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

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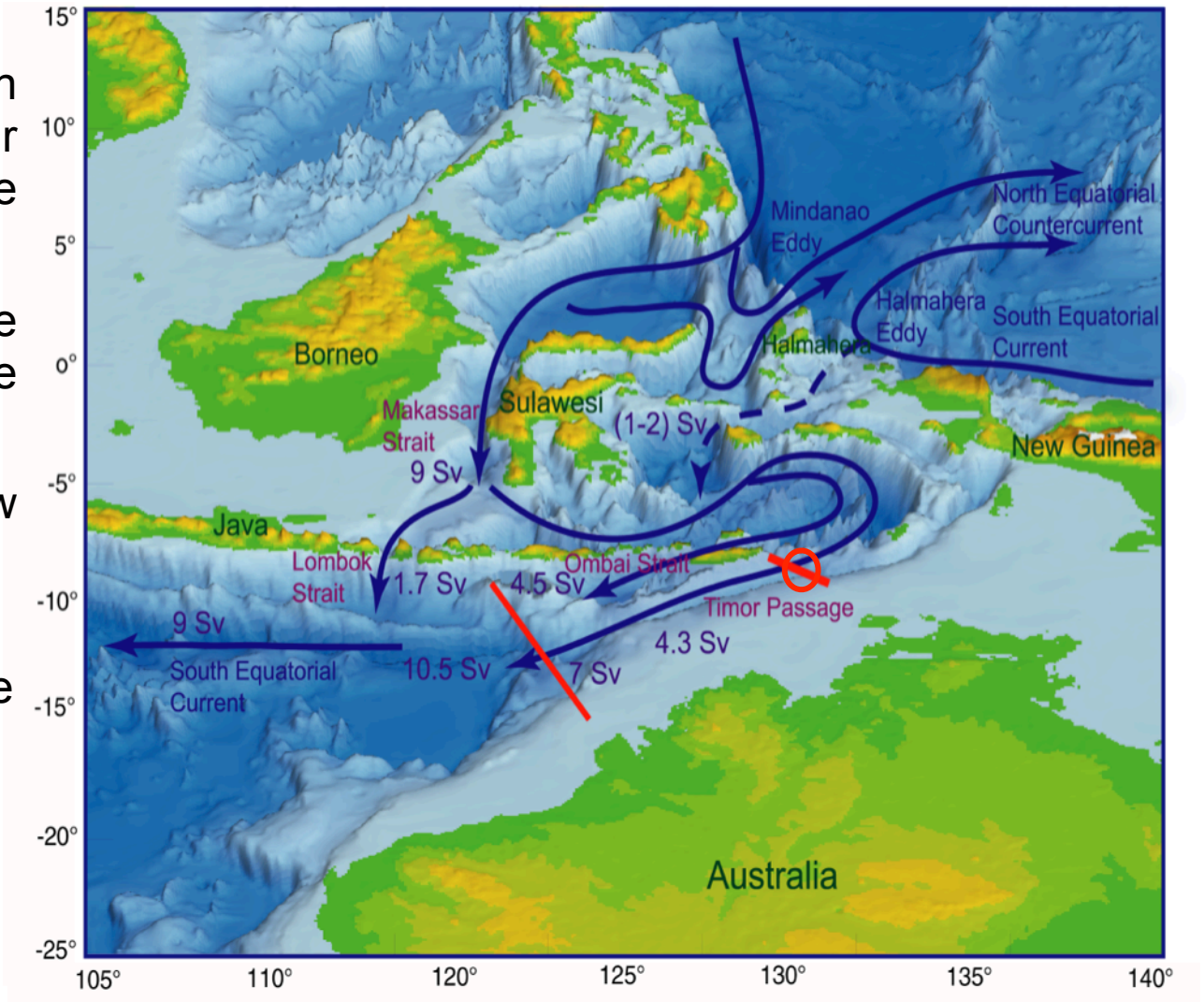
Overview

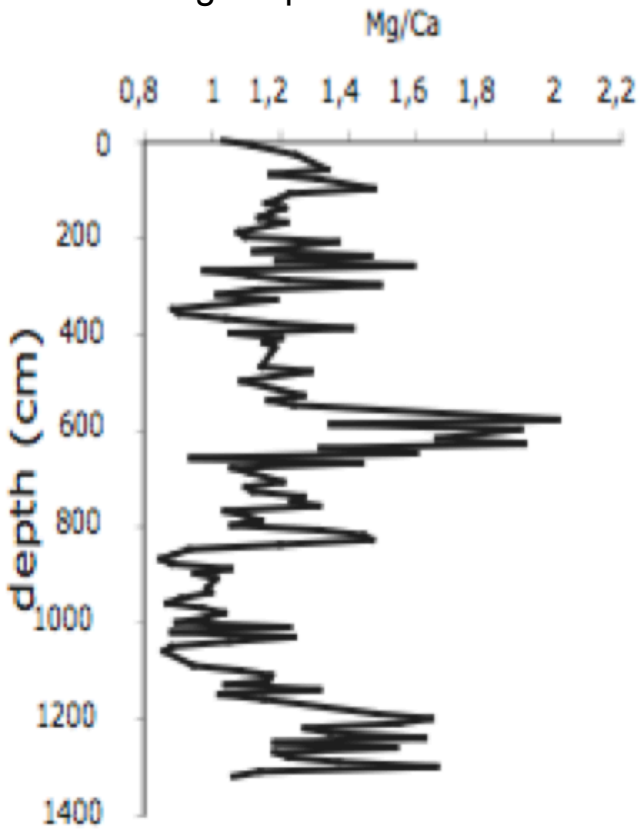
- Mg/Ca palaethermometry: preliminary results
- XRF core scanning: preliminary results
- Future work

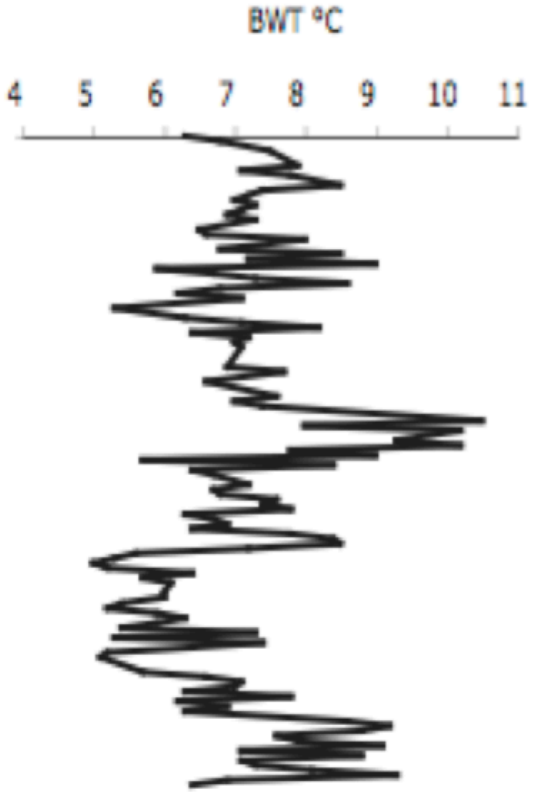
Core 18471-2

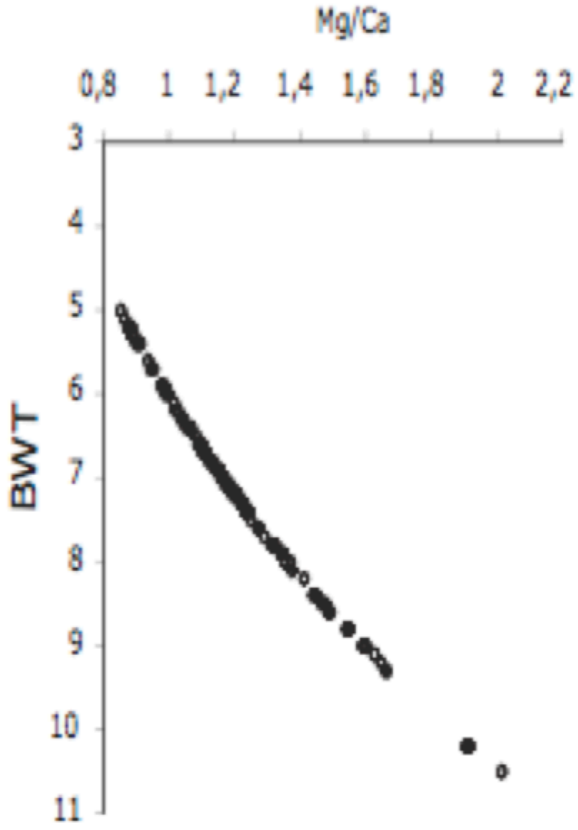
- The core has been collected in the Timor Passage, at the end of the most easterly transect.
- This area represents the outflow in the path of the ITF.
- The core is from a shallow water depth of 485 m.
- The shallow location of the core allows us to investigate about the bottom of the ITF with particular attention to the thermocline flow, for the first time in this area.



Results: Mg/Ca palaeothermometer







BWT = ln((Mg/Ca)/0.3894)/0.1564

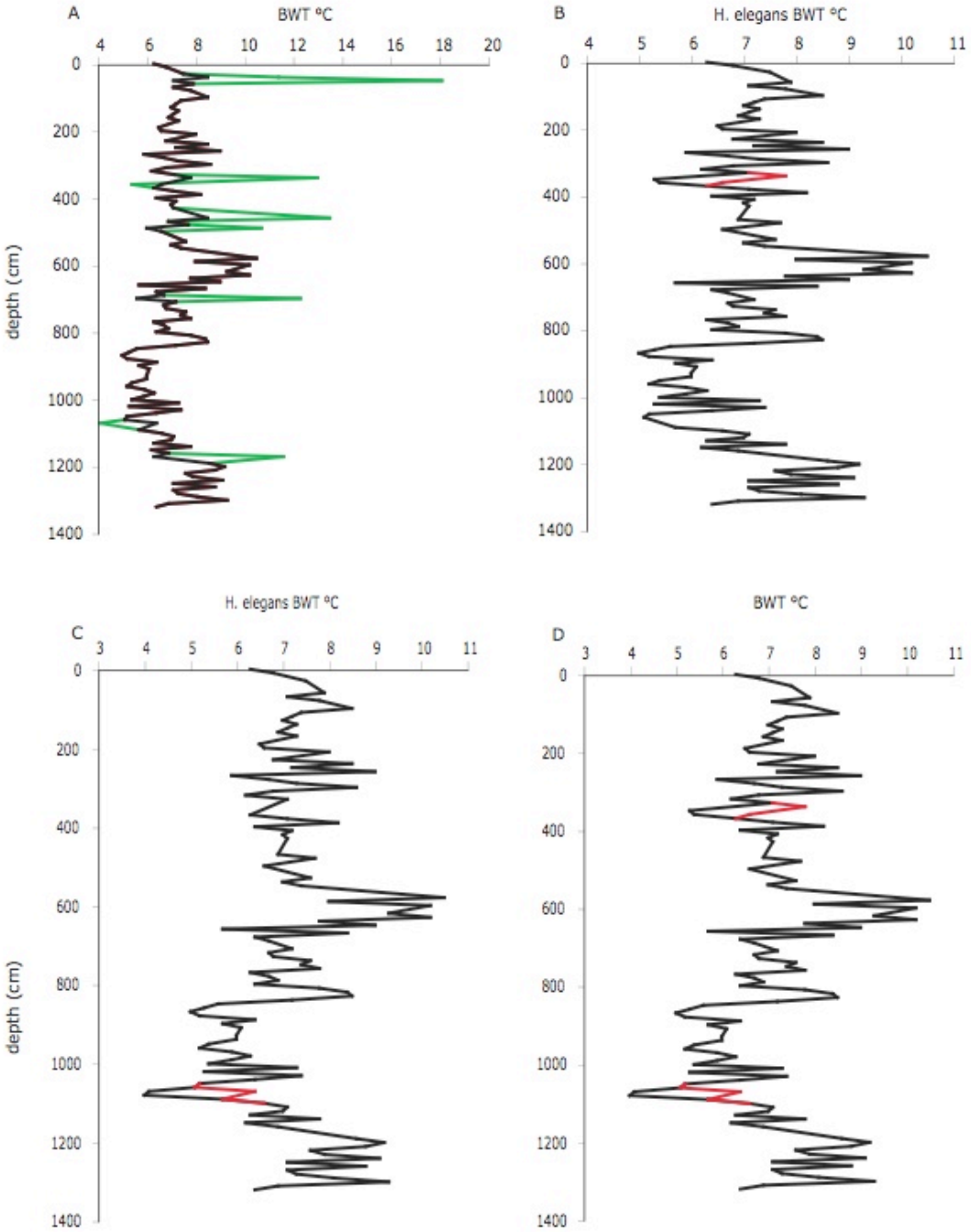
Fhlaithearta *et al*., 2010.

Temperature variability between:

5°C and 10.5°C

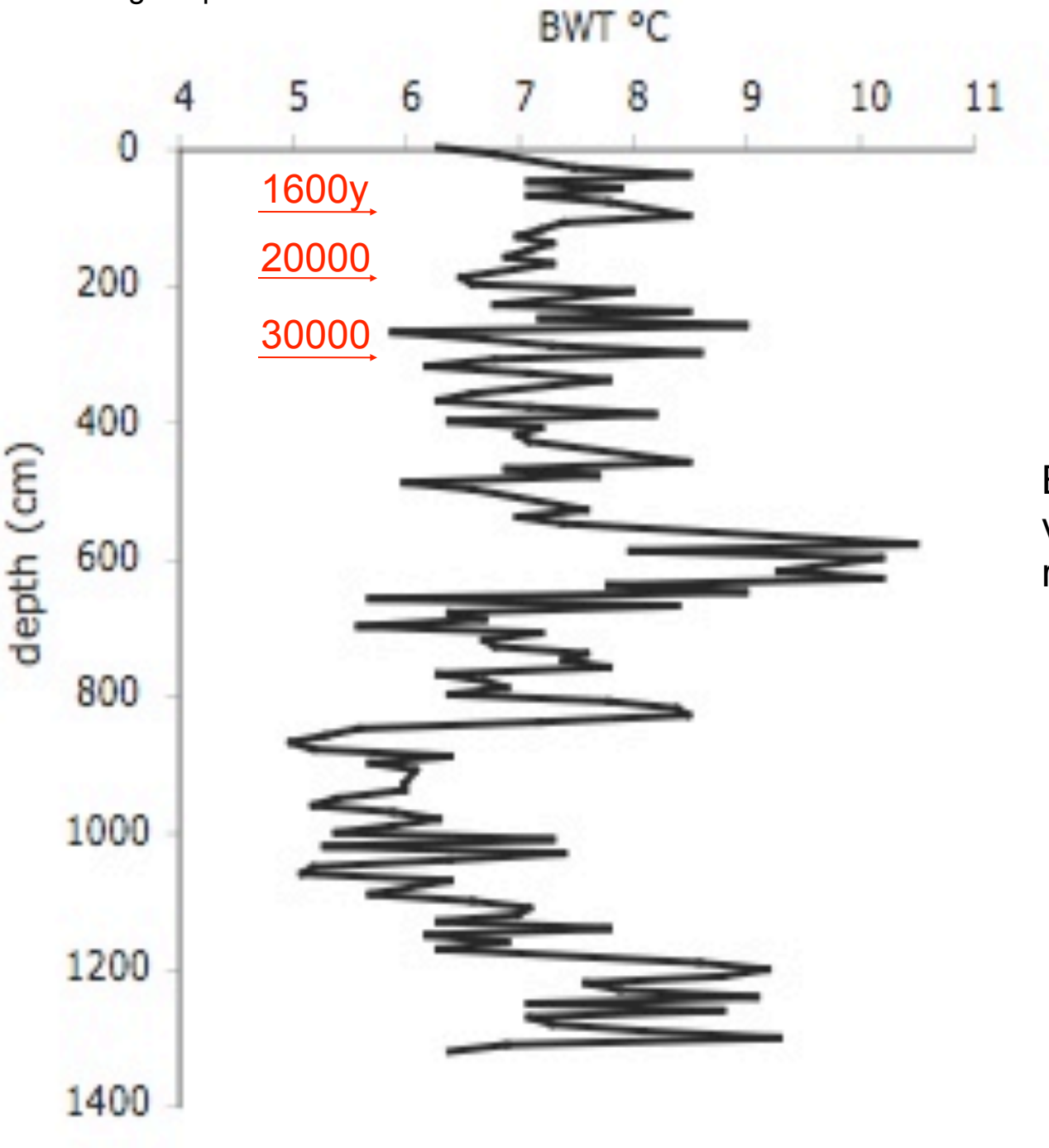
Modern BWT at 400-500 m varies between 7 and 8.5°C

Results: Mg/Ca palaeothermometer



8 samples showed odd values of Mg/Ca ratios so we reanalyzed them using *Cibicidoides wuellerstorfi* instead. The new Mg/Ca values were thus converted in BWT using Elderfield *et al*. (2006) equation and then added to the previous BWT trend.

Results: Mg/Ca palaeothermometer



BWT trend including 8 values from Mg/Ca ratios of *C. wuellerstorfi*

In summary:

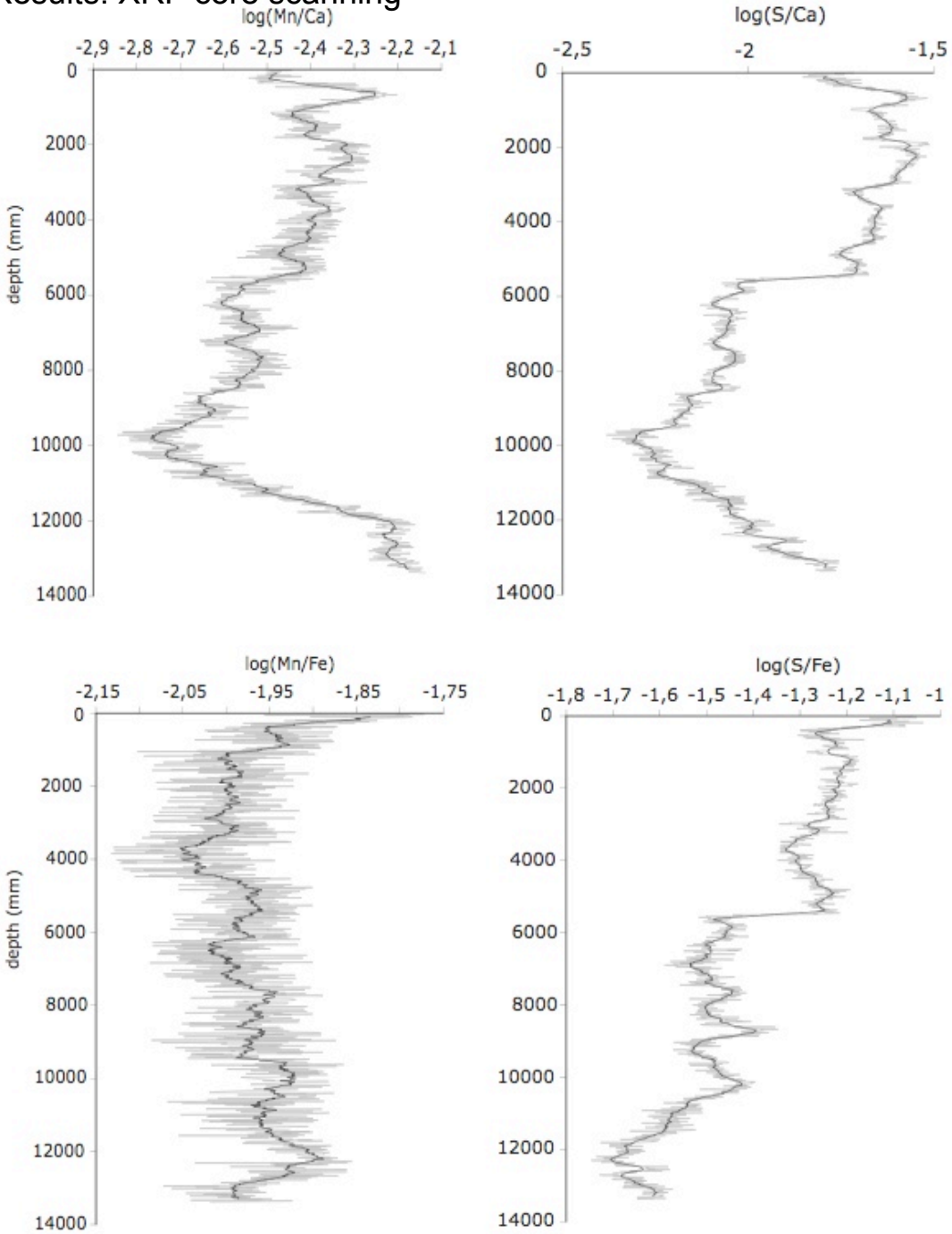
We obtain BWT fluctuating between 5°C and 10.5°C using to species of benthic foraminifers *H. elegans and C. wuellerstorfi.*

We analyzed about 200 samples including duplicates, but we still have 11 flyers (20, 90, 180, 220, 350, 450, 520, 920, 1082, 1182 and 1332 cm).

To solve this last problem, we will try to ablate some tests.

9 of 11 samples (450 and 520 don't) still have well preserved shells suitable for laser ablation.

Results: XRF core scanning

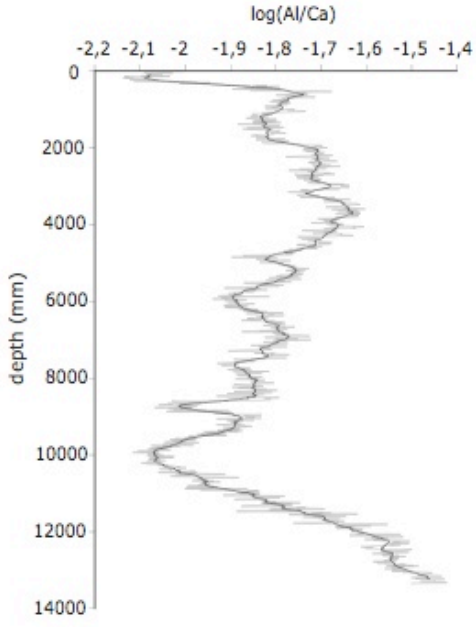


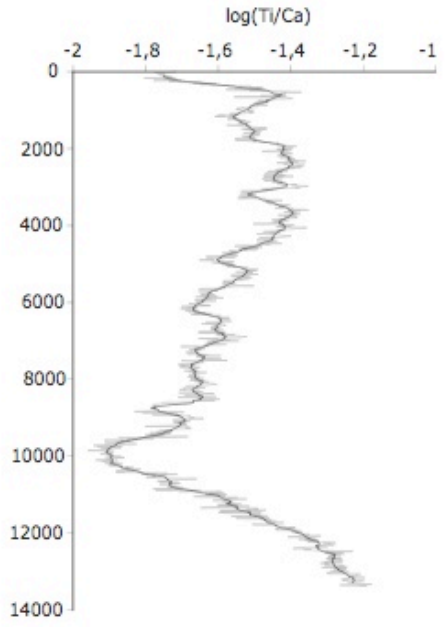
Oxygenation

Mn is a redox sensitive element which is remobilized from solid phase Mn oxide to dissolved Mn^{2+} during oxygen depleted bottom water conditions.

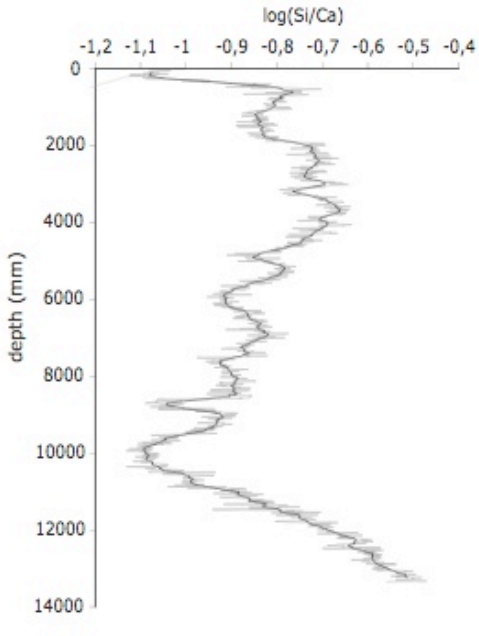
S indicates the degree of pyritization in sediments and consequently the oxygen conditions during sedimentation.

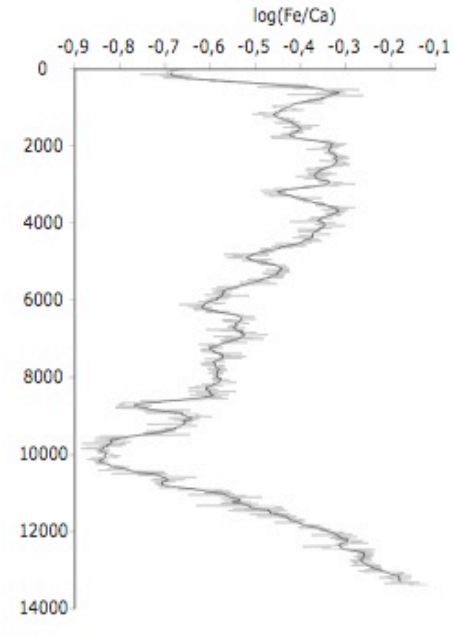
Results: XRF core scanning



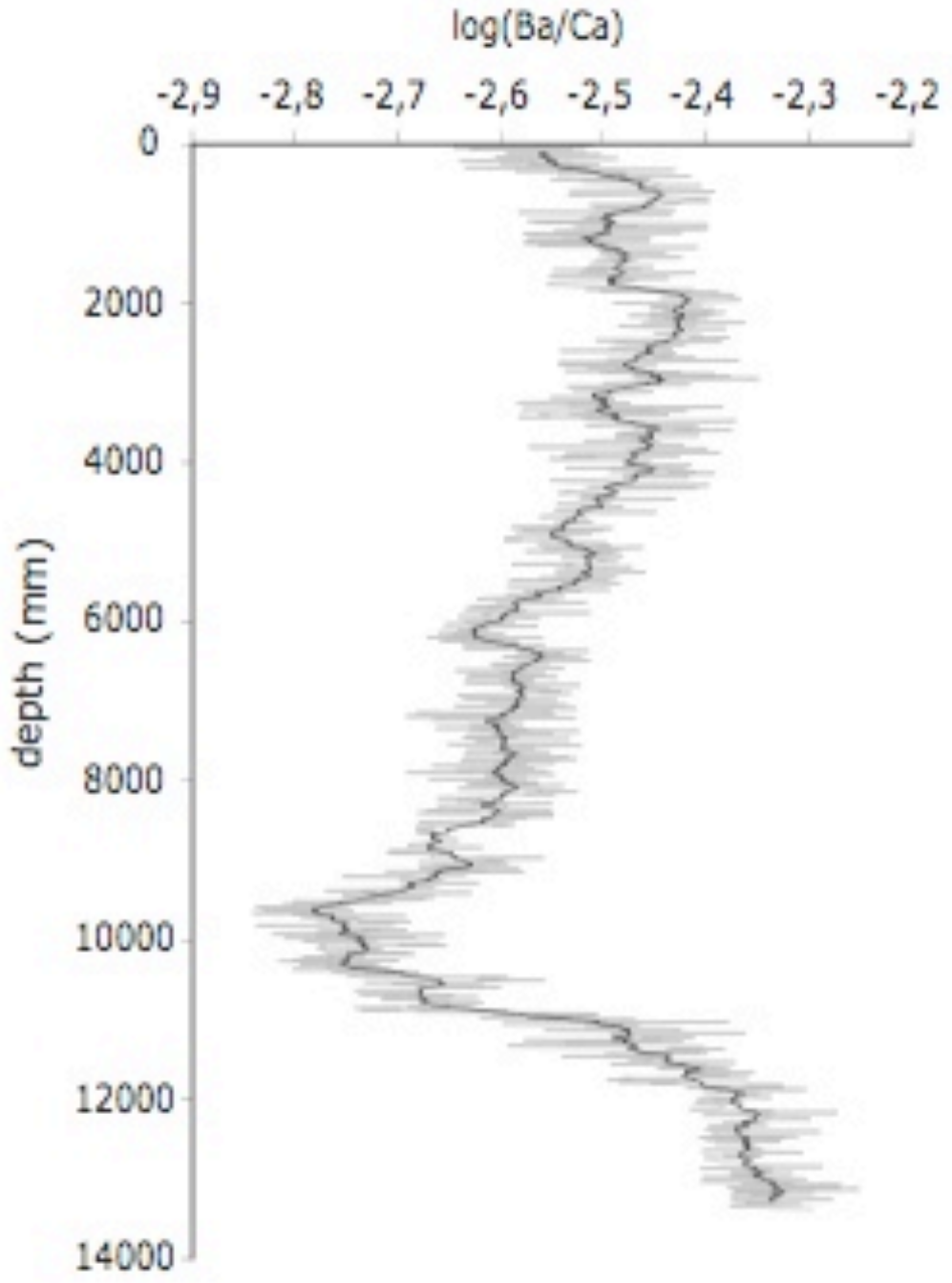


Terrigenous inputs





Results: XRF core scanning



Productivity

Marine sediments contain Ba mainly in the form of biogenic barite, so barite burial fluxes are a function of productivity.

Future work:

Laser ablation

Deepen XRF discussion

Benthic foraminifers assemblages

Build age model using AMS data and oxygen isotope, as soon as I receive them

PAPER

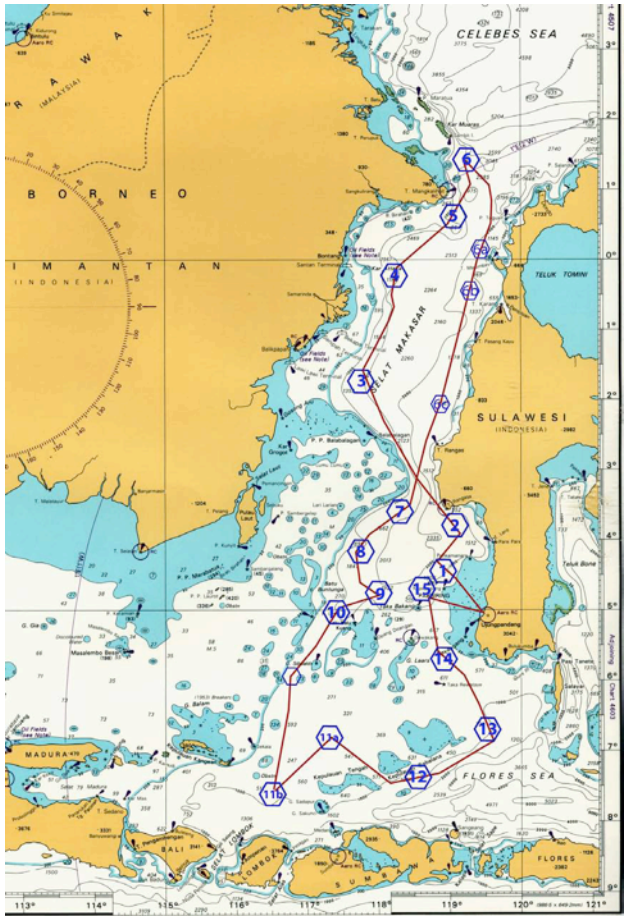
Start working on a new core retrieved during the “MAJA” cruise on board the R/V Sonne

Sonne 217 “MAJA”:

Variability of the Indonesian throughflow within the Makassar - Java Passage

Makassar - Singapore

25 July 2011 - 16 August 2011



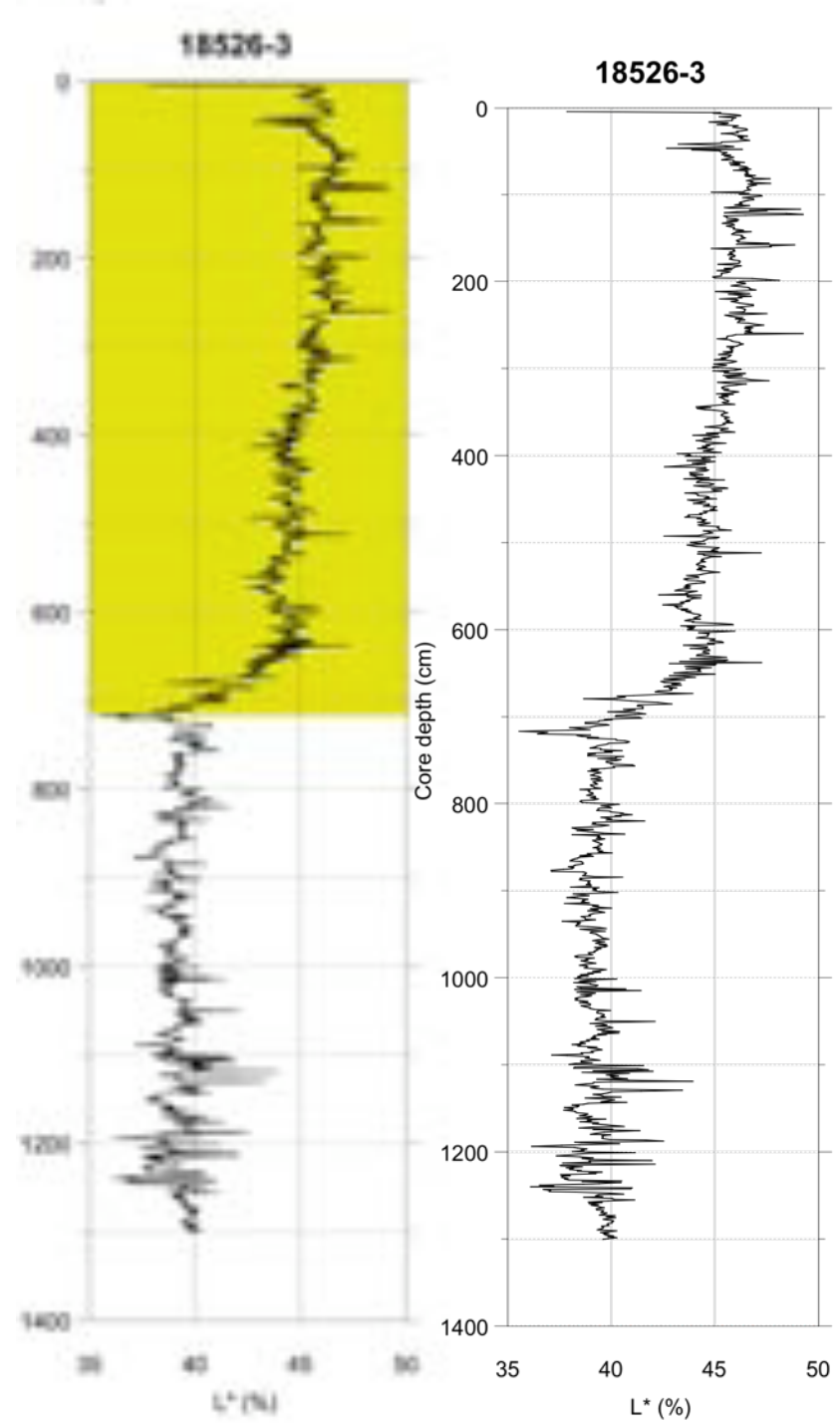
The main objectives of Cruise SO-217 MAJA are:

- to determine the isotopic and geochemical characteristics of North Pacific thermocline water and Java Sea low salinity surface water, which have formed the main components of the ITF over most of the Holocene;
- to evaluate present-day hydrograph as well as past changes in hydrographic profiles along the ITF main inflow path during the late Pleistocene;
- to reconstruct changes in summer and winter monsoonal systems and assess regional climate variability over the late Pleistocene to Holocene;
- to test model predictions of a strongly reduced glacial throughflow and significantly changed hydrographic profile within the Makassar Strait.

Sonne 217 “MAJA”

Future work:

- Modern hydrography of the Makassar Strait
- ITF current variability
- Freshwater outflow from Java Sea
- History of deep water ventilation
- Flores Sea upwelling, indicator of austral summer monsoon variability
- Monsoonal run off from Borneo and Sulawesi
- Volcanic history of Sulawesi and Java (Tambora)



A preliminary shipboard stratigraphy was developed using the lightness (L*) records from spectrophotometry. The most characteristic feature is the significant increase in L* in the early part of the last glacial termination resulting in consistently lighter (carbonate rich) Holocene sediments in contrast to dark, clay-rich glacial sediments. Using this change in sediment color as diagnostic for the end of the glacial maximum and early Termination 1 (occurring between ~18.3 and ~15 ka), we were able to provide a first estimate of sedimentation rates in most of the piston cores recovered during the SO-217 MAJA cruise.

Lightness (L*) records of a piston core from the southwestern part of the Makassar Strait and Java Sea. Holocene sedimentation is indicated in yellow.

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

THROUGHFLOW

C A U

Christian-Albrechts-Universität zu Kiel