Supplementary Material

Supplementary figure legends

Supplementary figures S1-S9
Supplementary figure legends

**Figure S1**
Temperature in 5 different depths (2.5 cm, 5 cm, 10 cm, 30 cm, 60 cm) over 170 days of the drained period 2009-2010 at site A in Pantanal wetland soil.

**Figure S2**
Soil NH$_4^+$ profiles from level 1 to level 3 (left to right) at site A, 2008 (a, b, c), site B (d, e, f), site A, 2009 (g, h, i), site C (j, k, l).

**Figure S3**
Soil NO$_3^-$ profiles from level 1 to level 3 (left to right) at site A, 2008 (a, b, c), site B (d, e, f), site A, 2009 (g, h, i), site C (j, k, l).

**Figure S4**
Soil pH profiles from level 1 to level 3 (left to right) at site A, 2008 (a, b, c), site B (d, e, f), site A, 2009 (g, h, i), site C (j, k, l).

**Figure S5**
*In situ* pH gradient from site A (green circles) and site C (red circles).

**Figure S6**
NH$_4^+$ and NO$_3^-$ in the water phase in (a) Rio Paraguai and Rio Presa and in (b) water bodies near site A, B and C.
Figure S7
Soil NO$_3^-$ and pH from screening field campaign. (a) NO$_3^-$ content in soil from 10 sites and (b) pH from 9 sites. Note discontinuous scale on (a).

Figure S8
Total nitrogen and carbon in wetland soil. (a) total nitrogen at site A, (b) total nitrogen at site B, (c) total carbon at site A, (d) total carbon at site B.

Figure S9
In situ flux of CO$_2$ from site A and B (2008) (a), and site A and C (2009) (b). Flux rates from site A are level 1 (▲) and level 2 (▲), from site B and C are level 1 (●) and level 2 (●). Symbols indicate mean ± S.E. (n=5).
Supplementary figures

Figure S1
Figure S2

Soil ammonium (μmol NH₄⁺ cm⁻³ soil)

Depth (cm)

Level 1  Level 2  Level 3
Figure S3

Soil nitrate (μmol NO$_3^-$ cm$^{-3}$ soil)

Depth (cm)

Level 1  Level 2  Level 3
Figure S4

Soil pH (pH in pore water)

Depth (cm)

Level 1

Level 2

Level 3
Figure S5
Figure S6

(a) Rio Paraguai vs. Rio Presa

(b) Inorganic nitrogen (µmol N liter⁻¹): 2008 (site A & B) vs. 2009 (site A & C)
Figure S7
Figure S8
Figure S9

(a) Site A, L1
(b) Site A, L2
(c) Site B, L1
(d) Site B, L2
(e) Site C, L1
(f) Site C, L2

In situ flux (mmol CO₂ m⁻² d⁻¹)

Dates:
- Sep 28
- Oct 06
- Oct 12
- Oct 19
- Oct 26
- Nov 02
- Nov 09
- Oct 13
- Oct 20
- Oct 27
- Nov 03