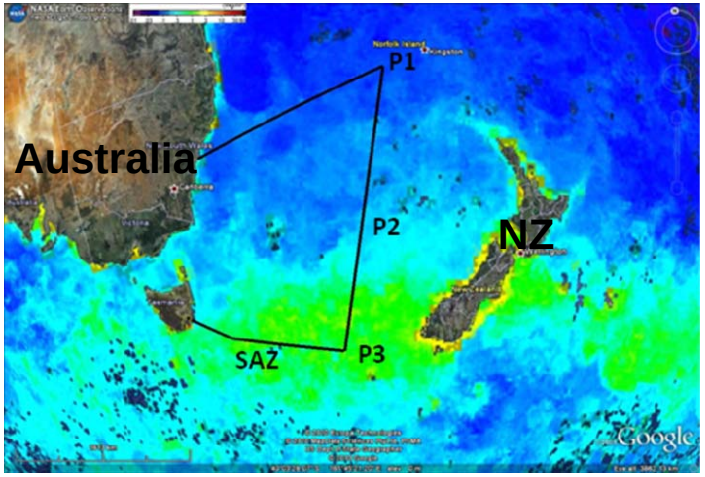
Australia 2009-2010 report

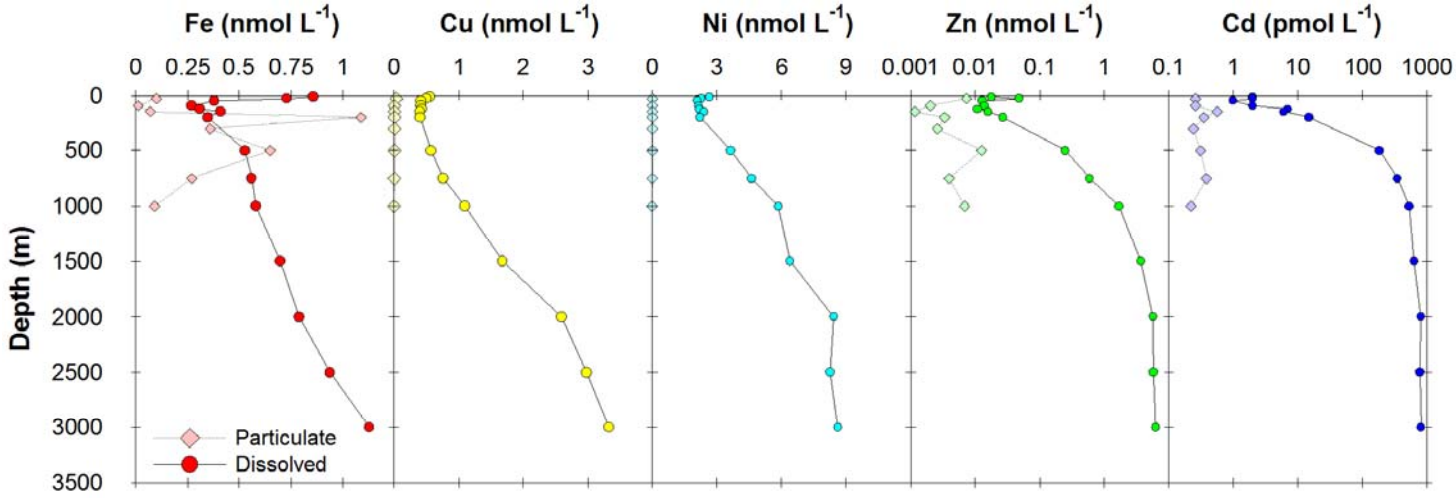
GEOTRACES process study
PINTS: 'Primary productivity Induced by Iron and Nitrogen in the Tasman Sea' (Jan-Feb 2010)
Follow-up workshop at AMSA, July 2010



PINTS activities and highlights:

- ❑ Iron bioavailability, sources, cycling
- ❑ GEOTRACES sections and process stations
- ❑ Trace metal rosette deployments, in situ pumps, aerosol sampling, deckboard incubations
- ❑ Trace element distributions (Zn, Cu, Mo, Co) and isotopes (Cd, Pb, Fe, Cu)

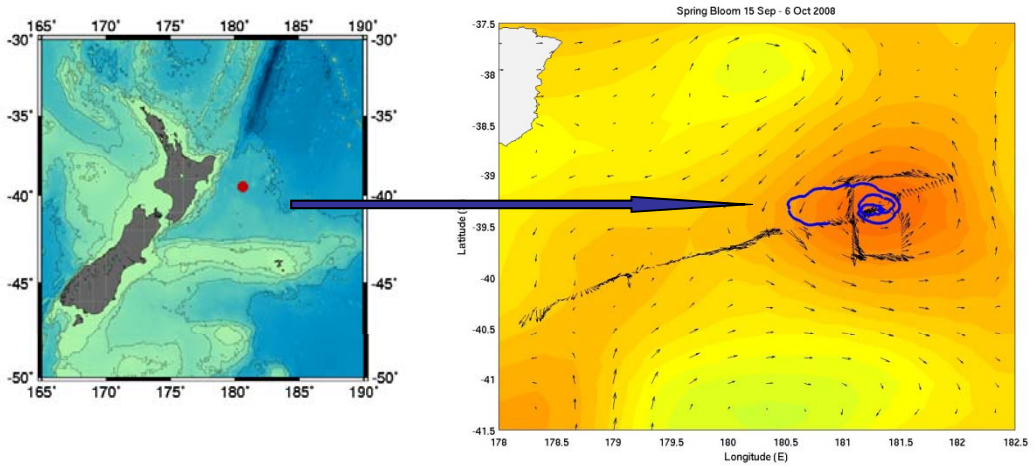
http://www.marine.csiro.au/nationalfacility/voyagedocs/index.htm



Profiles of dissolved and particulate trace metals versus depth for station P1. Note the logarithmic concentration scale for the zinc and cadmium profiles.

New Zealand 2009-10 report

5 day Workshop on
GEOTRACES
Process study
FeCycle II
December 2009

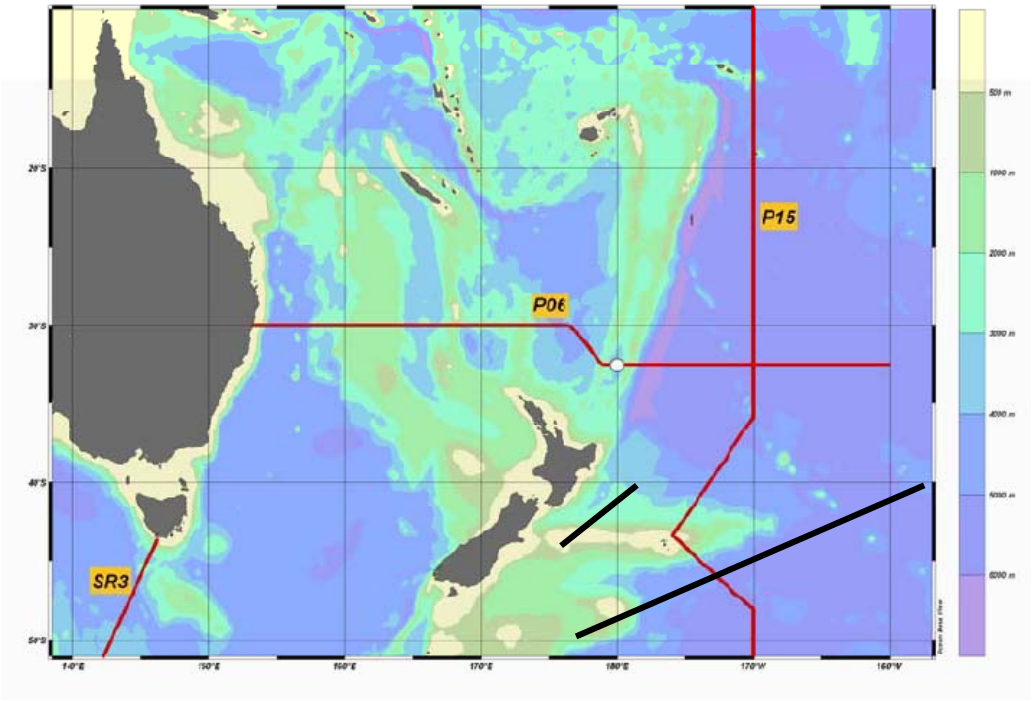


Highlights of FeCycle II:

- ❑ The onset, termination and decline of the spring bloom were observed
- ❑ The study was quasi-Lagrangian within an eddy centre for 13 days
- ❑ Dissolved iron concentrations decreased rapidly from 0.5 to 0.05 nmol L^{-1}
- ❑ Iron budgets are being constructed & suggest that the *f*e ratio = 0.35

Decreases In [DFe]	+	Concurrent new iron supply	+	Viral lysis Grazing Remin.	? =	Algal & Bacterial Fe uptake
New iron inventory		New iron		Recycled iron		Biol. Iron demand

P06 zonal section in 2011 (along ~30ºS)



- ❑ Planning for May-June 2011 voyage (Brisbane-Auckland-Tahiti)
- ❑ Normal stations (1º): rosette, CTD and 4 depths McLane pumps (to 1500 m)
- ❑ Super stations (5º): rosette, CTD and 2x8 casts of McLane pumps (full water column)
- ❑ GEOTRACES intercalibration stations at 165ºE (PINTS) and 170oW (Aus/NZ)
- ❑ Sample archival for US GEOTRACES and wider community
- ❑ Rendez-vous with Australians to exchange back-up sampling equipment
- ❑ Regional bioGEOTRACES component – diazotroph community structure and environmental controls
- ❑ Sampling for international bioGEOTRACES labs

GEOTRACES key parameters

Table 2. A list of suggested 'key parameters' for GEOTRACES ocean sections. This is not a list of all TEIs expected to be measured during GEOTRACES. Rather, it represents those TEIs (and related measurements) that are likely to be particularly fruitful to measure on all ocean sections and for which global coverage is highly desirable. It is not envisaged that each of these parameters will be measured at all stations, but that at least some measurements of these key parameters will be made on all GEOTRACES ocean sections.

P06

	Key parameter	Examples of use
	Trace elements	
☑	Fe	Essential micronutrient
☑	Al	Tracer of Fe inputs (from mineral dust and elsewhere)
☑	Zn	Micronutrient; potentially toxic at high concentration
☑	Mn	Tracer of Fe inputs and redox cycling
☑	Cd	Essential micronutrient; palaeoproxy for nutrient content of waters
☑	Cu	Micronutrient; potentially toxic at high concentration
	Stable isotopes	
☑	$\delta^{15}N$ (nitrate)	Modern and palaeoproxy for nitrate cycling
	$\delta^{13}C$	Modern and palaeoproxy for nutrient content and ocean circulation
	Radioactive isotopes	
☑	^{230}Th	Constant flux monitor in sediments; tracer of modern ocean circulation and particle scavenging
☑	^{231}Pa	Palaeoproxy for circulation and productivity; tracer of modern particle processes
	Radiogenic isotopes	
	Pb isotopes	Tracer of natural and contaminant sources to the ocean
	Nd isotopes	Tracer of natural sources of TEIs to the ocean
	Other parameters	
☑	Stored sample	To allow future work
☑	Particles	Essential transport vector for many TEIs
☑	Aerosols	Essential source of TEIs to the surface ocean

Sampling systems

Nation	Status	System/ Carousel	Bottles	Depth[(2)]	Contact
Australia	Complete	Powder coated aluminum Autonomous 1018 intelligent rosette system (General Oceanics)	10-L Teflon-lined Niskin-X	4000 m; 6 mm Dynex rope (extra 2000 m to be purchased in 2011) No dedicated winch available (request for new ship from 2013-	Andrew Bowie (Andrew.Bowie@utas.edu.au)
	Complete	2x WTS Large Volume Pump (WTS-6-1-142LV); 8L/min pump heads (McLane Research Labs)		2000 m; 9 mm; dedicate sheathed mooring wire (extra 2000 m for 2011) No dedicated winch available	
New Zealand	Complete	Powder coated aluminum Autonomous 1018 intelligent rosette system (General Oceanics)	5-L Teflon-lined Niskin-X	2000 m; 8 mm Kevlar rope	Michael Ellwood (Michael.Ellwood@anu.edu.au)
	Complete	4x WTS Large Volume Pump (WTS-6-1-142LV); 4 L/min and 8L/min pump heads (McLane Research Labs)		2000 m; 9 mm; dedicate sheathed mooring wire No dedicated winch available	

References: Ellwood et al., GRL 2008; Bowie et al., GBC 2009