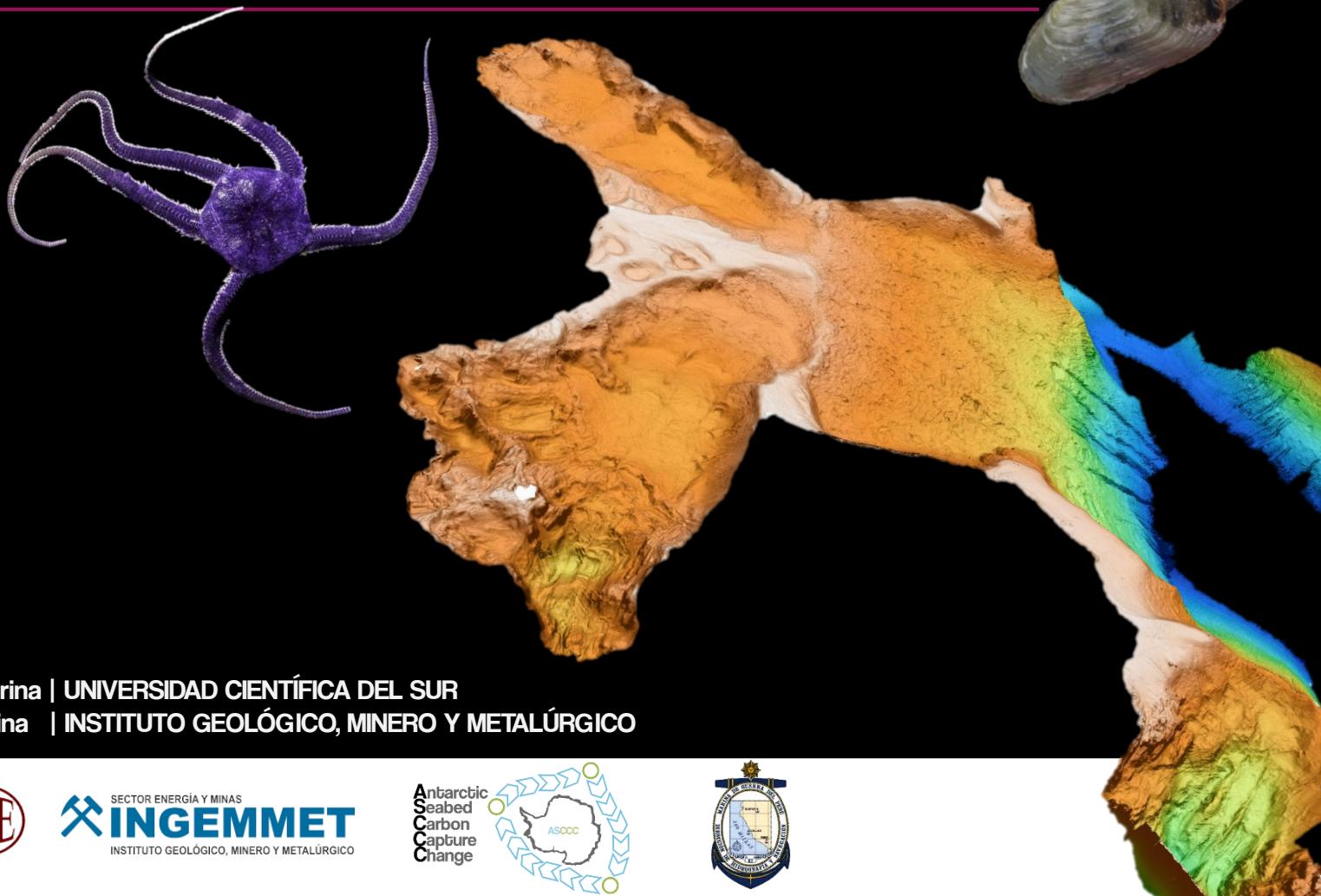


FUNCTIONAL ANALYSIS of the SPATIOTEMPORAL DISTRIBUTION of the MACROBENTHOS associated to BATHYLITHOLOGICAL aspects & ENVIRONMENTAL VARIABLES at the Mackellar Inlet, KGI, Antarctica



[†] Bernabé Moreno

[†] Cesar O. Pacherres

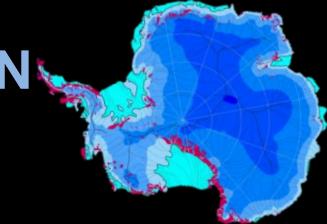
[†] Aldo G. Indacochea

^{*} Luis Cerpa

[†] Laboratorio de Biología Marina | UNIVERSIDAD CIENTÍFICA DEL SUR

^{*} Programa de Geología Marina | INSTITUTO GEOLÓGICO, MINERO Y METALÚRGICO

INTRODUCTION

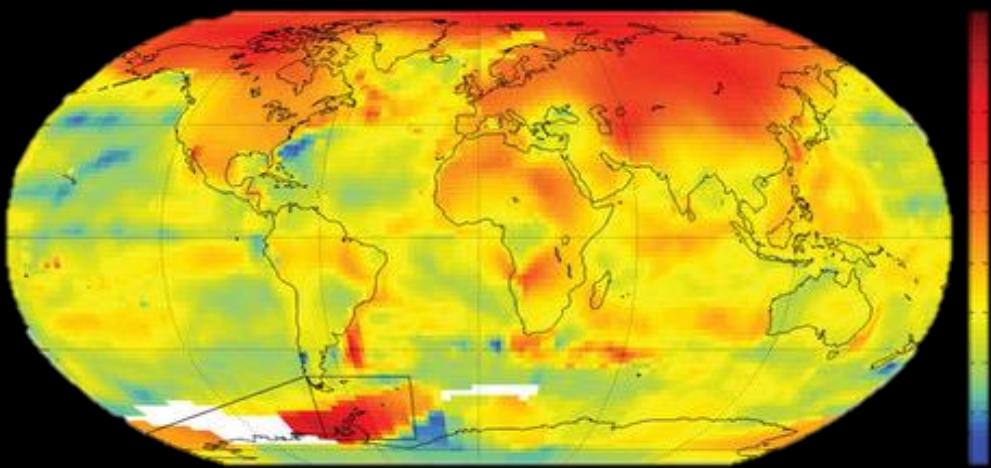


Antarctic Peninsula

- Recent Rapid Regional warming in last 50 yrs
- Ice shelves collapse / Glacier mass loss

King George Island

- Intensively sampled
- Highly vulnerable, antarctic maritime island



Mulvaney *et al.* 2012 | Nature

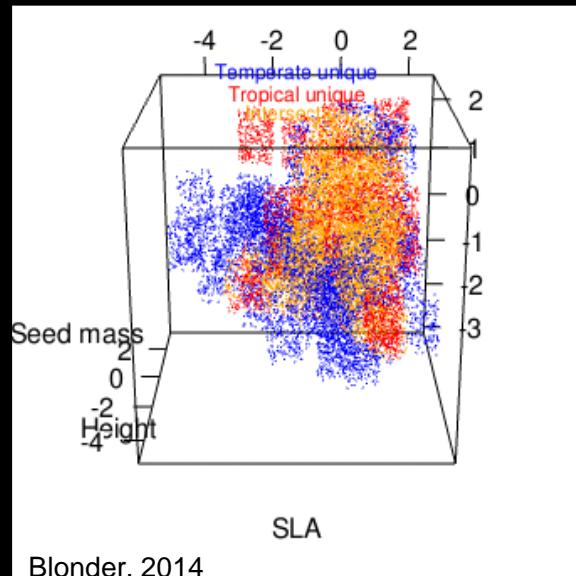
Δ Ecosystem structure/functioning
Δ Biogeographic patterns and thresholds

INTRODUCTION

Functional Classification

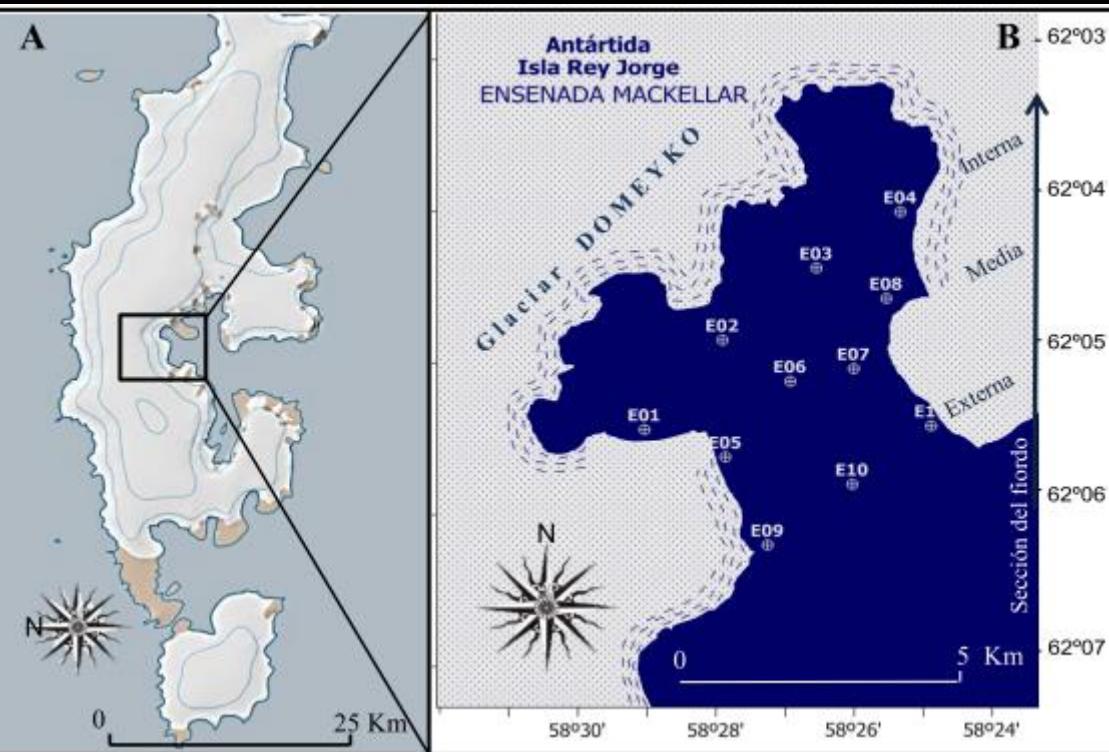
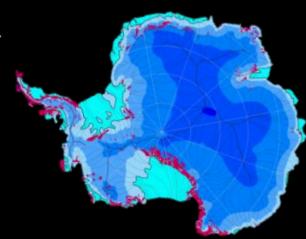


- **TAXONOMIC approach**
- **Functional groups** | *Genossenschaften* (Root, 1967)
- Hutchinson (1957)
x-organism in *n*-dimensions
- Predictability of faunistic composition
- Simplified classification scheme: reasonable taxonomic surrogacy by benthic functional groups and habitats (Barnes & Sands, 2017)

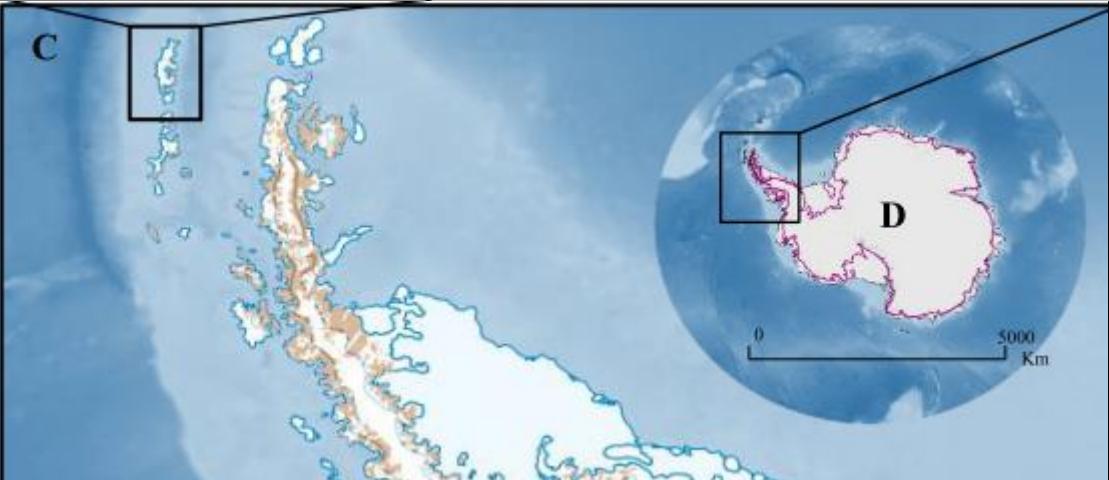


METHODOLOGY

STUDY AREA, BIOLOGICAL SAMPLING & PROCESSING



A: King George Island
B: Mackellar Inlet
C: Antarctic Peninsula
D: Antarctica

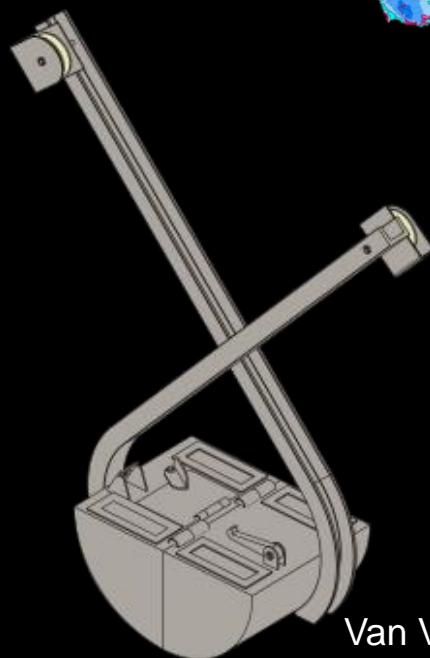
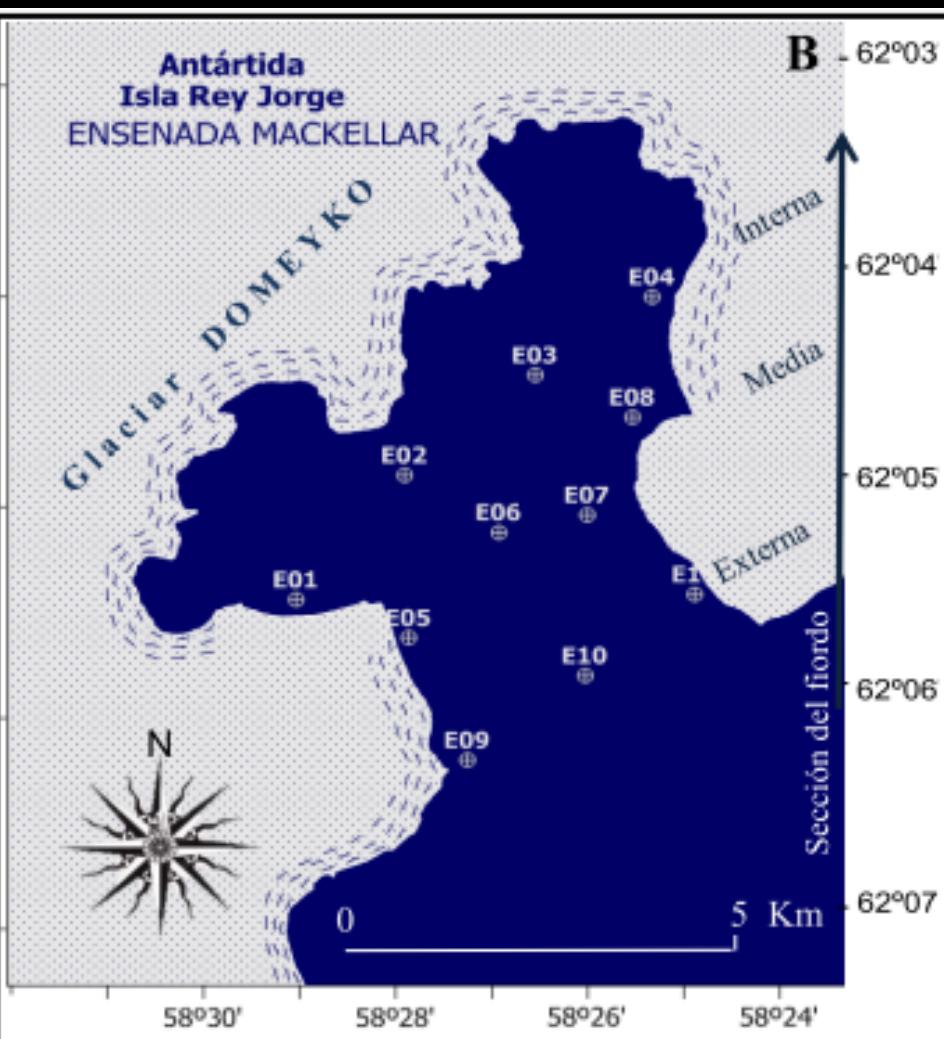
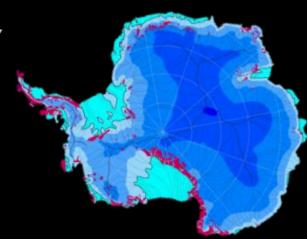


ANTAR

XVII	- 2007
XVIII	- 2008
XIX	- 2010
XX	- 2012
XXI	- 2013
XXIII	- 2015

METHODOLOGY

STUDY AREA, BIOLOGICAL SAMPLING & PROCESSING



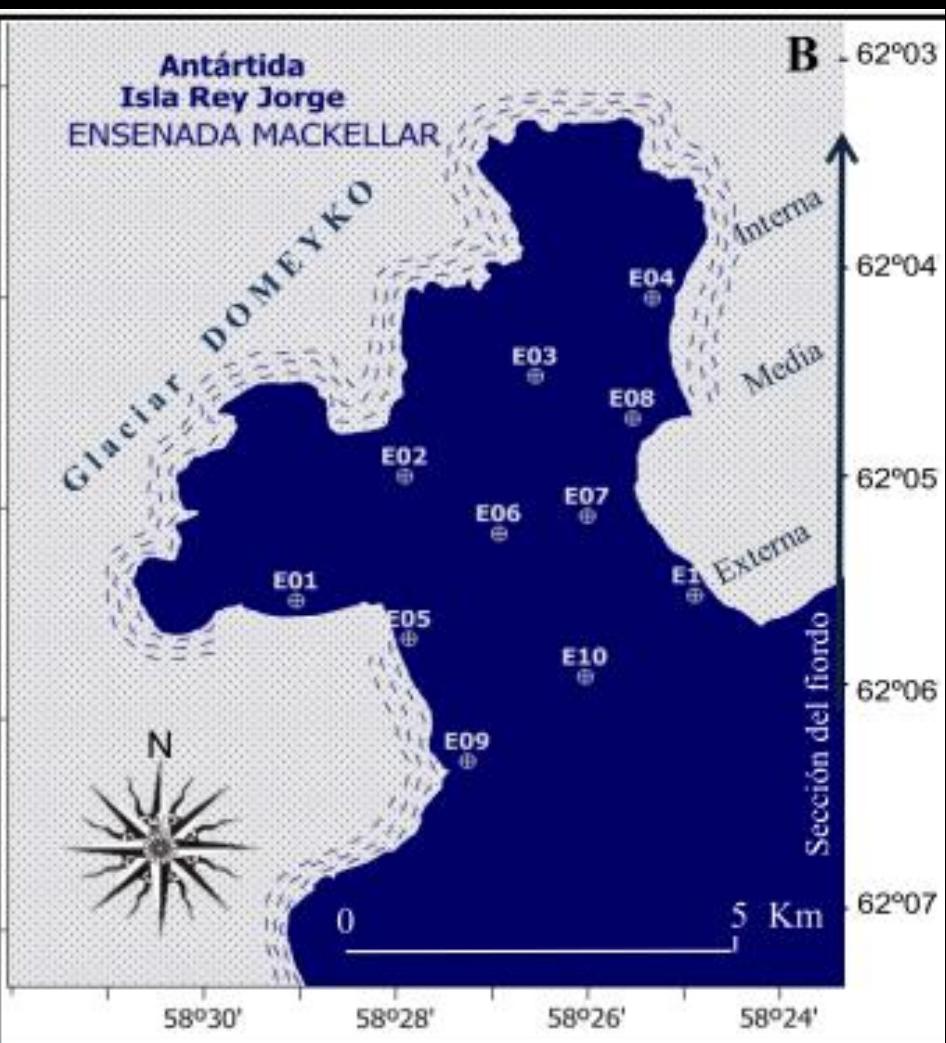
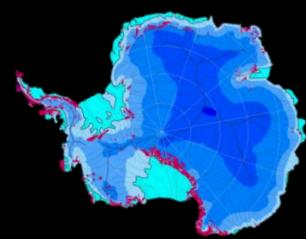
Van Veen grab
0.05m²



Gutt, 2007

METHODOLOGY

STUDY AREA, ABIOTIC SAMPLING & PROCESSING



°C

%o

Currents

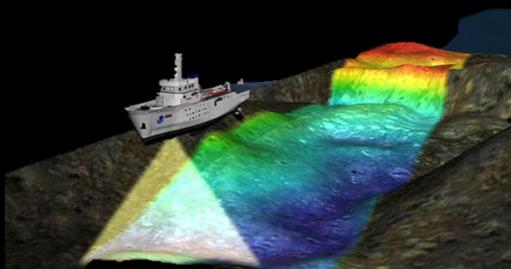
Speed cms⁻¹

Direction



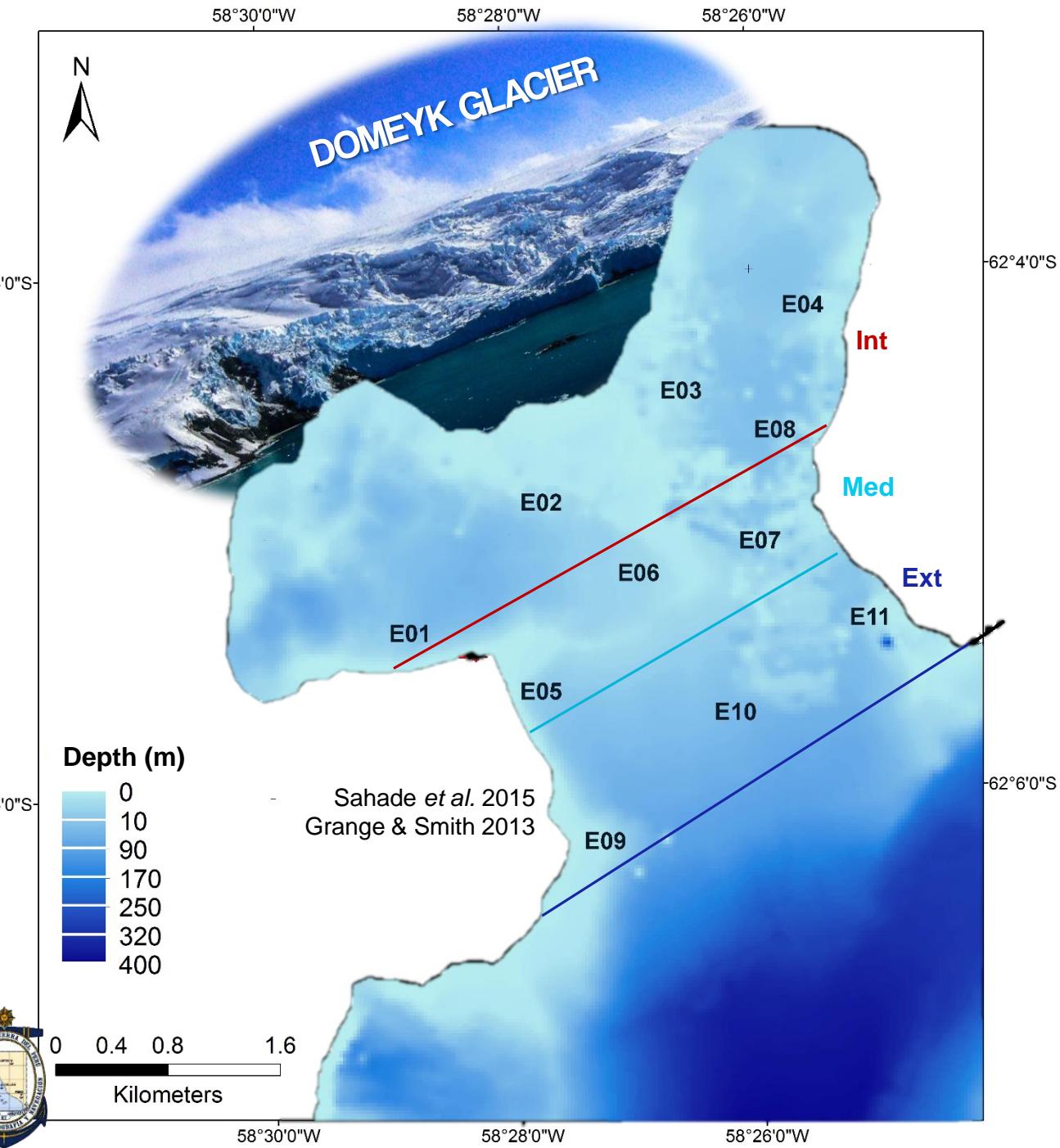
METHODOLOGY

STUDY AREA, ABIOTIC SAMPLING PROCESSING



Mackellar Inlet
Bathymetric chart (multi-beam)

Fjord section
a priori classification



METHODOLOGY

STUDY AREA, ABIOTIC SAMPLING & PROCESSING



Detritus feeder
Surface
Herbivore
Highly motile
Free-living

➤ 21311

FUNCTIONAL classification



Suspension feeder
Epibenthic
Omnivore
Discretely motile
Free-living

➤ 63121



61334
➤
Suspension feeder
Surface
Herbivore
Sessile
Encrusting

Gutt, 2007

METHODOLOGY

STUDY AREA, ABIOTIC SAMPLING, PROCESSING



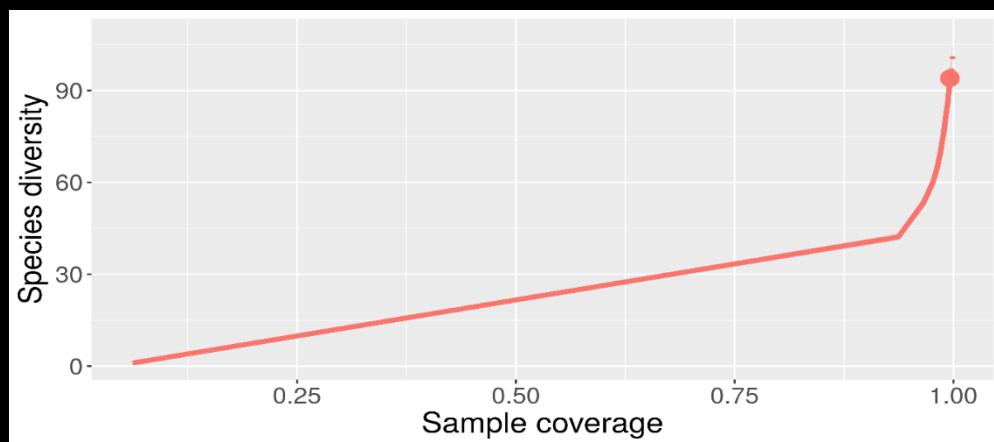
Poppe & Eliason (2008)

RESULTS

Diversity estimation

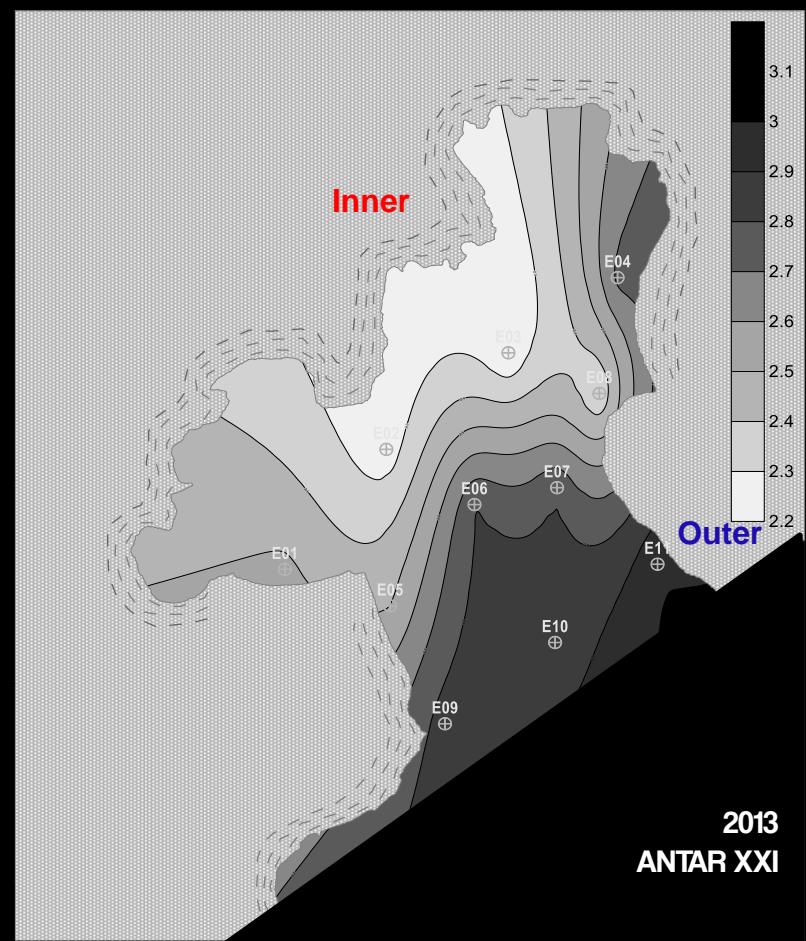


ANTAR XXI – Shallow soft-bottom macrozoobenthos



Functional diversity gradient
Inner to **Outer**
left to **right** margin

Species diversity: **94** taxa
Estimated diversity: **111**

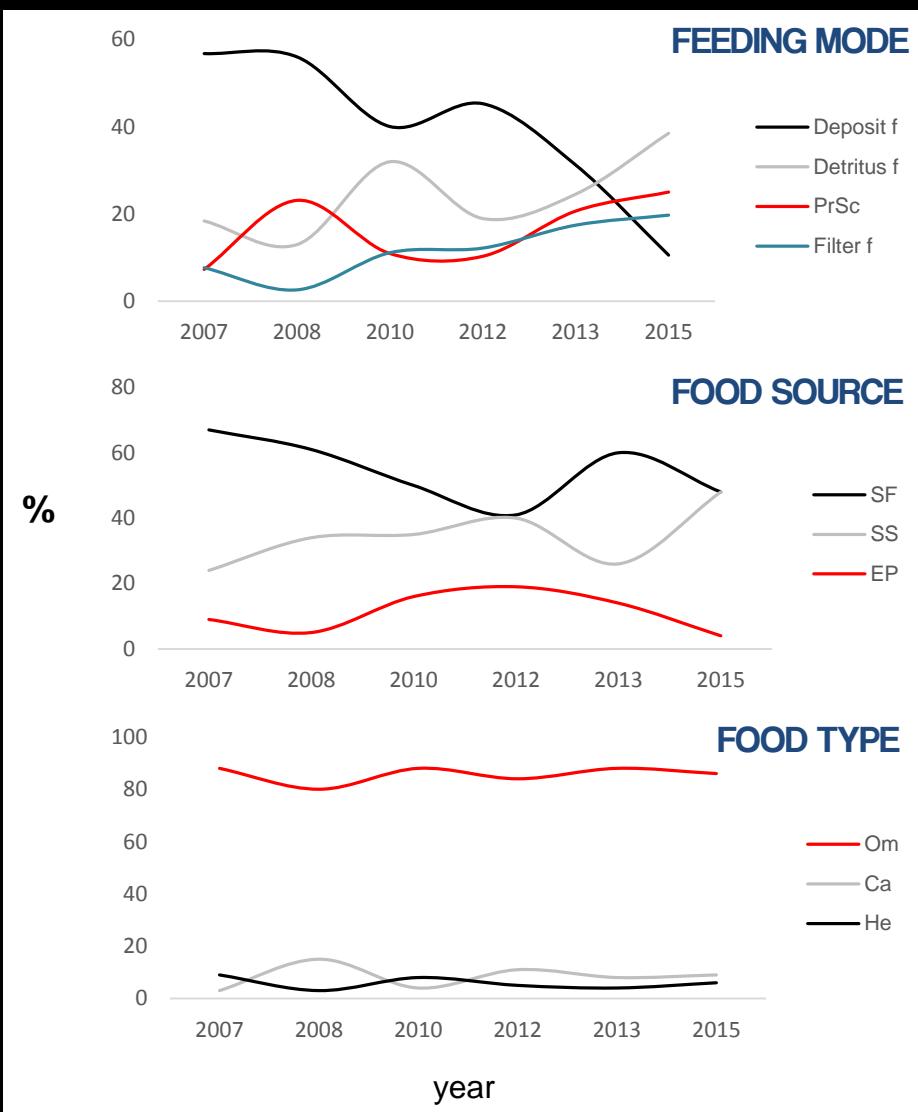


RESULTS

% according to FUNCTIONAL COMPONENTS



TROPHIC functions



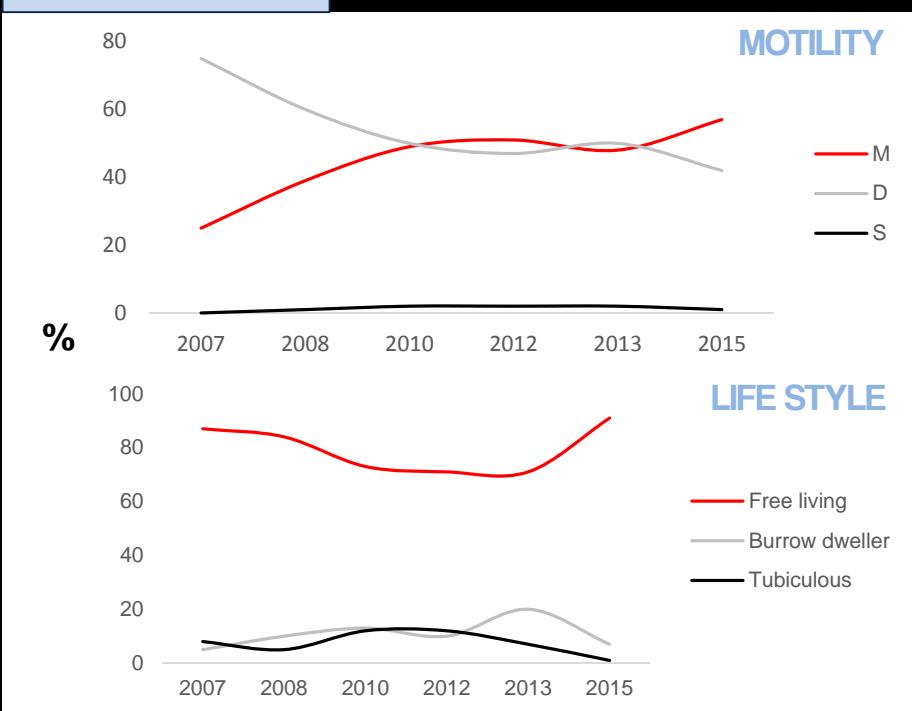
- Deposit * detritus feeders turnover
- Filter f
- Fewer EP
- Omnivores, predominant

RESULTS

% according to FUNCTIONAL COMPONENTS



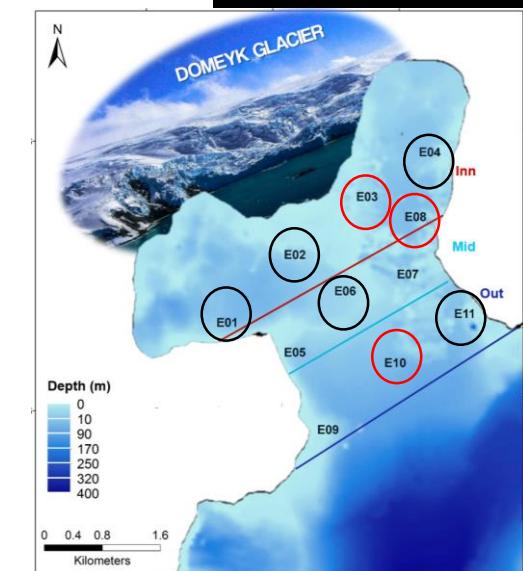
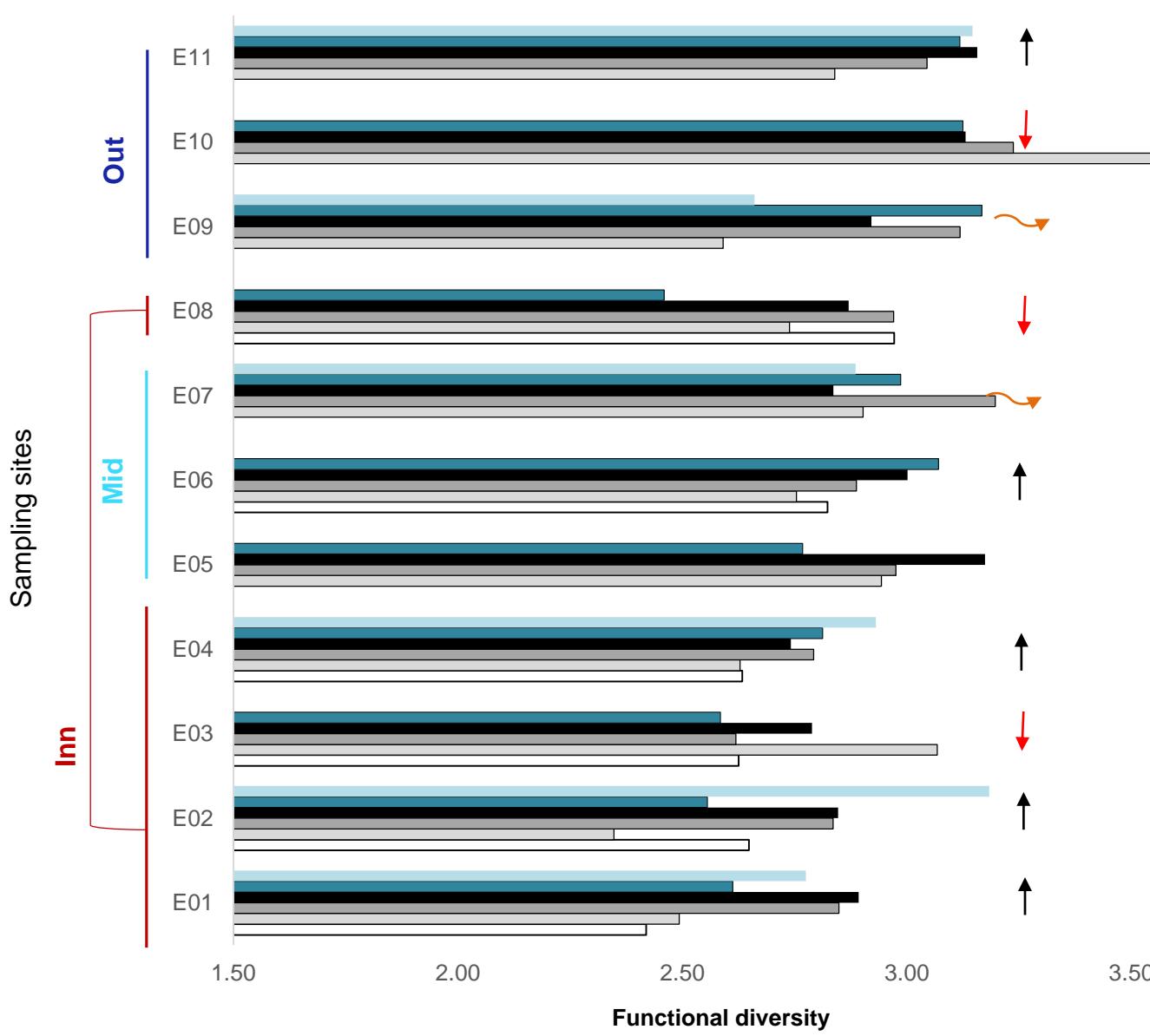
DISTRIBUTION functions



- Few sessile
- High motility ◀▶ PrSc

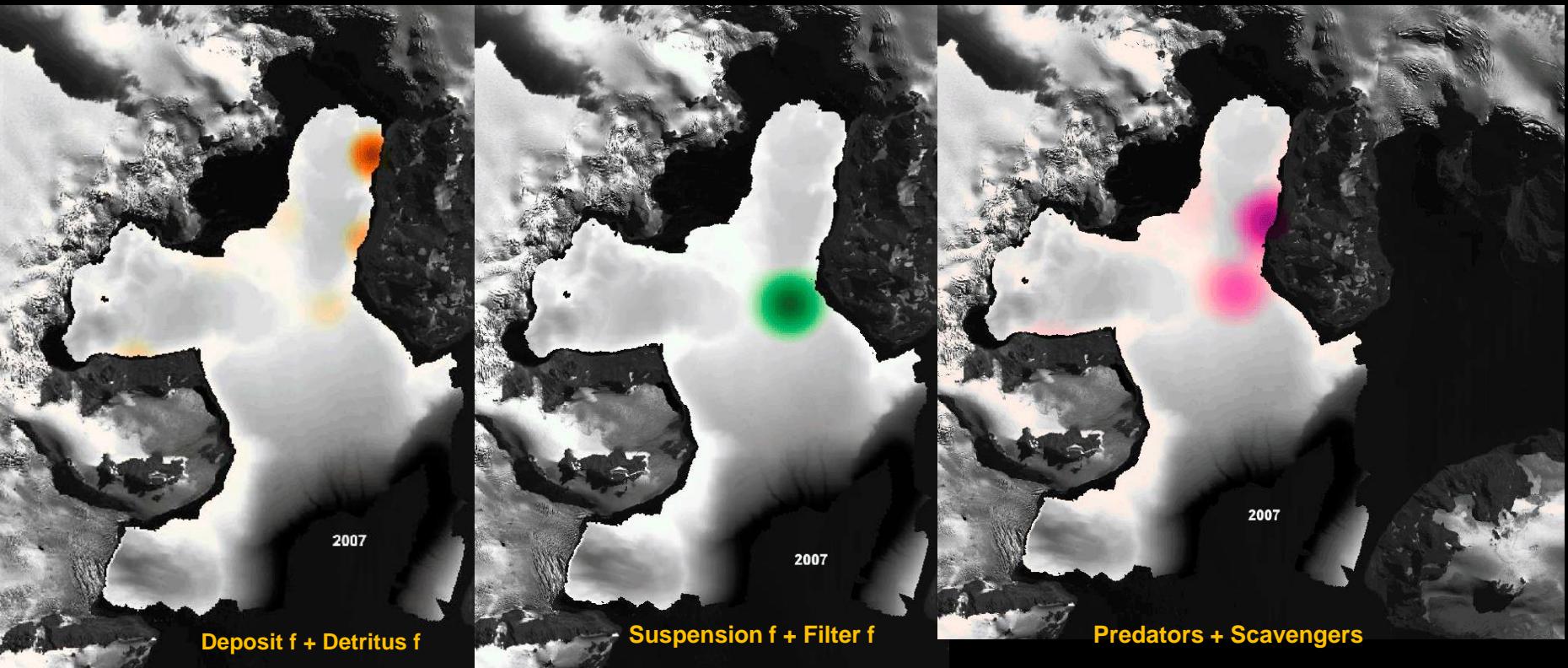
RESULTADOS

Diversidad funcional



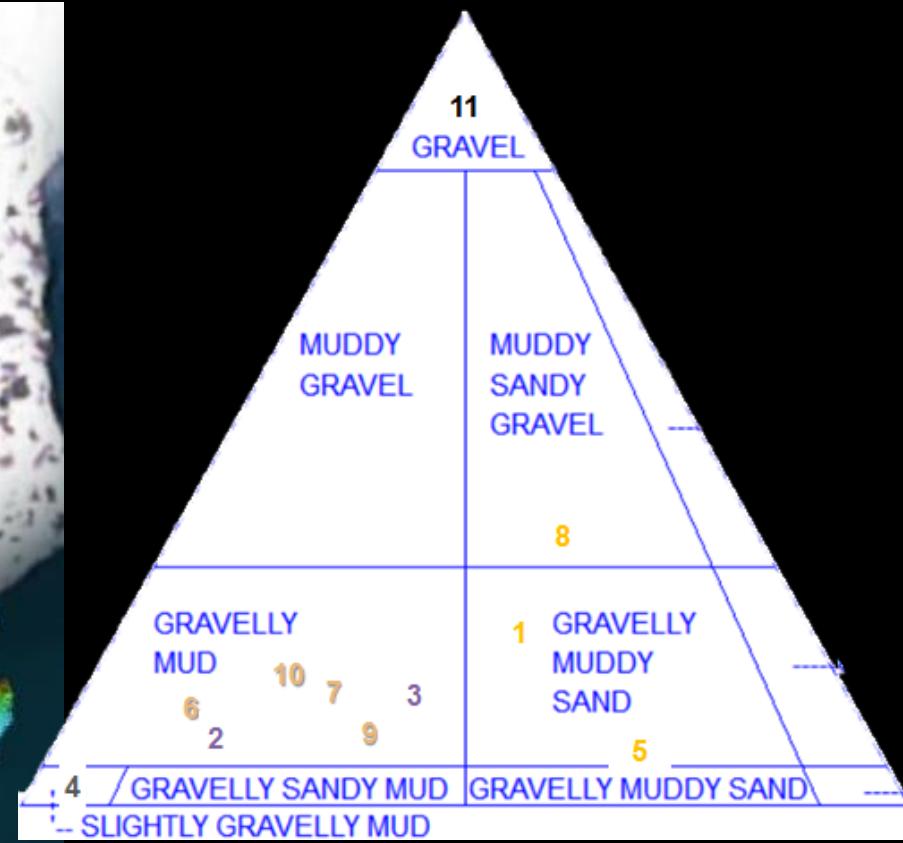
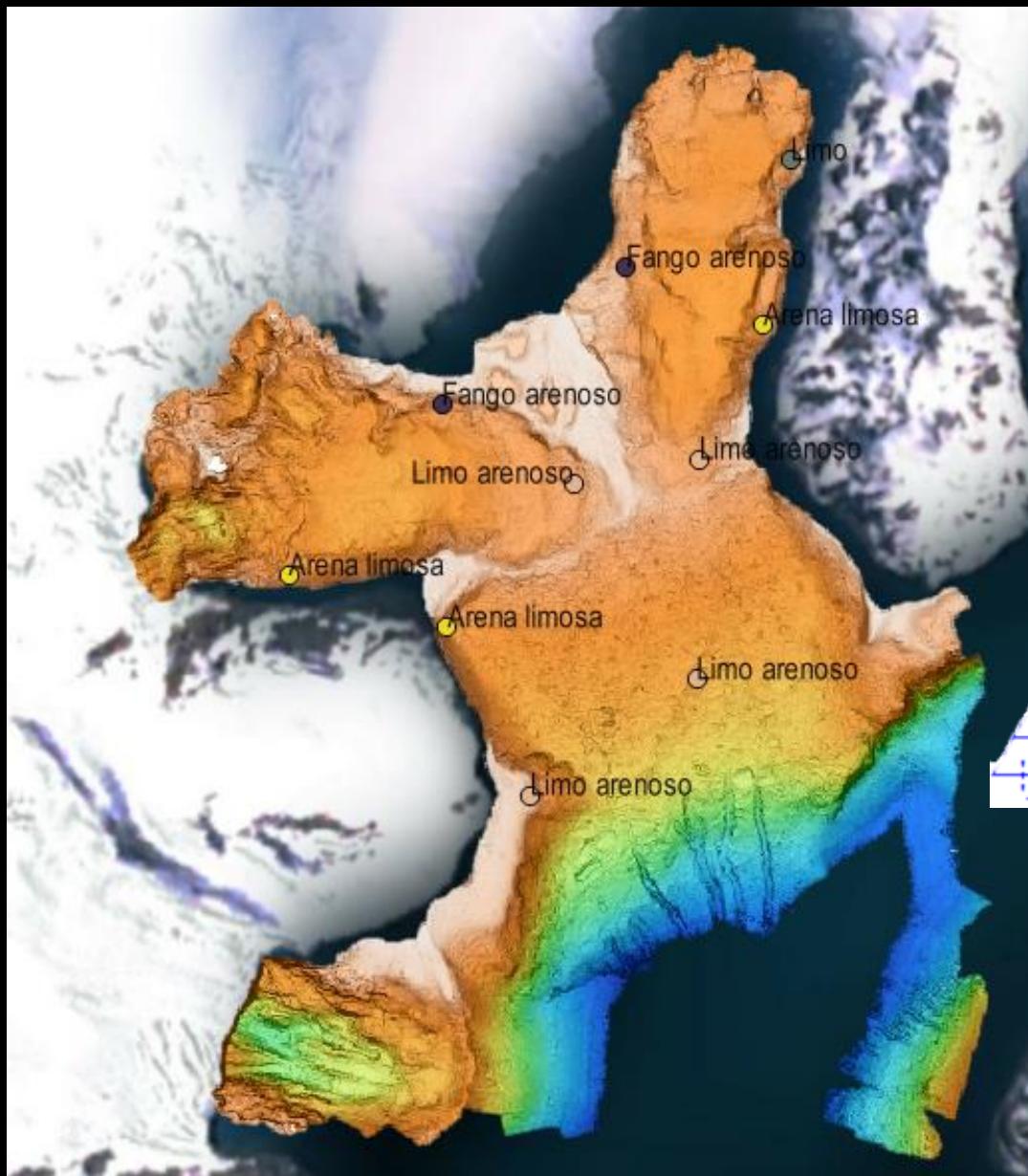
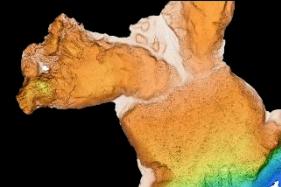
RESULTS

Functional diversity



RESULTS

Bathylithology

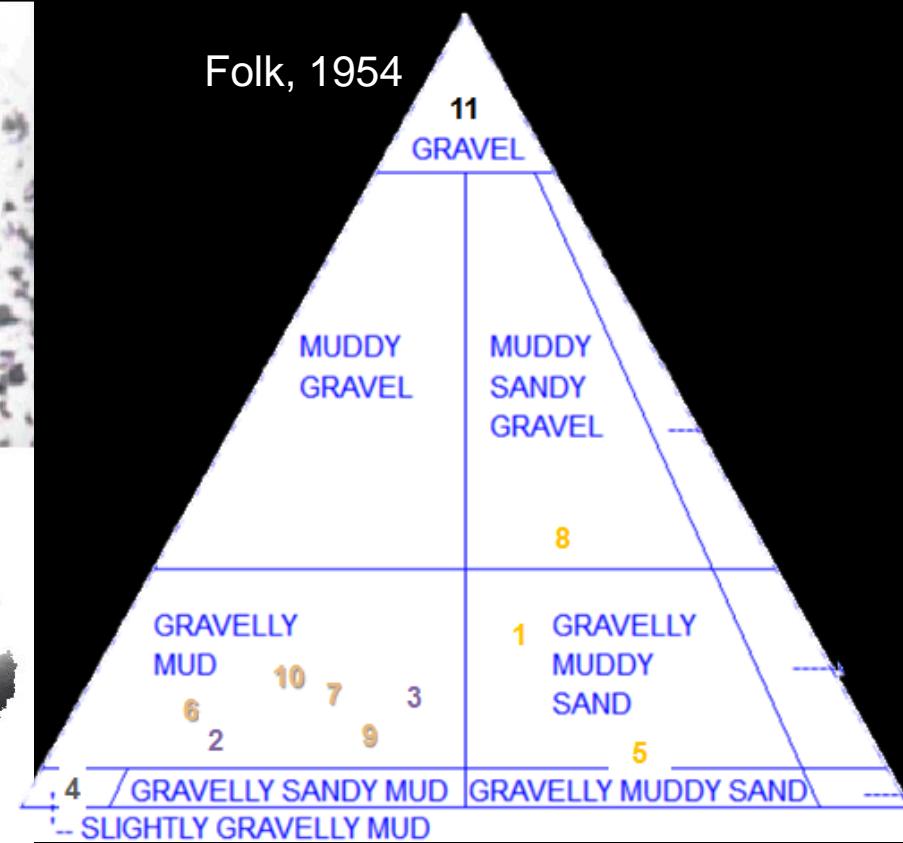
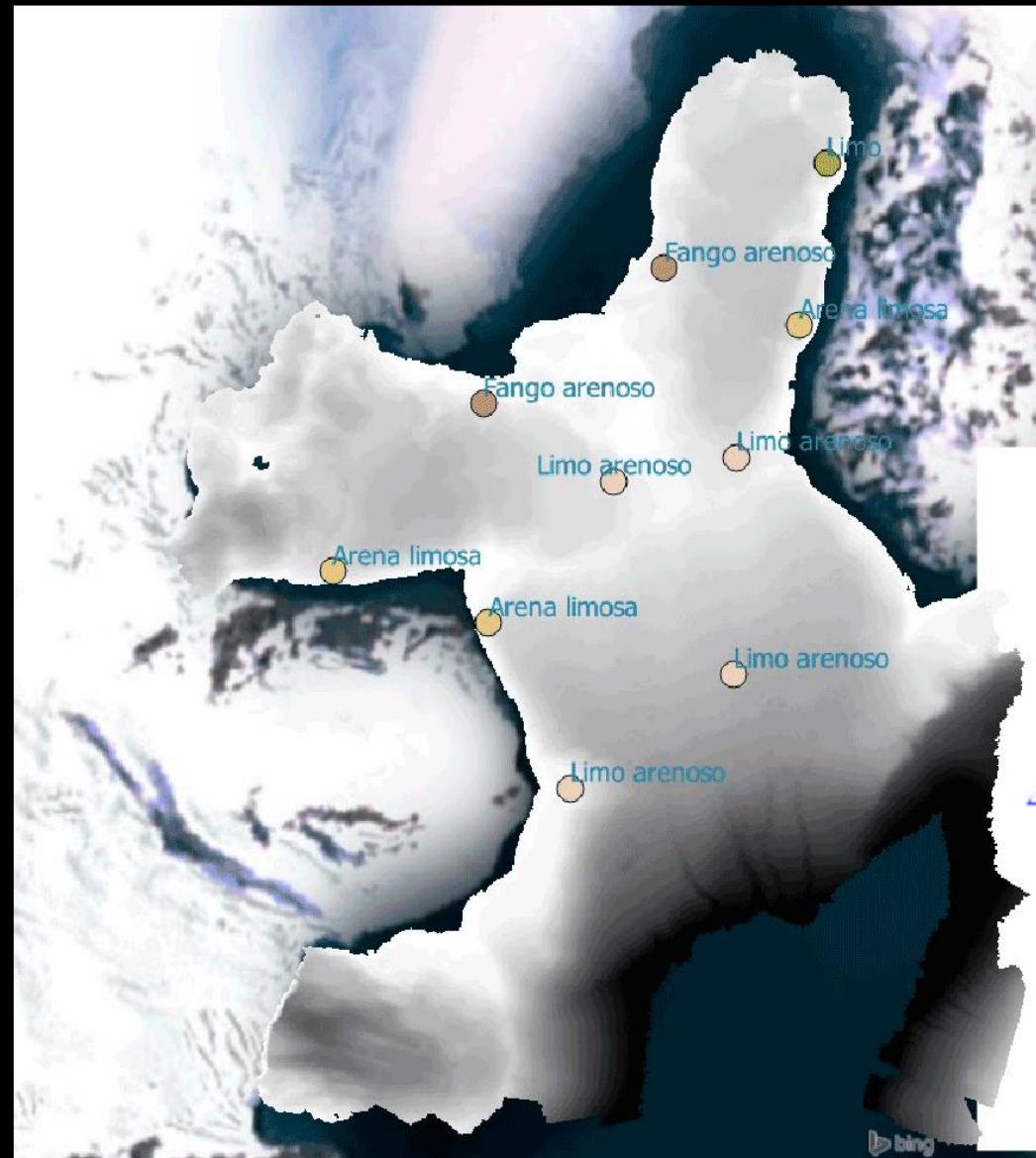
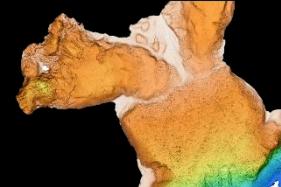


Folk, 1954



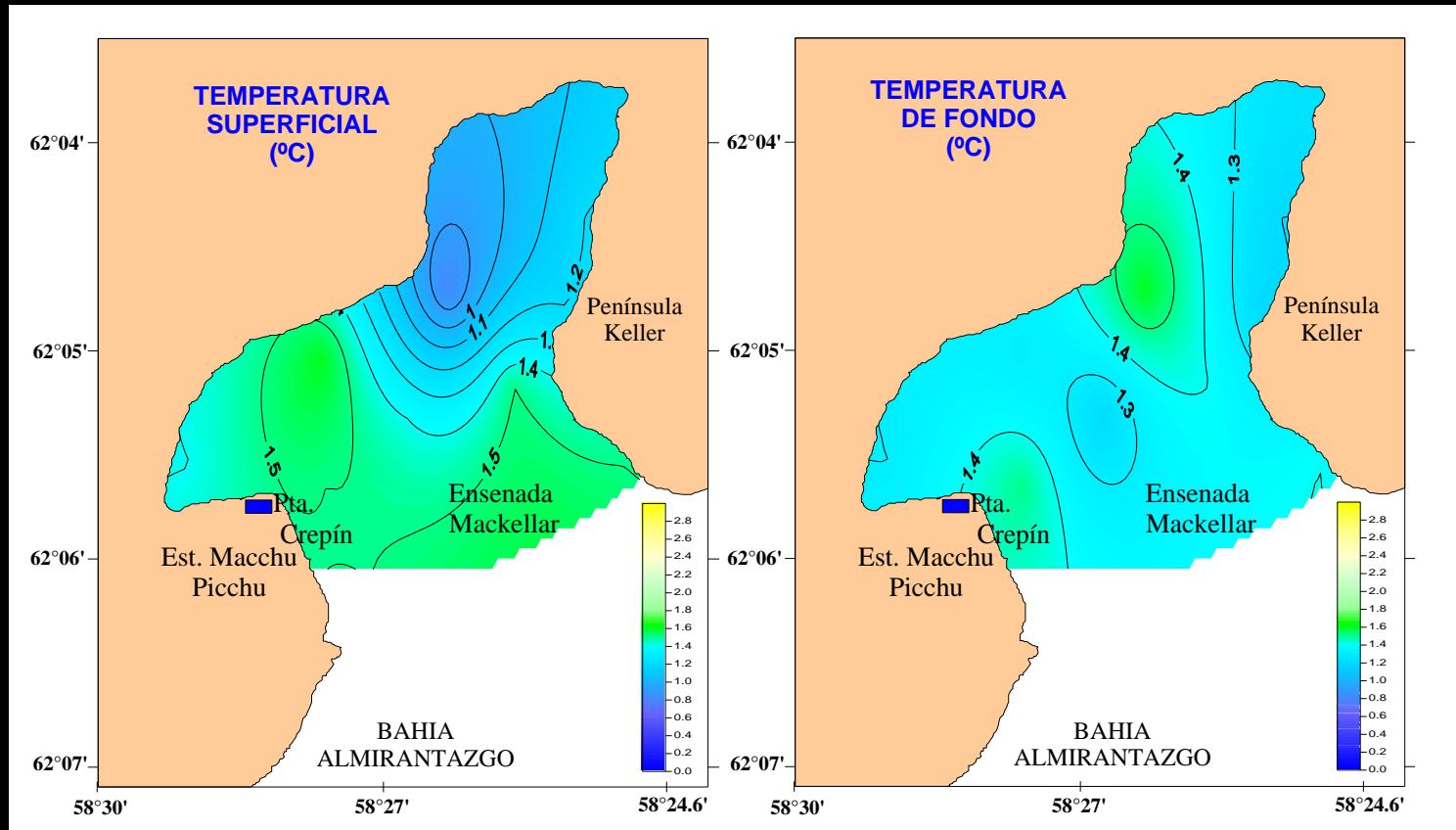
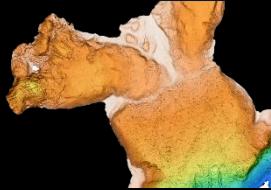
RESULTS

Bathylithology



RESULTS

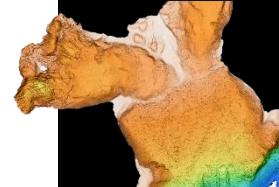
Oceanography



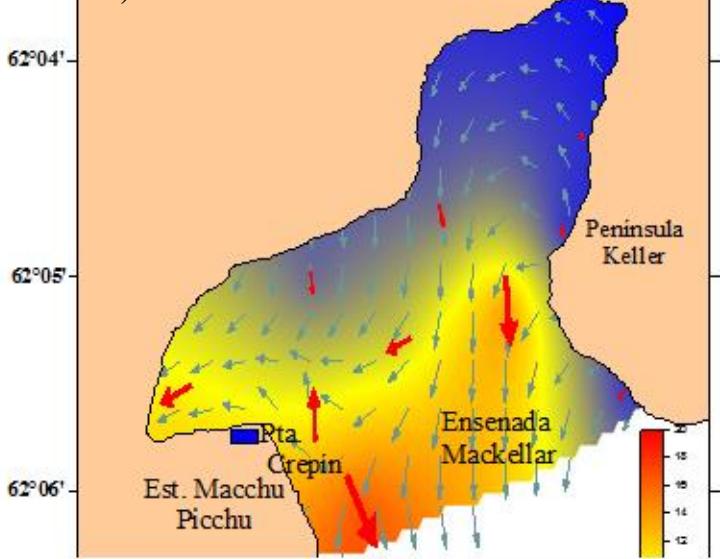
2007

2013

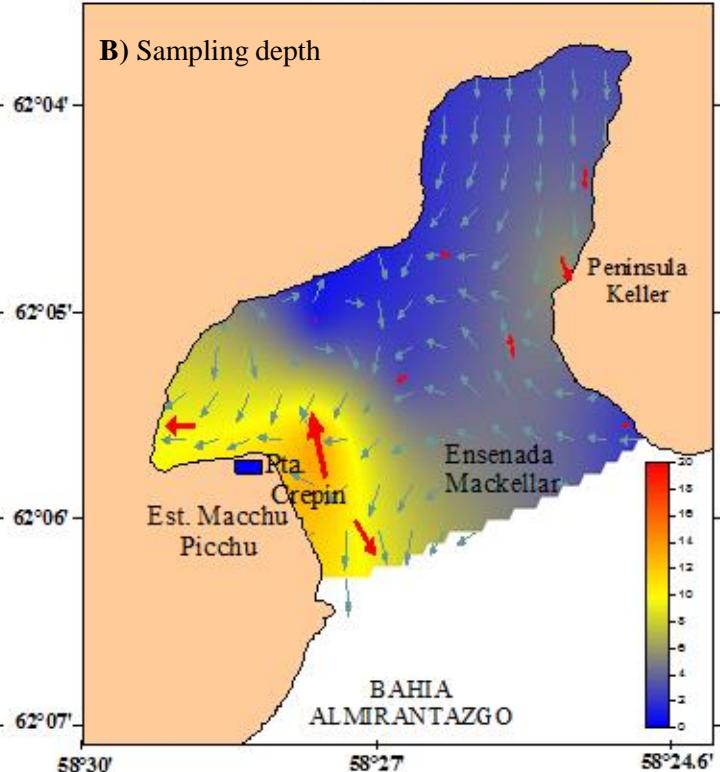
RESULTS



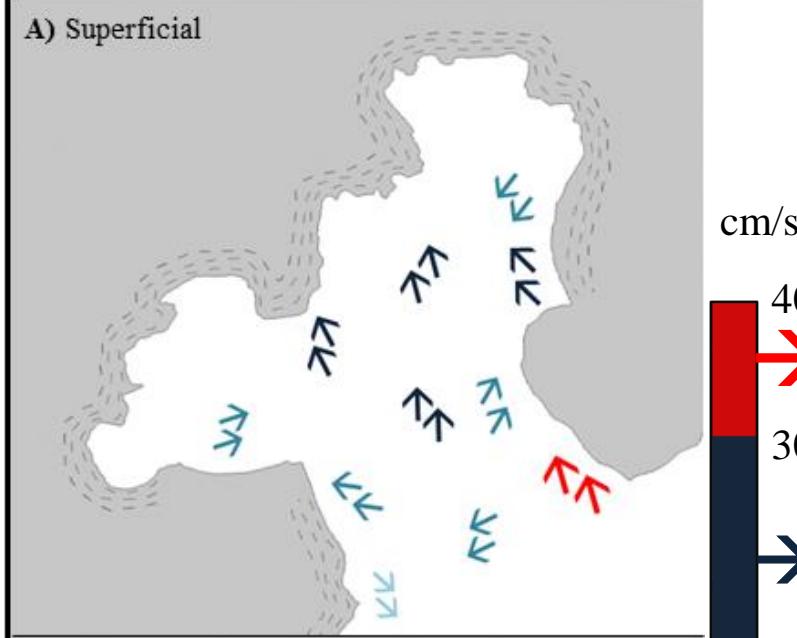
A) Surface



B) Sampling depth



A) Superficial



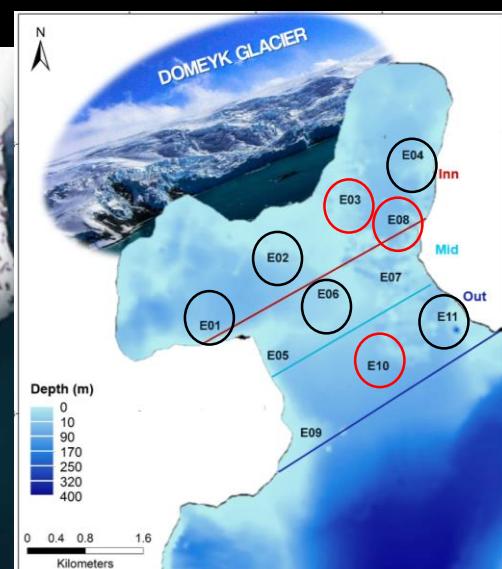
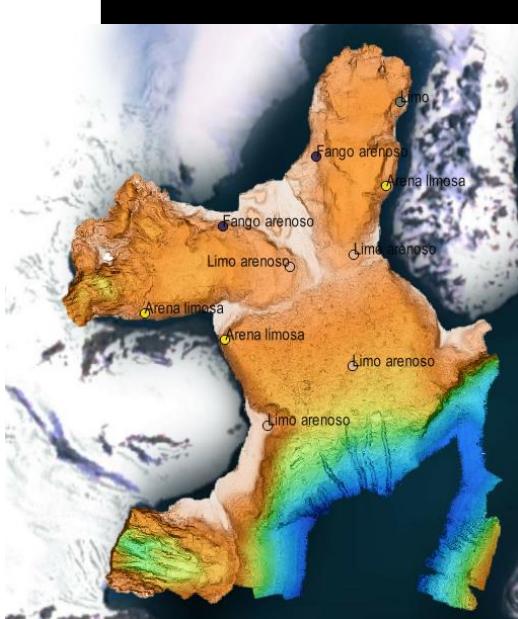
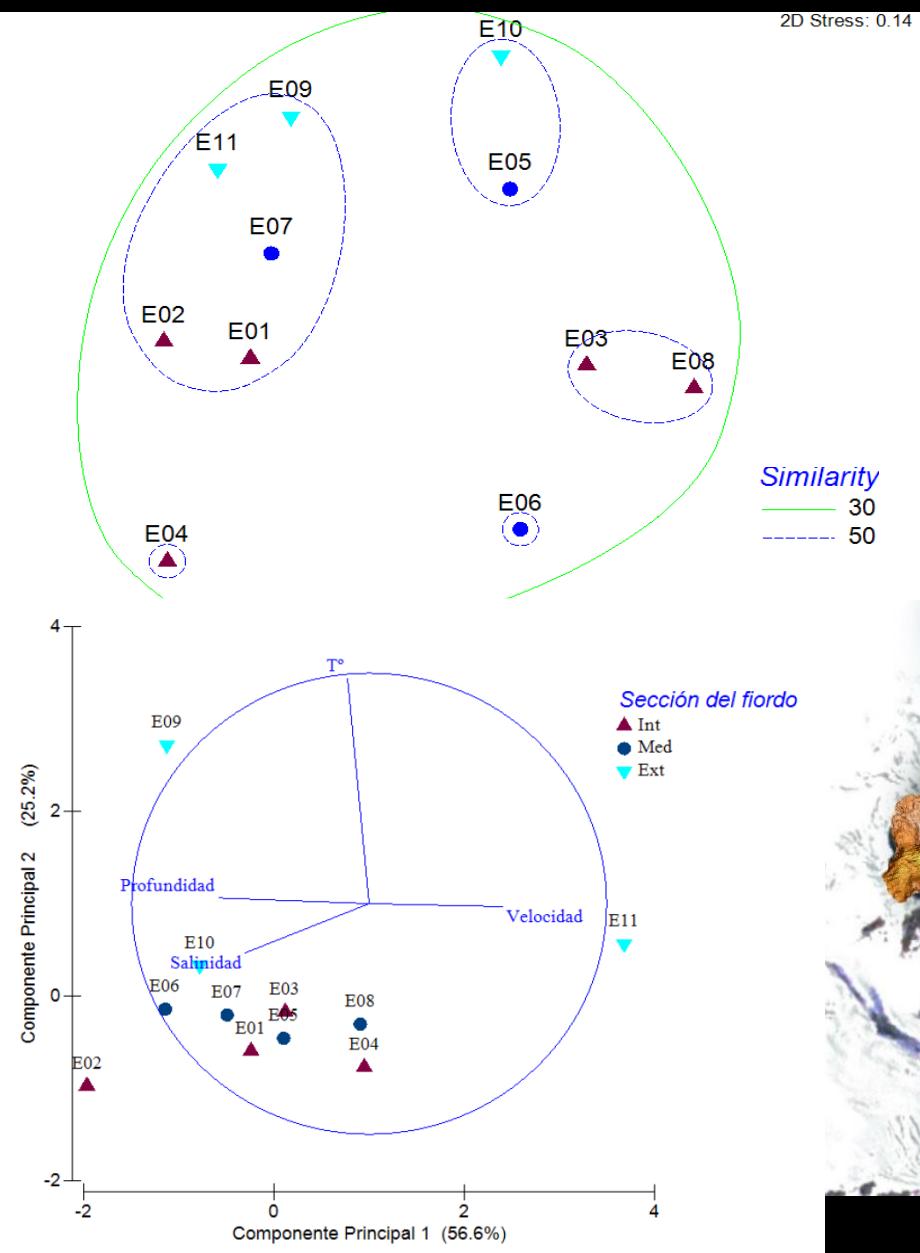
B) Profundidad dragado



PATRÓN de CORRIENTES

RESULTS

MDS | compendio



CONCLUSIONS



- Diversity gradients Inn > Out
 - Deposit-Detritus- and Filter f
A diagram showing a large, white, textured iceberg floating in dark blue water. A circular arrow is drawn around the top left portion of the iceberg, indicating a flow or cycle.
 - Salinity, speed, depth → currents, resuspension
- | | |
|-------------|----------|
| Omnivores | Abundant |
| Surface | |
| Motility | |
| Free-living | |

IMMEDIATE PLANS



- Water mass
ADCP + CTD + data loggers (T° & %)
- Sedimentation processes
Sediment traps
Geochemical analysis
- *In situ* observations
 - Direct
 - Indirect: ROV deployments, *timelapse* cameras



THANK YOU

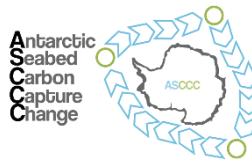


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CIENTÍFICA



SECTOR ENERGÍA Y MINAS
INGEMMET
INSTITUTO GEOLÓGICO, MINERO Y METALÚRGICO



APECS
Association of Polar
Early Career Scientists

 APECS
PERU