

Eucalyptus camaldulensis (river red gum)
**Biogeochemistry: An Innovative Tool for Mineral
Exploration in the Curnamona Province and
Adjacent Regions**

Karen A. Hulme, B.Env.Sc (Hons)



Geology and Geophysics
School of Earth and Environmental Sciences
The University of Adelaide
April 2008

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibbooburra W/NSW - (Mn)

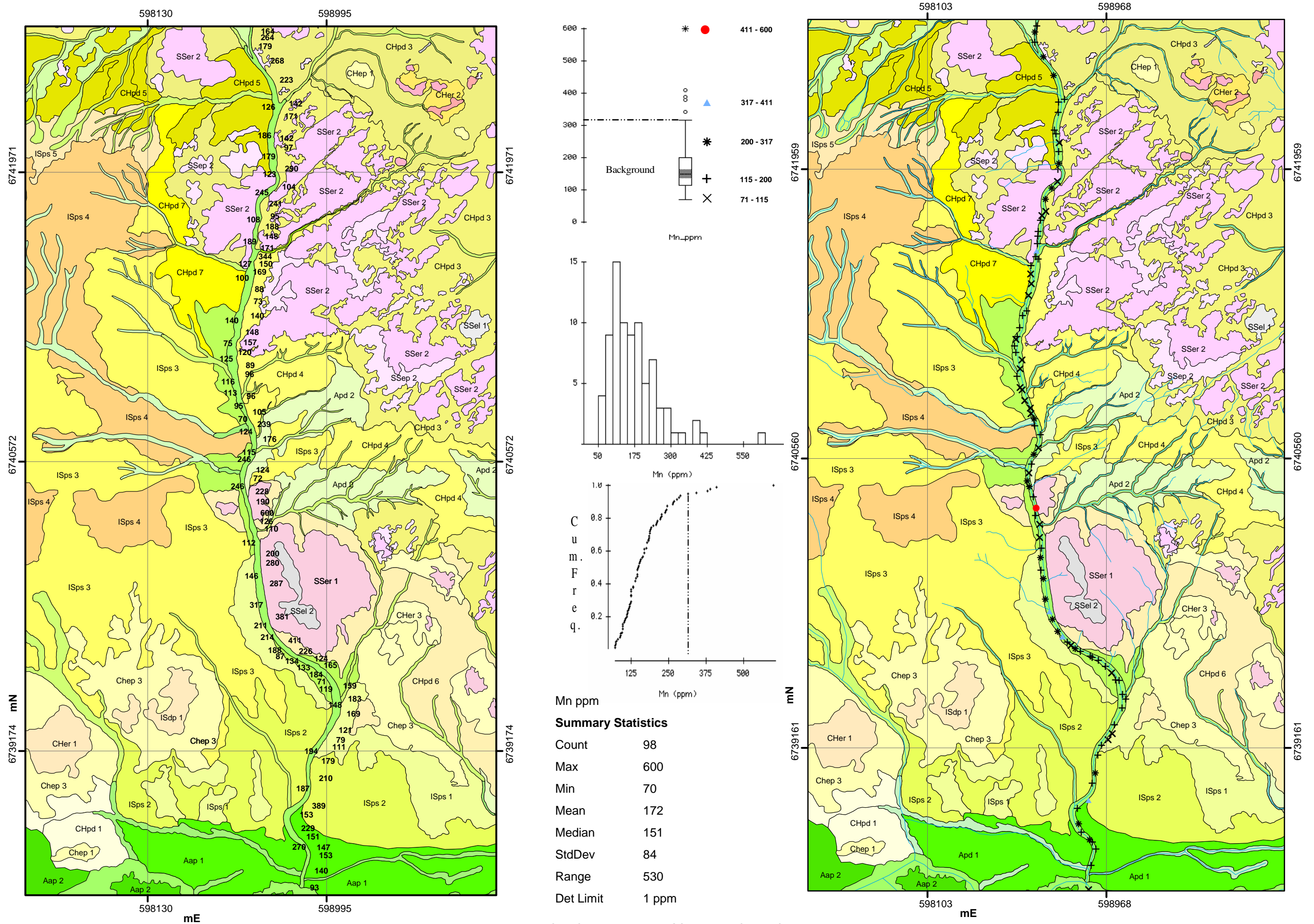


Figure 4.10: Raw data and spatial distribution of detectable Mn in *E. camaldulensis* (leaves) down Racecourse Creek with accompanying boxplots, histogram, cumulative frequency plot and summary statistics.

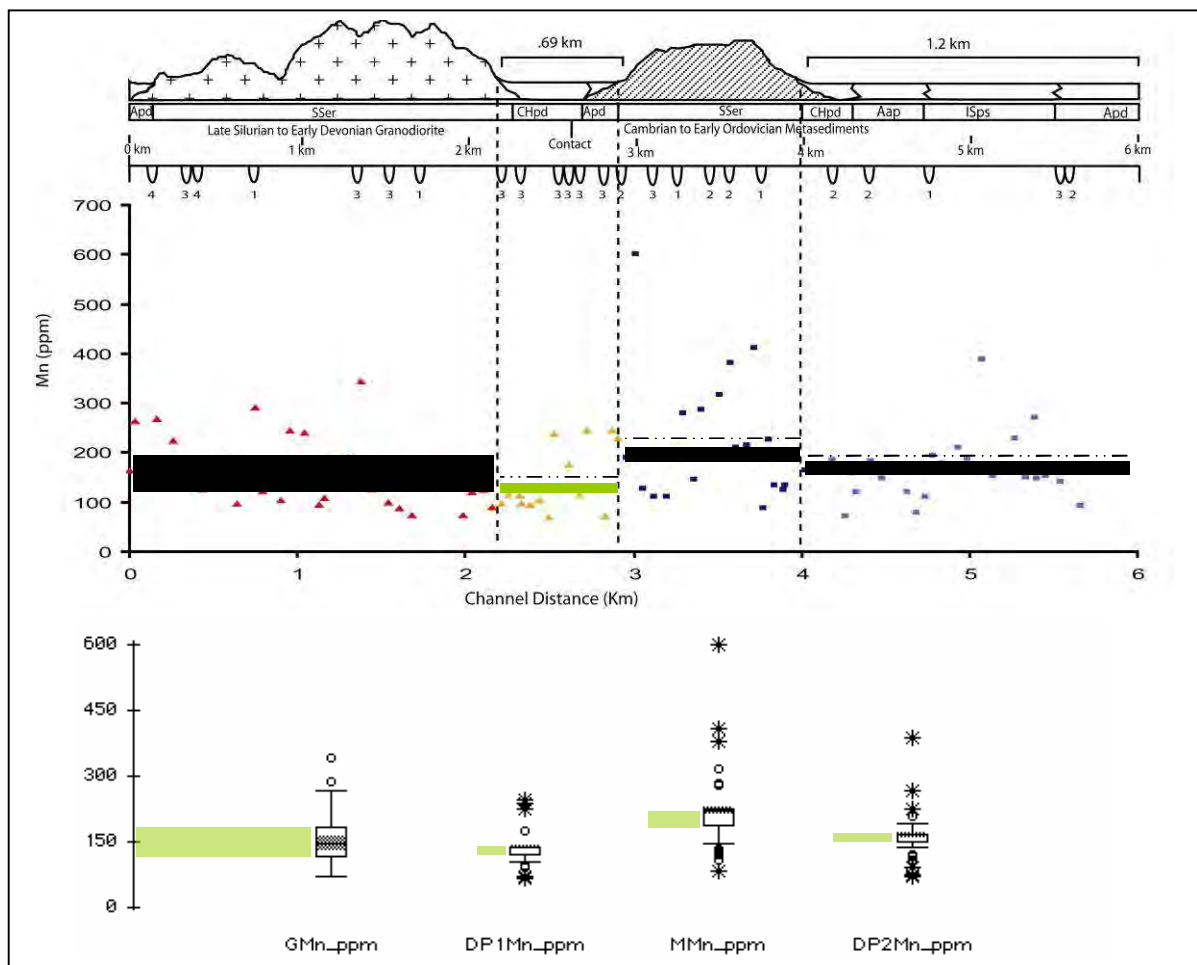


Figure 4.11: Mn concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90th percentile.

Element (ppm) [detection limit] Analytical Method	Parameters	Total data set (C) n=98	Setting				Data set comparison
			Granodiorite (SSer) (C) n=38	Upper catchment depositional (CHpd and Apd) (C) n=16	Metasediment (SSer) (C) n=25	Lower catchment depositional (CHpd, Aap, ISps and Apd) (C) n=19	
Mn [1] ICP-OES	Concentration range (Mean)	70-600 (171)	73-344 (160)	70-246 (141)	87-600 (221)	71-389 (166)	Regolith-landforms units associated with granodiorite, upper catchment depositional and lower catchment depositional regolith-landforms all have similarities at the 5% Sig Level, compared to the metasediment.
	25 th - 75 th percentile	115-200	120-186	96-202	188-221.04	51-169	
	95% confidence level	17	21	34	56	29	
	>90th percentile (outliers), # of samples	344-600 (5)	290-344 (2)	228-246 (4)	280-600 (6)	229-389 (3)	
	<i>E. camaldulensis</i> position with the greatest concentration.	adjacent to metasediment	central & adjacent to flanking CHpd3 & CHpd4	southern margin & down stream of intersecting Aed unit	evenly scattered adjacent to ISps1 regolith-landform unit flanking the metasediment	southern margin & down stream of intersecting Aed unit	

Table 4.19: Variation of Mn concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, 25th - 75th percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibbooburra W/NSW - (Nd)

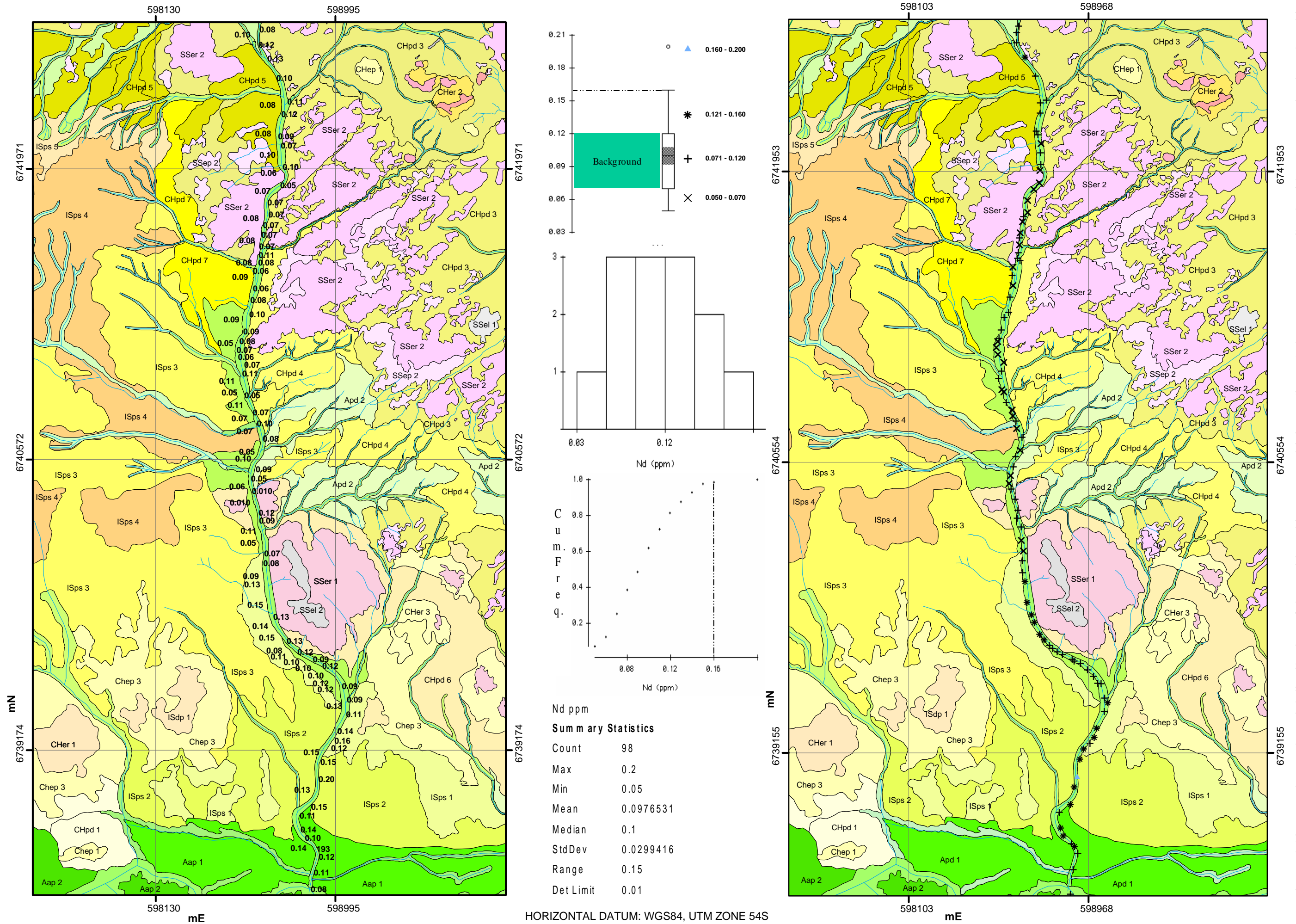


Figure 4.12: Raw data and spatial distribution of detectable Nd in *E. camaldulensis* (leaves) down Racecourse Creek with accompanying boxplots, histogram, cumulative frequency plot and summary statistics.

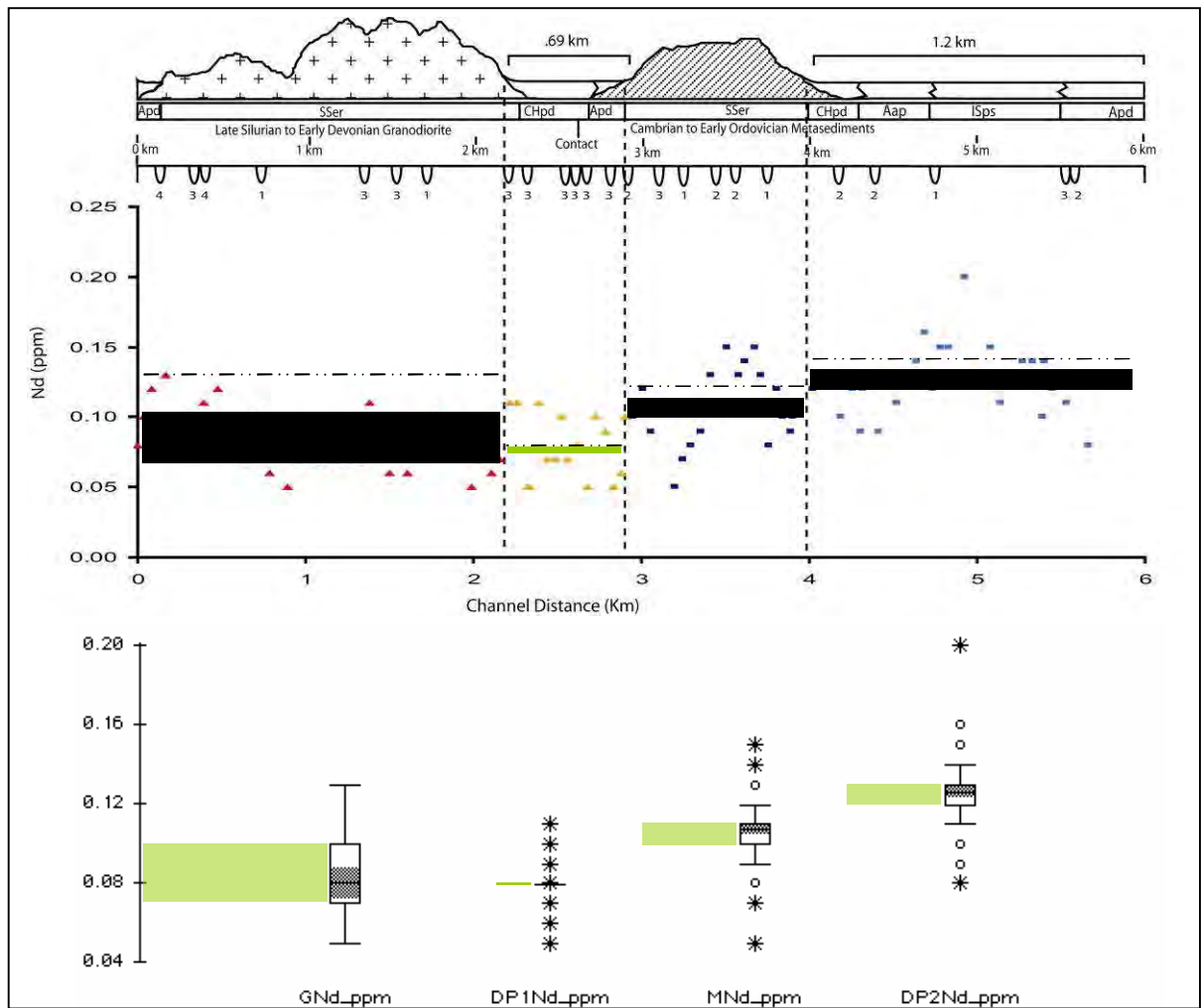
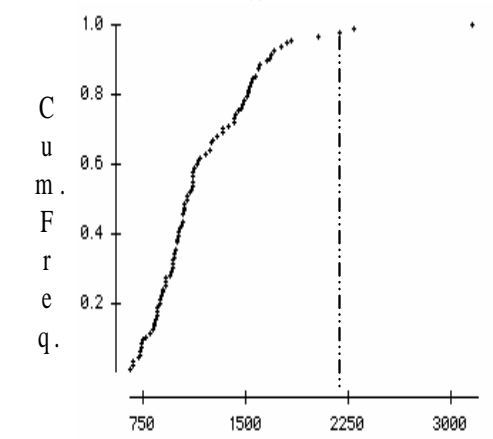
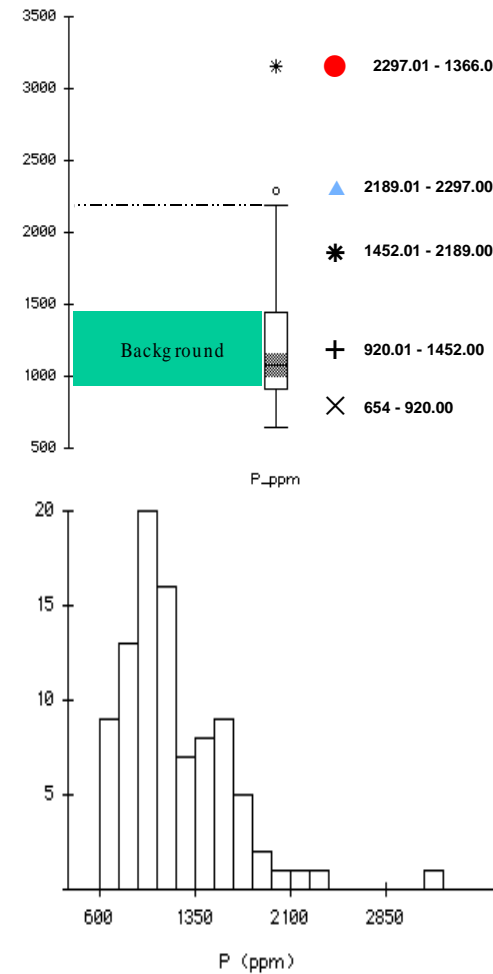
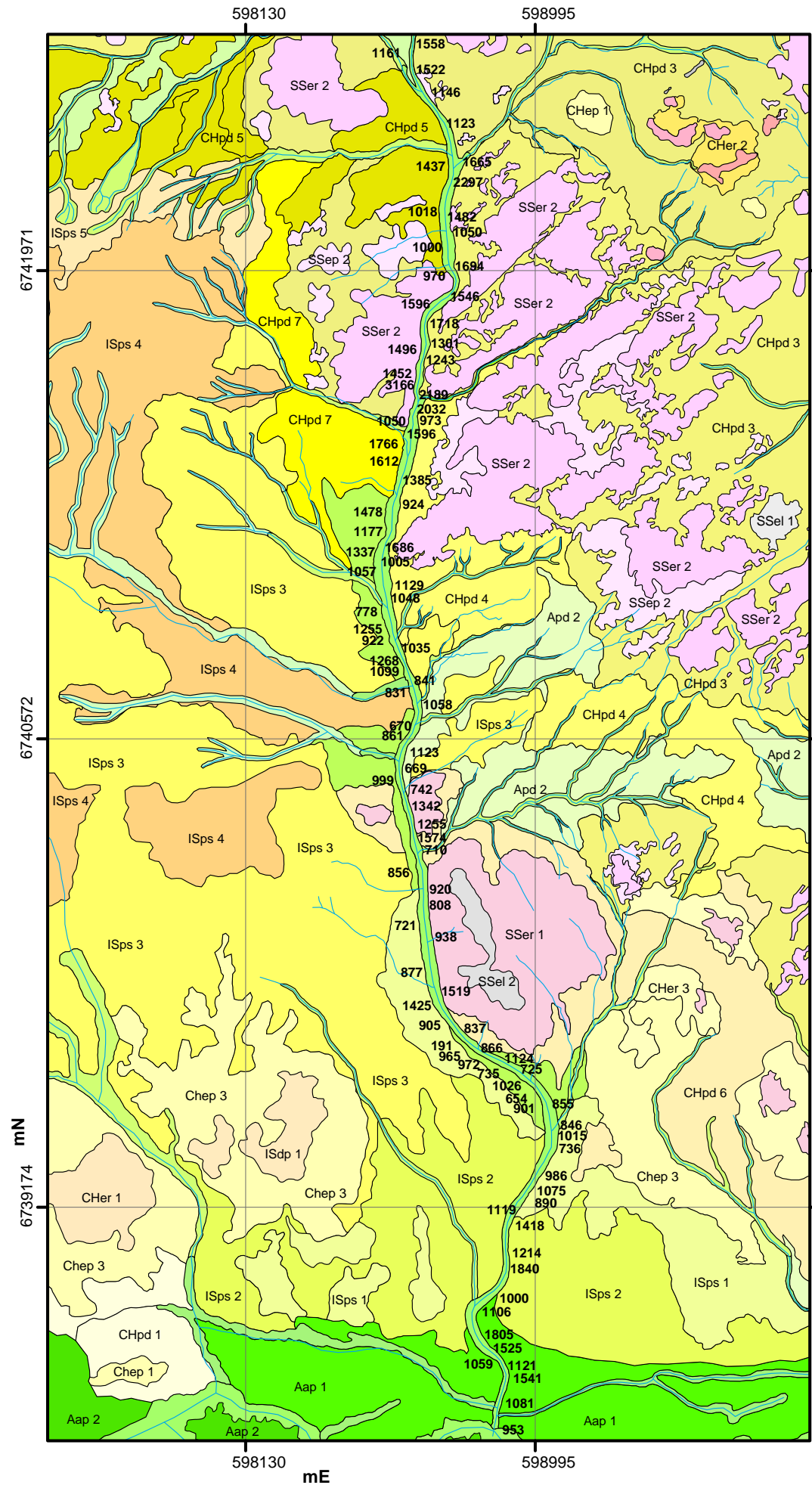


Figure 4.13: Nd concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90th percentile.

Element (ppm) [detection limit] Analytical Method	Parameters	Total data set (C) n=98	Setting				Data set comparison
			Granodiorite (SSer) (C) n=38	Upper catchment depositional (CHpd and Apd) (C) n=16	Metasediment (SSer) (C) n=25	Lower catchment depositional (CHpd, Aap, ISps and Apd) (C) n=19	
Nd [0.01] ICP-MS	Concentration range (Mean)	0.05-0.20 (0.09)	0.05-0.13 (0.08)	0.05-0.11 (0.07)	0.05-0.15 (0.11)	0.08-0.20 (0.13)	Regolith-landforms associated with granodiorite upper catchment depositional regolith-landforms are similar at the 5 % Sig level in their median conc ⁿ . While the metasediment & lower catchment depositional regolith-landform units have major difference between each other and other associated regolith-landforms at the 5 % Sig level.
	25 th - 75 th percentile	0.07-0.12	0.07-0.10	0.055-0.10	0.09-0.12	0.12-0.13	
	95% confidence level	0.006	0.006	0.01	0.01	0.01	
	>90th percentile (outliers), # of samples	0.20 (1)	No outliers'	No outliers'	0.13-0.15 (6)	0.15-0.20 (5)	
	<i>E. camaldulensis</i> position with the greatest concentration.	southern part of Racecourse Ck	northern margin of the granodiorite flanked by CHpd2 & CHpd5	northern margin & down stream of intersecting Aed unit	southern margin & down stream of intersecting Aed unit	central & adjacent to flanking ISps1 & ISps2	

Table 4.20: Variation of Nd concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, 25th - 75th percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibooburra W/NSW - (P)



P ppm

Summary Statistics

Count	98
Max	3166
Min	654
Mean	1193.93
Median	1078
StdDev	402.867
Range	2512
Det Limit	20 ppm

HORIZONTAL DATUM: WGS84, UTM ZONE 54S

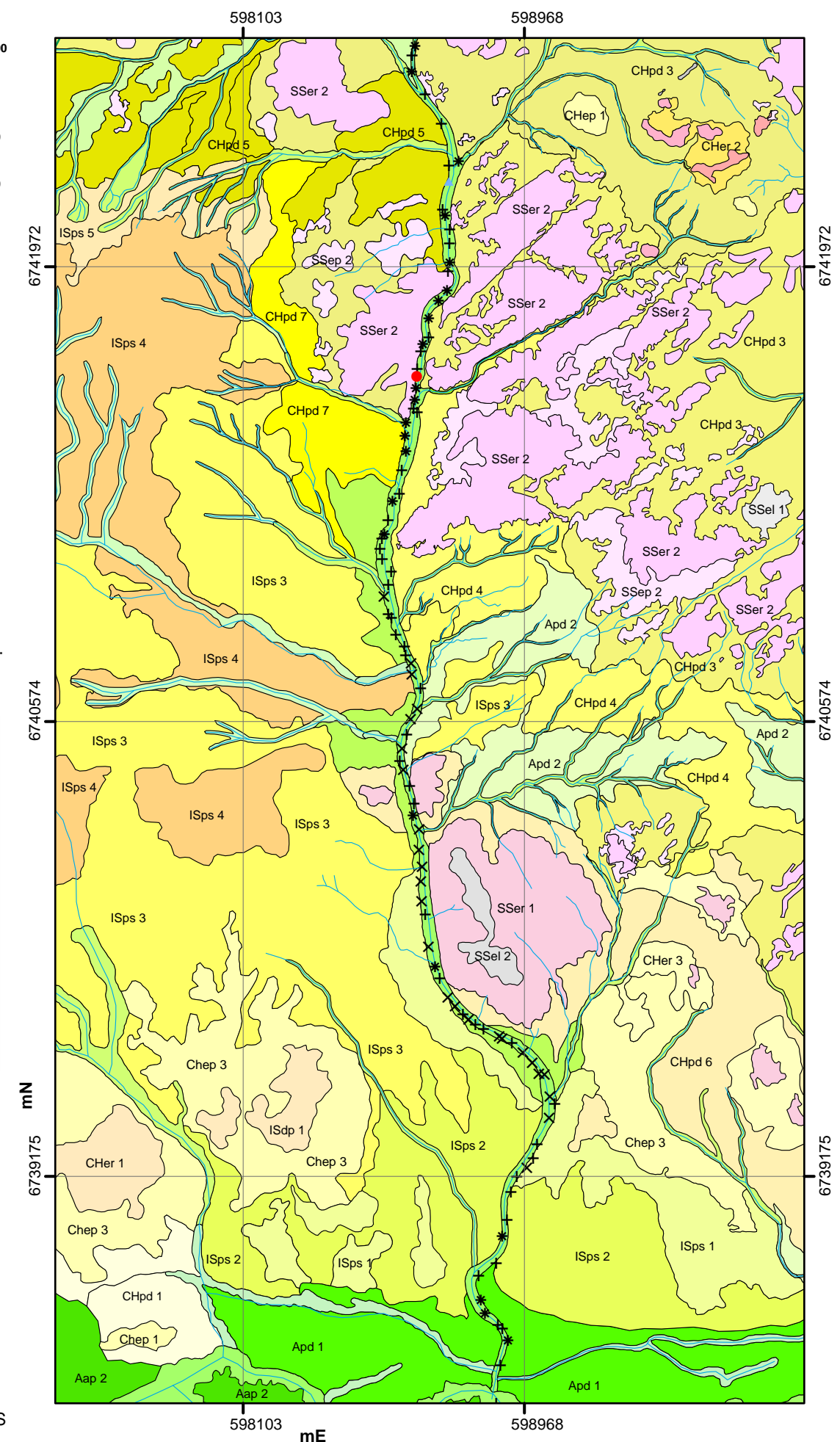


Figure 4.14: Raw data and spatial distribution of detectable P in *E. camaldulensis* (leaves) down Racecourse Creek with accompanying boxplots, histogram, cumulative frequency plot and summary statistics.

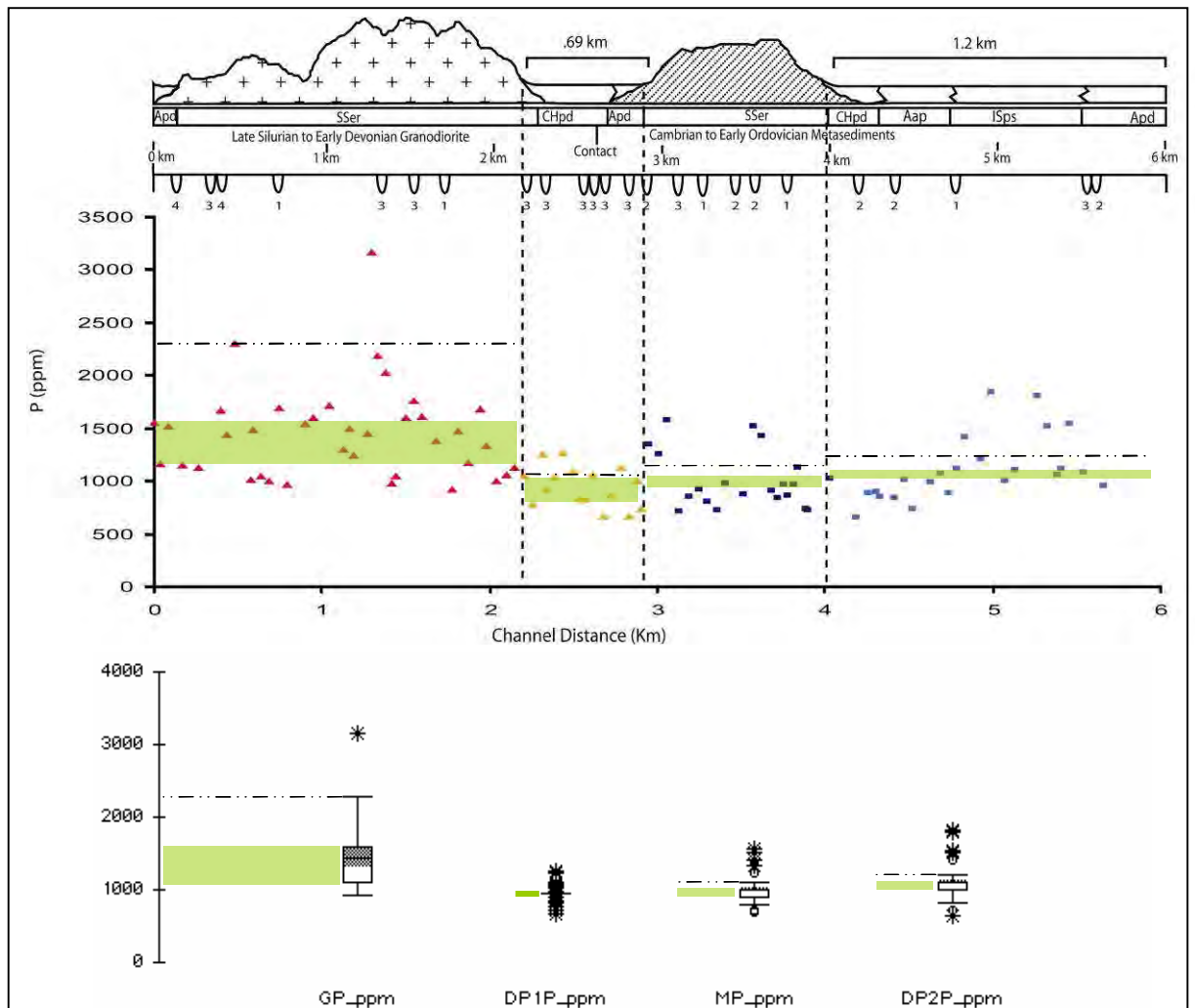


Figure 4.15: P concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90th percentile.

Element (ppm) [detection limit] Analytical Method	Parameters	Total data set (C) n=98	Setting				Data set comparison
			Granodiorite (SSer) (C) n=38	Upper catchment depositional (CHpd and Apd) (C) n=16	Metasediment (SSer) (C) n=25	Lower catchment depositional (CHpd, Aap, ISps and Apd) (C) n=19	
P [20] ICP-OES	Concentration range (Mean)	654-3166 (1193)	924-3166 (1448)	669-1268 (949)	710-1574 (1006)	654-1840 (1114)	Regolith-landforms units associated with the metasediment, upper catchment depositional & lower catchment depositional have slight differences at the 5% Sig Level in their median conc ⁿ . However regolith-landforms associated with the granodiorite has major differences with all other land-forms at the 5% Sig Level.
	25 th - 75 th percentile	920-1452	1123-1612	804.5-1078.5	905-1006	1081-1114	
	95% confidence level	80	146	101	121	135	
	>90th percentile (outliers), # of samples	2297-3166 (2)	3166 (1)	No outliers'	1342-1574 (4)	1525-1840 (4)	
	<i>E. camaldulensis</i> position with the greatest concentration.	northern part of Racecourse Ck	adjacent to granodiorite & at a point were Racecourse Ck is quite narrow	at the interface between the granodiorite and northern margin of the upper catchment depositional	southern margin, flanked by ISps1 & CHpd6	down stream of intersecting Aed unit	

Table 4.21: Variation of P concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, 25th - 75th percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibbooburra W/NSW - (S)

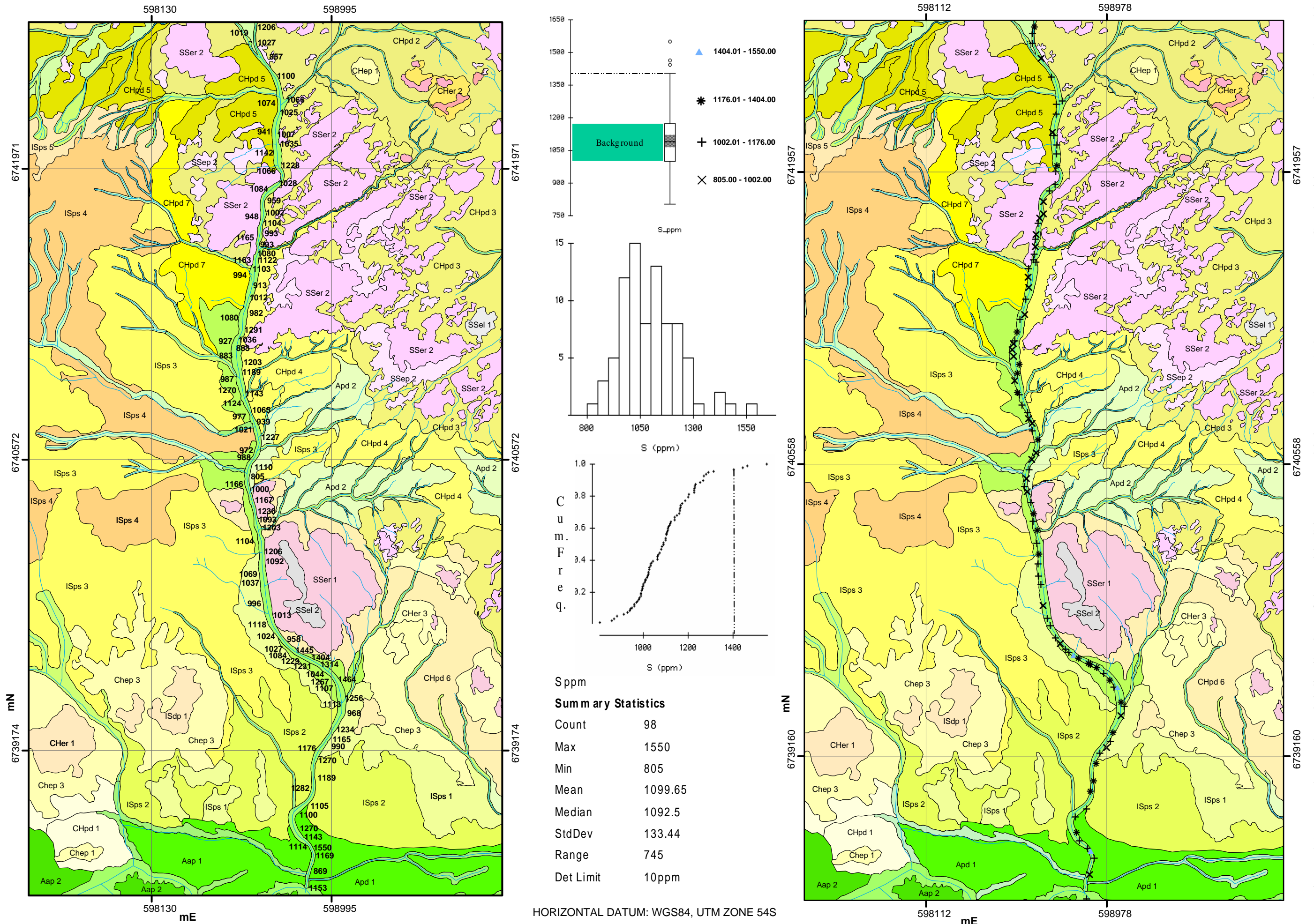


Figure 4.16: Raw data and spatial distribution of detectable S in *E. camaldulensis* (leaves) down Racecourse Creek with accompanying boxplots, histogram, cumulative frequency plot and summary statistics.

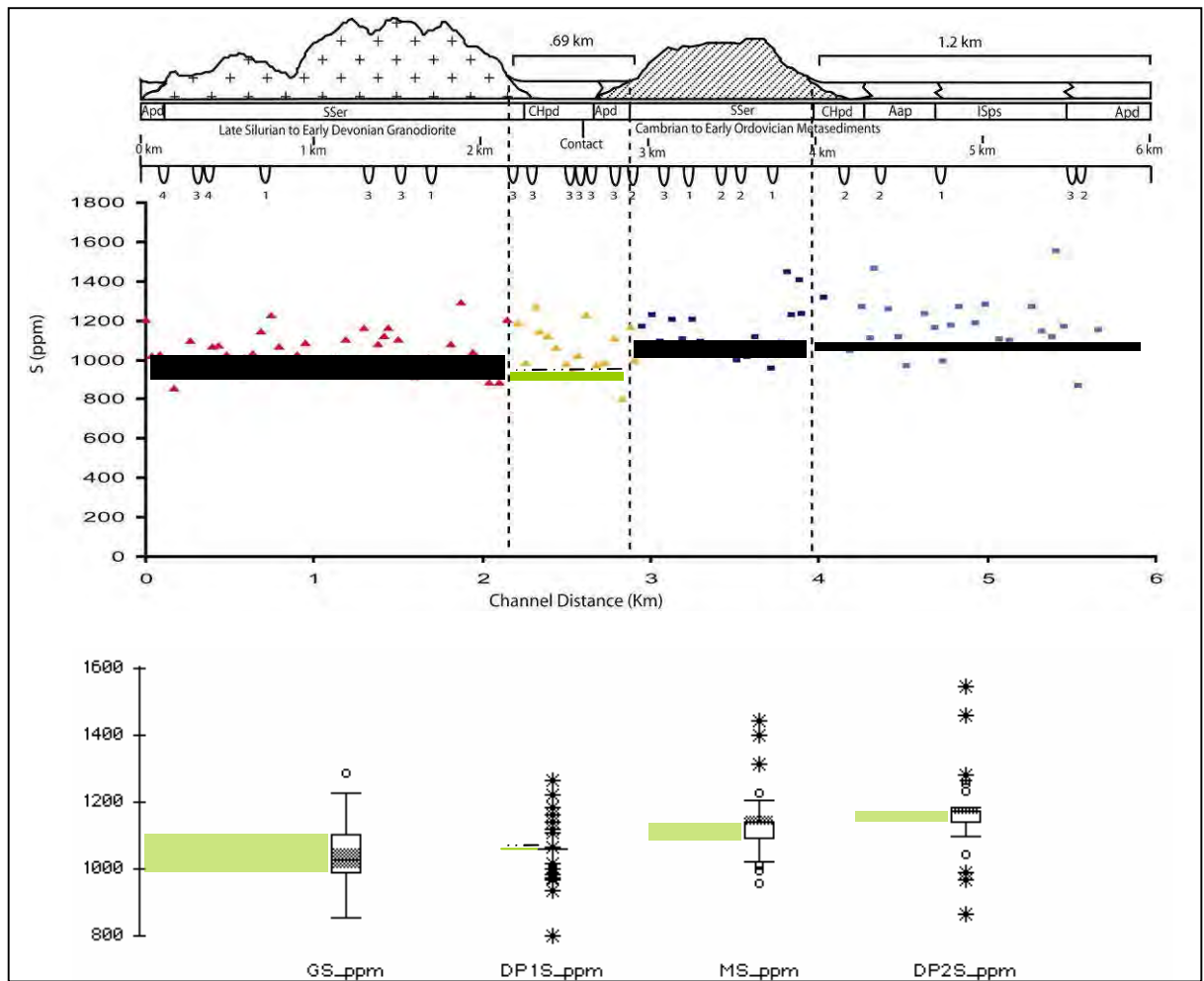


Figure 4.17: S concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90th percentile.

Element (ppm) [detection limit] Analytical Method	Parameters	Total data set (C) n=98	Setting				Data set comparison
			Granodiorite (SSer) (C) n=38	Upper catchment depositional (CHpd and Apd) (C) n=16	Metasediment (SSer) (C) n=25	Lower catchment depositional (CHpd, Aap, ISps and Apd) (C) n=19	
S [10] ICP-OES	Concentration range (Mean)	805-1550 (1099)	857-1291 (1045)	805-1270 (1061)	958-1145 (1144)	869-1550 (1173)	Regolith-landforms units associated with the granodiorite & upper catchment depositional similar at the 5% Sig Level in their median conc ^a . Regolith-landforms associated with the metasediment & lower catchment depositional similar at the 5% Sig Level in their median conc ^a . However both groups display differences at the 5% Sig Level.
	25 th - 75 th percentile	1002-1176	993-1103	982.5-1154.5	1093-1144	1143-1176	
	95% confidence level	27	33	65	60	64	
	>90 th percentile (outliers), # of samples	1291 (1)	1291 (1)	No outliers'	1314-1445 (3)	1282-1550 (3)	
	<i>E. camaldulensis</i> position with the greatest concentration.	down stream of metasediment, & intersecting Aed units	southern margin of granodiorite & down stream of intersecting Aed unit	down stream of intersecting NE/SW Aed units	southern margin & flanked by Aap1 & CHpd6	at the interface between the metasediment and northern margin of the upper catchment depositional	

Table 4.22: Variation of S concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, 25th - 75th percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.