

# PALANZ- Australia New Zealand collaboration in palaeoceanography









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# Who are we? What are we doing?

- A group of palaeoceanographers with a vision of increasing research activity in this field in Australia and New Zealand
- Goals are to maximise analysis of existing core material and pool resources to collect new cores
- We've written some proposals for joint work (~~Discovery, Antarctic Science, Marsden, Ship Time~~)
- We're writing a paper summarising existing palaeoceanographic records from the region (Bostock et al. in prep)

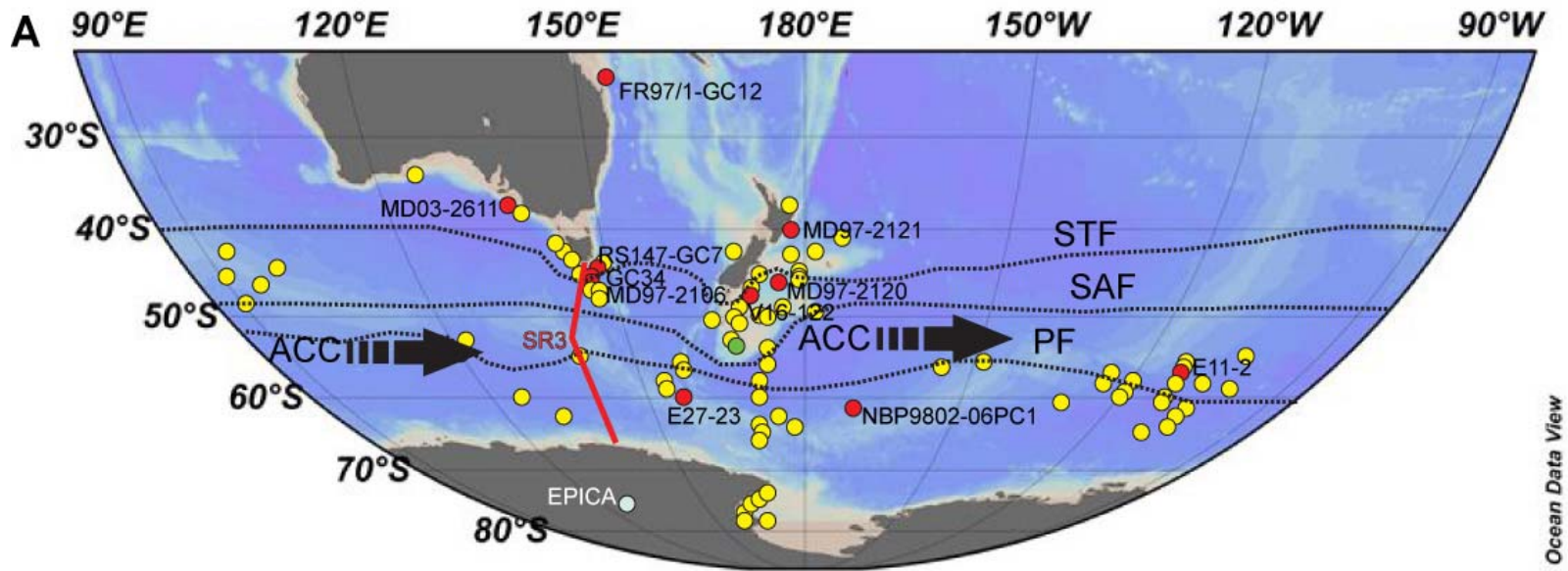
# Who are we?

|                  |  |               |                                |
|------------------|--|---------------|--------------------------------|
| Leanne Armand    |   | Macquarie Uni | diatom microfossils            |
| Helen Bostock    |   | NIWA          | foraminiferal microfossils     |
| Zanna Chase      |   | UTas          | particle flux proxies (Th, Pa) |
| Giuseppe Cortese |   | GNS           | radiolarian microfossils       |
| Michael Ellwood  |   | ANU           | fossil-based geochemistry      |
| Bill Maher       |   | Canberra Uni  | Si-isotopes                    |
| Helen Neil       |   | NIWA          | C, O isotopes                  |
| Taryn Noble      |  | UTas          | radiogenic isotopes (Nd)       |

# What is palaeoceanography?

- Ocean observing on really long time-scales
- Our main interest is ‘recent’ change; the Pleistocene glaciations (past ~ 1 million years)
- “Boundary conditions” of continents, species, same as today
- Goal is to reconstruct ocean circulation, biogeochemistry, and ecosystems
- Focus to date on the Southern Ocean
- Most interested in climate feedback processes
- Useful check for climate models

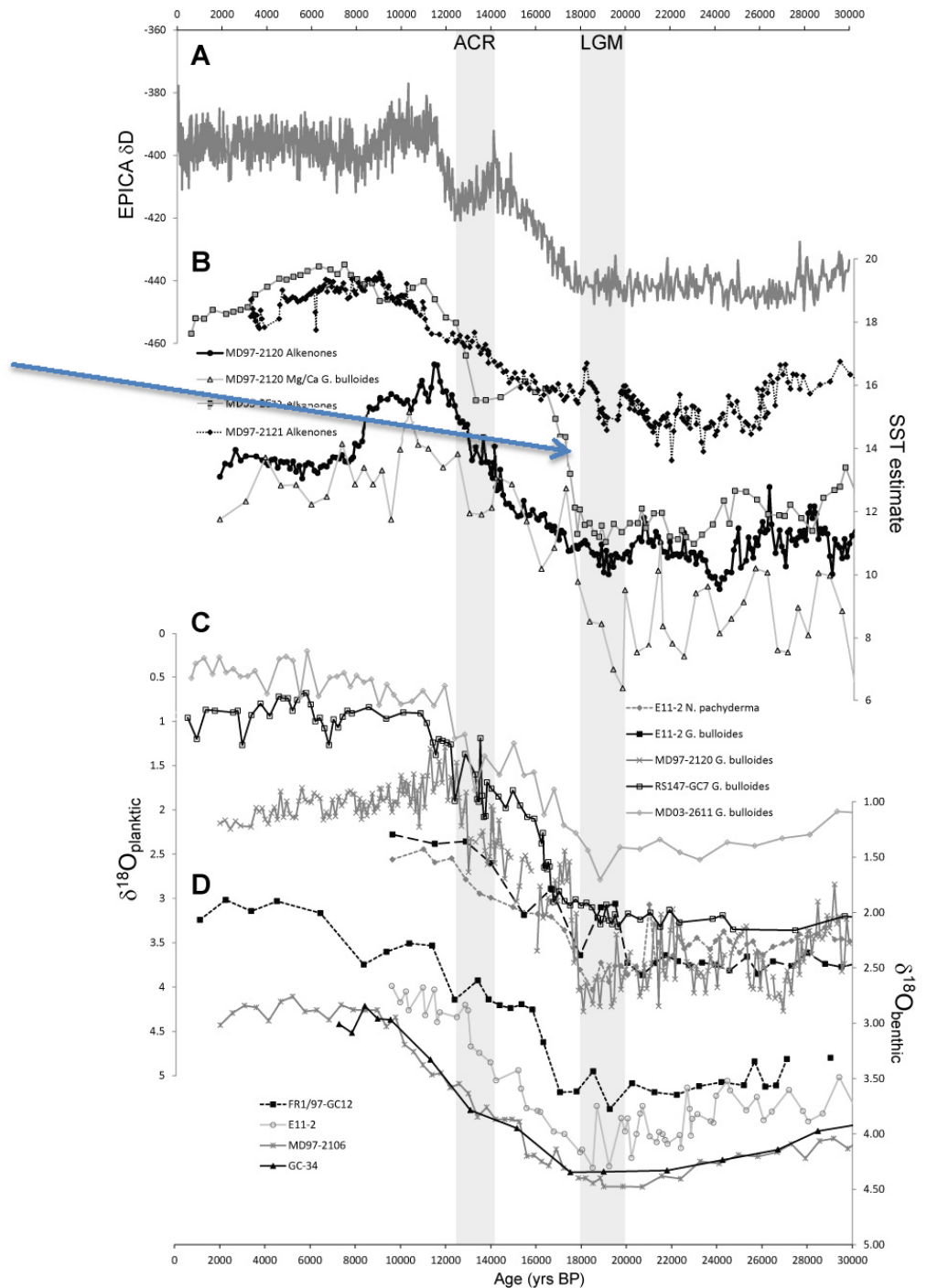
# Analysis of existing cores



Cores with published data (Bostock et al. in prep)  
Most studies have focused on SST reconstruction

# SST records

evidence for poleward shift of STF with warming (Calvo et al. 2007)

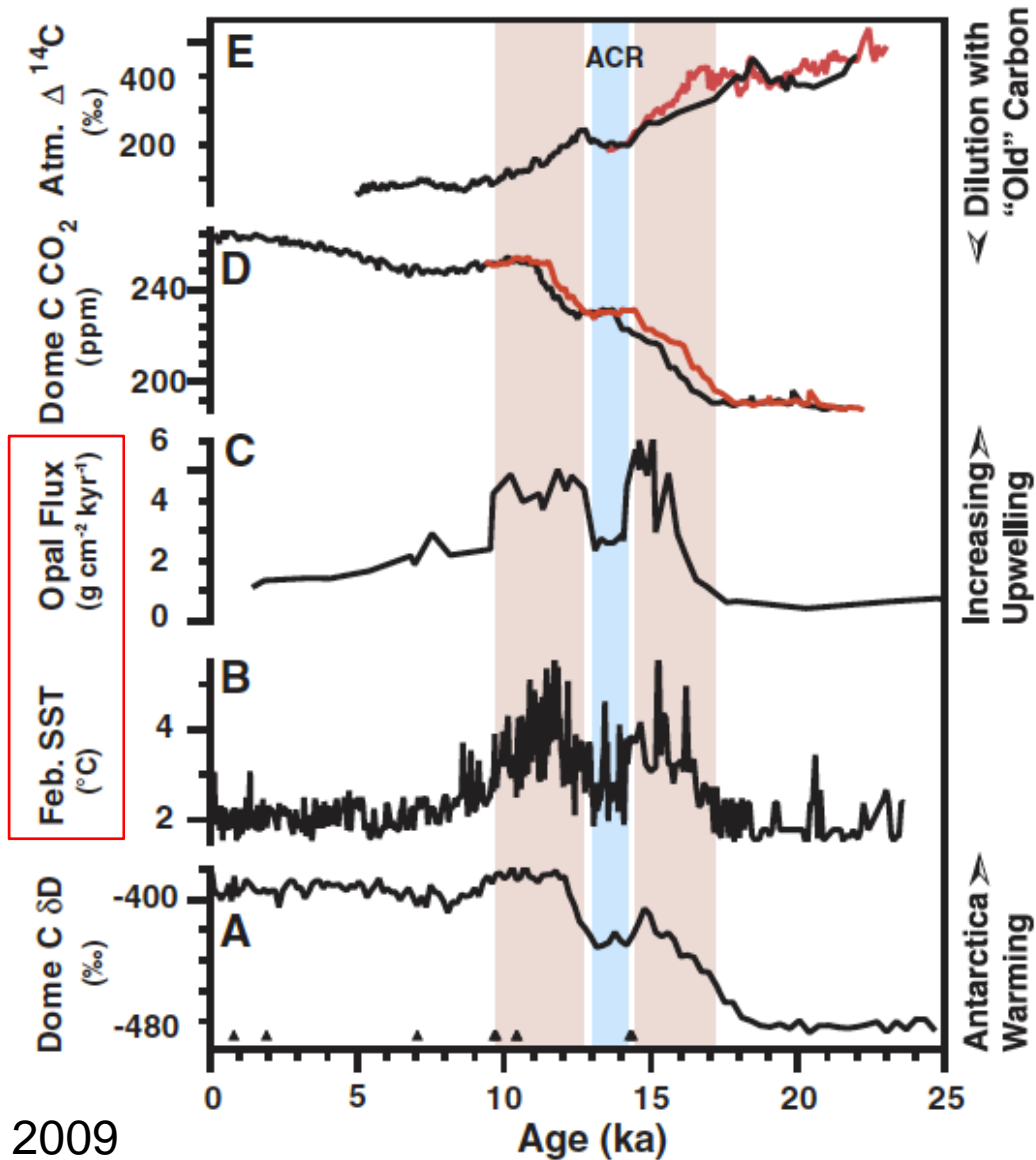


# Some specific science questions

How have the following responded to glacial cycles?

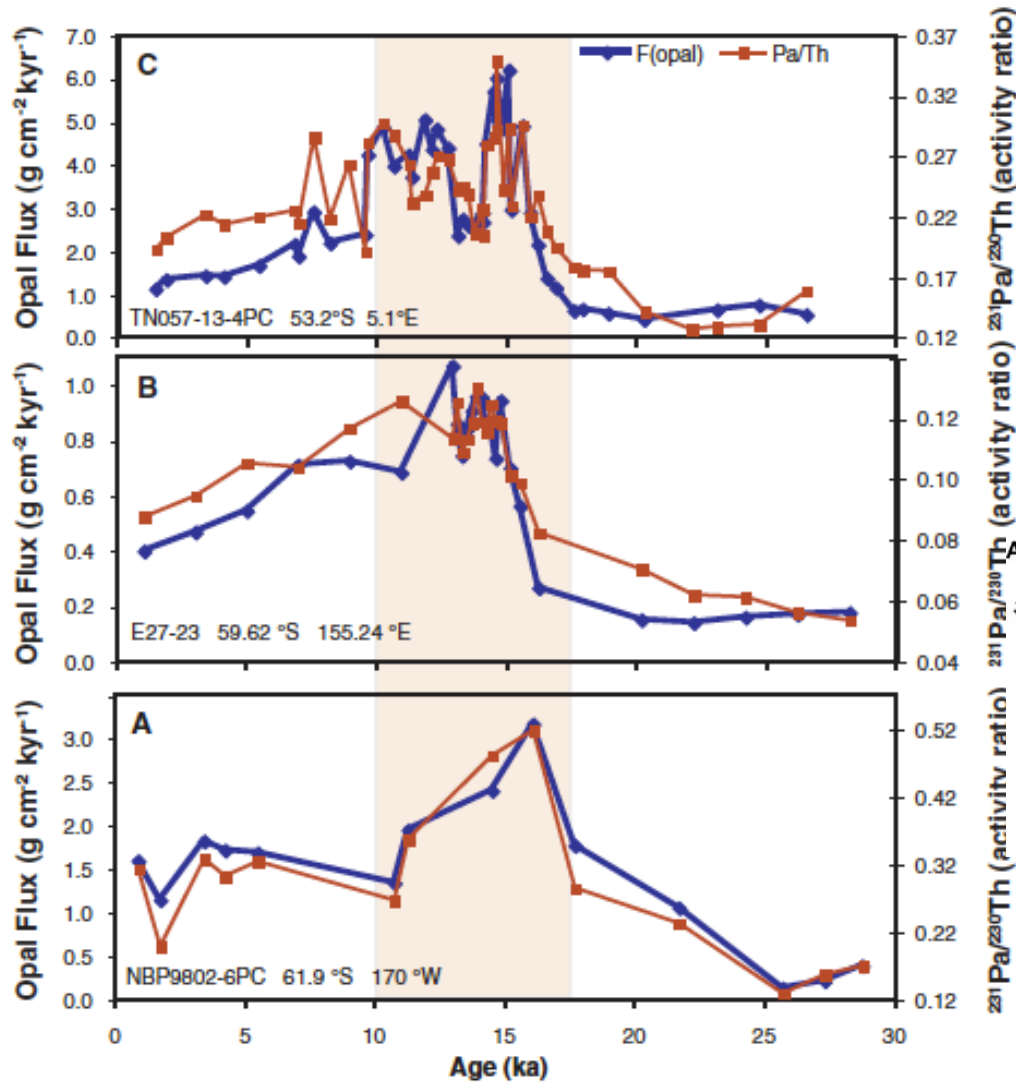
1. Southern Ocean overturning: upwelling/ventilation
2. Carbon sequestration
3. Ocean oxygenation, particularly intermediate depths
4. Circulation in the SH supergyre, Tasman leakage
5. Silicic Acid Leakage
6. Productivity response to dust deposition/ Fe addition
7. Pelagic ecosystem composition

# Southern Ocean upwelling example

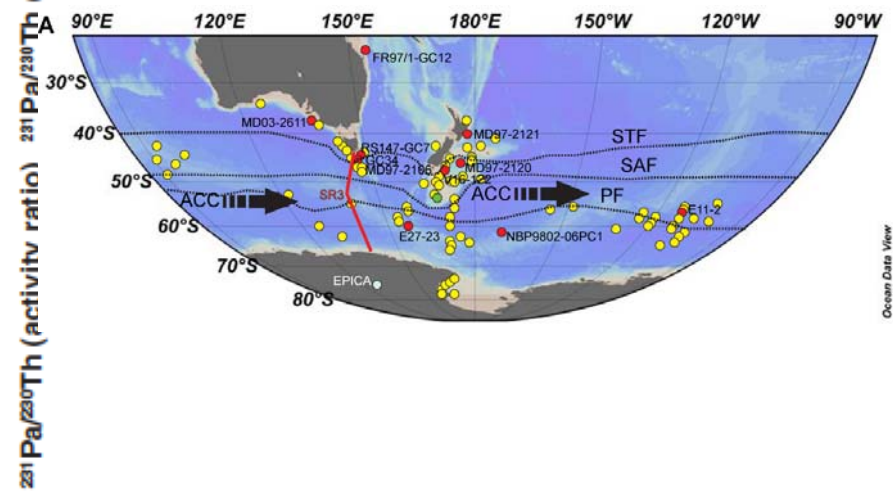




# Southern Ocean upwelling example



High-resolution cores suitable for resolving events such as the ACR are rare from the Southern Ocean



# Collection of new sediment cores

Tangaroa and Investigator have/will have coring capability

1. Coring along SR3 line
2. High-resolution records from open ocean, particularly south of PF
3. Zonal transects away from dust sources
4. Cores from IMOS reference stations

# Other potential collaborative activities

- Cross-fertilisation with modern observers: Are there questions that would benefit from a long-term perspective?
- Limited coring activity on 'water' voyages
- Proxy calibration on voyages