Geochemical proxies calibration along the Indonesian Throughflow (ITF) pathway.

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Area of study

●Fresh Java Sea surface water inhibits the southward flow of warm water within the Makassar Strait.

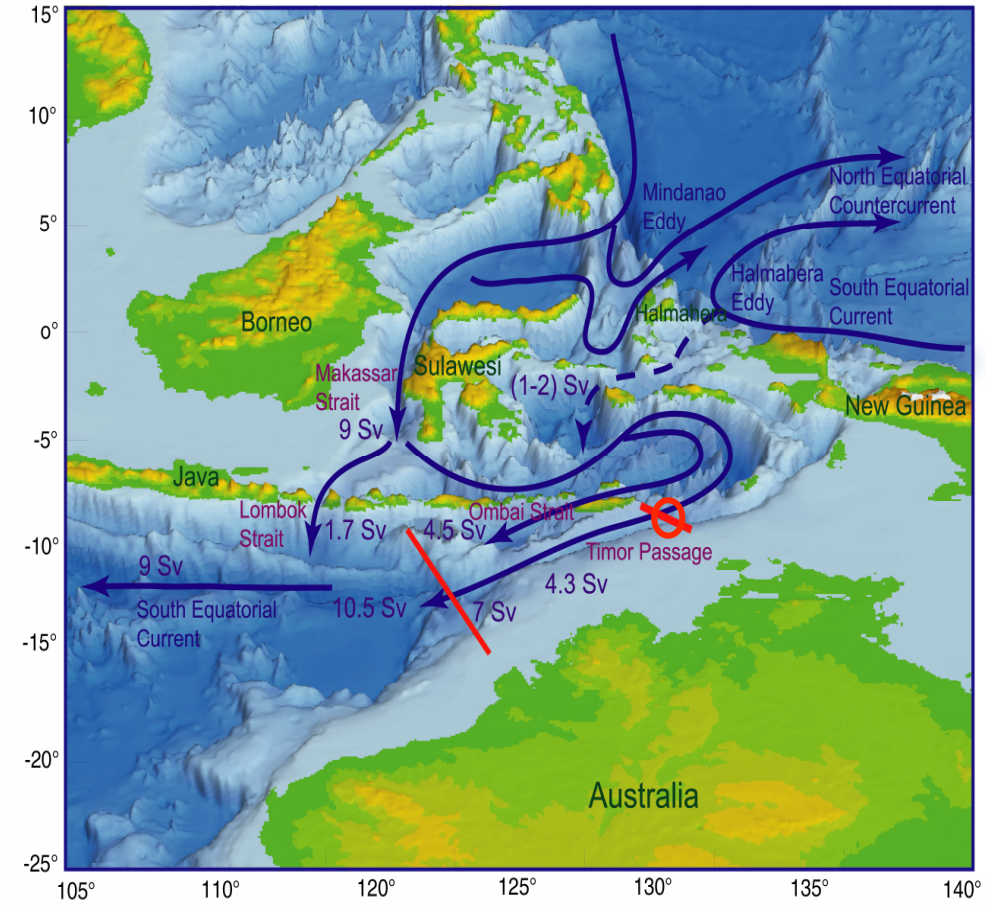
●Air-sea exchange, vertical mixing fueled by tidal energy, wind-driven upwelling cool and freshen the ITF in the Banda Sea.

●Winds appear also to control the strength and the direction of the ITF flow between the Banda Sea and the exit passages.

●During el Niño event, the ITF strength is reduced and the thermocline shoals.

Core 18471-2

- The core has been collected in the Timor Passage, at the end of the most easterly transect.
- This area represents the outflow in the path of the ITF.
- The core is from a shallow water depth of 485 m.



- The shallow location of the core allows us to investigate about the bottom of the ITF with particular attention to the thermocline flow, for the first time in this area.

Overview

AMS → Age constraint.

Mg/Ca → Palaeotemperature

XRF core scanning → Terrigenous inputs

AMS results: age constraints

Depth (cm)	Radiocarbon age		Calendar age		Calibration version
	mean	1 std dev	mean	1 std dev	
0-1	1565	25	1445	41	Fairbanks0107
100-101	16580	90	19698	115	Fairbanks0107
200-201	25140	220	30234	333	Fairbanks0107

http://radiocarbon.ldeo.columbia.edu/cgi-bin/radcarbcal?fig=1&entry_type=0&add=1&id=19859&age=25140&std=220

About 2400 shells of the planktonic foram *Globigerinoides ruber* have been picked for the AMS analysis.

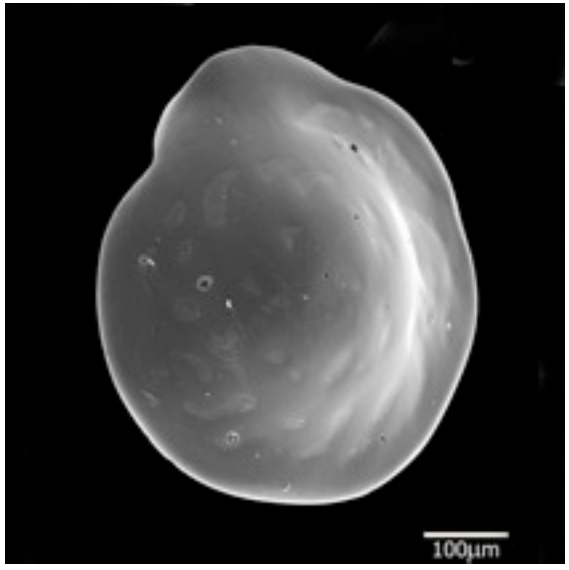
Reservoir age (atmospheric ^{14}C content - local ^{14}C content in ocean surface water) 480 years.

First step to create an age model.

Mg/Ca analysis

- Crushing

Hoeglundina elegans



- Cleaning
  - ✓Removal of clay - methanol
  - ✓Removal of metal oxides - hydrazine + NH_4OH + ammonium citrate
  - ✓Removal of organic matter - NaOH + H_2O_2

Mg/Ca analysis

- Crushing

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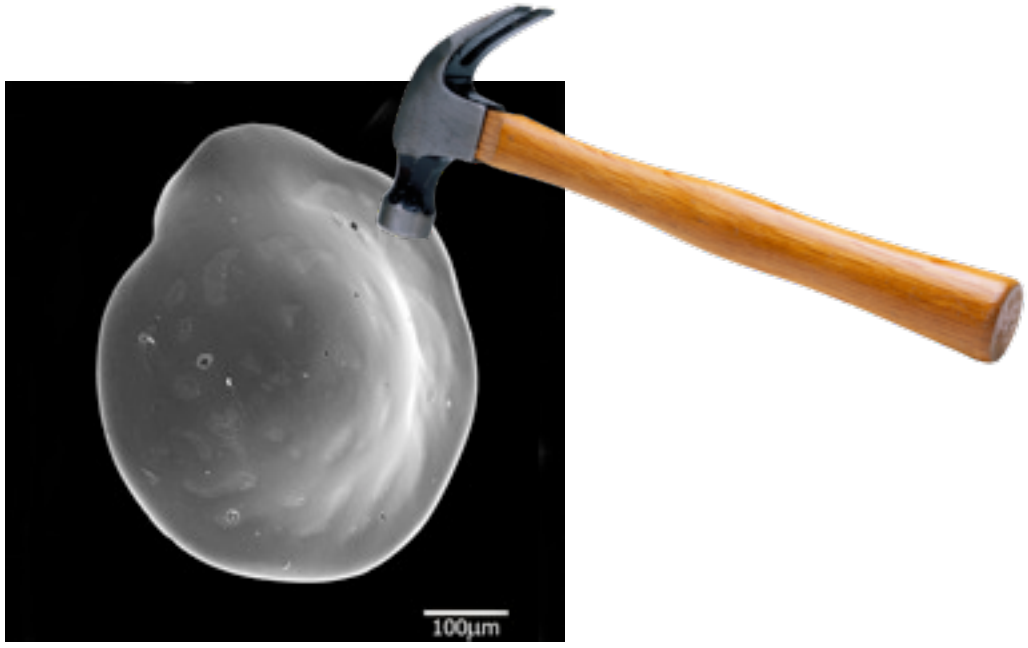

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Mg/Ca analysis

H_2O_2

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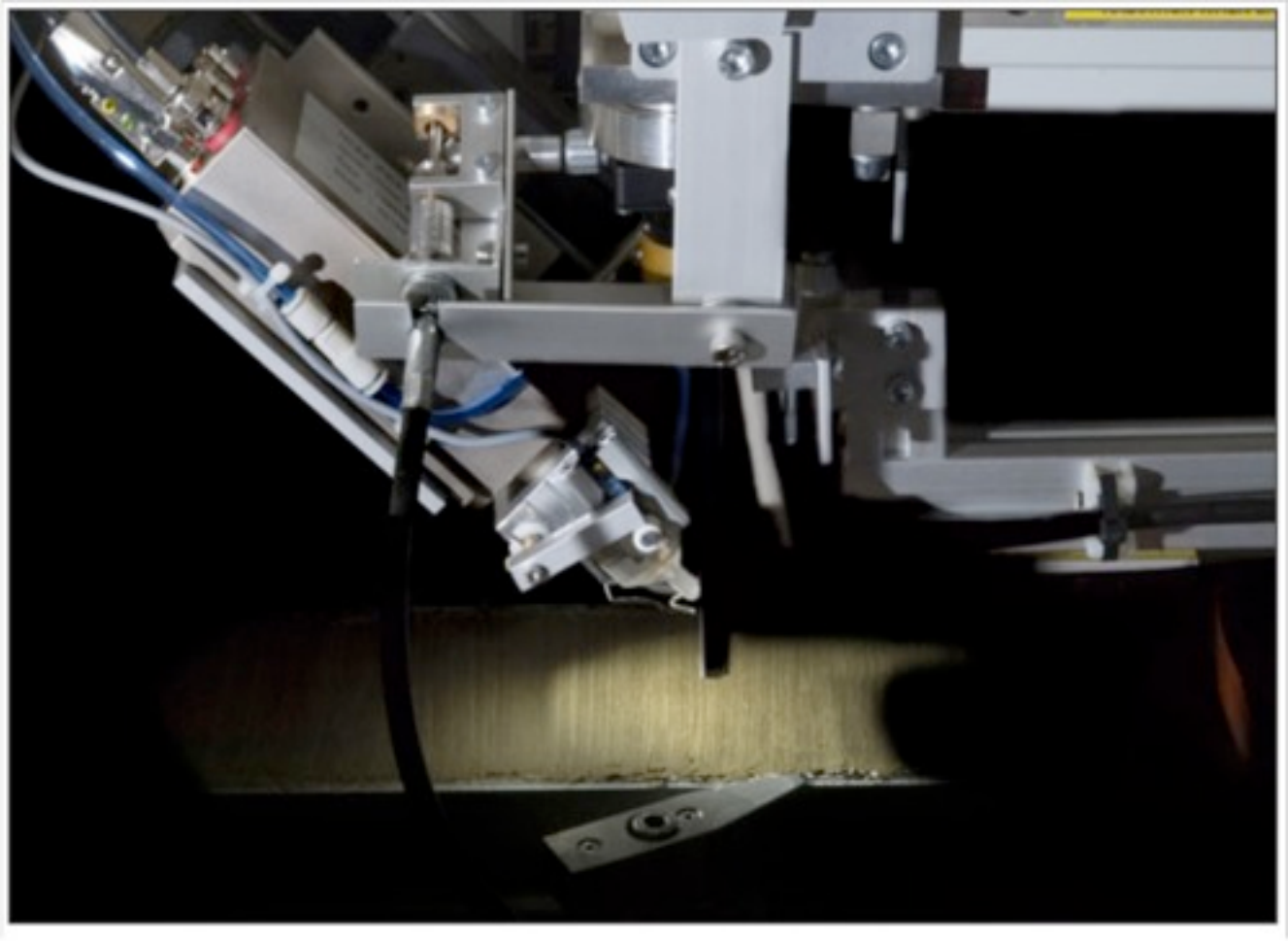
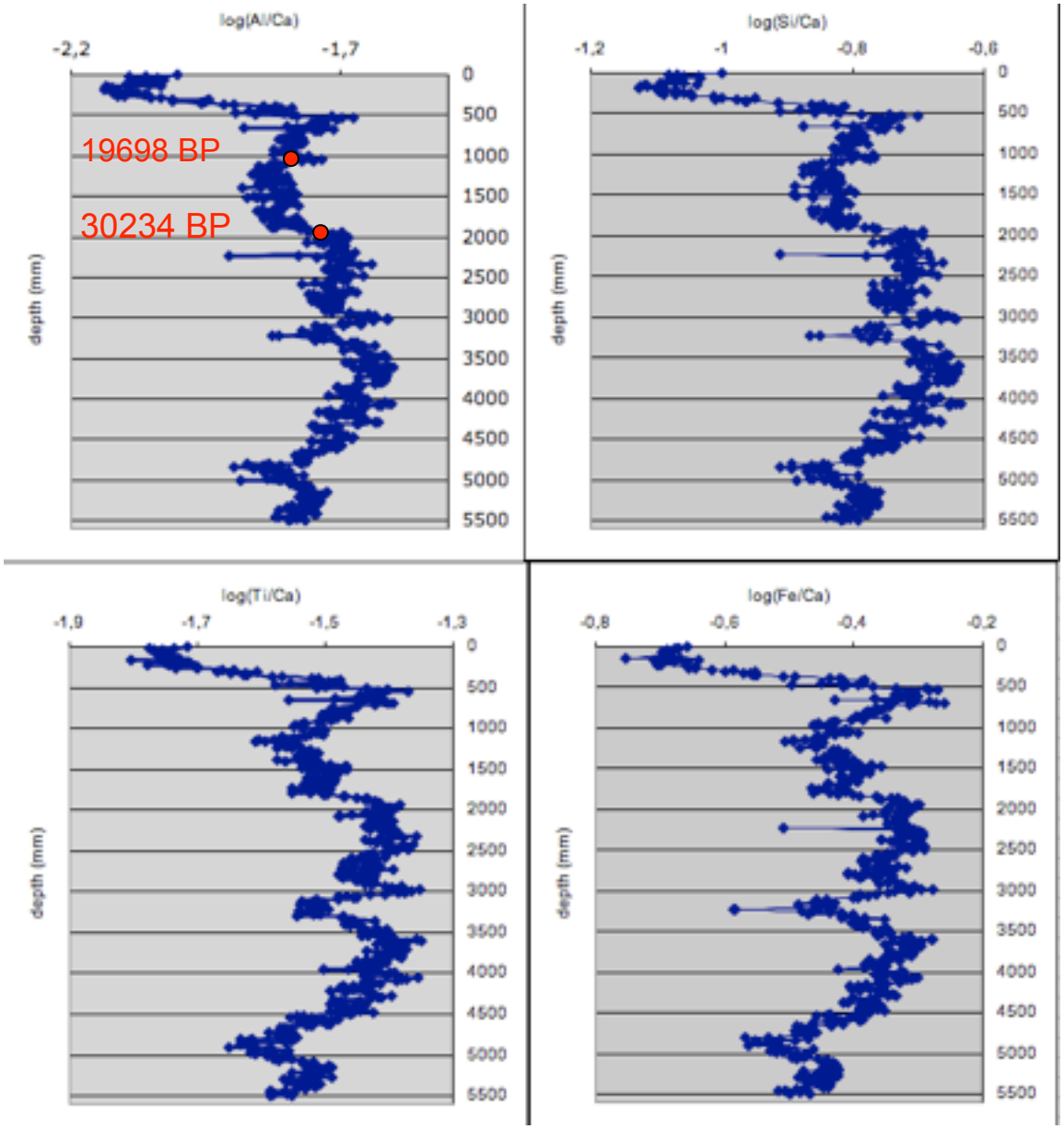
XRF core scanning

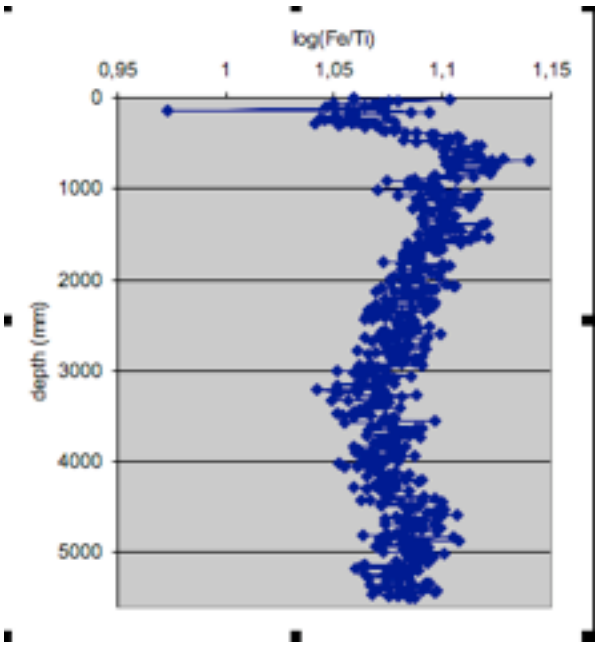


Light elements: Ca, Al, Ti, Fe, Si, Mn, S.

XRF core scanning



Terrigenous inputs



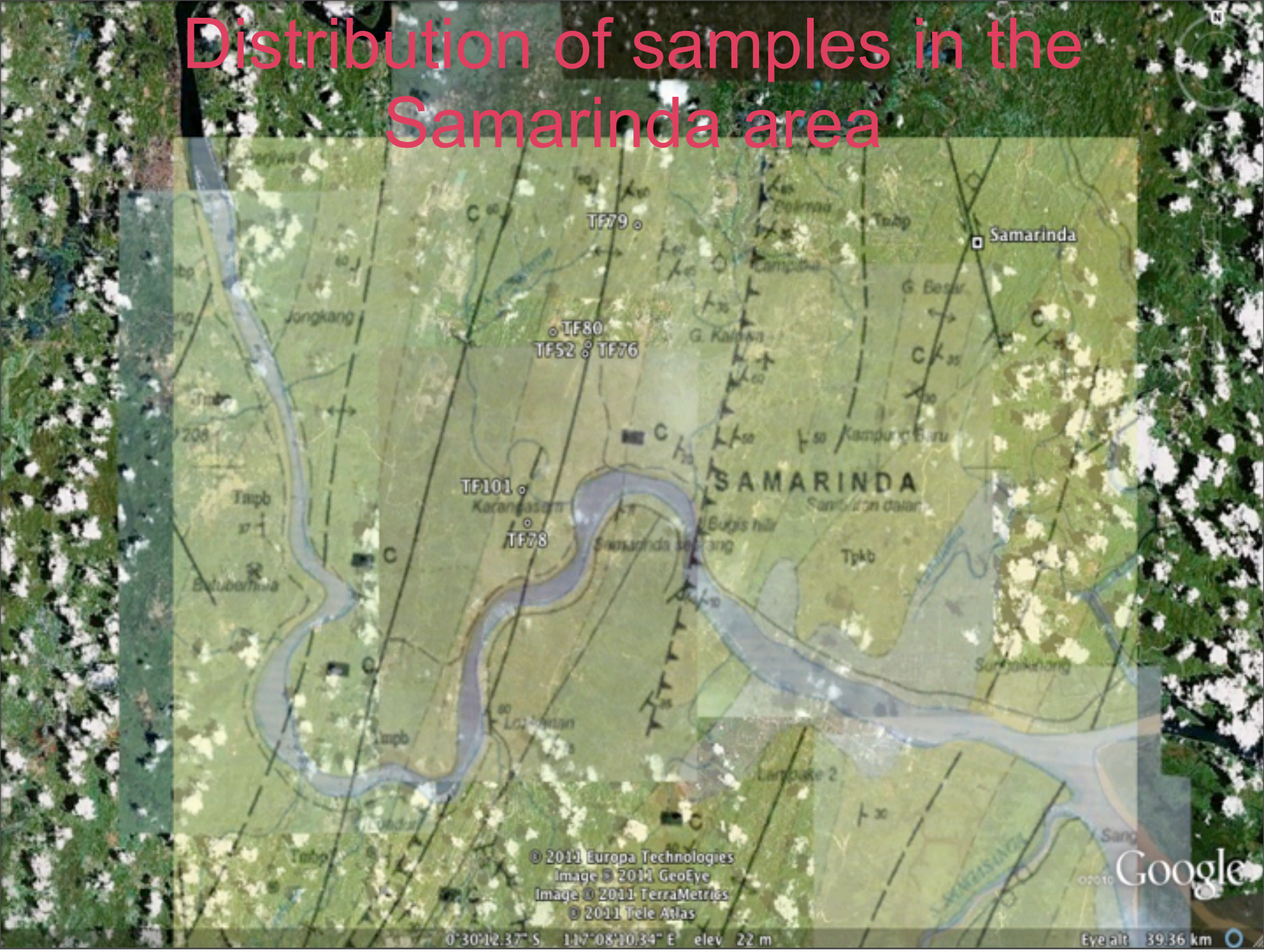
XRF core scanning

Oxygenation → log(Mn/Ca) and log(S/Ca).

Productivity → log(Ba/Ca).

It would be interesting to compare the sedimentological description of the core and the stable isotopes curves with the distribution of the light elements as the one shown in the previous graphs.

Distribution of samples in the Samarinda area



Samarinda samples

TF 52 → *Globorotalia praemenardii* 14.20 - 11.79 Ma

TF 76 → Globorotalia *fohsi robusta* 13.13 - 11.79 Ma

→ *Sphenolithus heteromorphosus* 13.40 - 16 Ma

TF 80 → Planktonic forams, unfortunately not diagnostic

TF 78 and TF 101 → No forams

About Bontang samples,we processed only few of them and so far we didn't find any relevant specimen.

Samarinda samples

Study of assemblages → Ecological info

Planktonic/Benthic ratio → Palaeobathymetry

Marker species → Age constraint

Future activities

- Workshop + Fieldwork: 12 - 24 June

Bandung and Samarinda, Indonesia

- Cruise: 21 July - 22 August

Makassar Strait - Singapore

- Keep on working with the fieldwork samples
- Finish the work on the core 18471-2:
  - ✓Additional AMS analysis
  - ✓Elaboration XRF data
  - ✓Mg/Ca analysis
  - ✓Stable isotopes analysis
- Write a manuscript on the results.