THG-Emissionen aus Waldökosystemen

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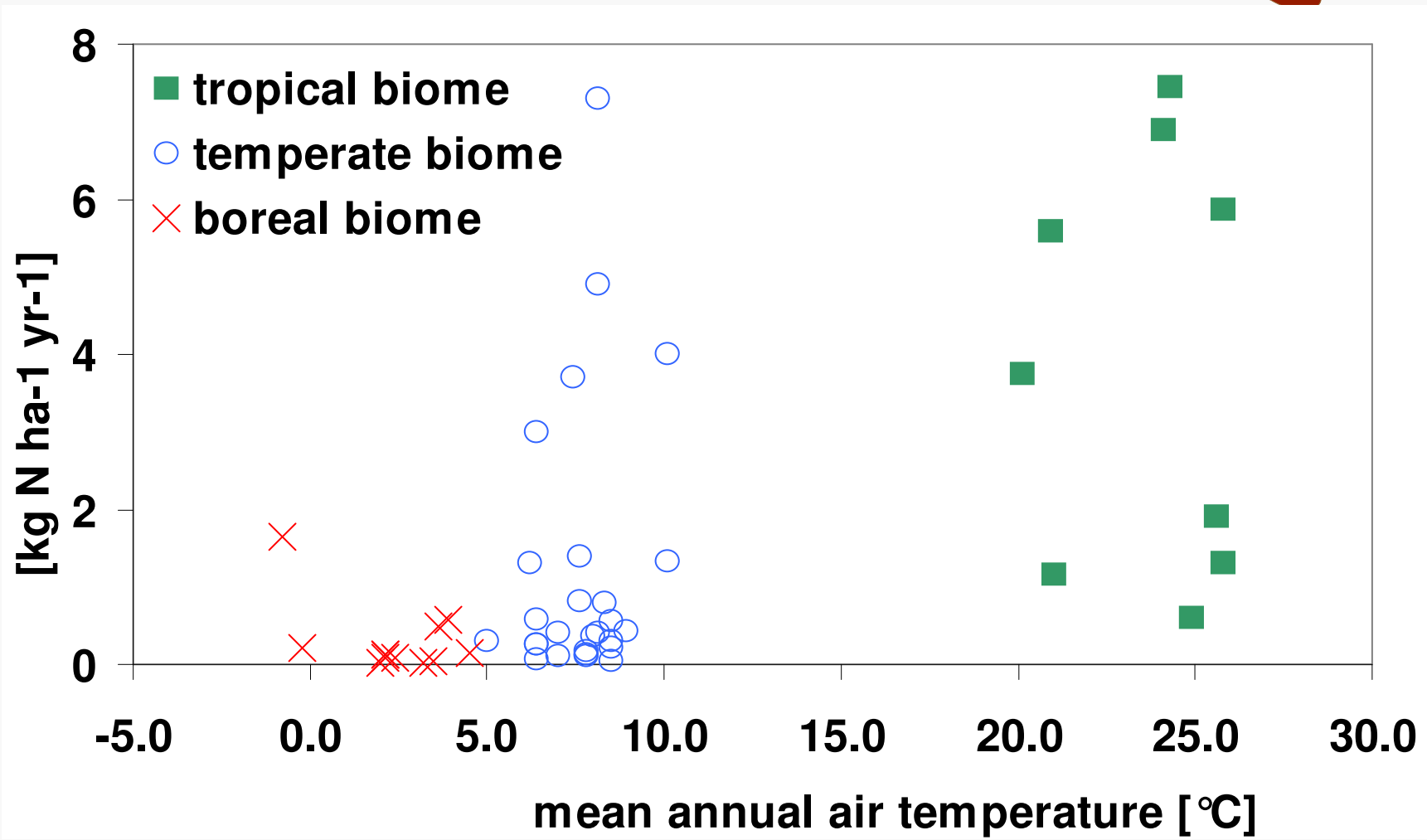
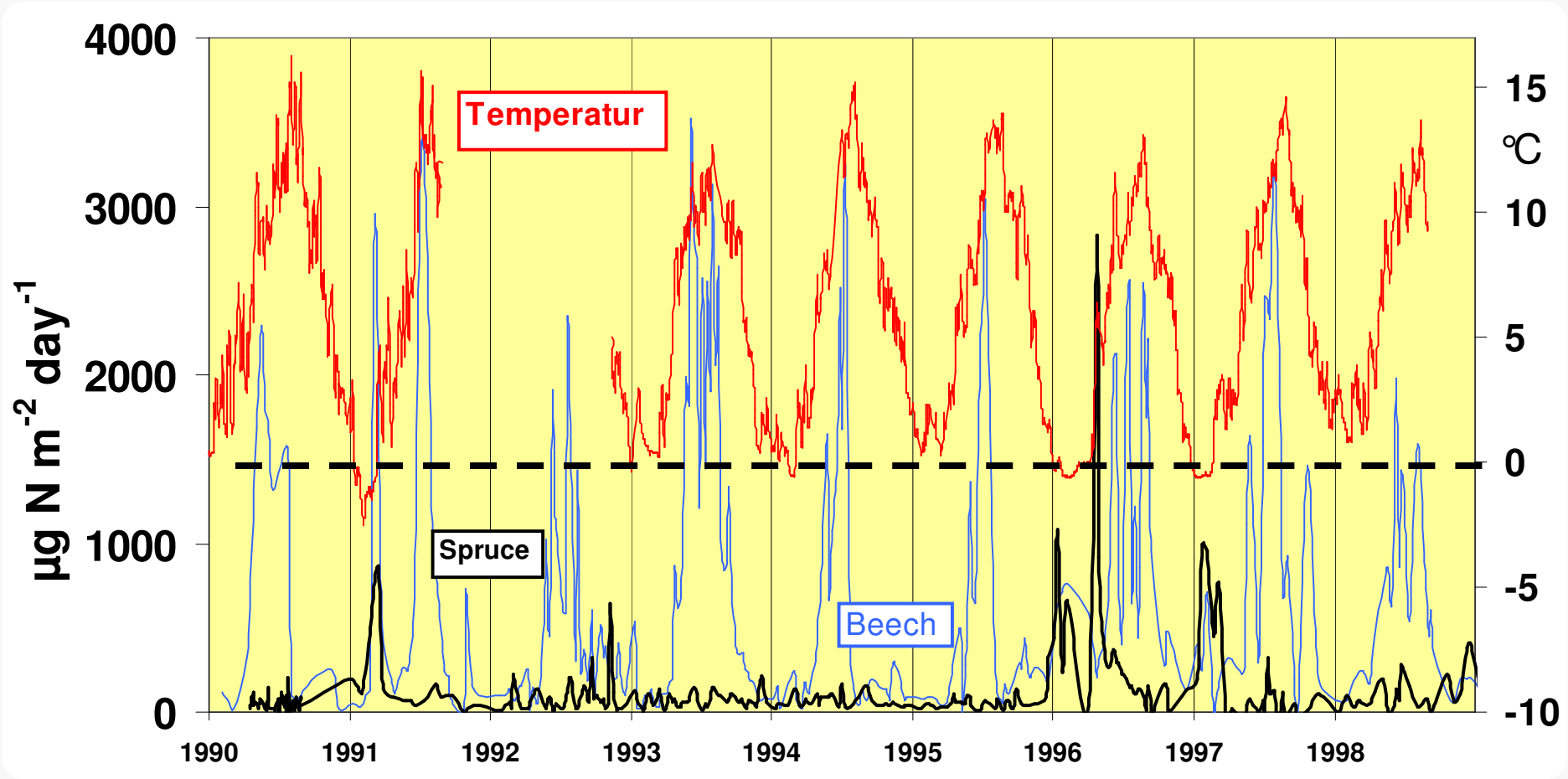
N_2O Emissionen aus Waldökosystemen

Mean annual N_2O fluxes in forest biomes

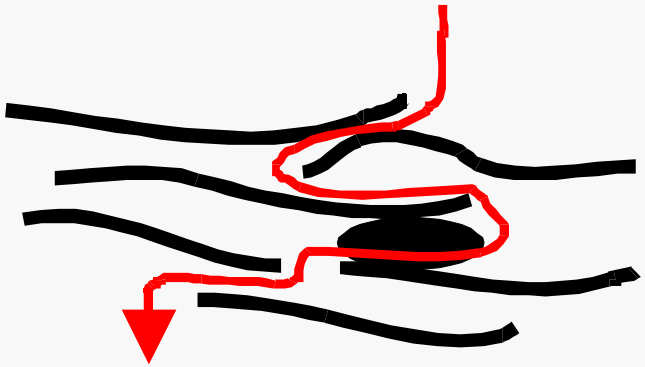


Brumme et al., 2005

Effects of trees on N_2O emission



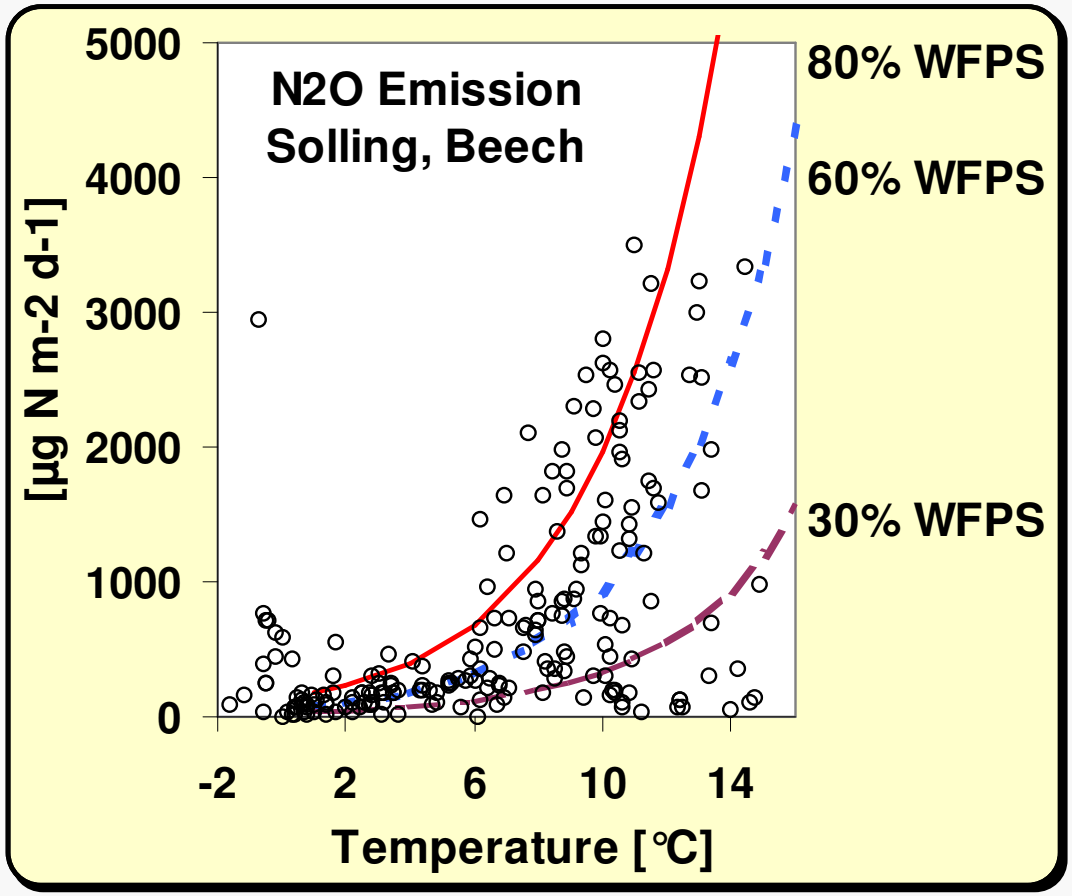
Control on N_2O emission



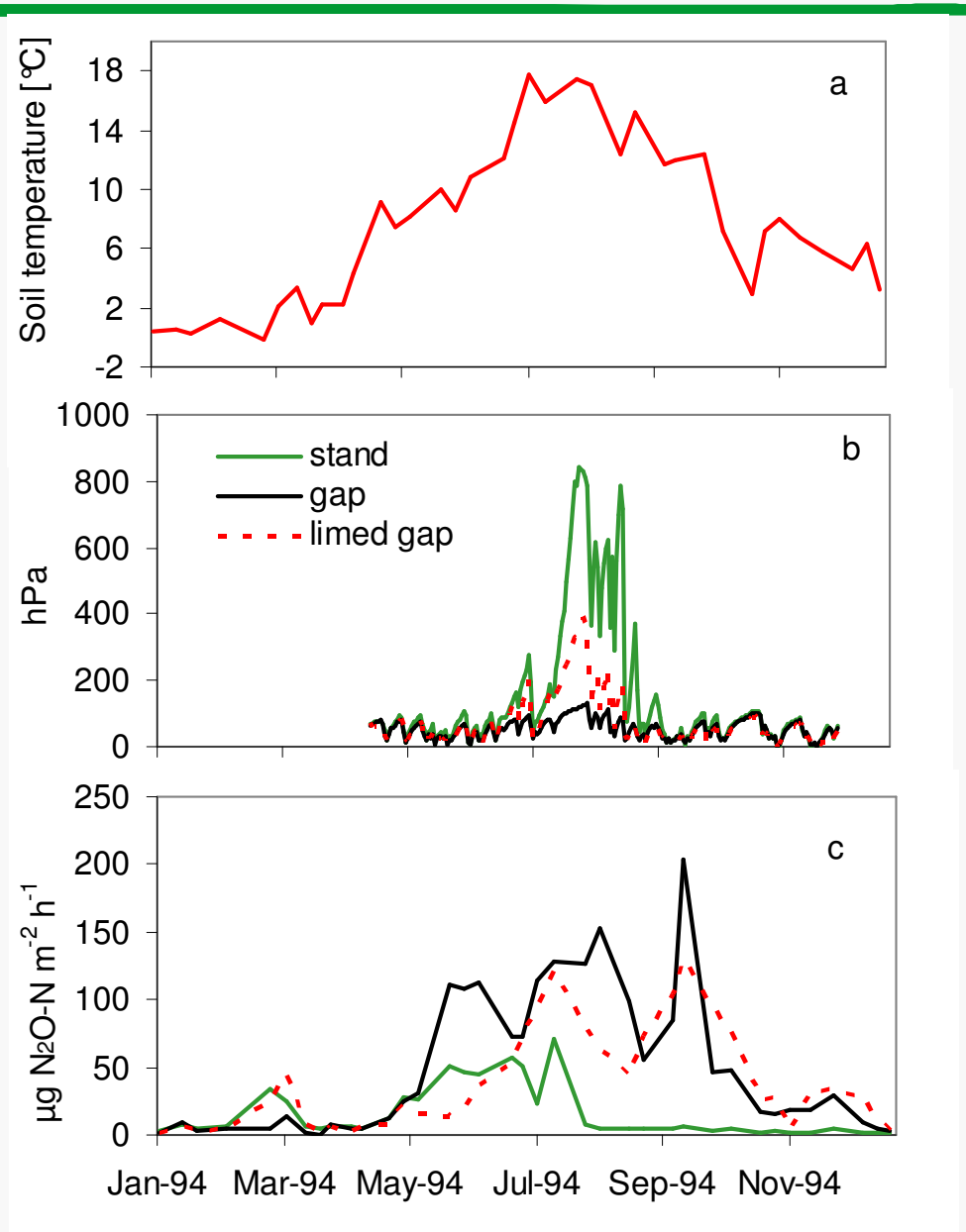
High seasonal emissions:

>6°C

>100 mm precipitation monat^{-1}



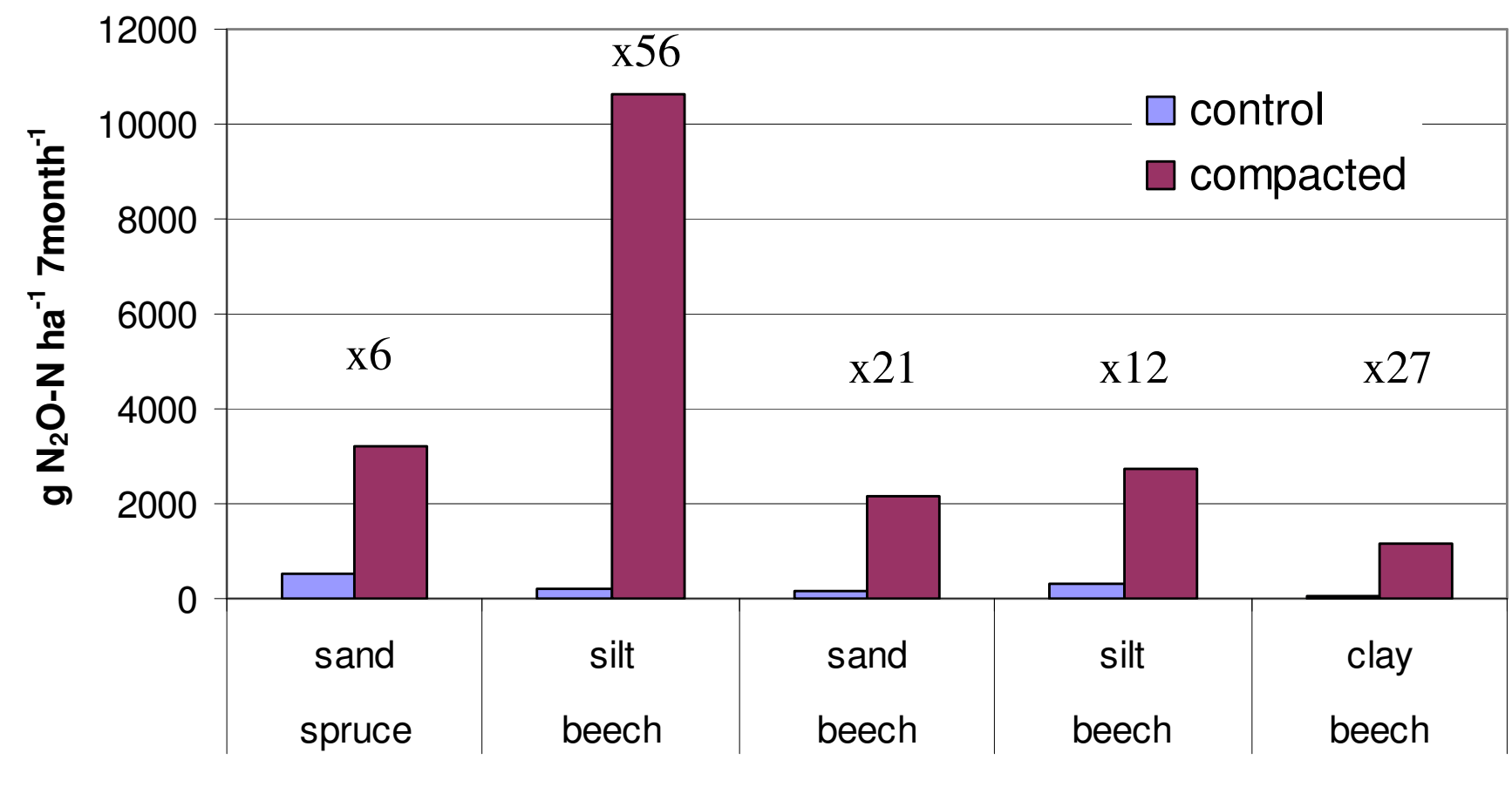
Effects of forest harvesting on N_2O emissions



Brumme & Borken submitted

Impact of soil compaction during harvesting on N_2O emissions

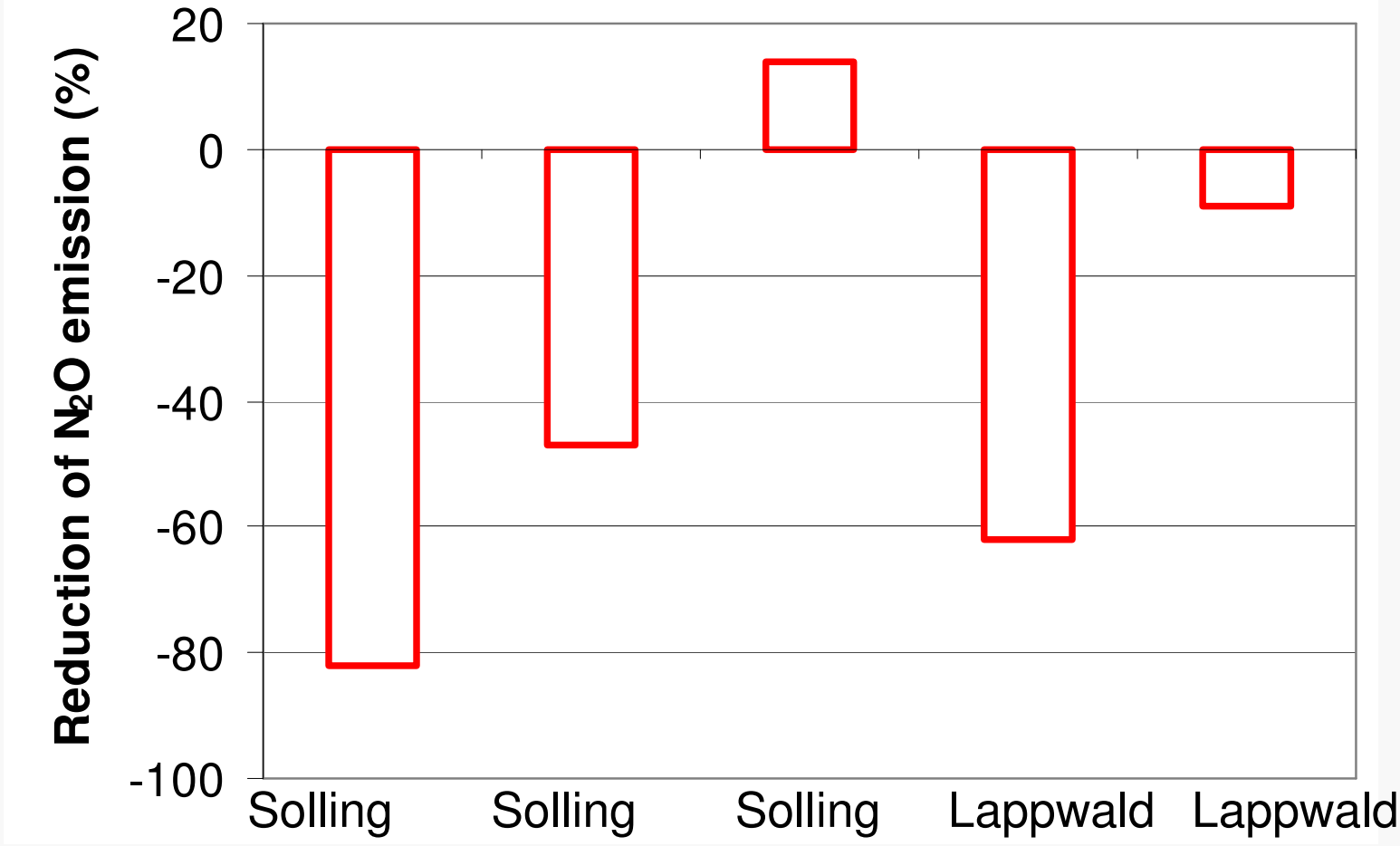
Impact of soil compaction during harvesting on N_2O emissions (growing season)



------1000 mm---- ----------700 mm----------

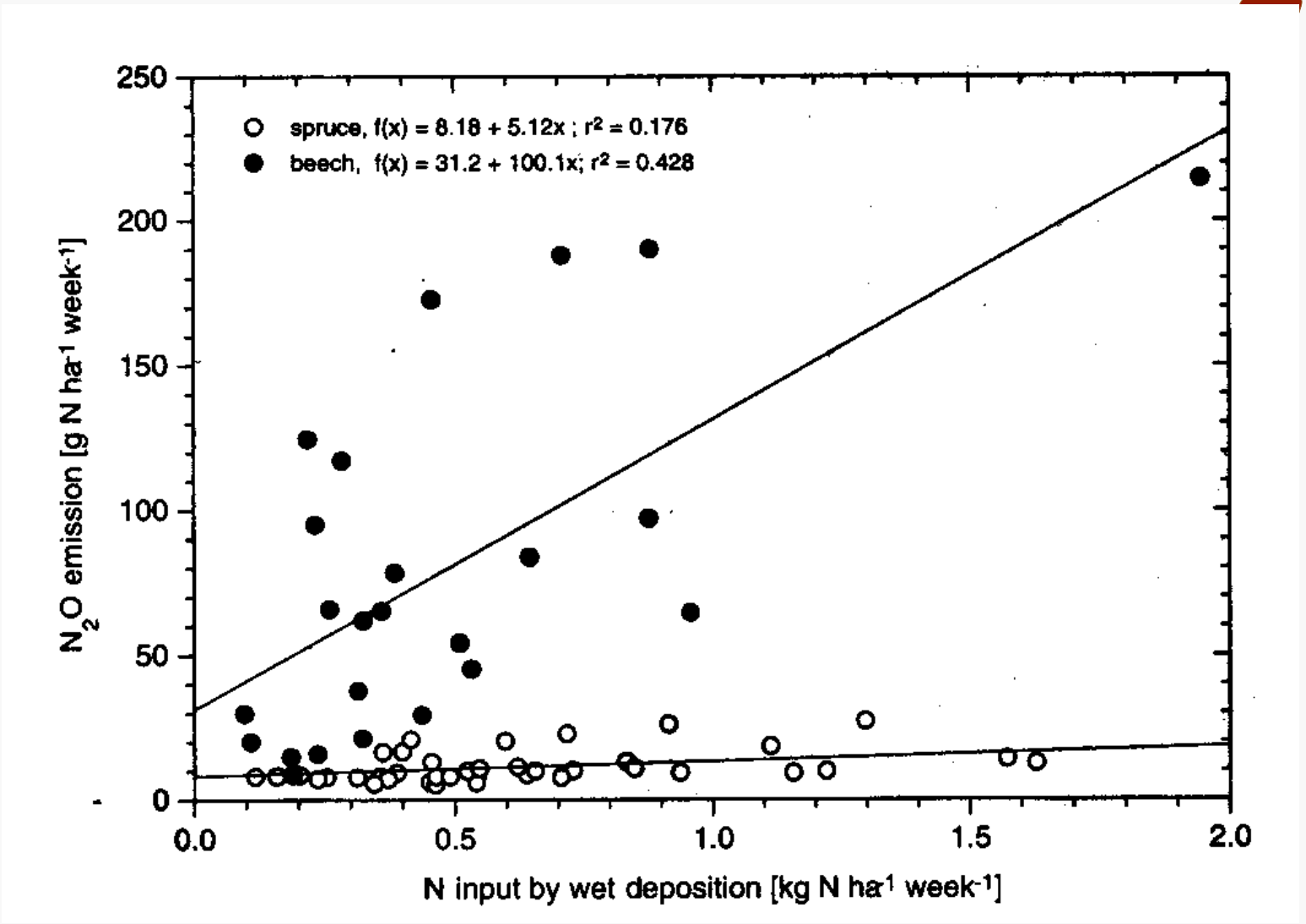
Teepe et al. SSSAJ 2004

Effects of liming on N_2O emission



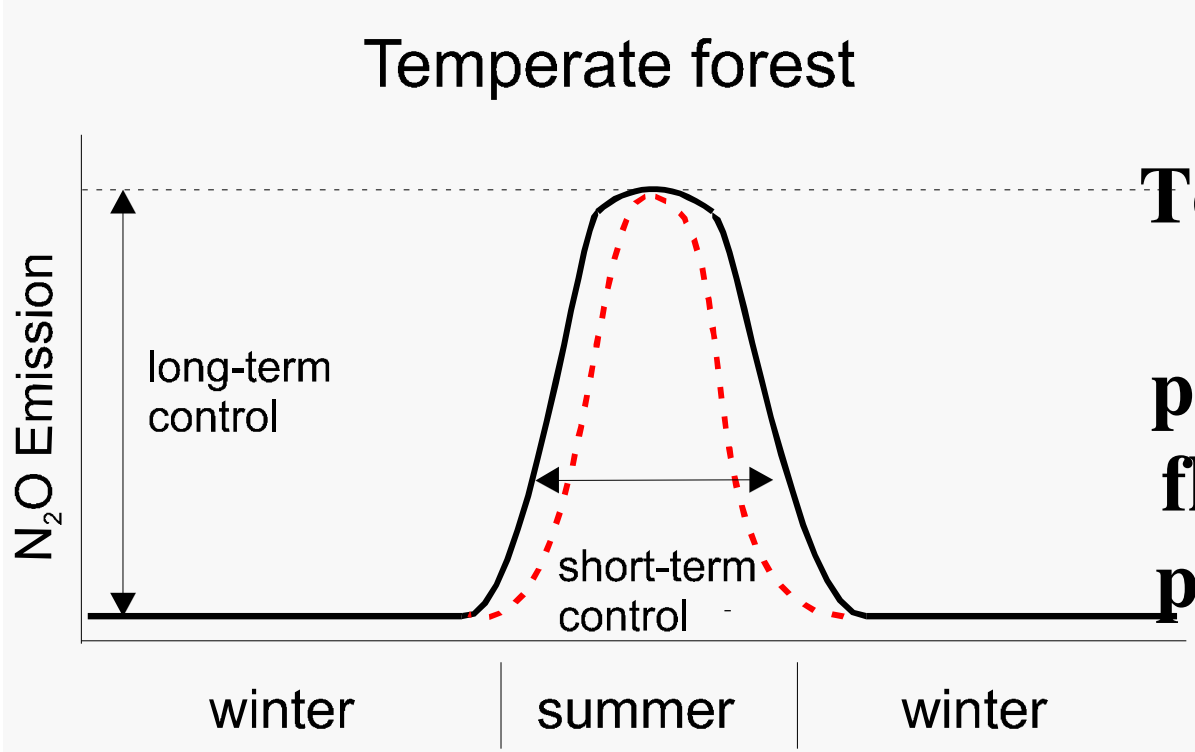
Borken & Brumme S&M 1997

Impact of N-deposition on N_2O emission



Papen & Butterbach-Bahl 1999

Impact of Climate Change on N_2O emission

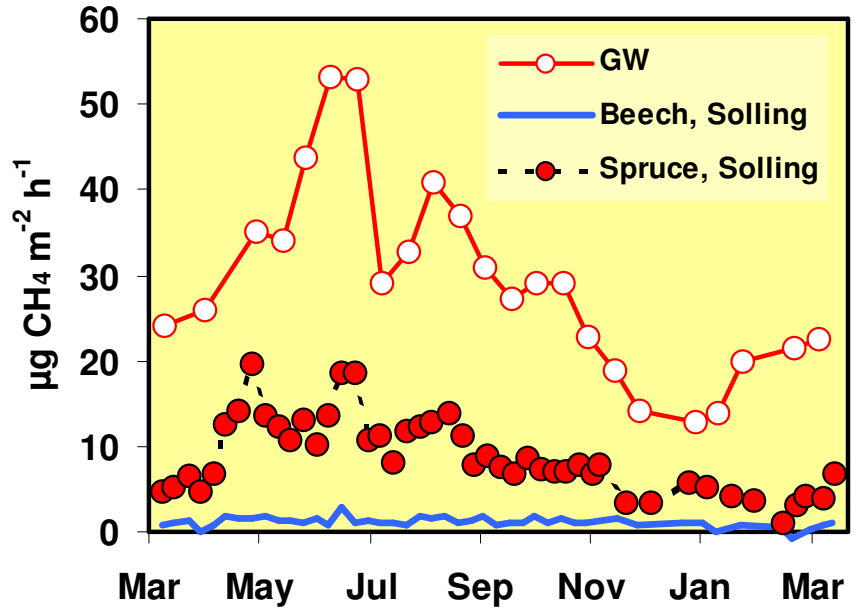


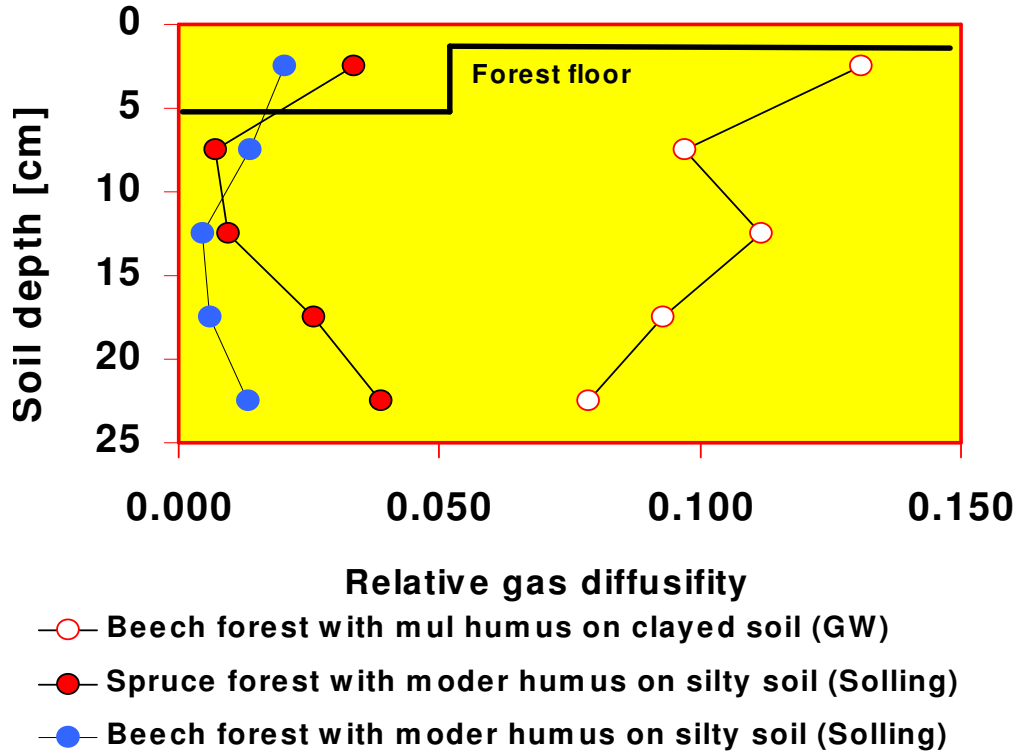
Temperature increase will prolong the period with high N_2O fluxes, as long as low precipitation reduces this period.

Brumme et al., 2005

CH_4 Oxidation in Waldböden

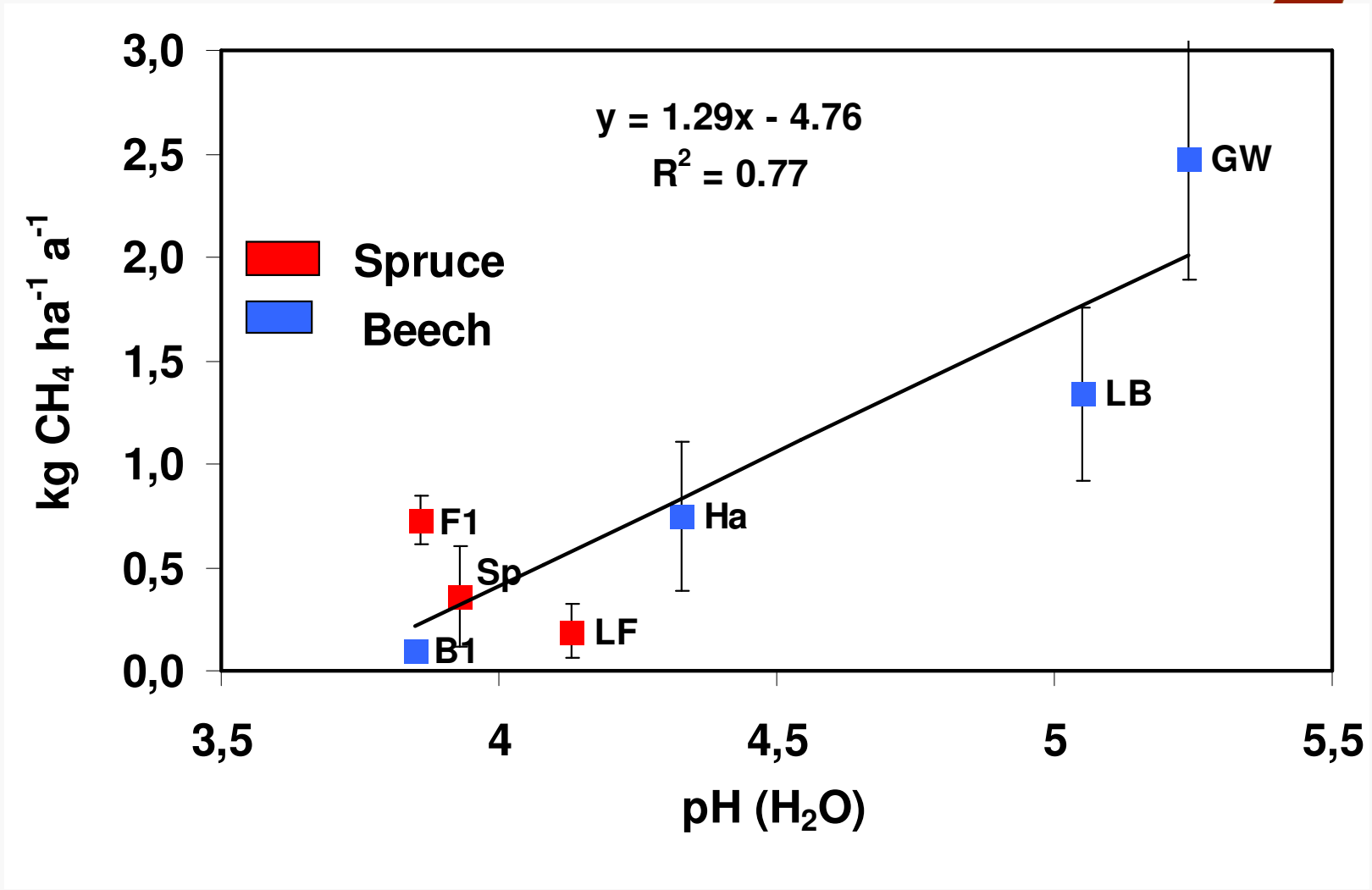
Methane oxidation in Temperate forests





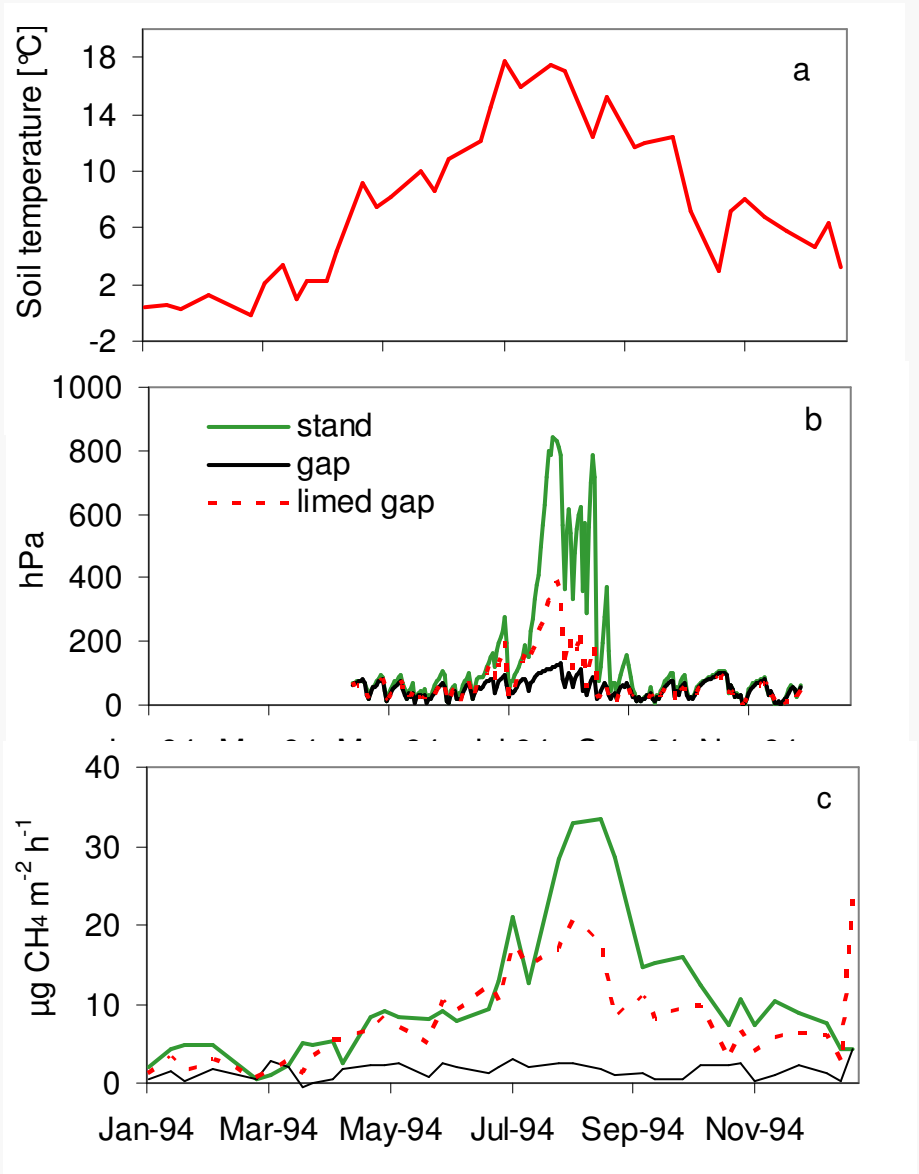
Brumme & Borken GBC 1999

Methane oxidation of 7 temperate forests



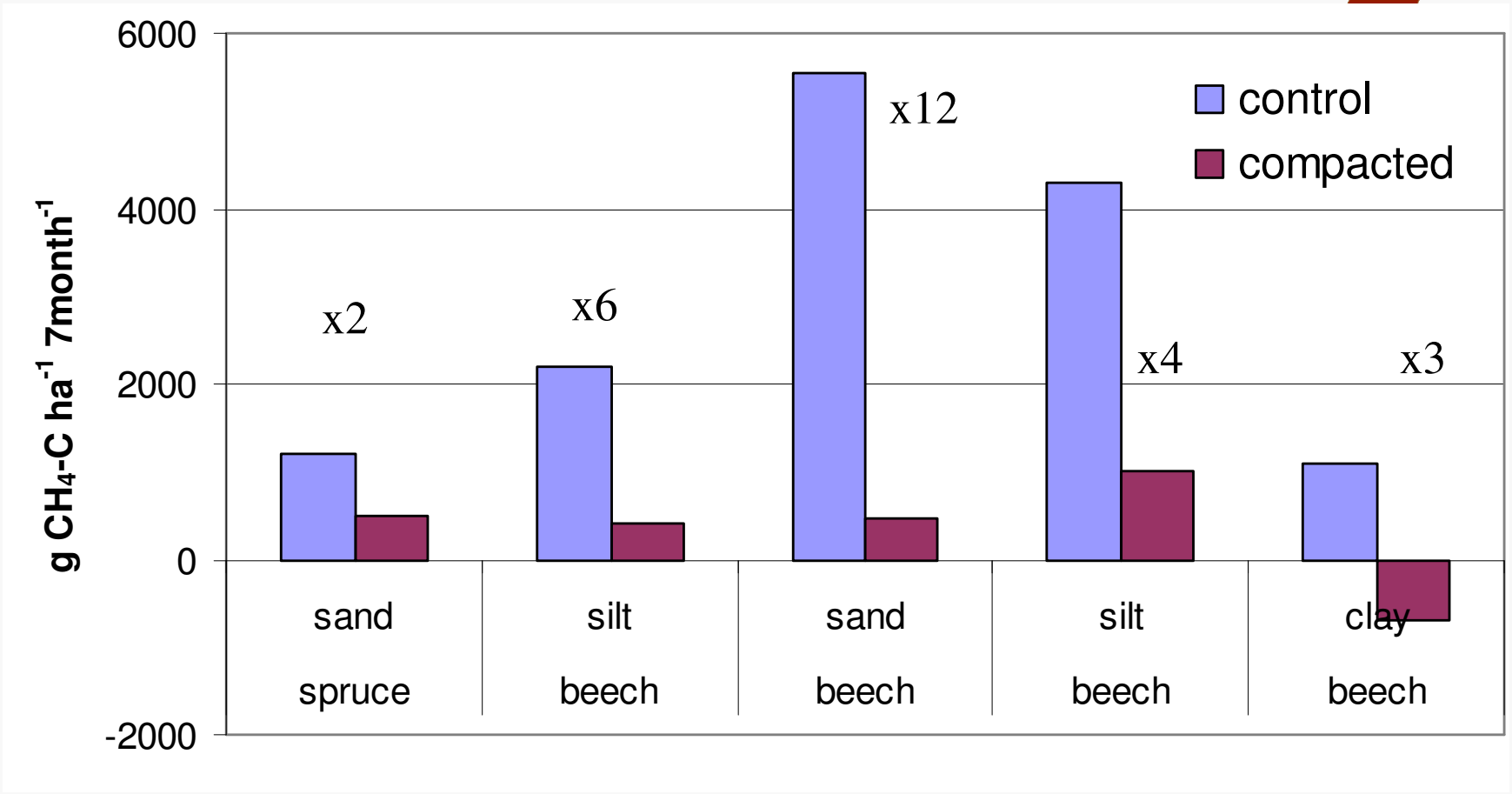
Brumme & Borken GBC 1999

Effects of forest harvesting and liming on CH_4 uptake



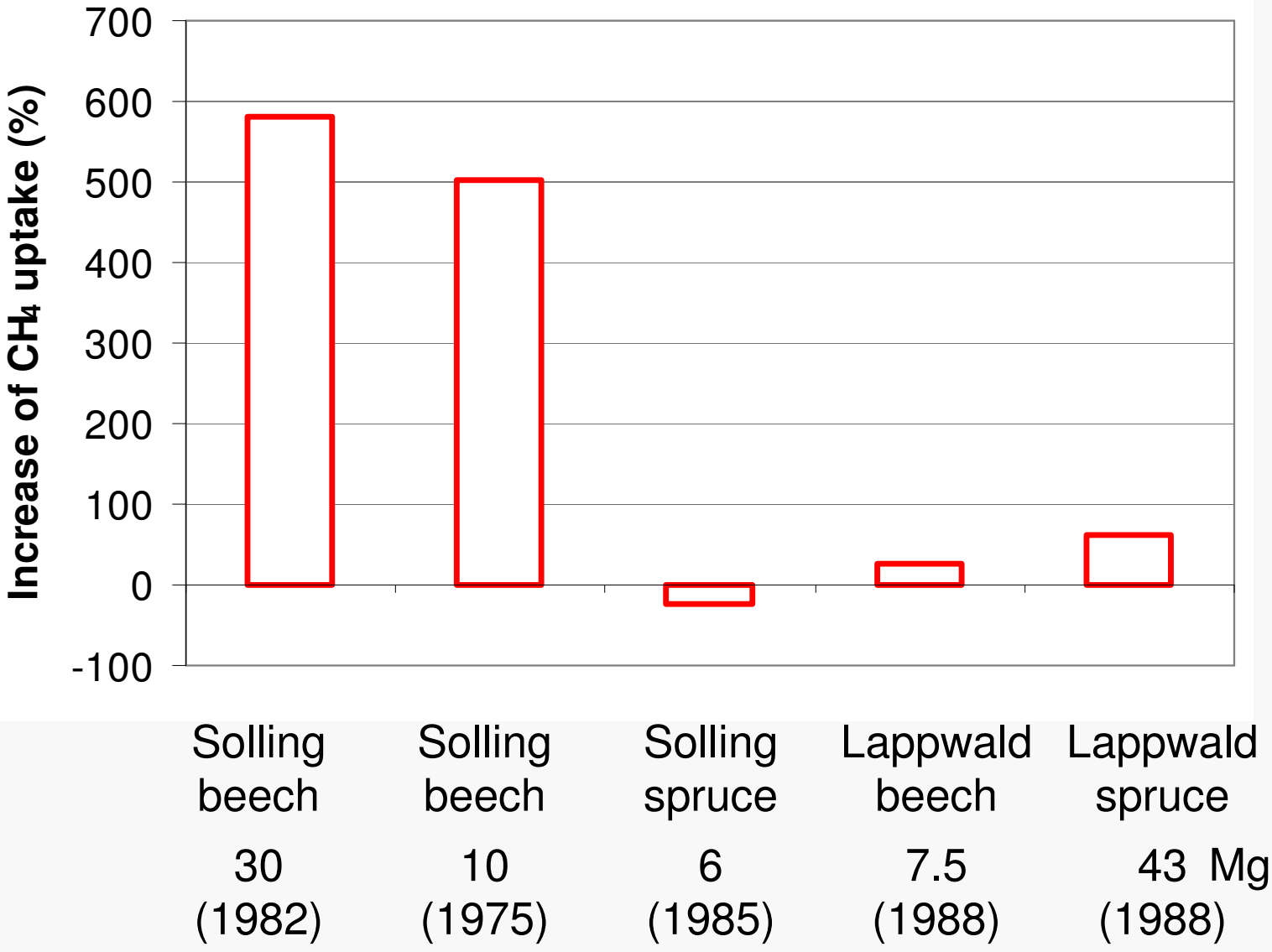
Borken & Brumme submitted

Impact of soil compaction during harvesting on CH_4 uptake (growing season)



Teepe et al. unpublished

Effects of liming on CH_4 uptake



Borken & Brumme S&M 1997

Effects of N-fertilisation on methane uptake

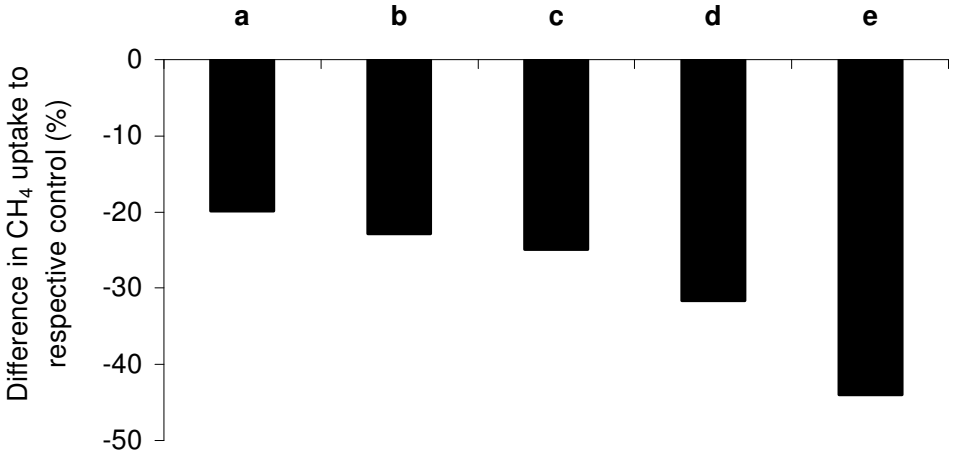


Figure 13.8. Proportional deviations of N-treated plots to the control plot in CH_4 uptake in the spruce forest at Solling using automated chambers from August 1993 to December 1994 [**a**: $(NH_4)_2SO_4$, **b**: NH_4NO_3, **c**: NH_4Cl, **d**: urea, **e**: $NaNO_3$]. All fertilized plots were treated four times with 30 kg N ha^{-1} on November 4th 1993, on May 22th 1994, on July 12th 1994 and on September 14th 1994.

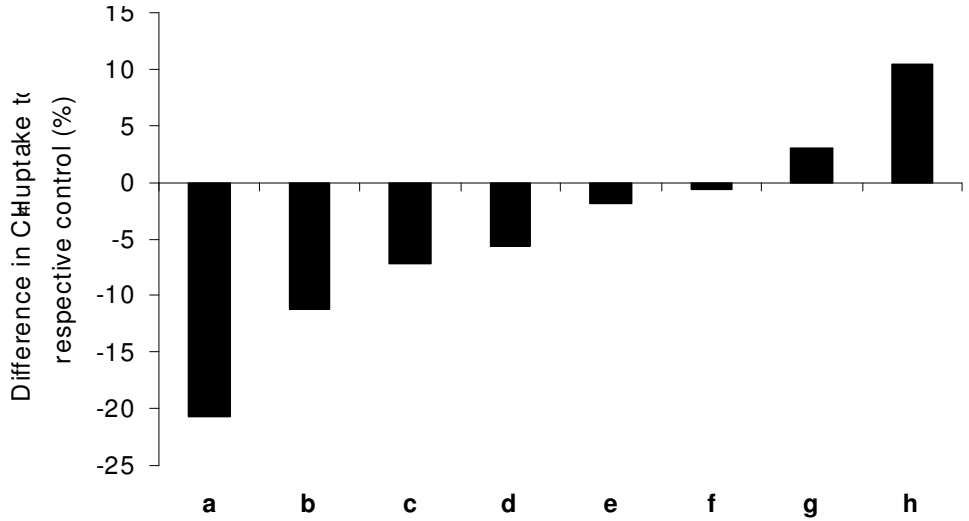
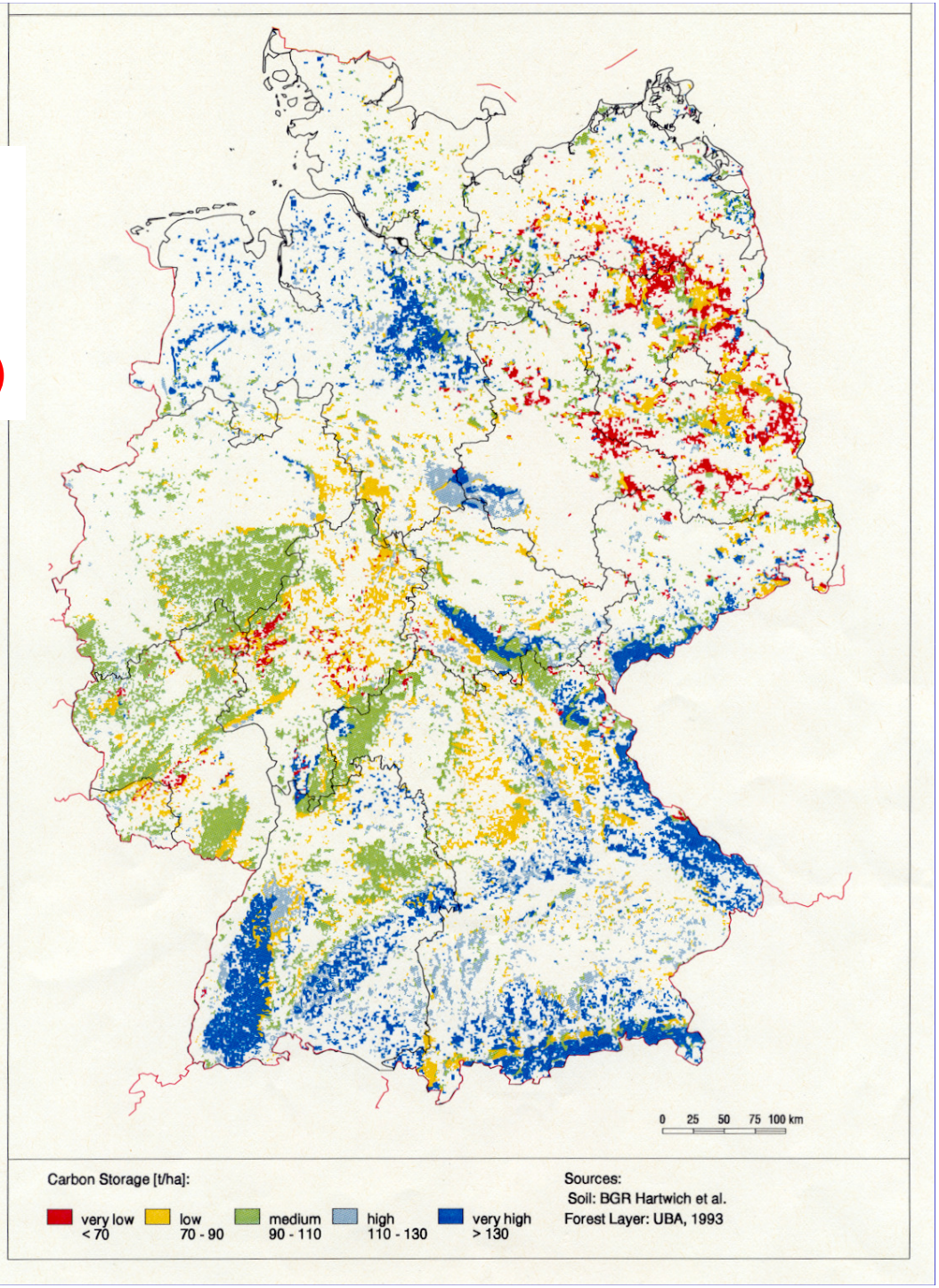


Figure 13.7. Proportional deviation of N-treated plots to the control plot in CH_4 uptake at Göttinger Wald measured from April 1994 to April 1995 (n=41) [**a**: $(NH_4)_2SO_4$, **b**: $(NH_4)_2SO_4$, **c**: NH_4-acetate, **d**: urea, **e**: NH_4Cl, **f**: $NaNO_3$, **g**: NH_4NO_3, **h**: KNO_3]. Plot **a** received 120 kg N ha^{-1} as $(NH_4)_2SO_4$ on June 1th 1994. All other plots received 30 kg N ha^{-1} on June 1th 1994, on August 4th 1994, on November 28th 1994 and on February 27th 1995.

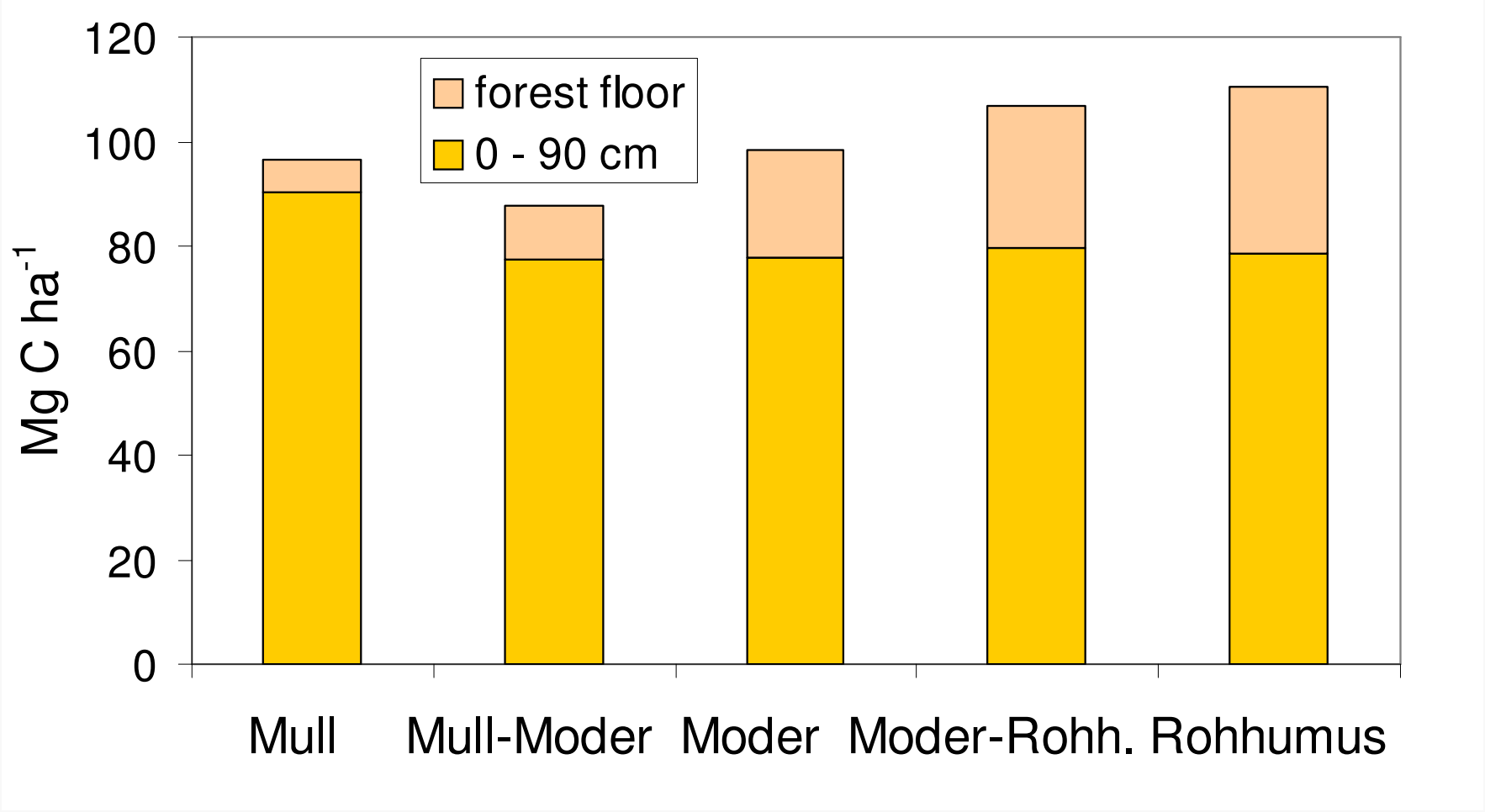
Borken & Brumme submitted

Waldökosysteme als Kohlenstoffspeicher

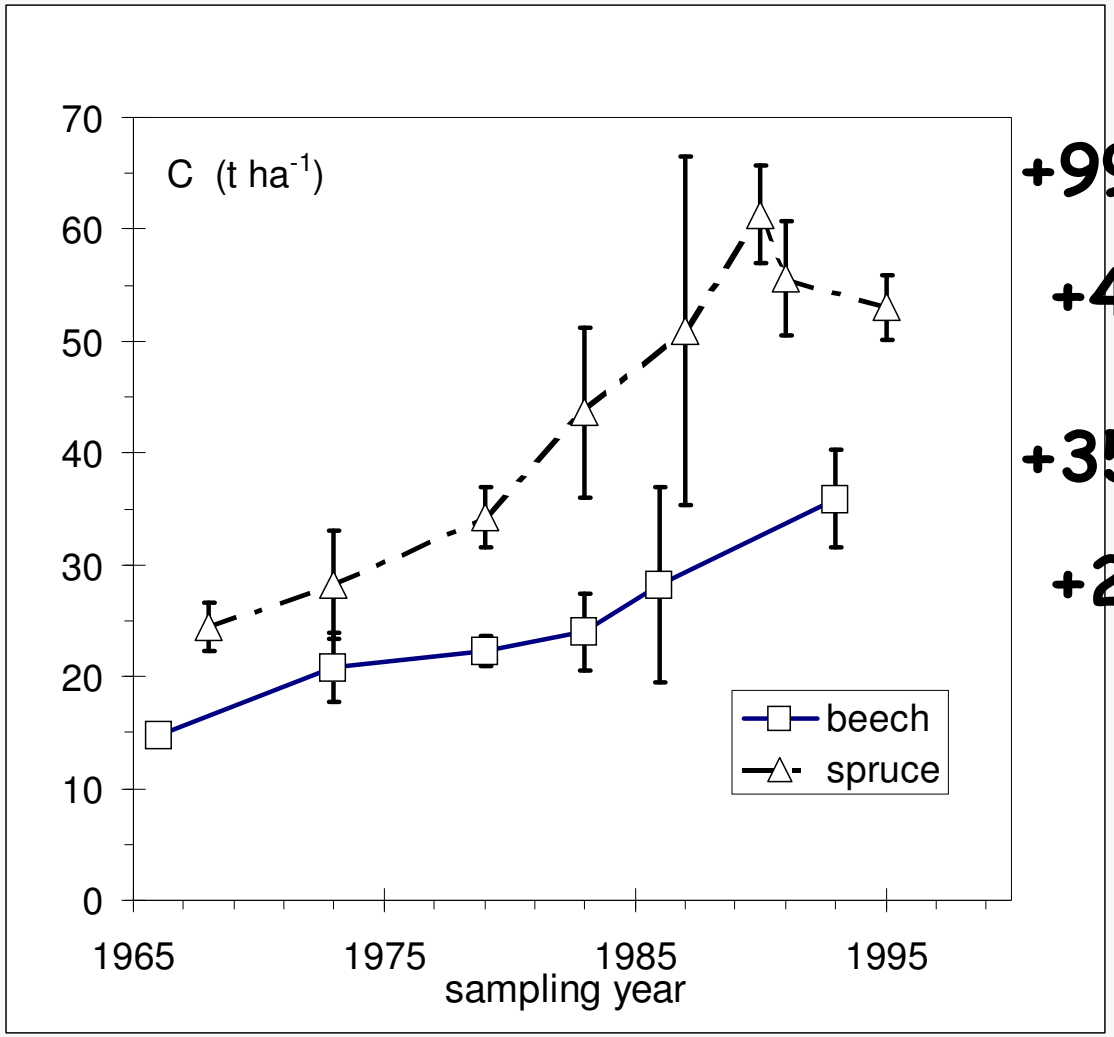
Kohlenstoffspeicherung in den Waldböden von Deutschland (t C ha^{-1} a^{-1})



Kohlenstoffspeicherung in Waldböden von Deutschland (BZE)



Humusakkumulation im Moderhumus (Buche, Fichte, Solling)



+999 kg C ha^{-1} yr^{-1}

+42 kg N ha^{-1} yr^{-1}

+350 kg C ha^{-1} yr^{-1}

+21 kg N ha^{-1} yr^{-1}

Meiwes et al., F&H, 2002

Einfluß der Bewirtschaftung auf den Kohlenstoffvorrat

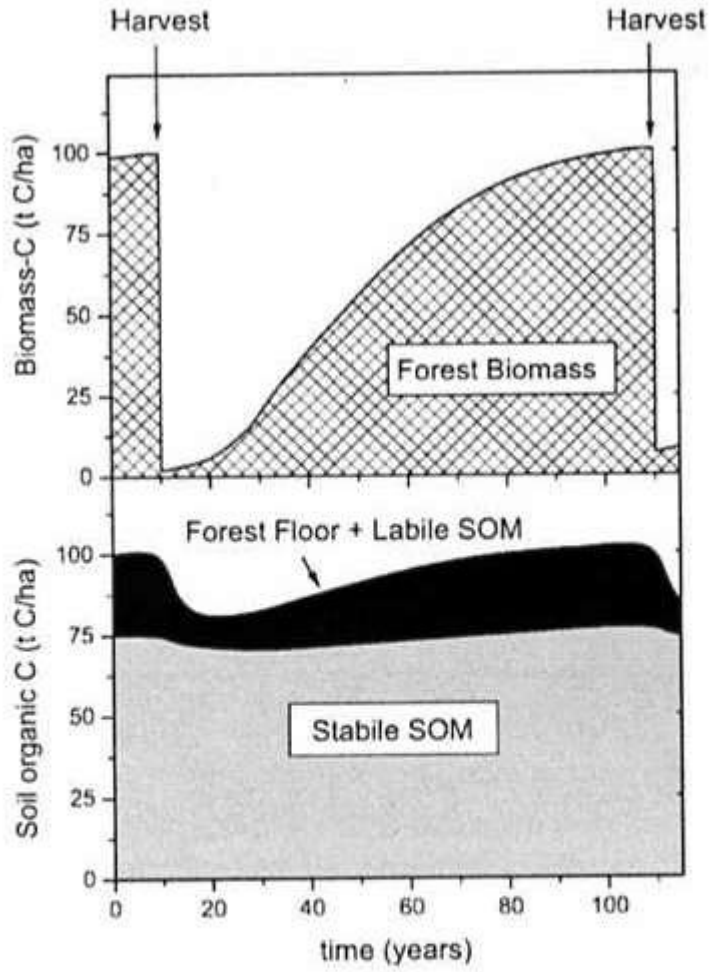
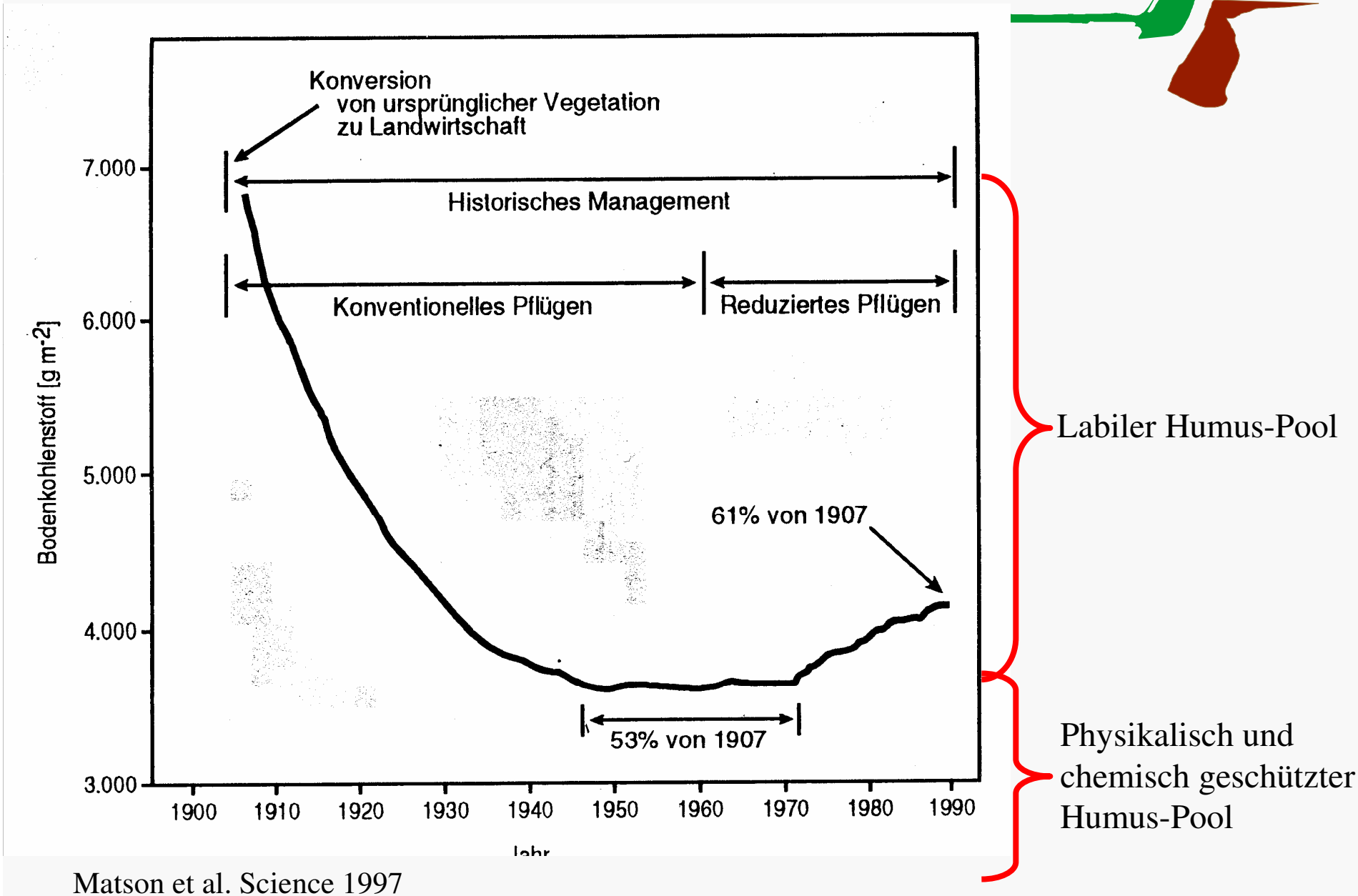


Fig. 2. Simulation of C dynamics in the aboveground biomass and the soil after harvesting. — Assumptions: Biomass-C stock typical for Central European Norway spruce forest; rotation period ≈ 100 years; 25% of SOM are labile, total SOM loss from literature (Olsson et al., 1996).

Jandl et al. 2007 (Geoderma)

Impact of land use change on the soil-C-stock



Matson et al. Science 1997

Zusammenfassung / N_2O

- Nur wenige Waldökosysteme emittieren mehr als 1 kg N_2O-N ha^{-1} yr^{-1}
- Eine fehlende Bestockung und Kompaktierung hat eine deutliche Erhöhung der N_2O Emissionen zur Folge
- Kalkungen reduzieren die N_2O Emission
- Den größten Einfluss auf die N_2O Emissionen aus N-gesättigten Wäldern haben Massnahmen, die die Sauerstoffzufuhr in den Boden verringern

Zusammenfassung / CH_4

- Eine hohe bodenbiologische Oxidation fördert die Oxidation von Methan
- Eine fehlende Bestockung und Kompaktierung verringert die Oxidation
- Kalkungen erhöhen die biologische Aktivität und fördern die Oxidation
- Der Einfluss von N-Depositionen ist widersprüchlich