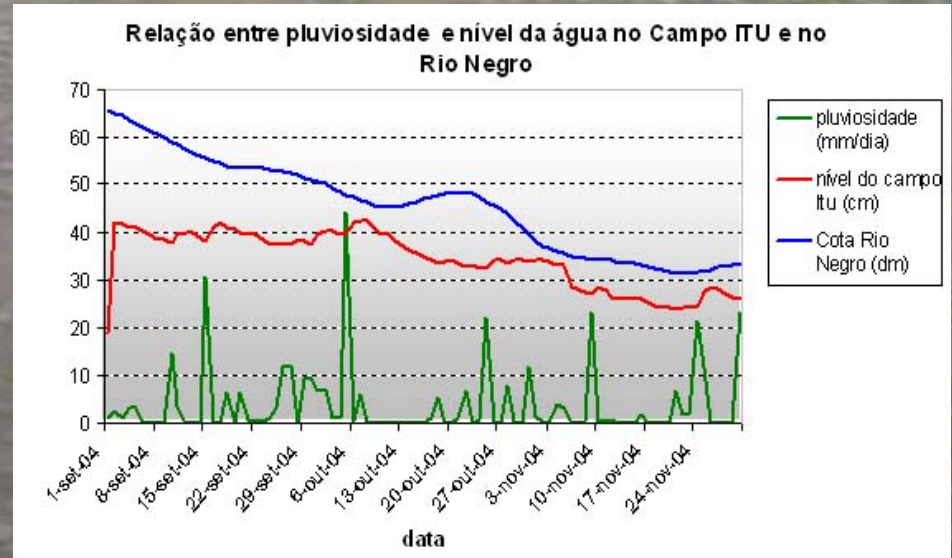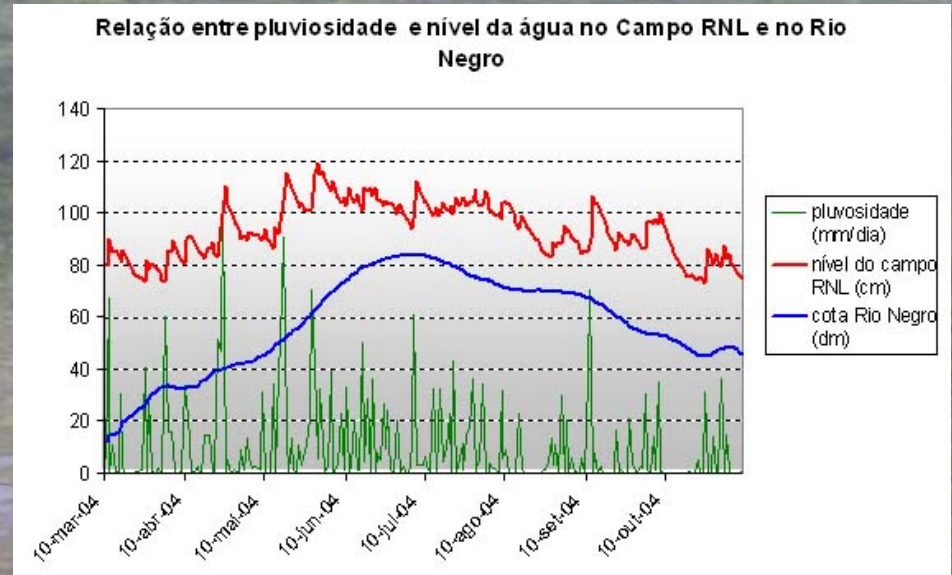
Analyzing Methane

- Methane concentrations were determined by gas chromatography using a Shimadzu GC14A.

# Results and Discussions

FLOODING PATTERNS

- The wetlands at both sites remained flooded during most of the year

- Water levels varied in response to rain fall and level of water table

- Water levels were also correlated to river stage, since both were influenced by regional variations in water table.


Relação entre pluviosidade e nível da água no Campo RNL e no Rio Negro

Relação entre pluviosidade e nível da água no Campo ITU e no Rio Negro

EMISSION PATTERNS

- The average emission rate for both sites during the study period was 21 mg $CH_4/m^2/h$ (SD = 43).

- Emissions were higher at Itu site (ANOVA p=0,003107).

- Emissions at both sites were highest in May and June
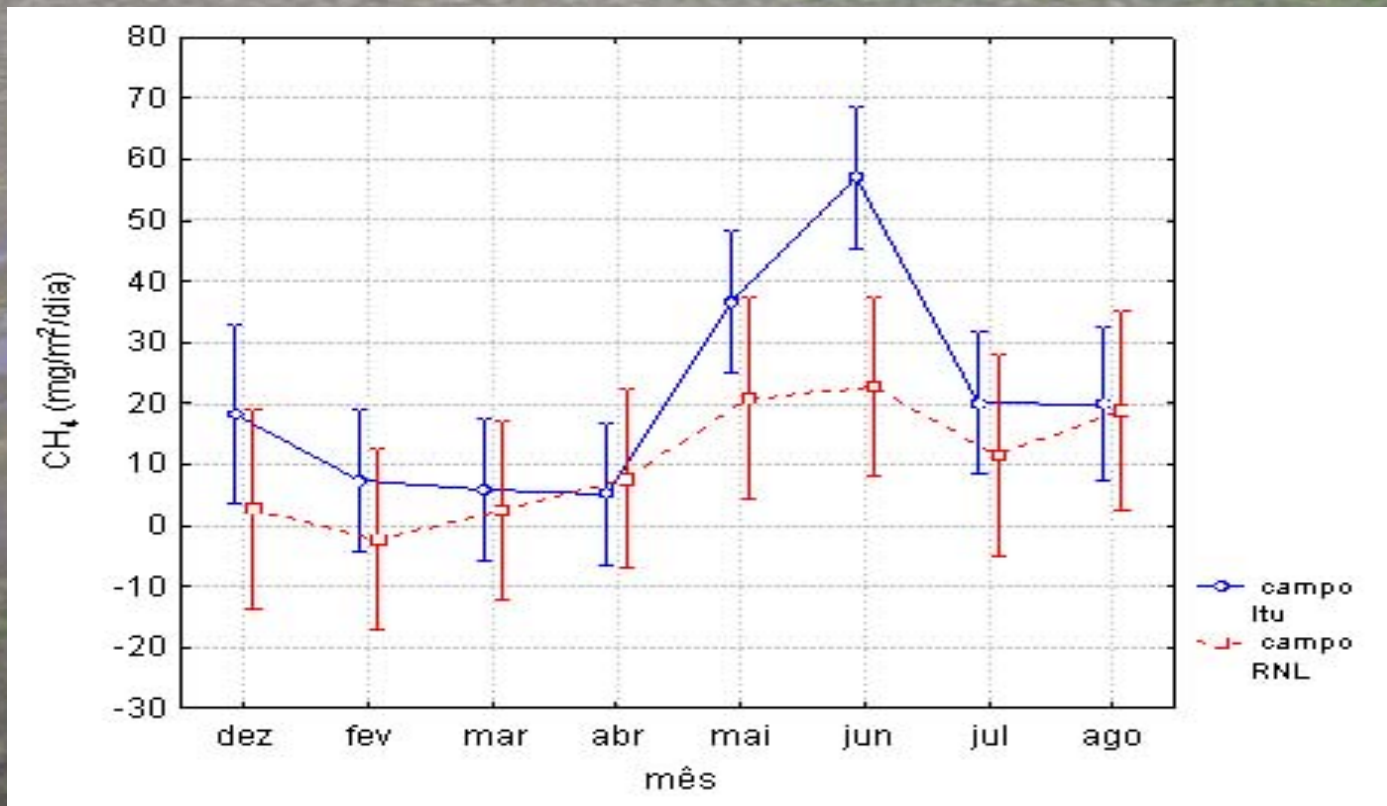
FLOODING vs EMISSIONS

- Emission levels were highest at high water levels

- The range of water levels and emissions were higher at Itu site.

- Highest water levels and emissions found during May and June at end of rainy season

RNL

ITU
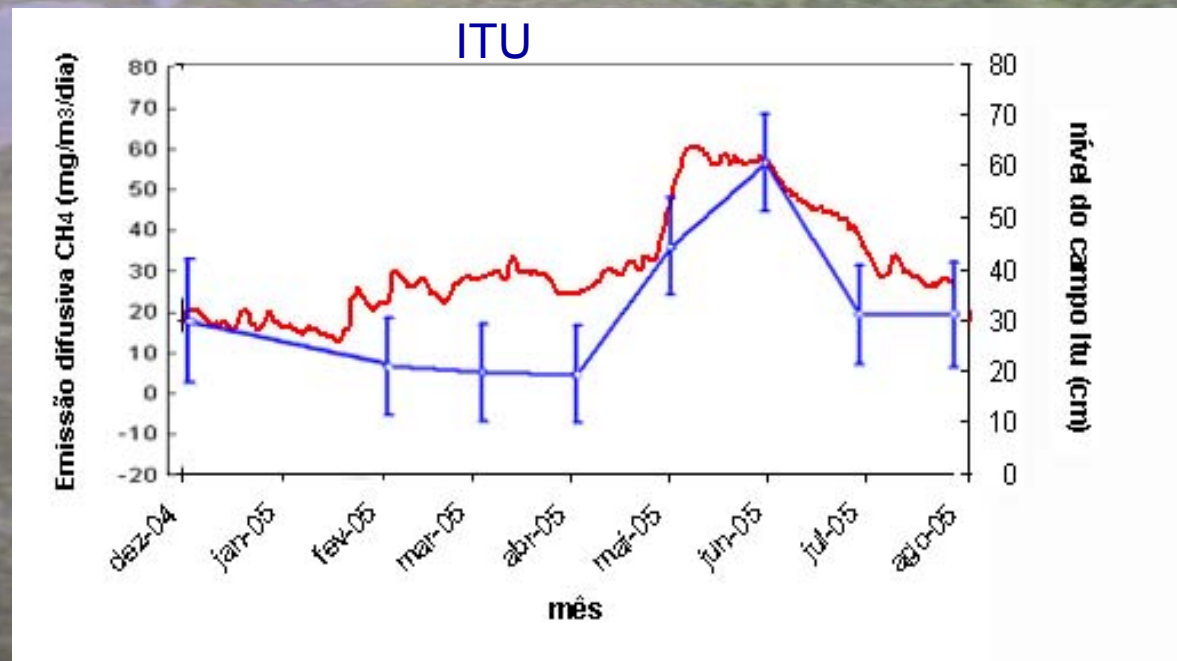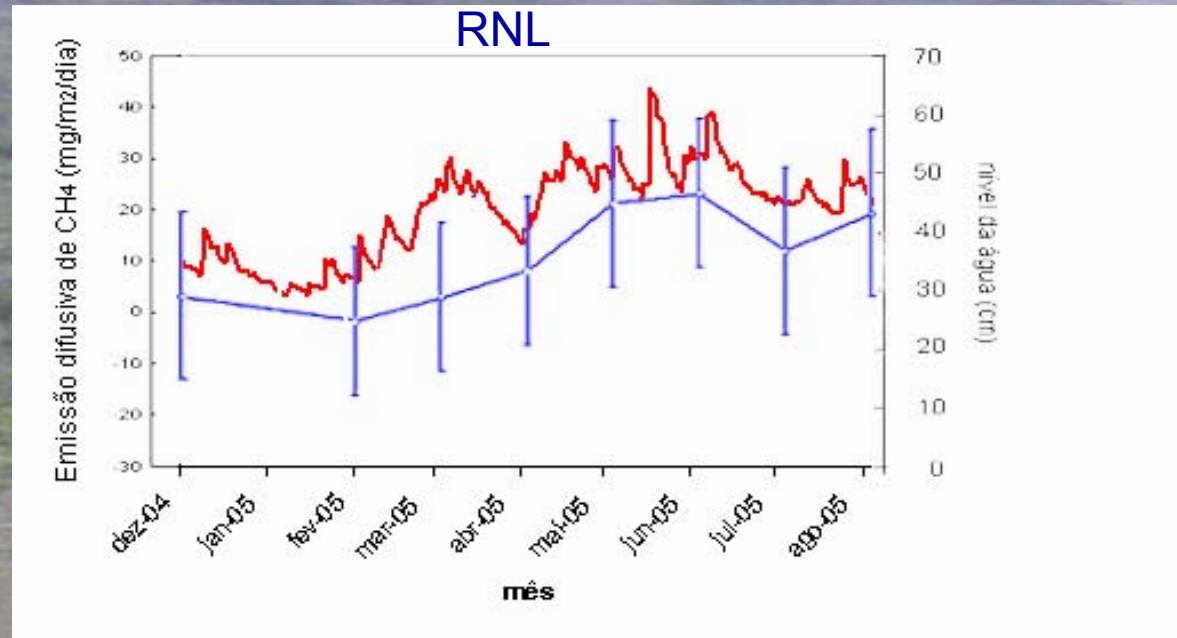
HABITAT PATTERNS

- Emissions were higher in flooded grasslands (mean=24,6, SD=8,73) than in open water environments (mean=11,1, SD=2,96) (p=0,032316).

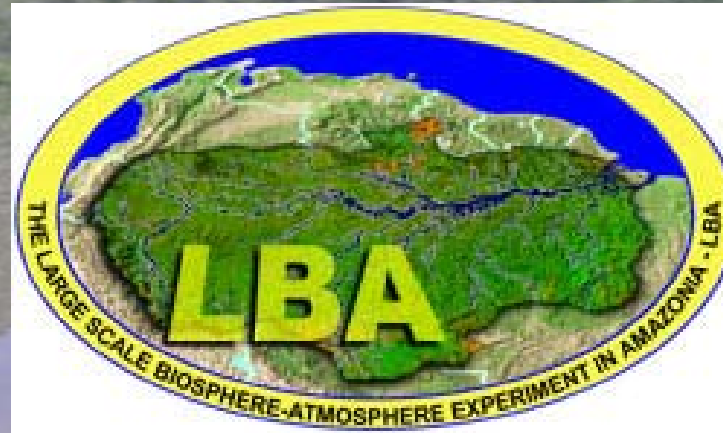- Anoxic conditions were more common in flooded grasslands.
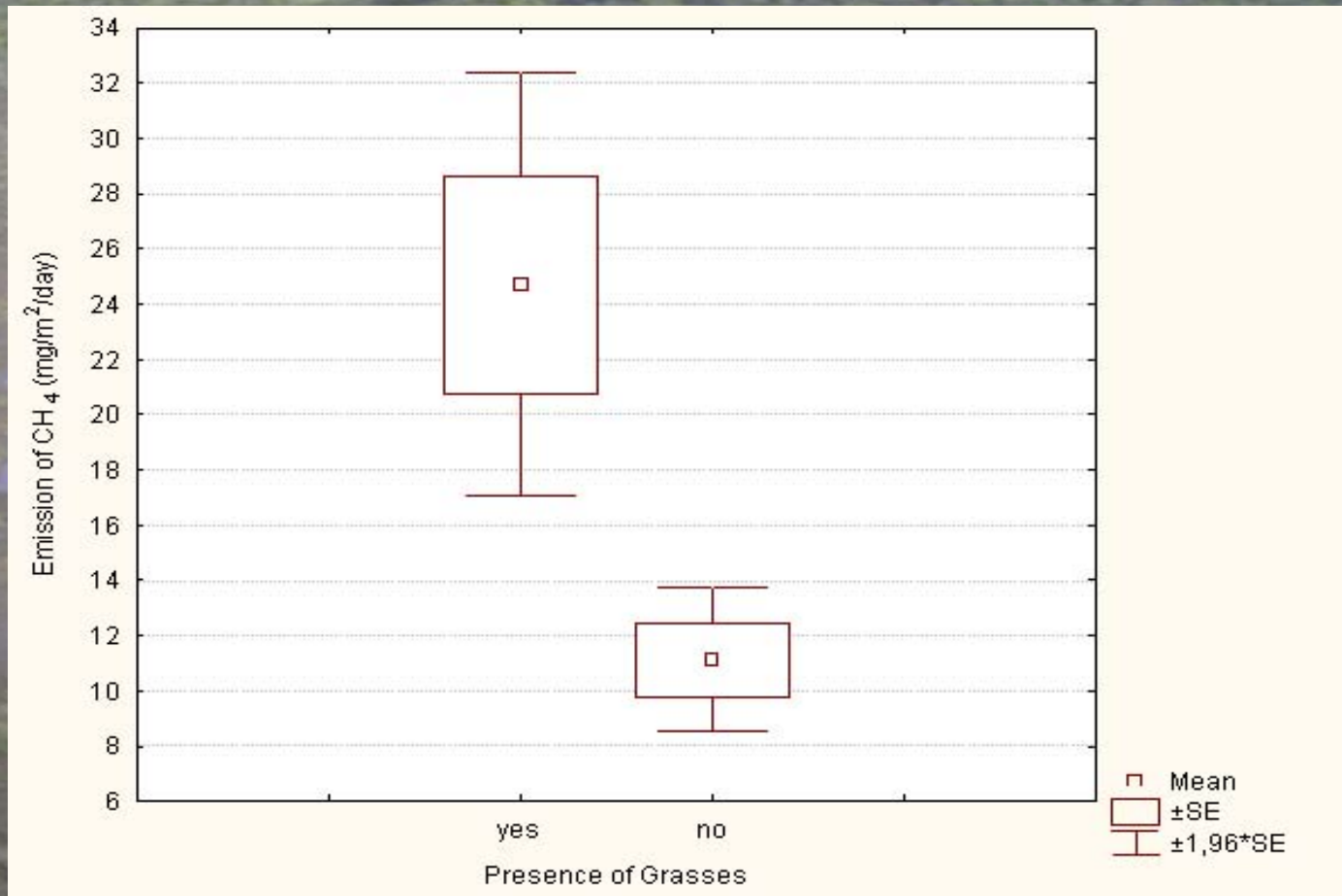
- The average surface water concentration of methane was 48 mg CH_4/l (SD = 140).
- Methane emissions and concentrations were correlated.

CH_4 (mg/m^2/dia) = 5.4397 + ,49527 * CH_4agua (mg/m^3)
Correlation: r = ,72287
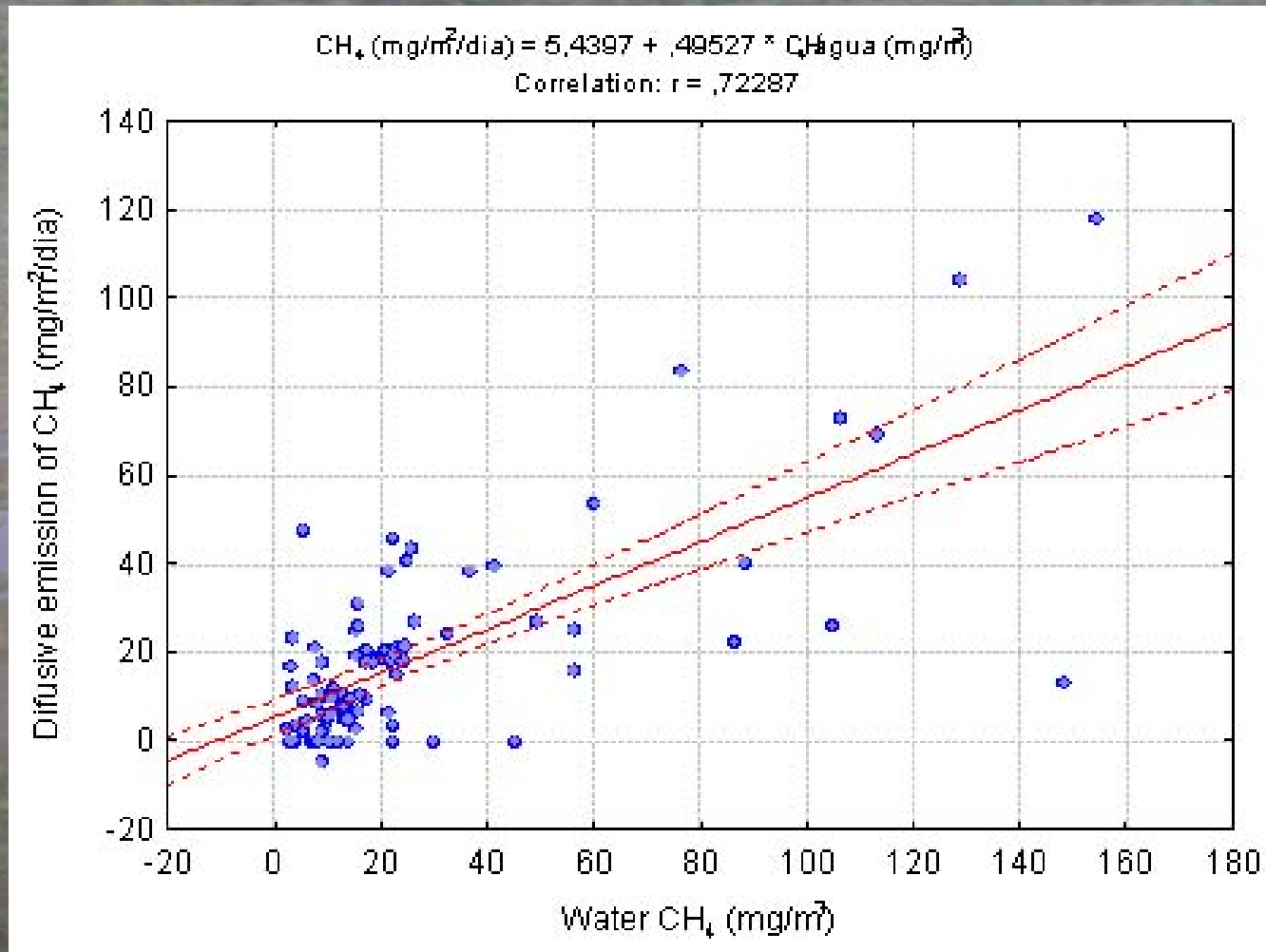
Conclusions

- Water levels in interfluvial wetlands controlled by variations in rainfall and water table

- CH_4 emissions relatively low

- CH_4 emissions higher during high water periods

- Flooded grasslands emit more CH_4

- CH_4 emissions and concentrations correlated

Acknowledgments

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