

# Linkages between the occurrence of persistent organic pollutants and biogeochemical characteristics of deep-sea trenches

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## INTRODUCTION

Persistent organic pollutants (POPs) such as Polychlorinated Biphenyls (PCBs) occur ubiquitously in the environment  
-> associate to organic carbon, leading to **close linkages between contaminant fate and carbon cycling**

The **trophic state** of marine systems plays an important role in contaminant fate

-> higher sorption capacity of organic matter in eutrophic regimes (Kuzyk et al., 2010)

-> higher mineralization rates may imply relative enrichment of POPs (Gobas and MacLean, 2003)

**Deep sea trenches:** formed at tectonic subduction zones ~ 8-10 km depth

-> Generally depleted in organic matter compared to other marine environments

BUT: **focusing effect** to the trench-centre, due to V-shape topography

## SAMPLING LOCATION

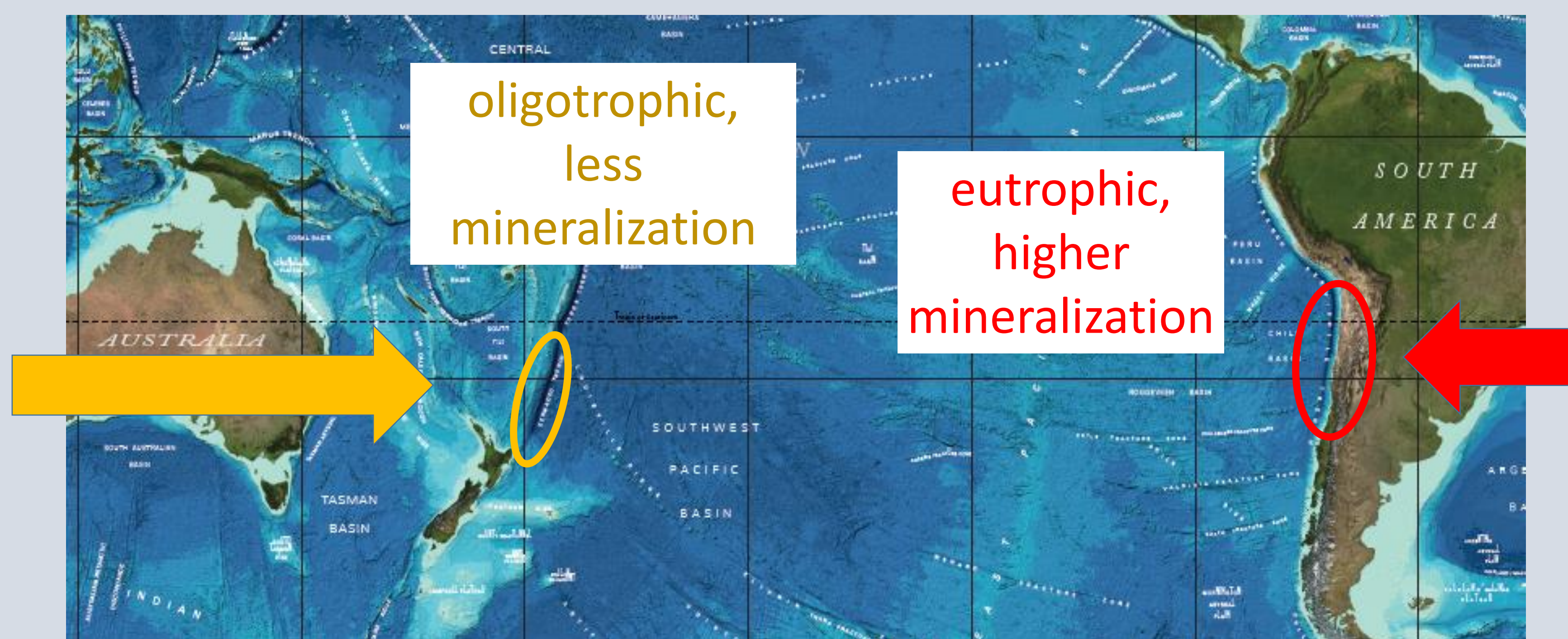
### KERMADEC trench:

6000 – 9300 m

TOC ~0.3%

primary production:  
75 gCm<sup>-1</sup>y<sup>-1</sup>

Oxygen penetration  
depth:  
~2-6 cm



### ATACAMA trench:

2500 – 8000 m

TOC ~0.3% – 2.1%

primary production:  
200 gCm<sup>-1</sup>y<sup>-1</sup>

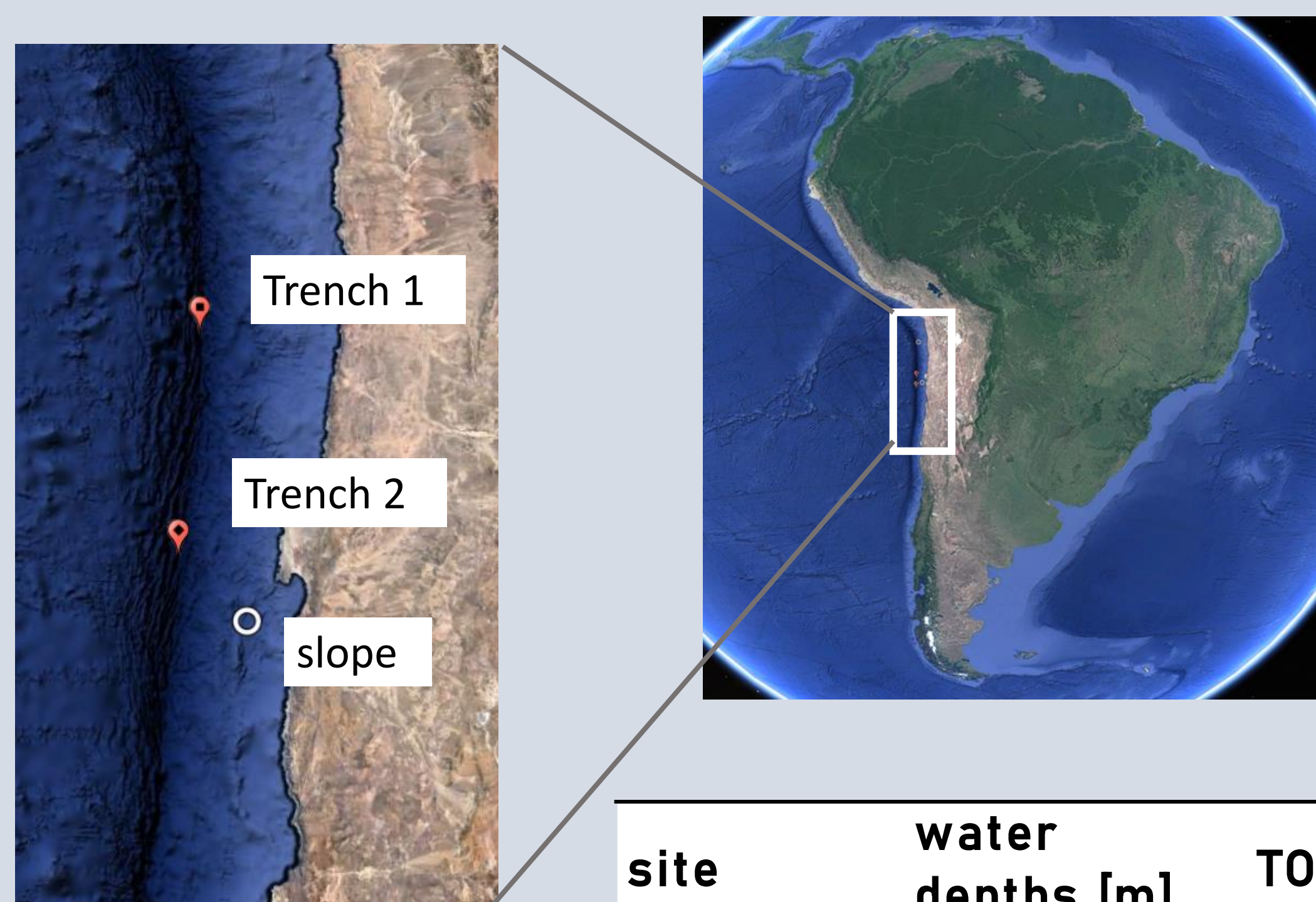
Oxygen penetration  
depth:  
~11-20 cm

Map source: GEBCO world map 2014, www.gebco.net

## HYPOTHESIS

1. Concentrations of POPs are higher at the eutrophic Atacama trench compared to the oligotrophic Kermadec
2. Mineralization of organic carbon leads to higher concentrations of POPs in deep-sea trenches

## SAMPLING LOCATION ATACAMA



site	water depths [m]	TOC [%]	TON [%]
slope	2500	1.5 – 2.1	0.27-0.3
trench 1+2	8000	0.4 – 0.6	0.05

## PRELIMINARY RESULTS (ATACAMA)

1. Very low concentrations
2. Concentrations the highest in the trench 2 site (8000 m depth)

