

# Deglacial to Holocene variations in nutrient utilisation and upwelling along the Peruvian shelf over the past 20,000 years

Project A6 (SFB754, Phase II)  
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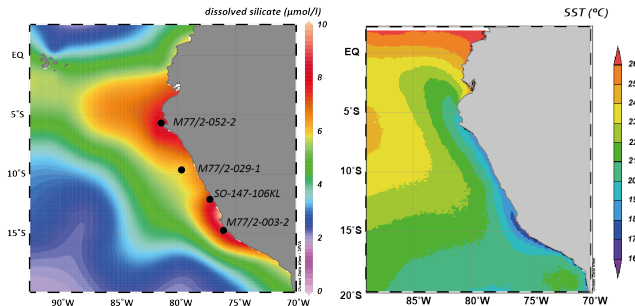
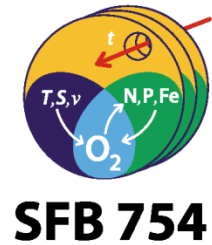


Fig. 1: Left: surface water concentration of dissolved silicate; Right: Sea Surface Temperature, the blue colour indicates the cool upwelled waters near the coast.

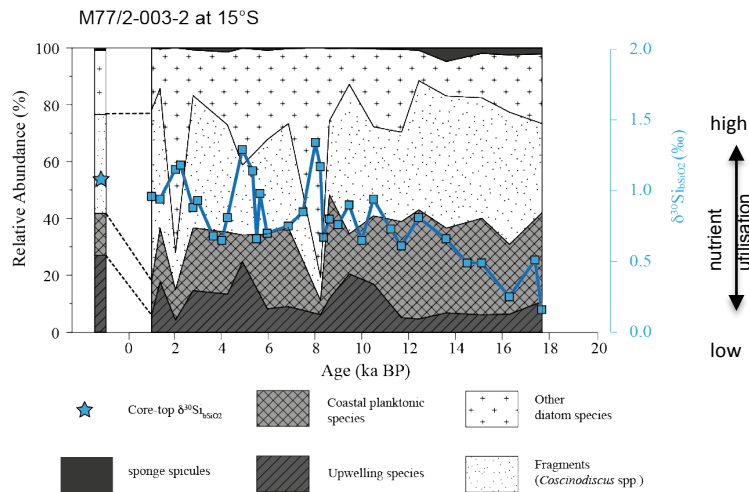


Fig. 2: Relative diatom abundance of important diatom groups as indicator for coastal upwelling in comparison to nutrient utilisation.

In coastal upwelling regions primary productivity is high. Key nutrients are nitrate and silicic acid, which are taken up by diatoms, the dominant phytoplankton group. The ratio of stable silicon and nitrogen isotopes in the diatom frustules ( $\delta^{30}\text{Si}$ ,  $\delta^{15}\text{N}$ ) can be used to reconstruct past nutrient utilization and nitrogen loss processes. Additional information about nutrient availability and upwelling strength can be gained via determination of the diatom assemblage.

## Results:

- pronounced differences between Deglacial (19 – 11.7 ka BP) and Holocene (11 ka BP until today)
- during the deglaciation low productivity and upwelling at the southern shelf, but high and more intense in the North
- Shift to modern conditions with high productivity and upwelling in the South compared to the North
- Nitrogen Isotopes are mainly affected by nutrient utilisation instead of denitrification
- water mass variations shown by diverging  $\delta^{30}\text{Si}$  and  $\delta^{15}\text{N}$  during the deglacial

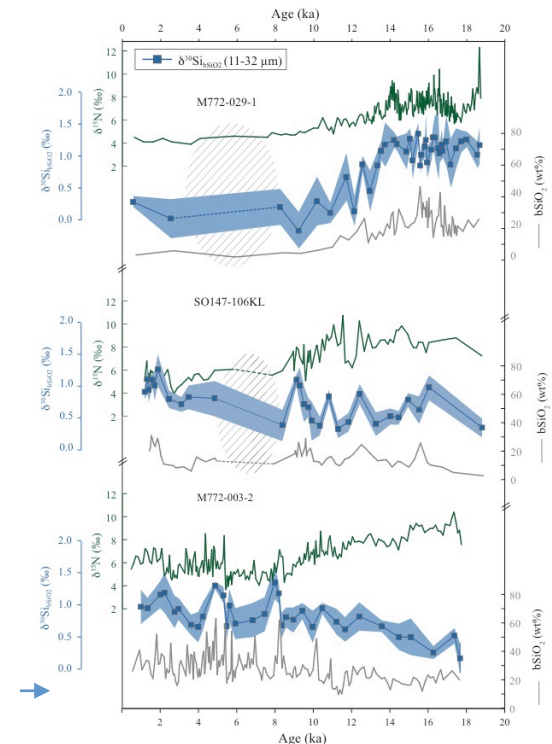


Fig. 3: Changes in productivity, nutrient utilisation and denitrification or water mass changes over the past 20,000 years off Peru