

Quaternary Paleoenvironmental records of the Antarctic zone in SW Pacific sector : Preliminary results

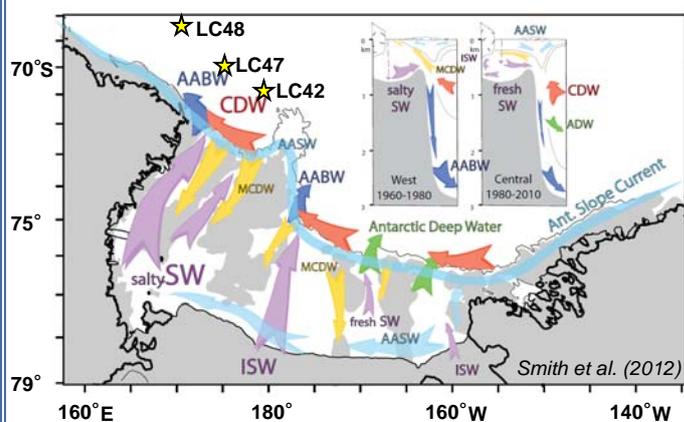
Min Kyung Lee¹, Kyu-Cheul Yoo¹, Jae Il Lee¹, Christian Ohneizer², Robert M McKay³, Sunghan Kim¹, Ho Il Yoon¹, Yeong Bae Seong⁴, Hyun Hee Rhee⁴
 mklee@kopri.re.kr

¹Korea Polar Research Institute, KOREA, ²University of Otago, New Zealand, ³Victoria University of Wellington, New Zealand, ⁴ Korea University, KOREA

Abstract

Three cores (RS15-LC42, -LC47, -LC48) were retrieved by long core system in Southern Ocean in proximity to the Ross Sea shelf in January, 2015 from the Korean RVIB Araon. The cores are generally composed of alternating massive light gray sandy mud and laminated greenish gray diatomaceous mud. Intermittent existence of IRDs on the whole core indicates that ice rafting contributed substantially to sediment deposition. Overall sediments include the traces of bioturbation. They contain diatoms and foraminifera, although diatoms are by far the dominant fossil present. Although study site is located near the late Cenozoic volcanic centers of Adare Peninsula and the Balleny islands, there is little evidence of volcanic contribution to the sediment. The chronology was roughly constructed based on paleomagnetism data by comparing with marine magnetic anomalies. Magnetic susceptibility (MS), concentrations of total organic carbon (TOC), biogenic opal, and CaCO₃, and grain size were measured at 1–5 cm intervals. Concentration of cosmogenic nuclide ¹⁰Be was measured at 30cm interval. Oxygen isotopic composition of foraminifera were analyzed. Here we present initial results from this core sediment.

Introduction



RS15 – LC42 (11.86 m)
 RS15 – LC47 (13.87 m)
 RS15 – LC48 (14.91 m)

a junction area between the Ross Sea and the Southern Ocean

Influenced by

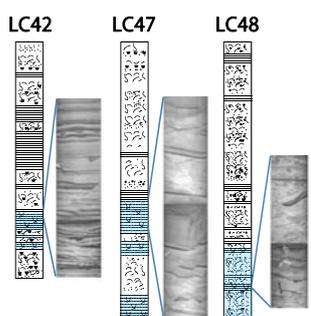
- 1) dense and salty High Salinity Shelf Water (HSSW)
- 2) warm Circumpolar Deep Water (CDW)
- 3) Antarctic slope current

Methods

- ✓ Paleomagnetism
- ✓ X-radiograph images
- ✓ Grain size analysis
- ✓ Magnetic susceptibility
- ✓ TOC, CaCO₃, biogenic opal analysis
- ✓ ¹⁰Be measurement
- ✓ Foram. O isotopes

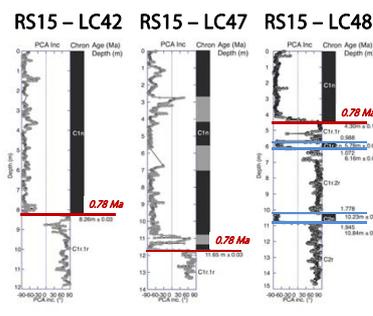
Results

Sedimentology



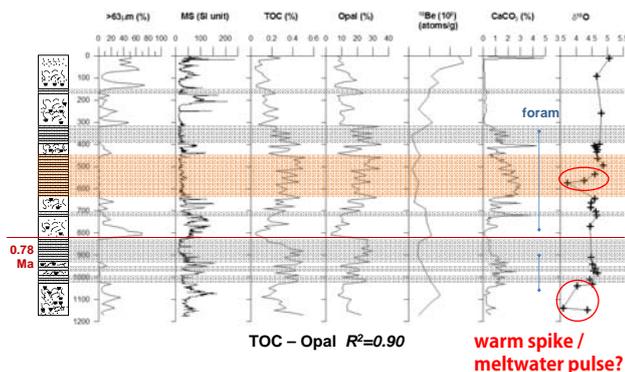
bioturbated – laminated facies
 (blue hatched : faulted)

Ages



LC48 : covers whole Pleistocene
 sedimentation rate: ~ 0.57cm/1000 yrs

RS15 - LC42



Discussion

1. LC42

no IRD – lamination preserved – ¹⁰Be ↓ – TOC ↑ – Opal ↑ – CaCO₃ ↑

- 1) cold : no IRD – fast sea ice – diatom abundant / high CaCO₃ ?
- 2) warm : open water – high productivity – foram occurred / no IRD?
 cold (polynya) or warm?

460~644cm : TOC ↓ – Opal ↓ – CaCO₃ ↑ – d¹⁸O (-) excursion (~ 1‰)
 warm SST / meltwater input ?

2. Different sedimentation pattern among LC42, 47, 48

: frequent occurrence of lamination in LC42

Future Plans

- ✓ Elaborate age model
- ✓ Opal analysis (LC47)
- ✓ d¹³C, d¹⁵N analysis (LC42, LC48)
- ✓ diatom assemblages (LC42)
- ✓ SST proxies (biomarker)