Surface Exchange of Greenhouse Gases from Natural and Cropped Red Mallee Soils

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Aim

To determine the change in greenhouse gas emissions due to conversion of pristine Mallee to farmland for nitrous oxide (N_2O), methane (CH_4) and the indirect greenhouse gas contributors carbon monoxide (CO) and odd nitrogen oxides (NO_X).

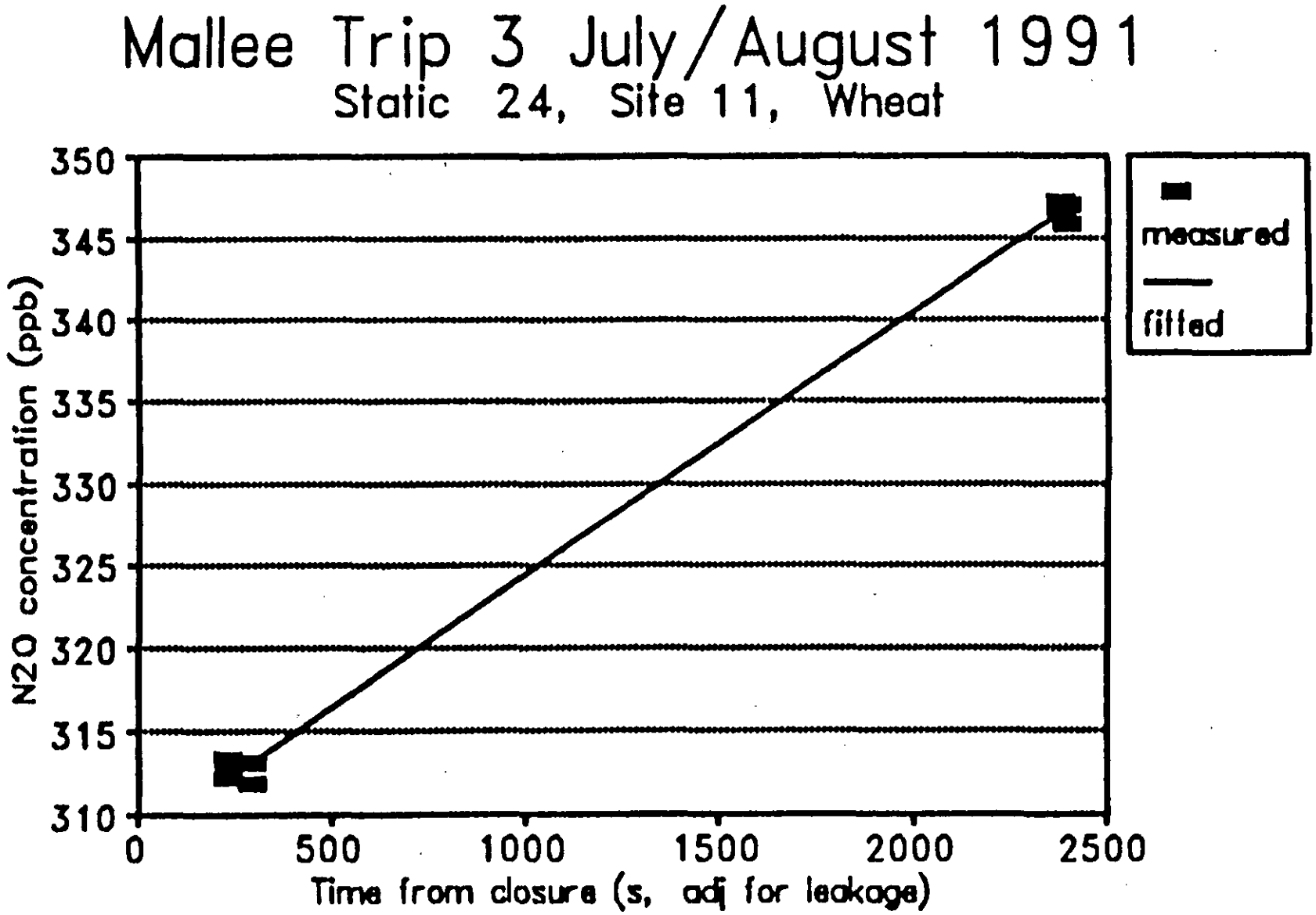
To understand the processes causing the changes in these gas emissions.

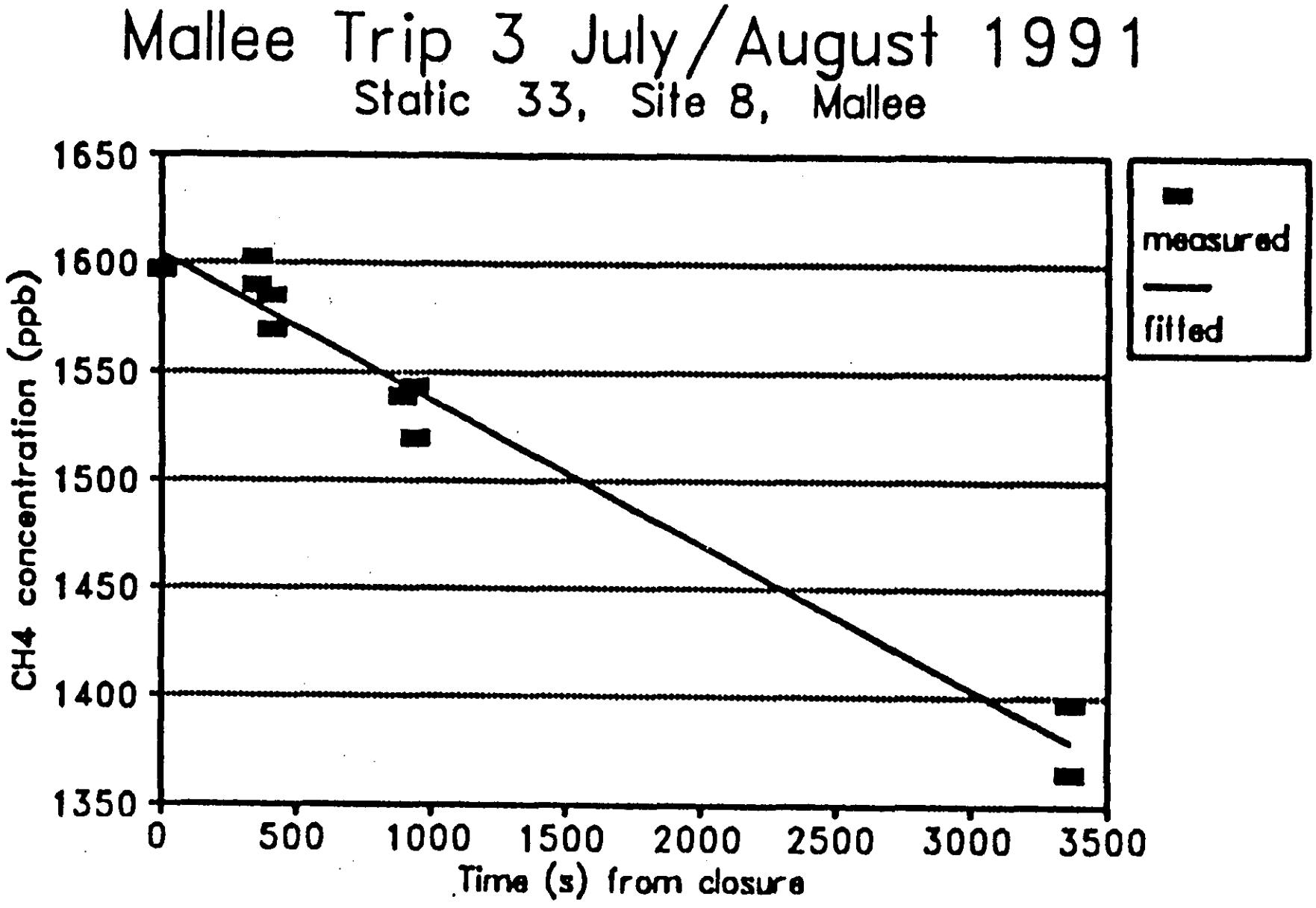
Static Chamber Flux Measurements

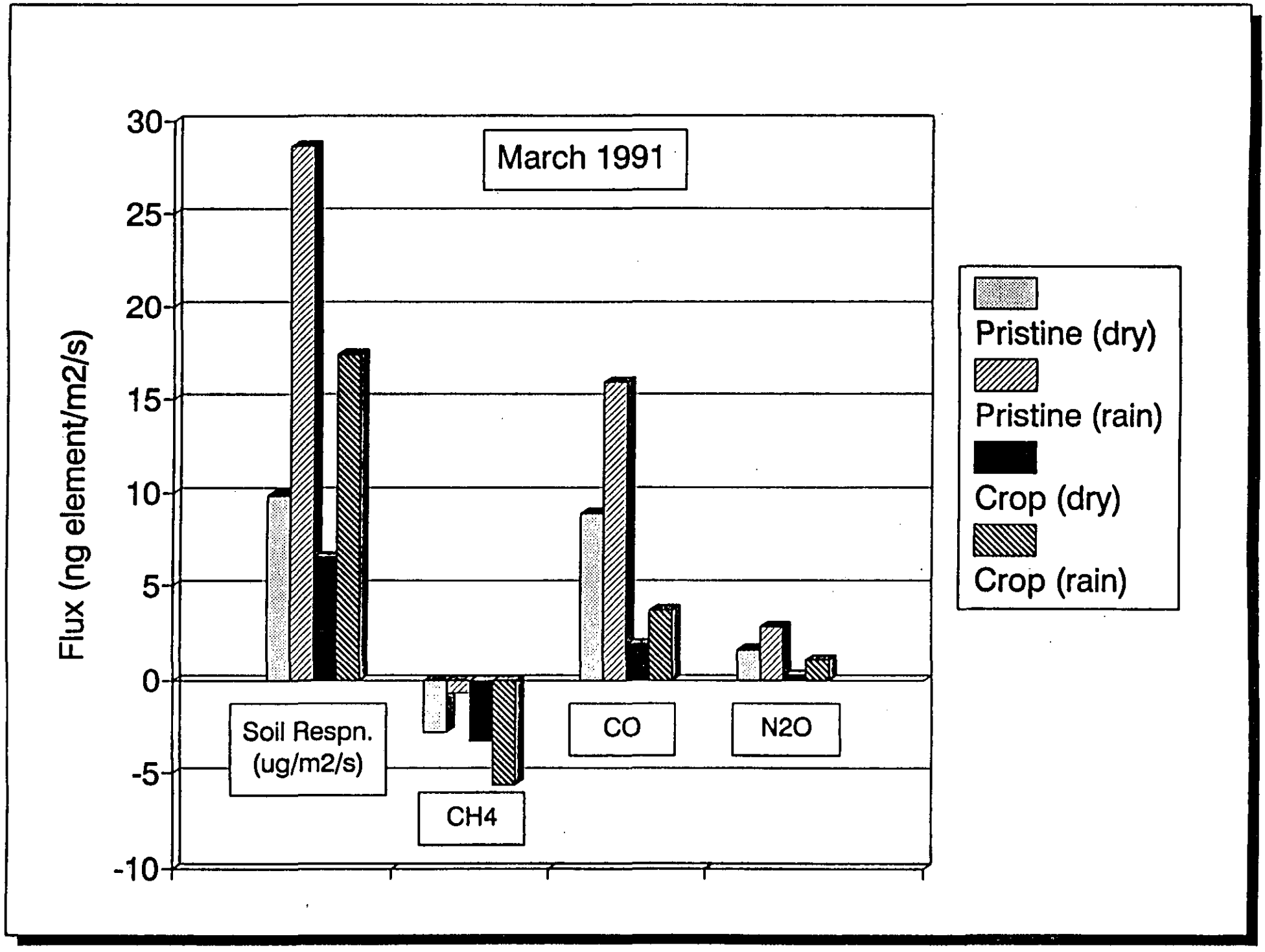
Variable depth chambers:	20, 40, 100 cm
Permanent bases in soil:	10cm depth
Pressure equalization:	hole 3mm diam
Internal stirring:	aerodynamic resistance
Measurements:	at 0, 5, 15, 50 min for CH_4,CO,N_2O
	continuous CO_2, NO_x
Leakage rate measurement:	F12, CO_2
Blank (zero emission) measurement:	Daily-weekly per chamber

Instruments and Precision

CH_4	GC/FID	+/- 0.4%	
CO	GC/FID	+/- 5%	(required)
N_2O	GC/ECD	+/-0.2-0.3%	
CO_2	IR	+/- 0.2 ppm	
NO_x	Chemilum.	+/- 0.1 ppbv	


Mallee Trip 3 July/August 1991
Static 24, Site 11, Wheat
N2O concentration (ppb)
350
345
340
335
330
325
320
315
310
0
500
1000
1500
2000
2500
Time from closure (s, adj for leakage)
measured
fitted


Mallee Trip 3 July/August 1991
Static 33, Site 8, Mallee
CH4 concentration (ppb)
1650
1600
1550
1500
1450
1400
1350
0
500
1000
1500
2000
2500
3000
3500
Time (s) from closure
measured
fitted


March 1991
Flux (ng element/m2/s)
30
25
20
15
10
5
0
-5
-10
Soil Respn. (ug/m2/s)
CH4
CO
N2O
Pristine (dry)
Pristine (rain)
Crop (dry)
Crop (rain)