



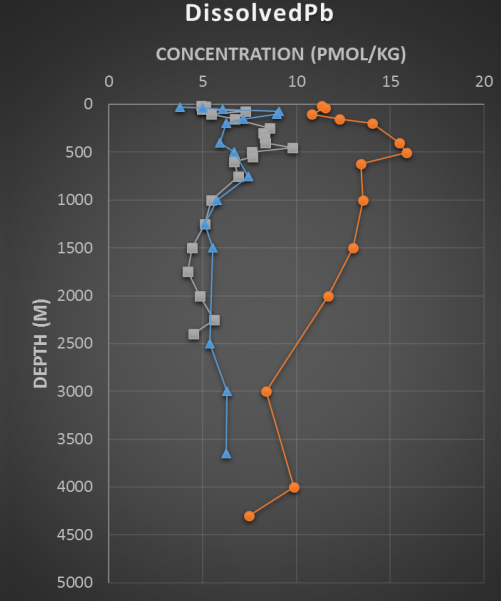
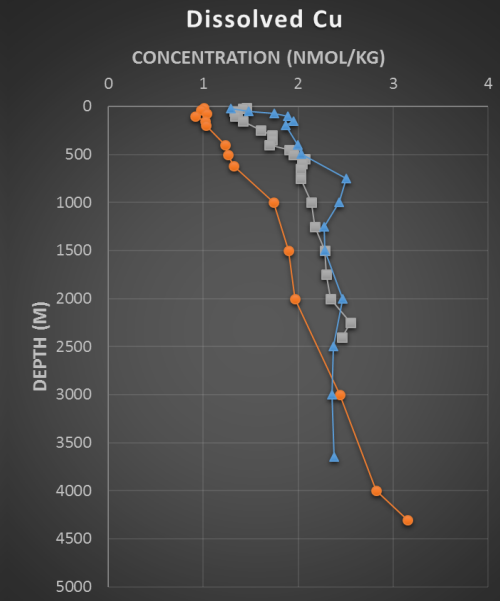
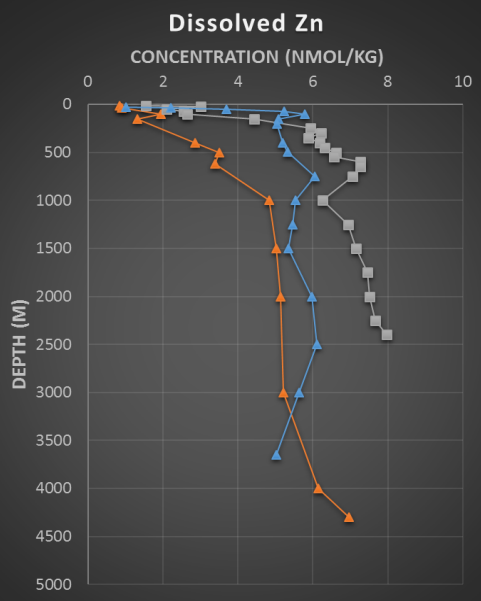
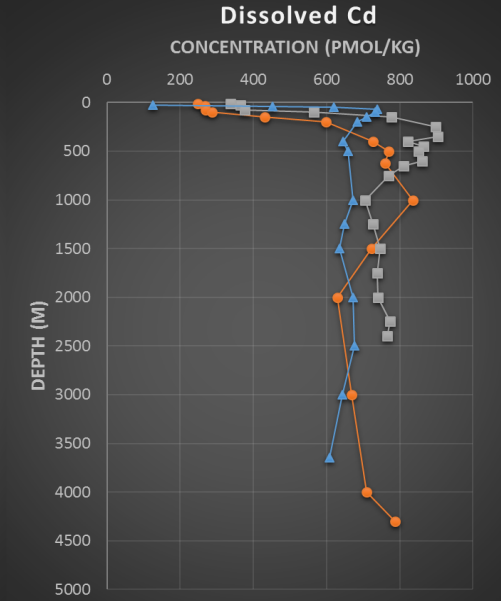
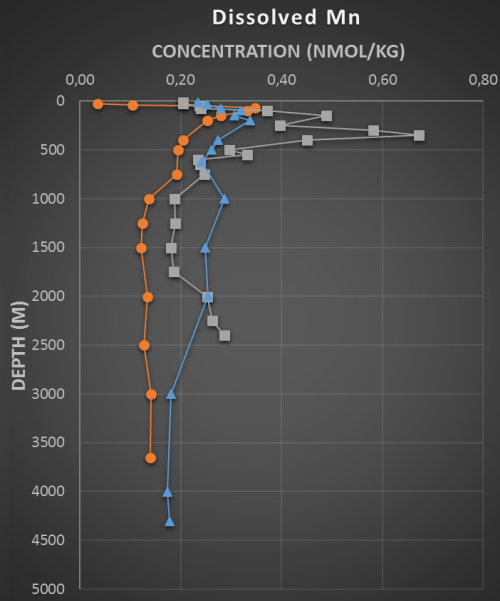
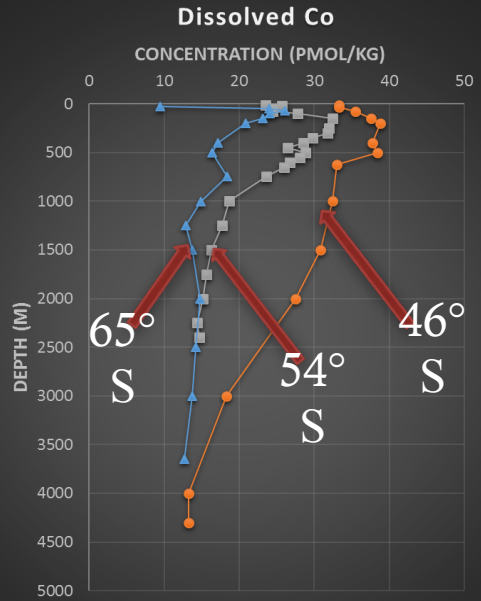
BIOACTIVE TRACE METALS: SOUTHERN OCEAN, ATLANTIC SECTOR

Alakendra Roychoudhury

CENTRE FOR TRACE & EXPERIMENTAL BIOGEOCHEMISTRY
STELLENBOSCH UNIVERSITY



TRACE METAL PROFILES



CEN

STRY

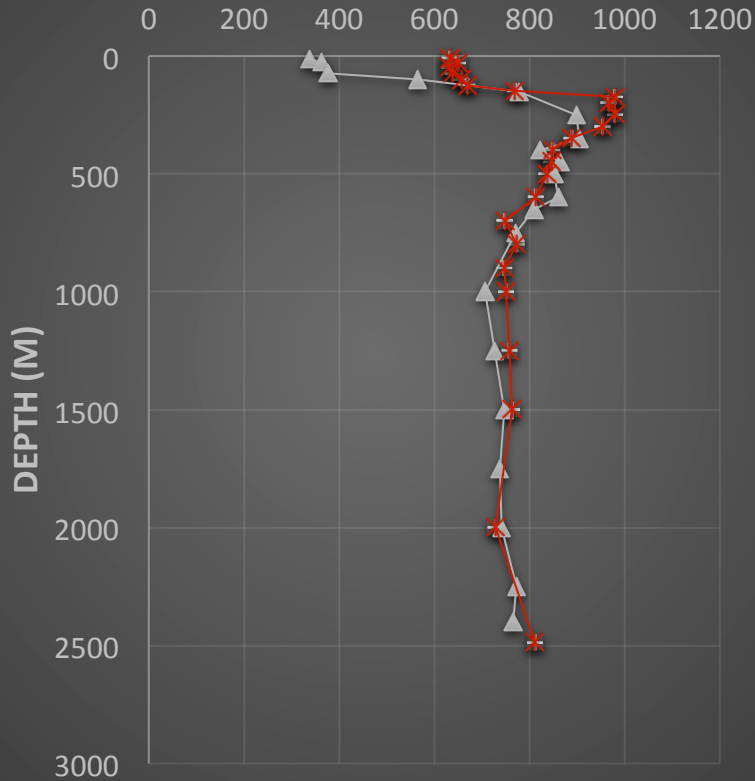


SUMMER VS WINTER SOUTHERN OCEAN, ATLANTIC

CENTRE FOR TRACE & EXPERIMENTAL BIOGEOCHEMISTRY
STELLENBOSCH UNIVERSITY

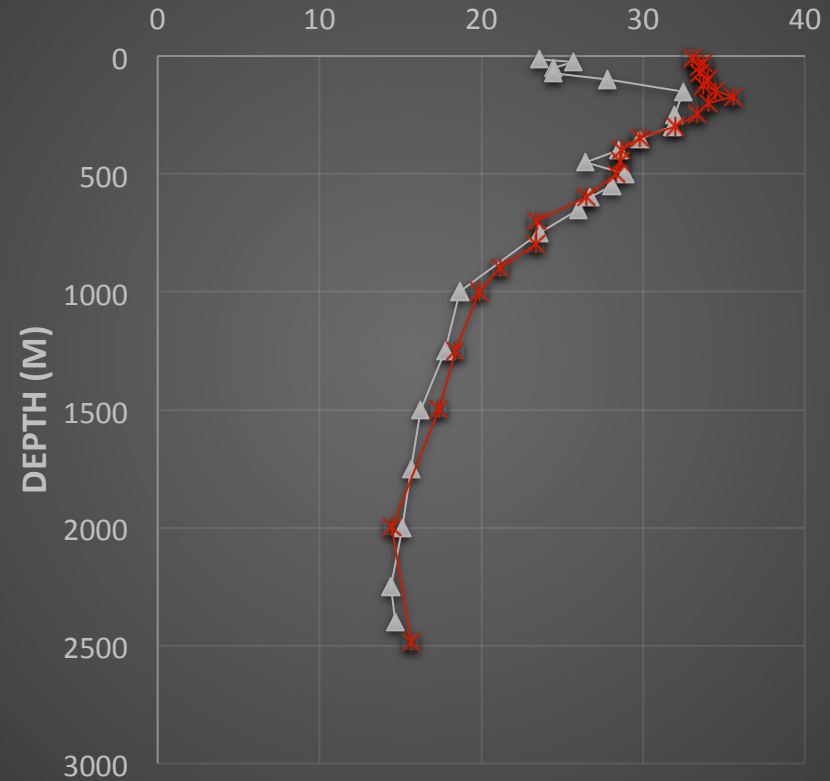


DTM3 (54°S) Meridional Depth vs [Cd] CONCENTRATION (PMOL/KG)



—▲— S54 DTM3 (54S) DCd
—*— SOSCEX III DTM3 (54S) DCd

DTM3 (54°S) Meridional Depth vs [Co] CONCENTRATION (PMOL/KG)

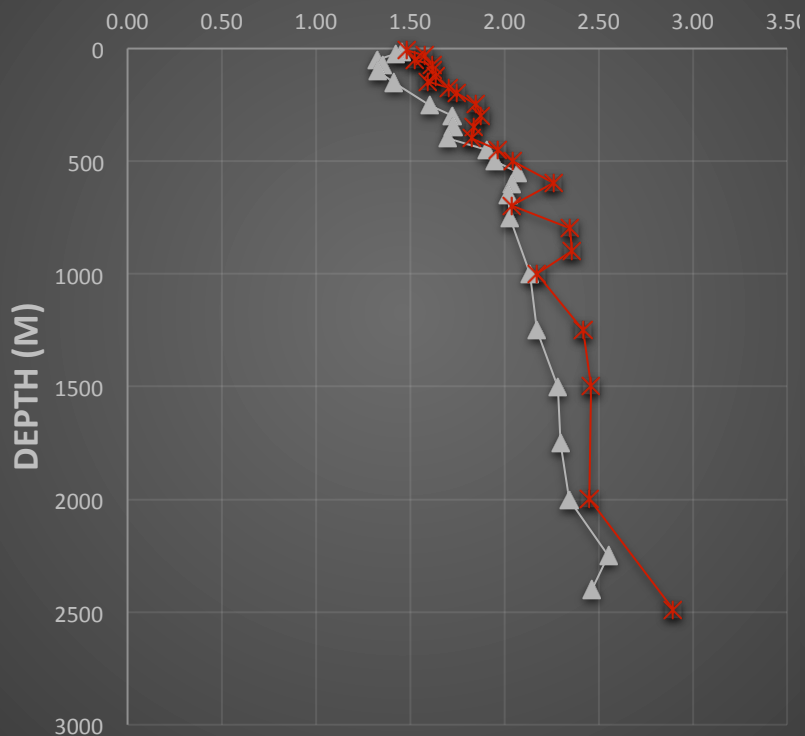


—▲— S54 DTM3 (54S) DCo
—*— SOSCEX III DTM3 (54S) DCo



DTM3 (54°S) Meridional Depth vs [Cu]

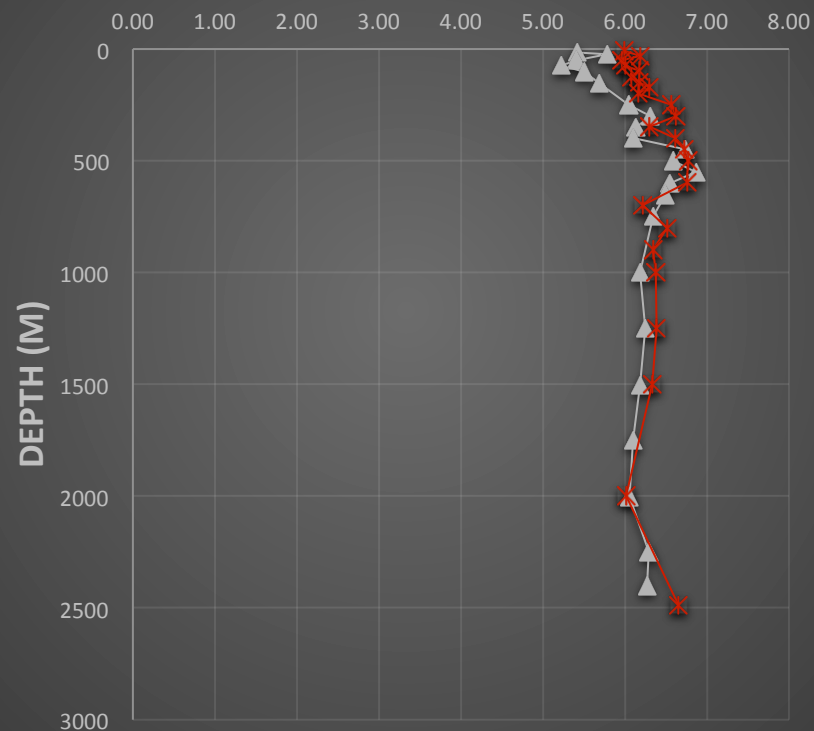
CONCENTRATION (NMOL/KG)



—▲— S54 DTM3 (54S) DCu
—*— SOSCEX III DTM3 (54S) DCu

DTM3 (54°S) Meridional Depth vs [Ni]

CONCENTRATION (NMOL/KG)

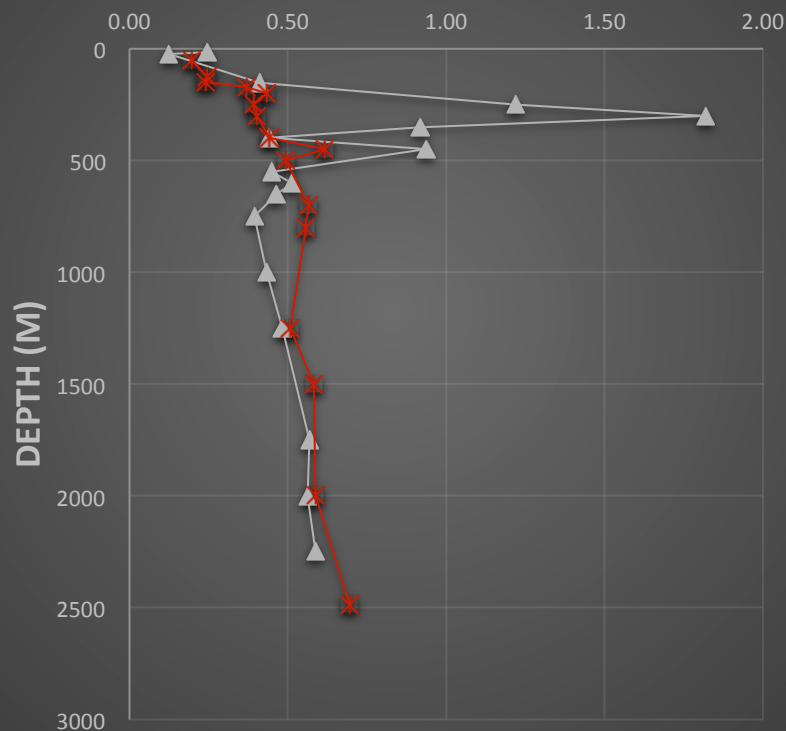


—▲— S54 DTM3 (54S) DNi
—*— SOSCEX III DTM3 (54S) DNi



DTM3 (54°S) Meridional Depth vs [Fe]

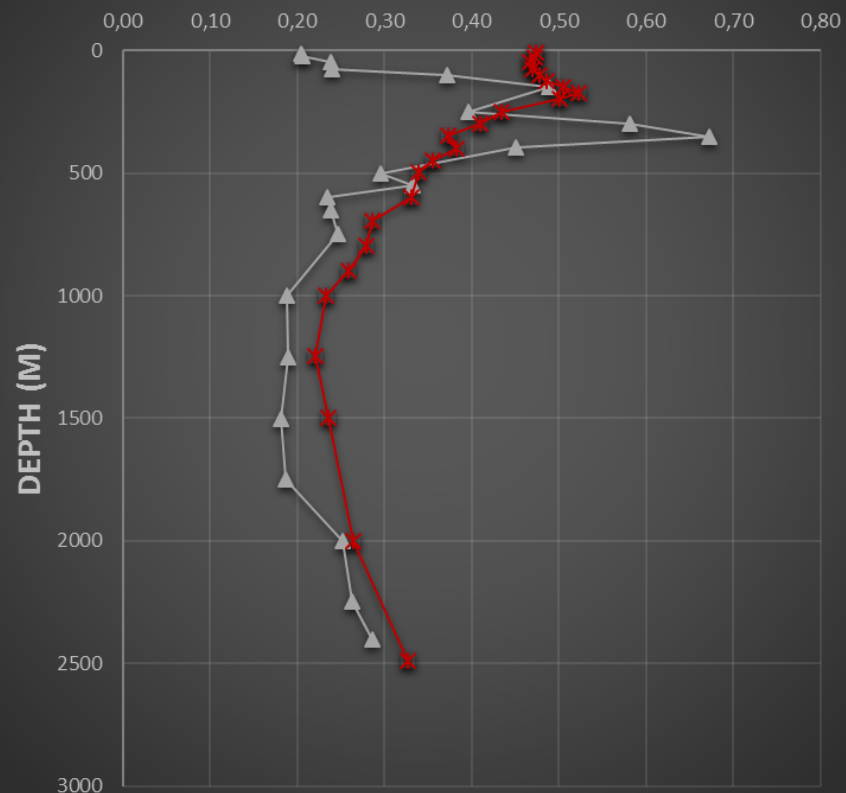
CONCENTRATION (NMOL/KG)



—▲— S54 DTM3 (54S) DFe
—*— SOSCEX III DTM3 (54S) DFe

DTM3 (54°S) Meridional Depth vs [Mn]

CONCENTRATION (NMOL/KG)

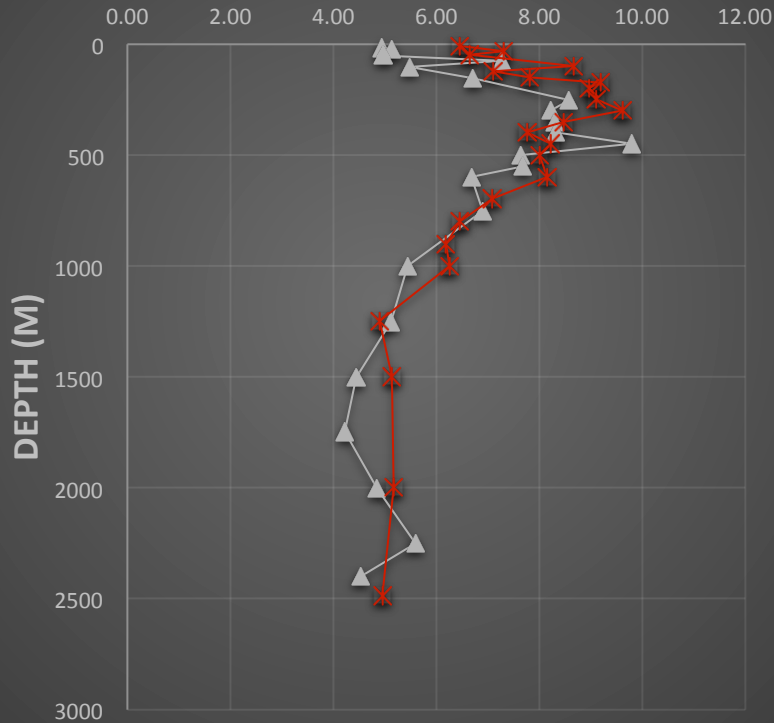


—▲— S54 DTM3 (54S) DMn —*— SOSCEX III DTM3 (54S) DMn



DTM3 (54°S) Meridional Depth vs [Pb]

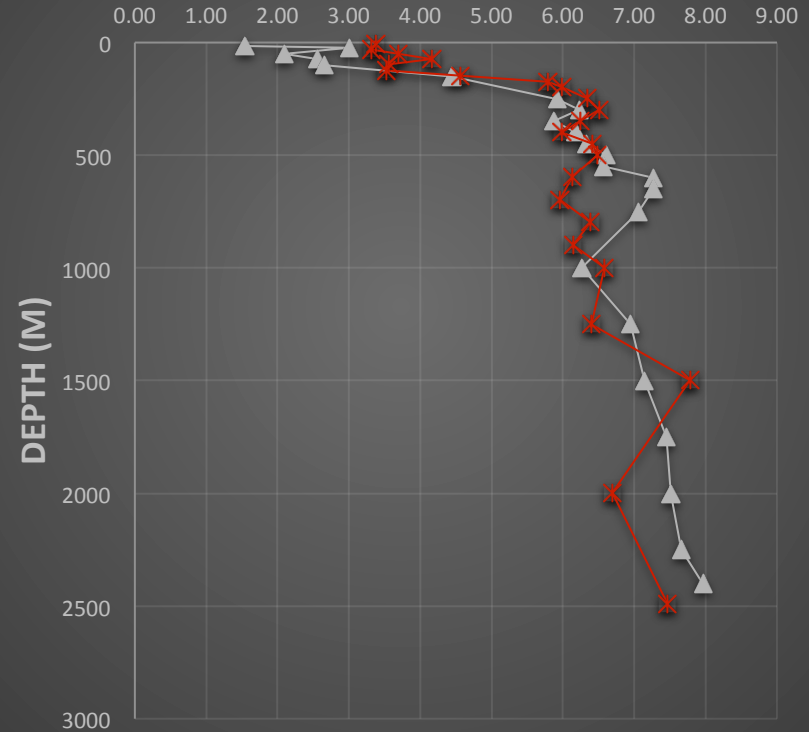
CONCENTRATION (PMOL/KG)



—▲— S54 DTM3 (54S) DPb
—*— SOSCEX III DTM3 (54S) DPb

DTM3 (54°S) Meridional Depth vs [Zn]

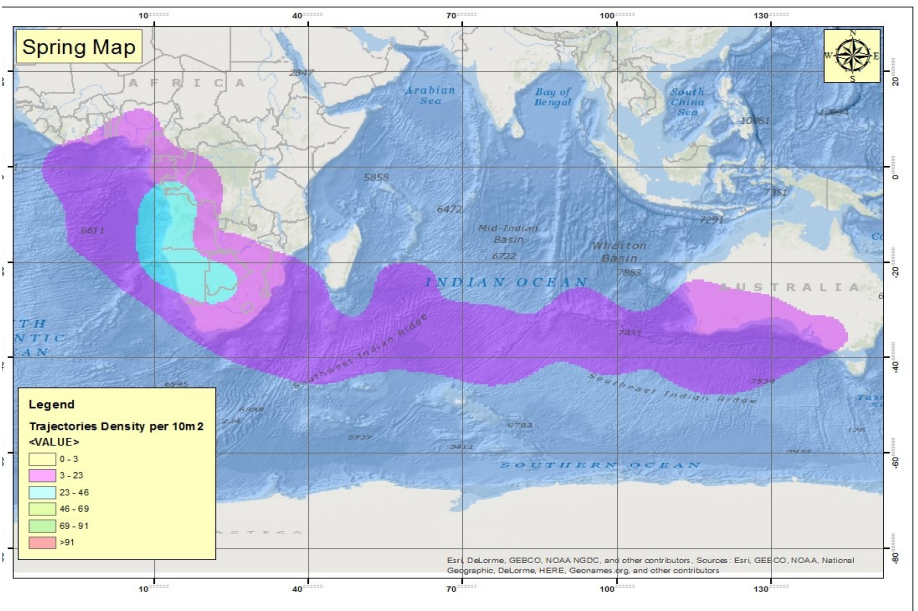
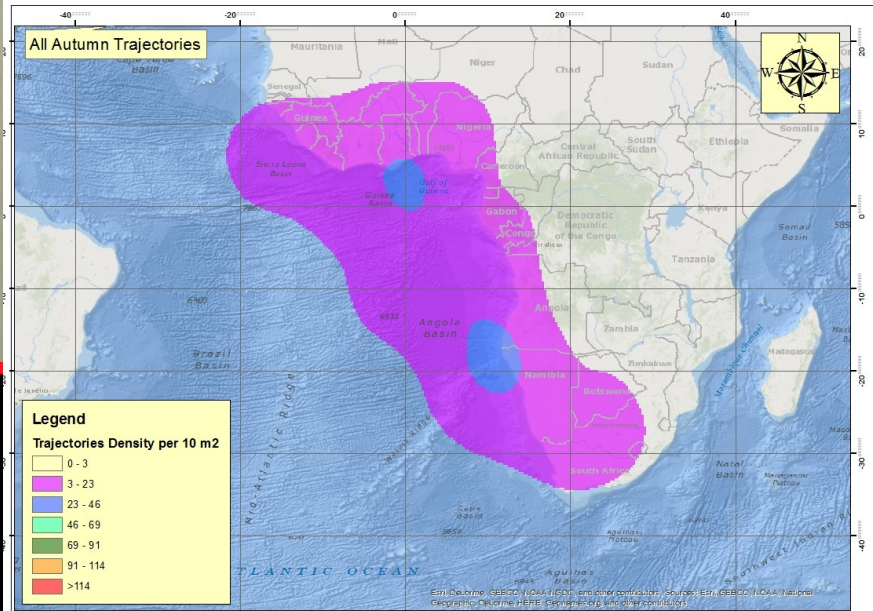
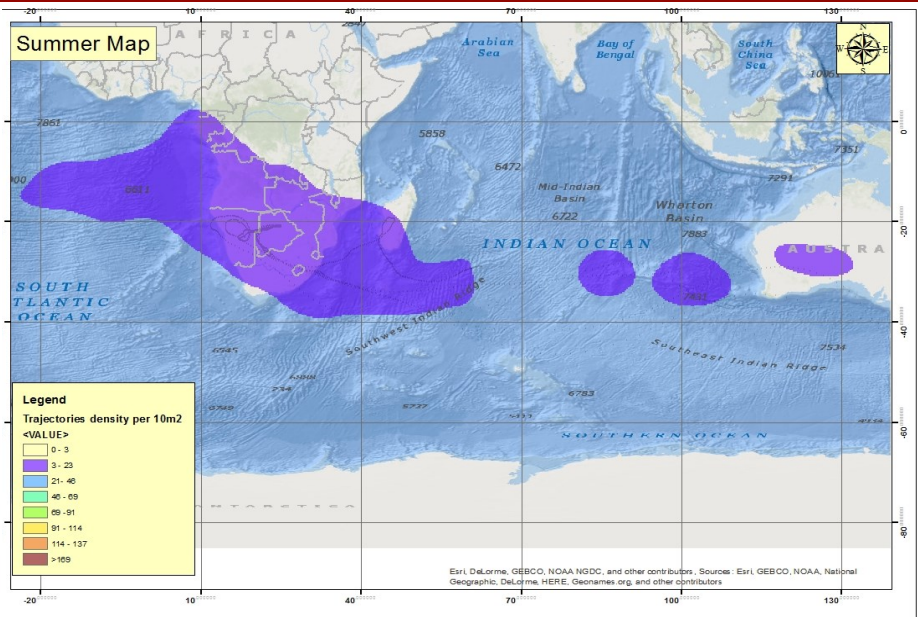
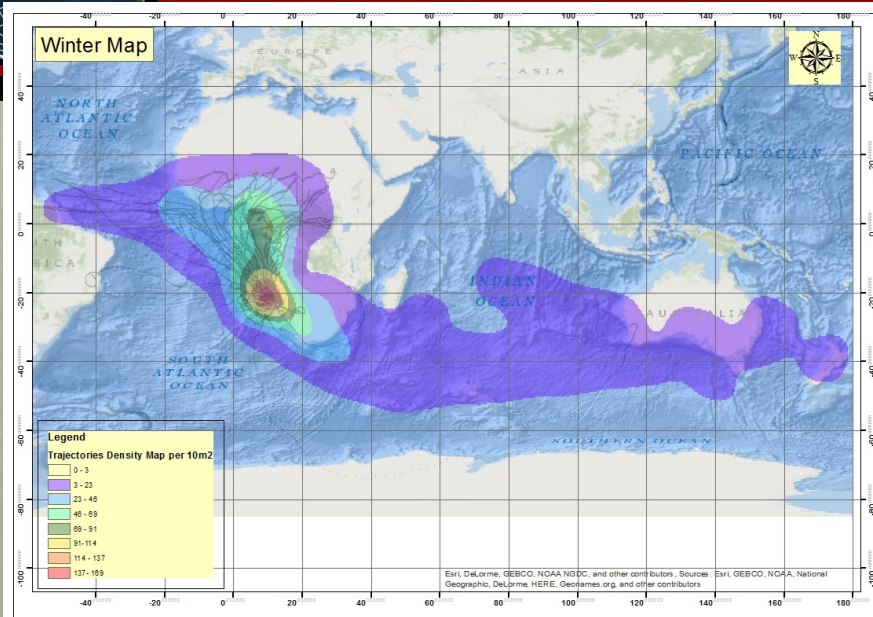
CONCENTRATION (NMOL/KG)



—▲— S54 DTM3 (54S) DZn
—*— SOSCEX III DTM3 (54S) DZn

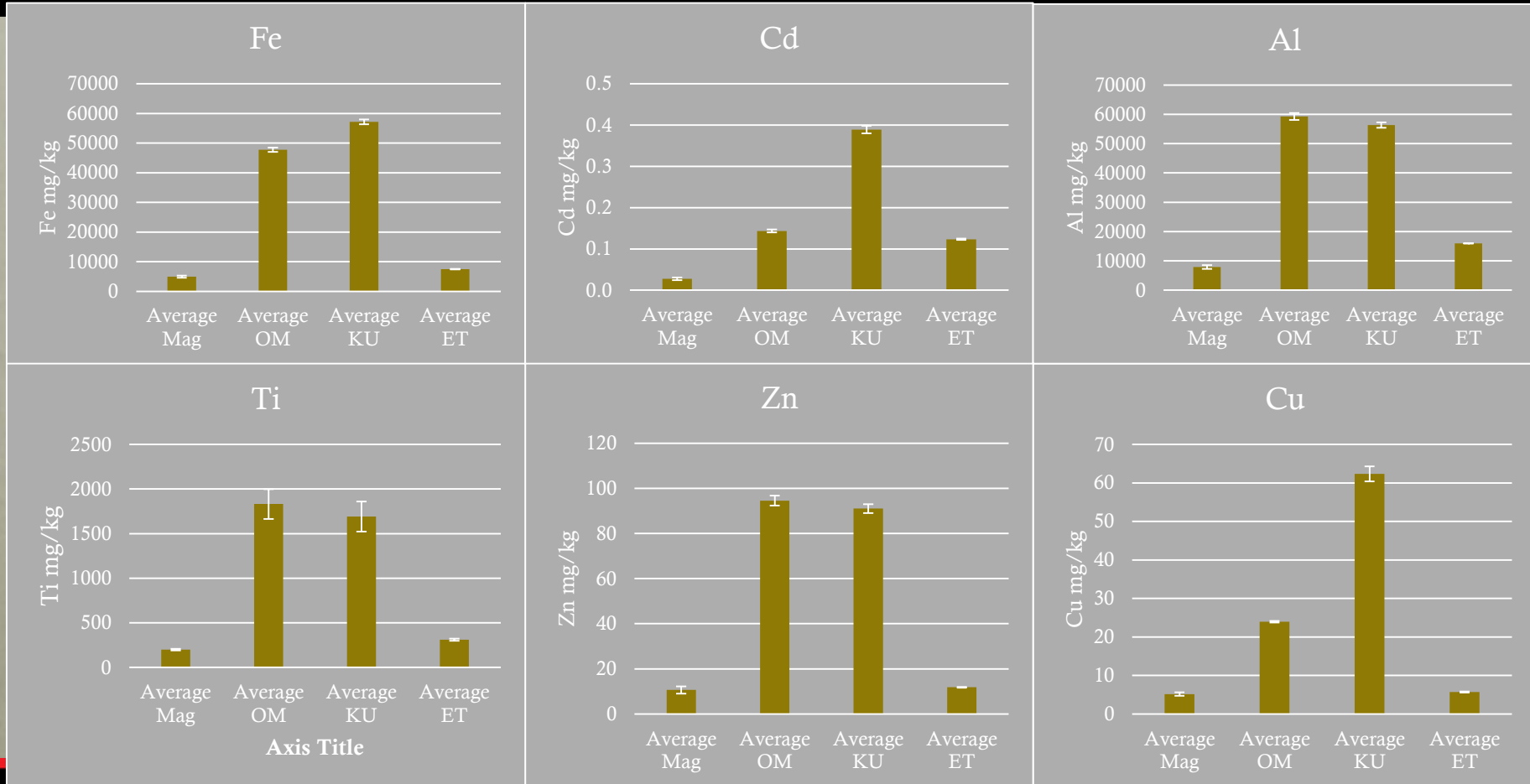


DIFFERENT SEASONS





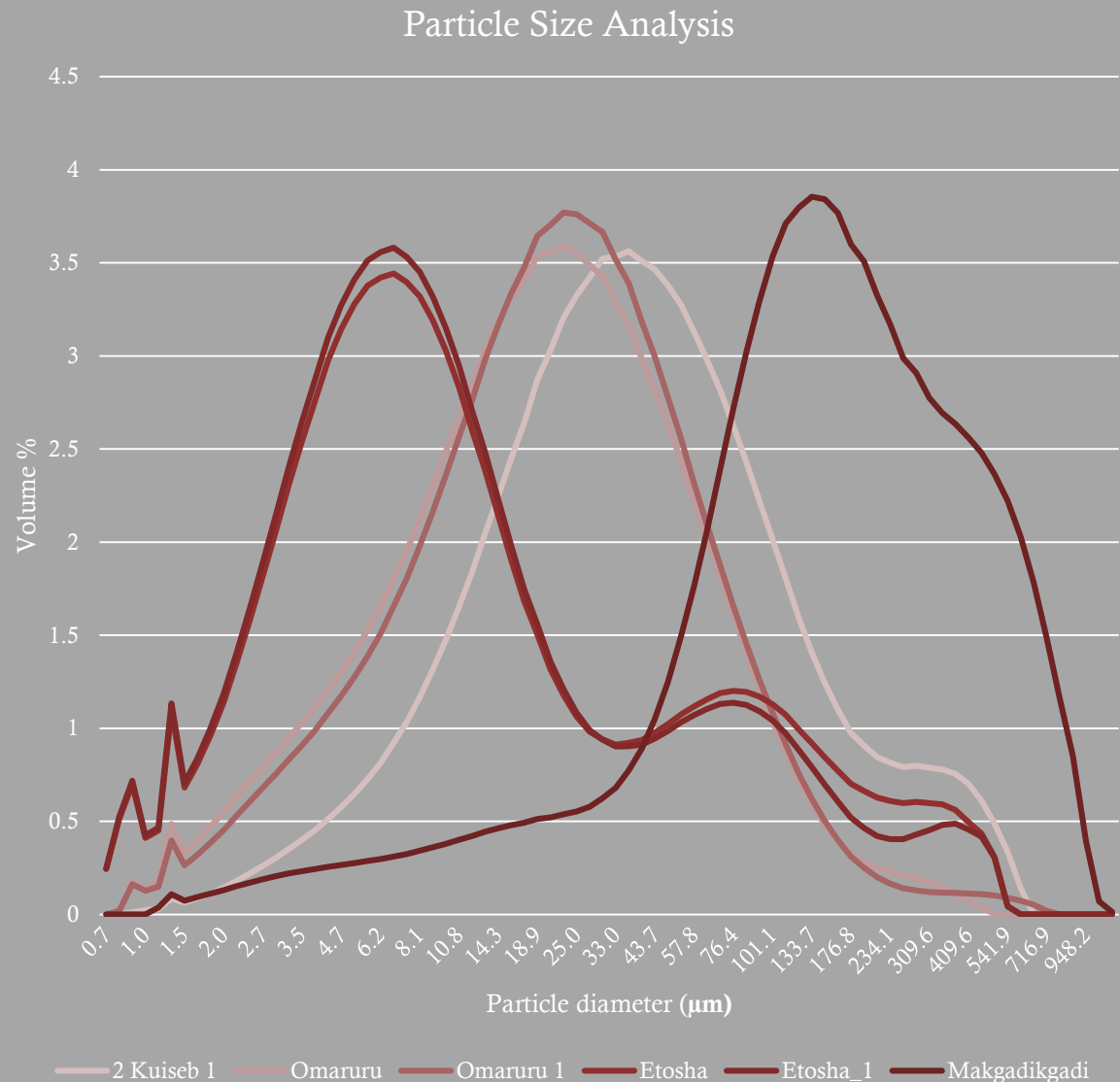
TRACE ELEMENTS COMPOSITION





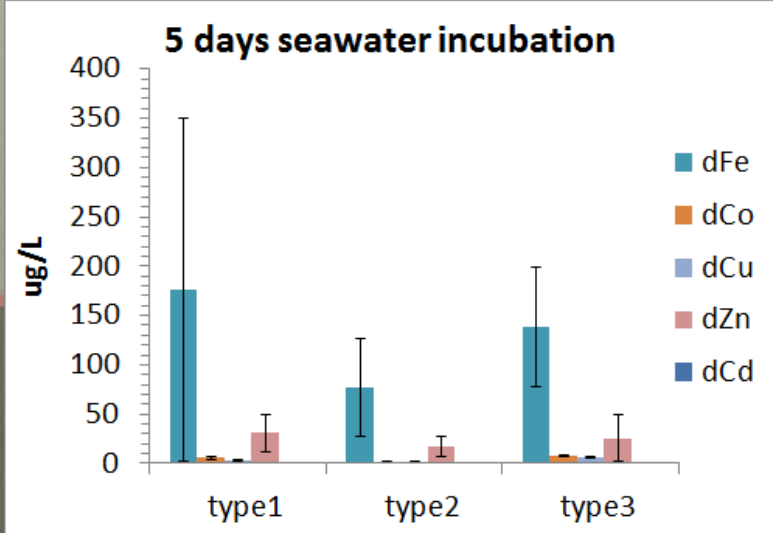
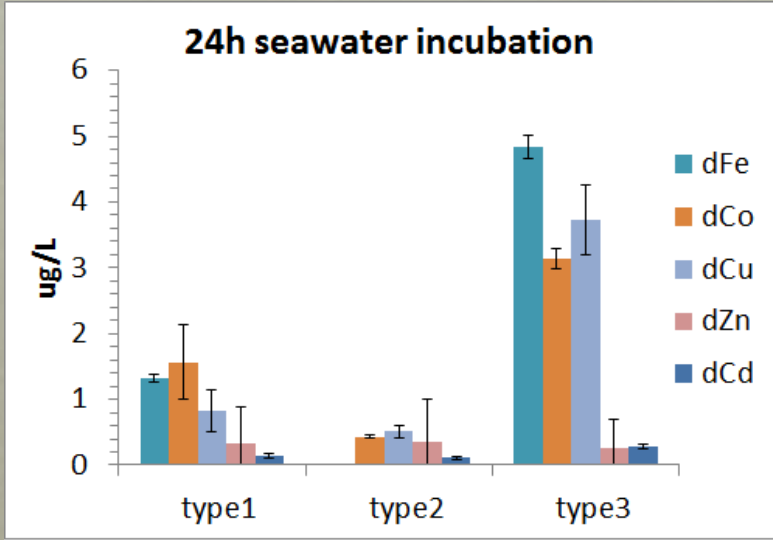
PARTICLE SIZE ANALYSIS

- Particle size can influence solubility, finer the grain size
- Finer grained can travel further ($>50 \mu\text{m} = \text{few km}$), ($15 \mu\text{m}$ to $50 \mu\text{m} = \text{tens to thousands of km}$), ($< 15 \mu\text{m} = \text{travel thousands of km}$ before being removed from atmosphere by depositional processes)
- **Model** mainly works for **dry terrains**, such as southern Africa
- Particle size analysis a good indicator of **transport distance**





What's in Southern Hemisphere dust & How do the eolian trace metals become bioavailable in the SO?



Paytan et al. 2009:
 Toxicity threshold for Cu from aerosols
 0.4 μg of Cu / μg Chl

Example @46°S
 Type 1: 0.9 μg Cu/0.4 μg Chl
non-toxic
 Type 3: 3.8 μg Cu/0.4 μg Chl
toxic(?)

