# The Malina oceanographic expedition: How do changes in ice cover, permafrost and UV radiation impact on biodiversity and biogeochemical fluxes in the Arctic Ocean?

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**Abstract.**

## 1 Introduction

## 2 Study area, environmental conditions and sampling strategy

### 2.1 Study area and environmental conditions

#### 2.1.1 CTD and rosette deployments

## 3 Figures

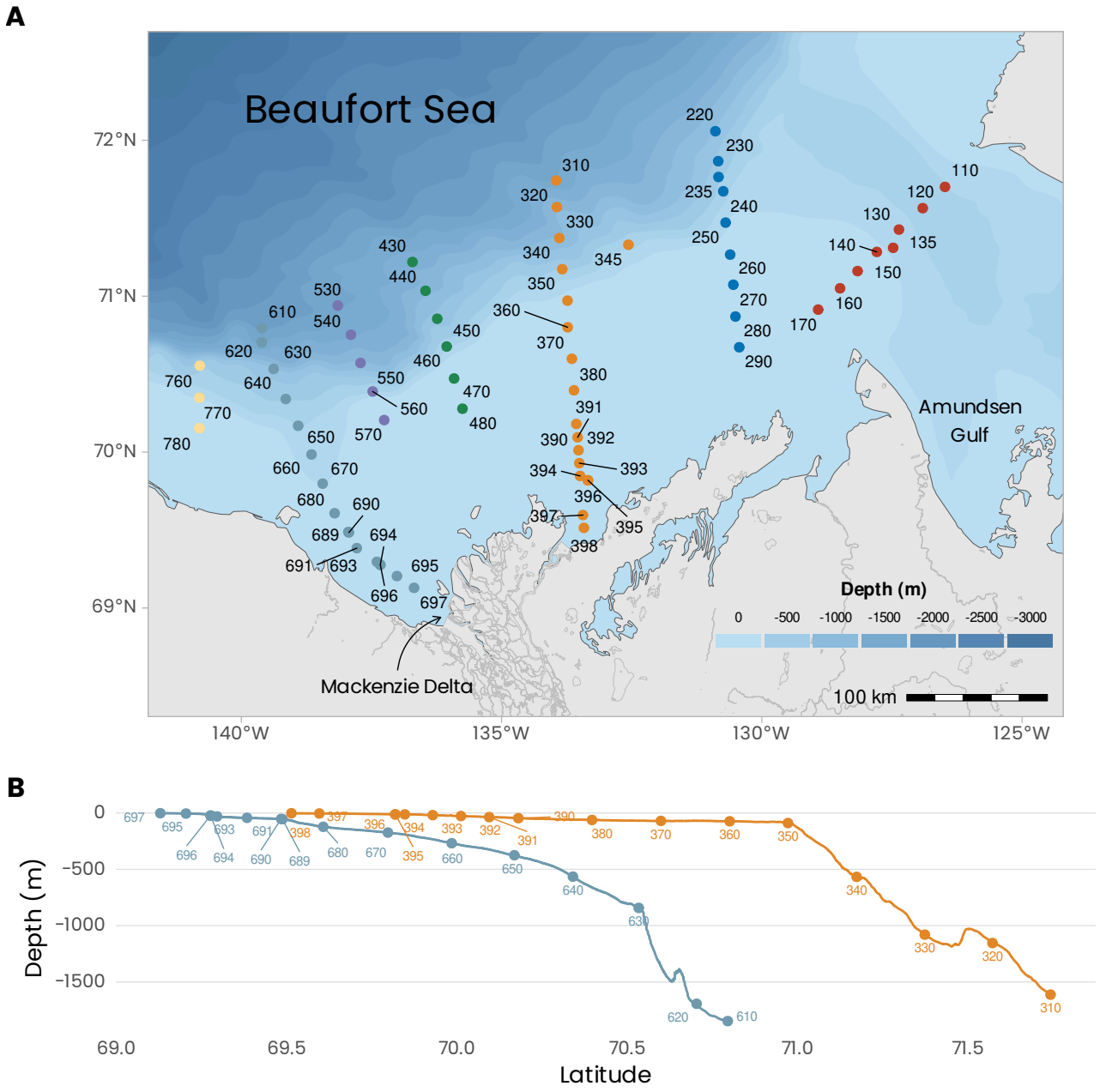


**Figure 1.** (**A**) Localizations of the sampling sites visited during the MALINA 2009 campaign. The colors of the dots represent the seven transects visited during the mission. (**B**) Bathymetric profiles for transects 600 and 300. Bathymetric data from GEBCO (https://download.gebco.net/).

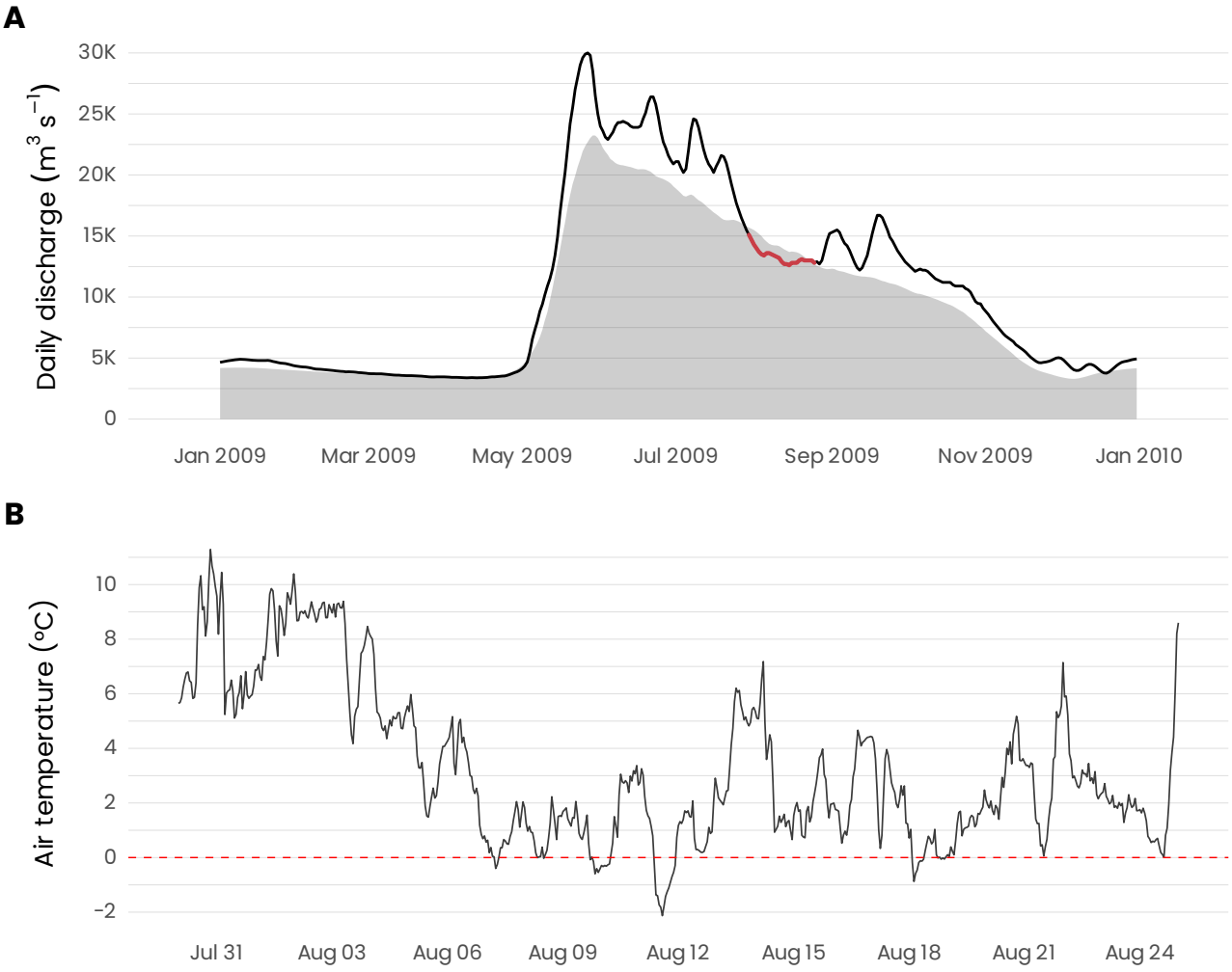


**Figure 2.** (**A**) Daily discharge of the Mackenzie River at the Arctic Red River junction (station 10LC014). The black line corresponds to the 2009 discharge whereas the coloured segment identifies the period of the MALINA campaign. The shaded area is the mean discharge calculated between 1972 and 2016. Discharge data from the Government of Canada (https://wateroffice.ec.gc.ca/search/historical_e.html). (**B**) Hourly air temperature recorded from the Amundsen's foredeck meteorological tower during the campaign.

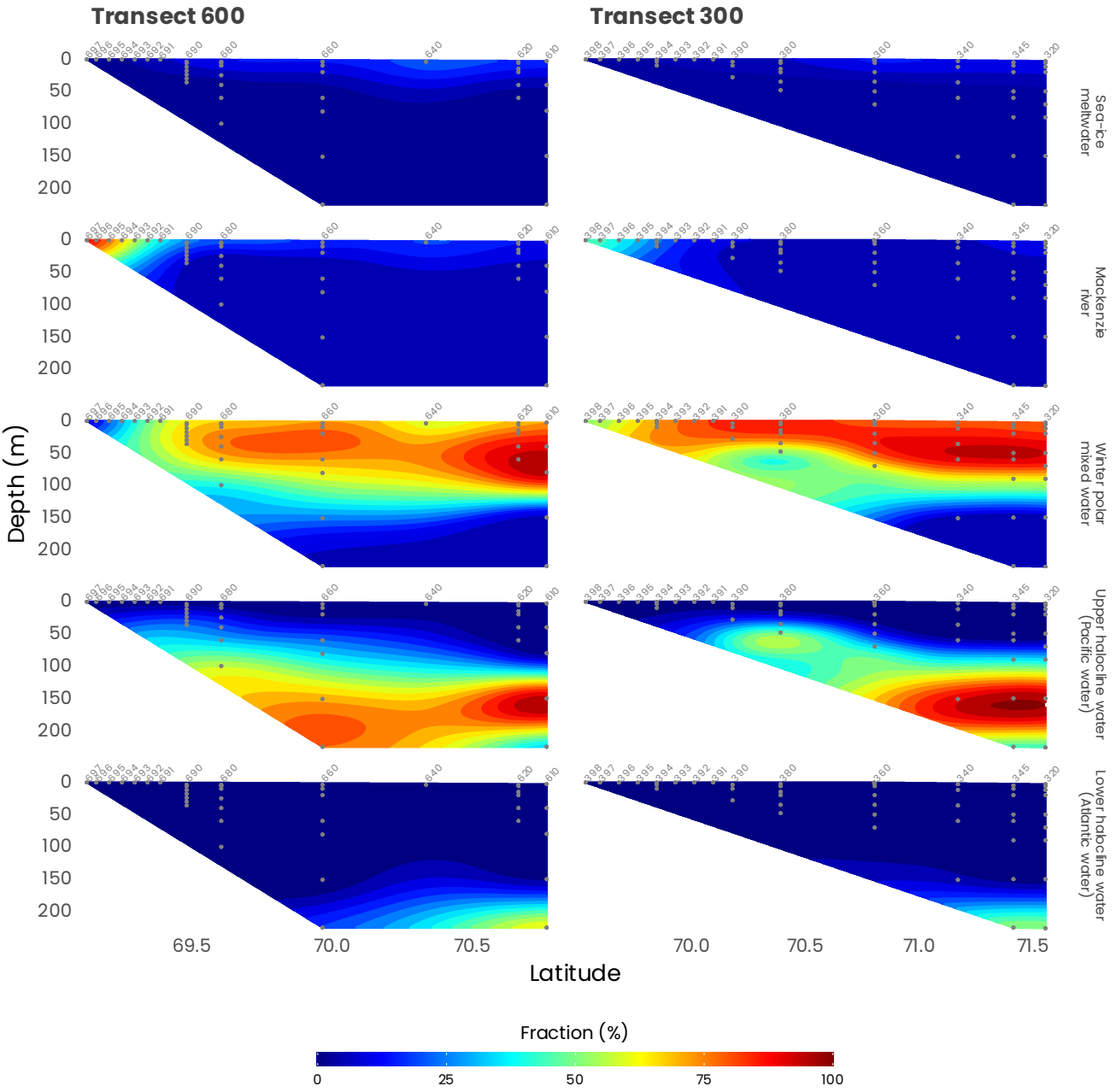


**Figure 3.** Distribution of source water types along transects 600 and 300 (see Fig. 1). Station numbers are identified in light gray on top of each panel.

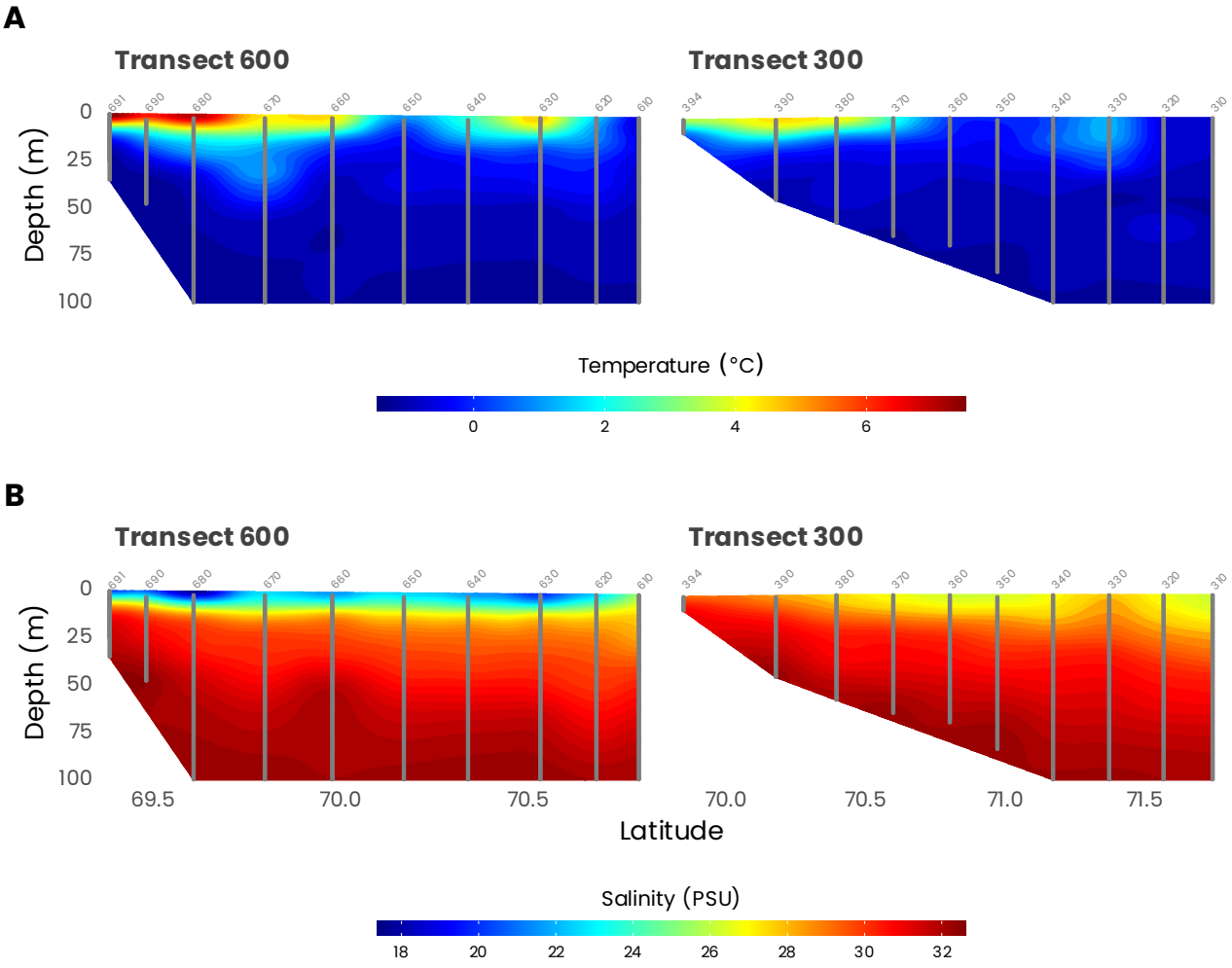


**Figure 4.** Cross-sections of temperature (**A**) and salinity (**B**) measured by the CTD (gray dots) along transects 600 and 300. Station numbers are identified in light gray on top of each panel.

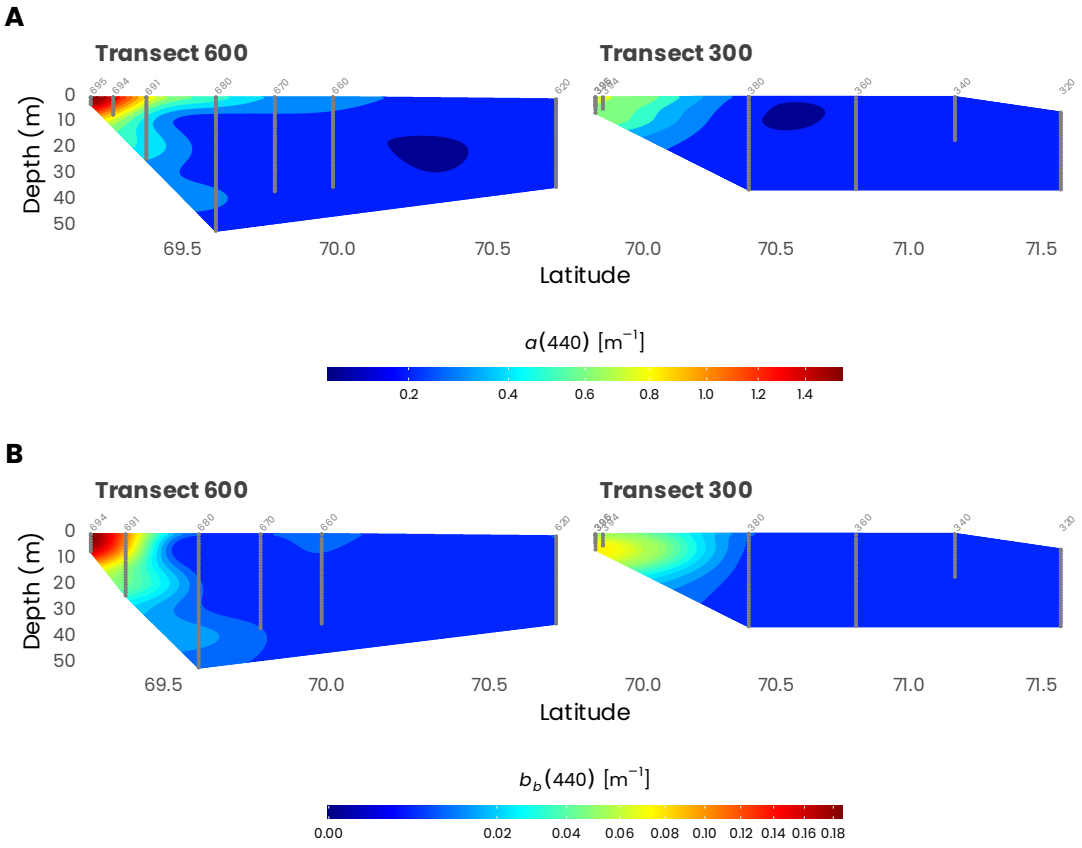


**Figure 5.** Cross-sections of (**A**) absoprtion ($a(440)$) and (**B**) total scattering ($b_b(440)$) measured from the barge at 440 nm with an AC9 and BB9 respectively along transects 600 and 300. Station numbers are identified in light gray on top of each panel. Note that the data has been square-root transformed for the visualization.

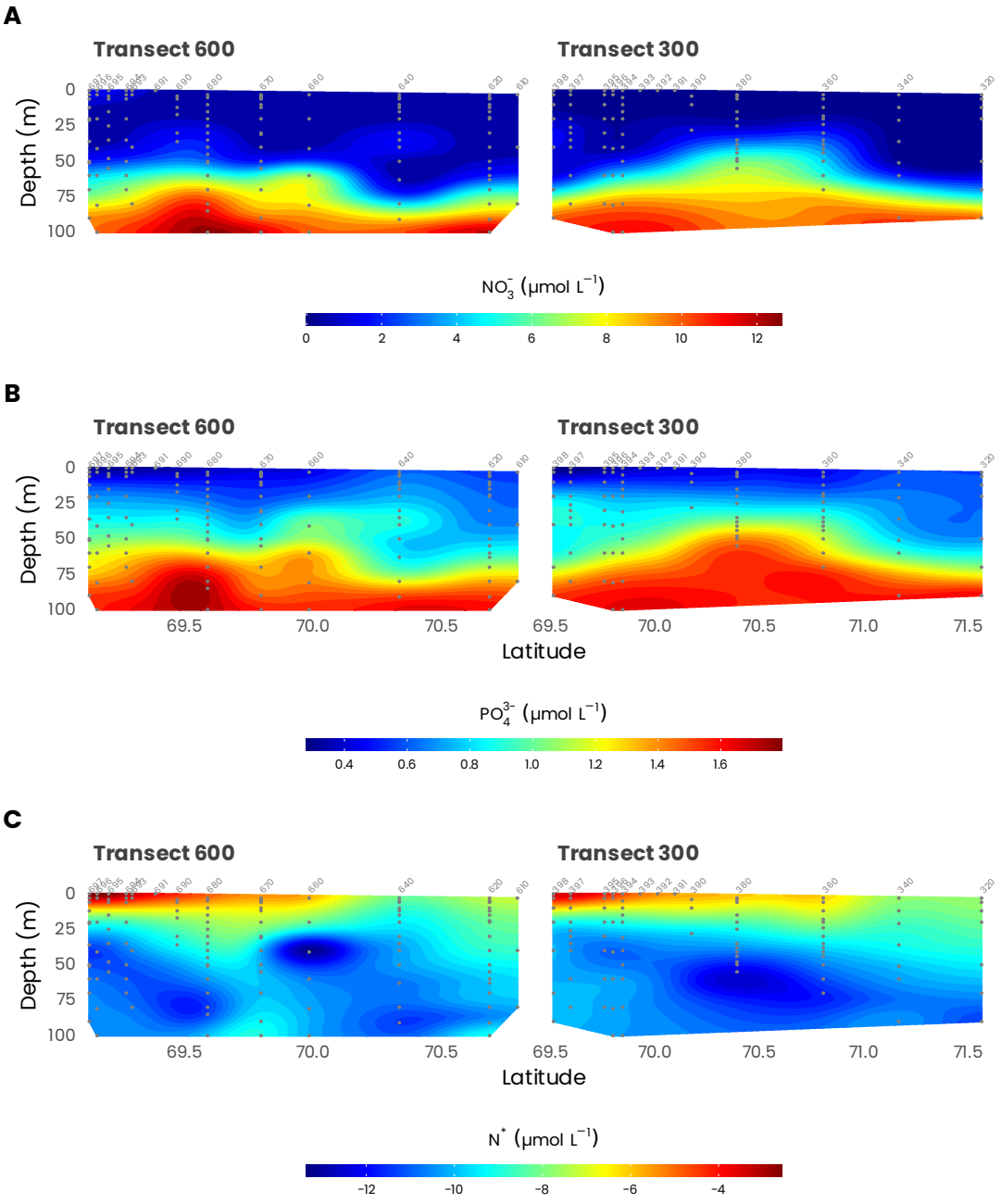


**Figure 6.** Cross-sections of (**A**) $NO_3^-$ and (**B**) $PO_4^{3-}$ measured from Niskin bottles (gray dots) along transects 600 and 300. (**C**) $N^*$ defined as N - rP with r = N/P = 13.1 (see the text for the details). Station numbers are identified in light gray on top of each panel.

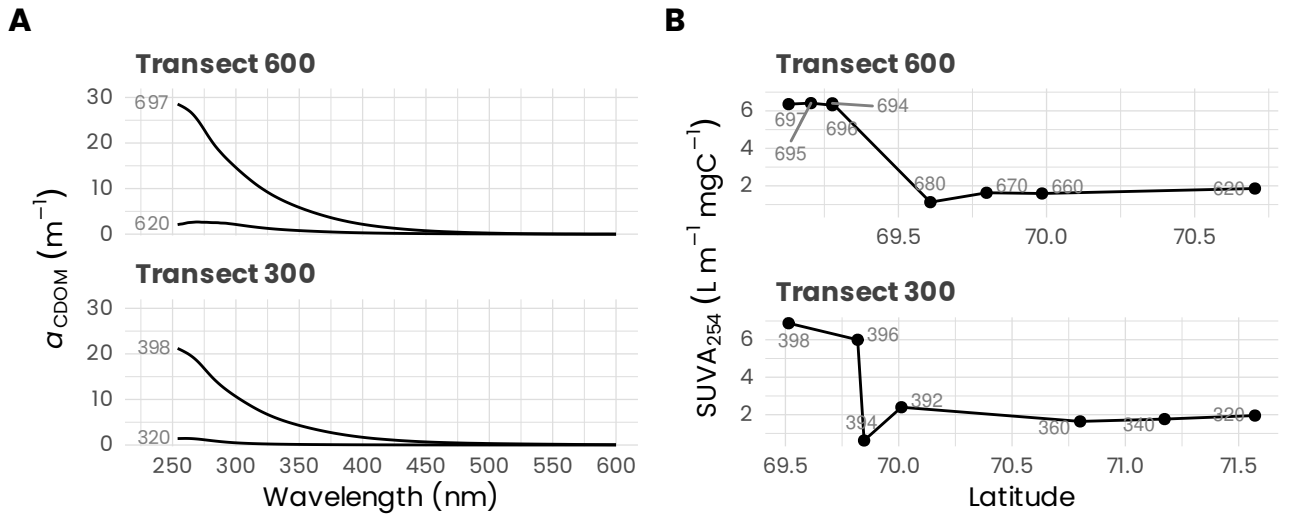


**Figure 7.** (**A**) Absorption spectra between 254 and 600 nm of chromophoric dissolved organic matter ($a_{CDOM}$) measured at the surface for the northern and southern stations of the transects 600 and 300. (**B**) Specific UV absorbance at 254 nm ($SUVA_{254}$, i.e. absorption of light at 254 nm per unit of carbon) at surface for stations along transects 600 and 300. Stations are identified in light gray.

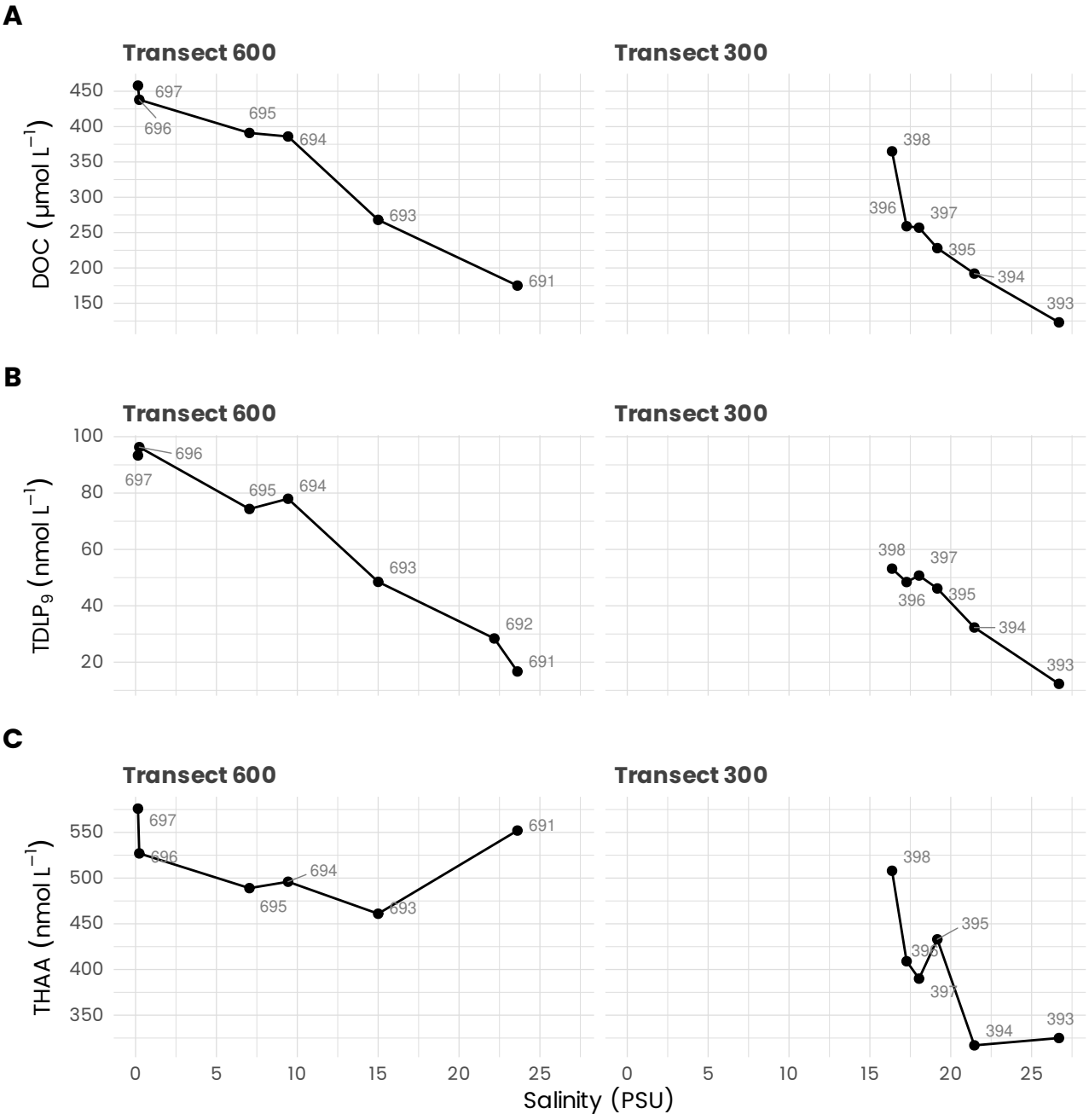


**Figure 8.** Concentrations of (**A**) dissolved organic carbon (DOC), (**B**) total dissolved lignin phenols ($TDLP_9$), and (**C**) total hydrolysable amino acids (THAA) measured along transects 600 and 300, and plotted against salinity.

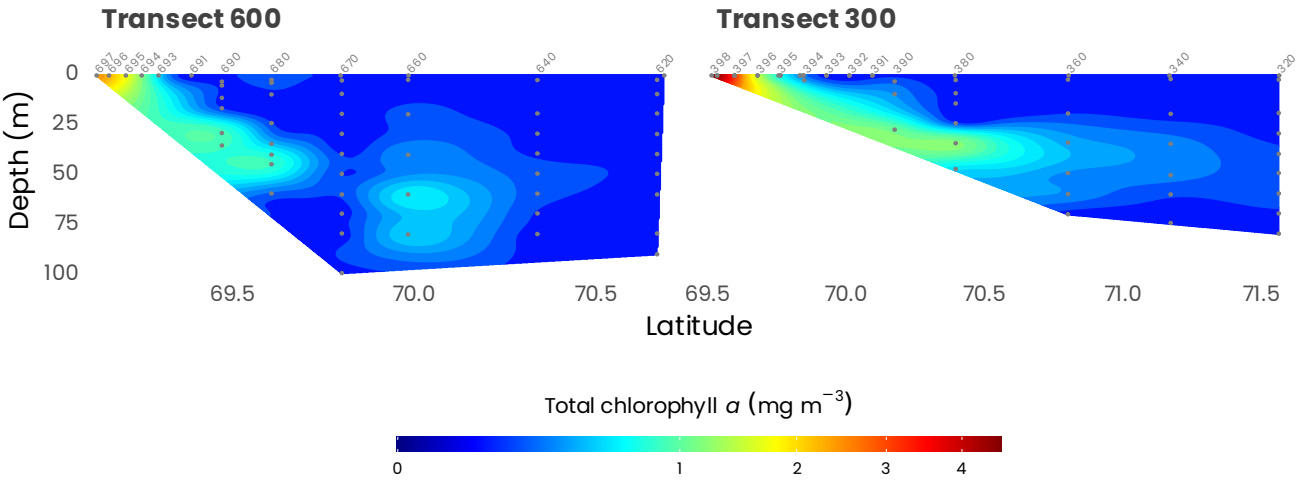


**Figure 9.** Cross-sections of total chlorophyll-a measured from HPLC (gray dots) along transects 600 and 300. Station numbers are identified in light gray on top of each panel. Note that the data has been square-root transformed for the visualization.

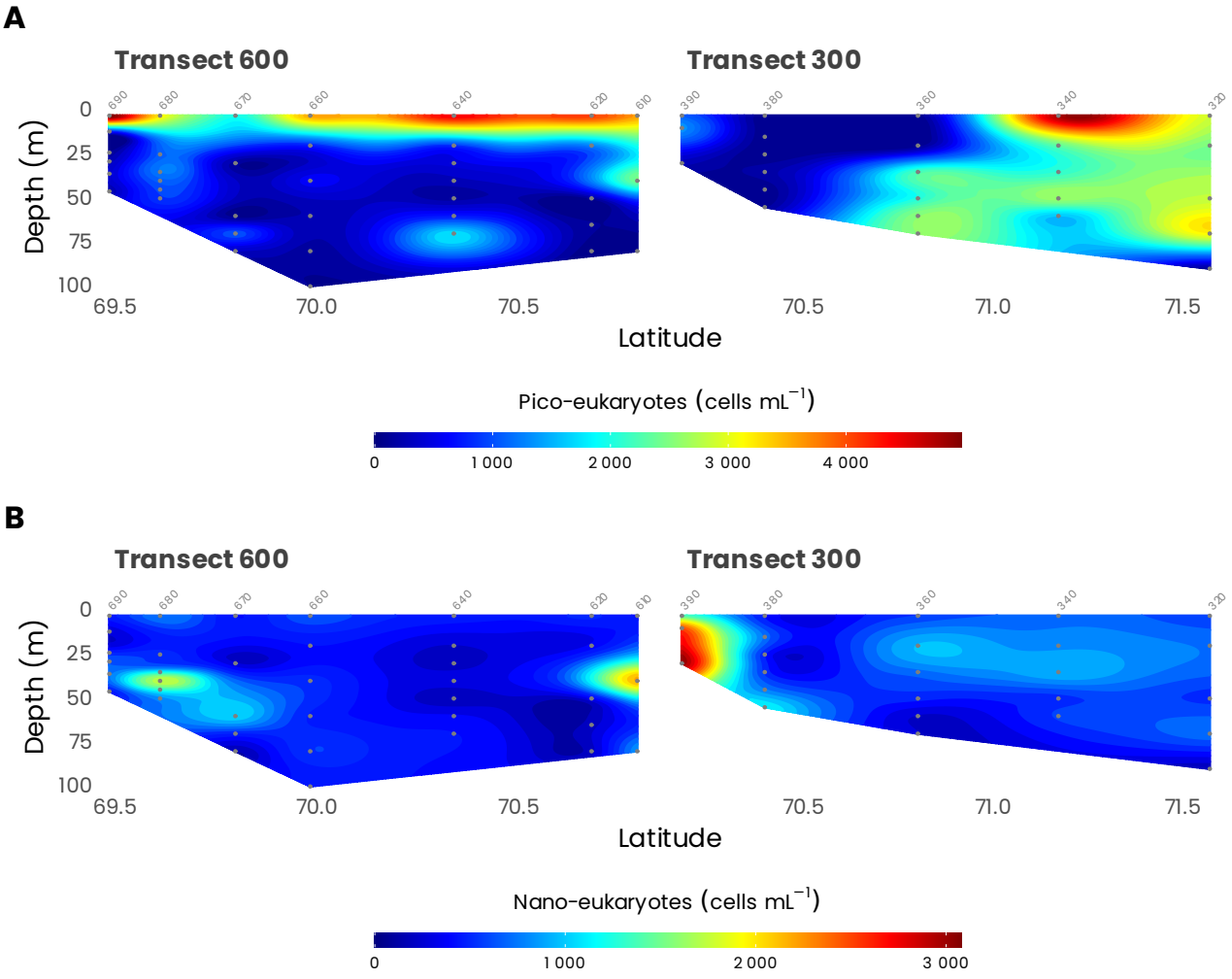


**Figure 10.** Concentrations of photosynthetic (**A**) pico- and (**B**) nano-eukaryotes measured by flow cytometry during the MALINA cruise on transects 600 and 300.

**A**
**Clone libraries**


**B**
**Cultures**


**Figure 11.** (**A**) Taxonomic composition of populations of photosynthetic pico- and nano-eukaryotes sorted flow cytometry from clone library sequences (Balzano et al., 2012b). (**B**) Taxonomic composition of cultures of phytoplankton isolated during the MALINA cruise (Balzano et al., 2012a).

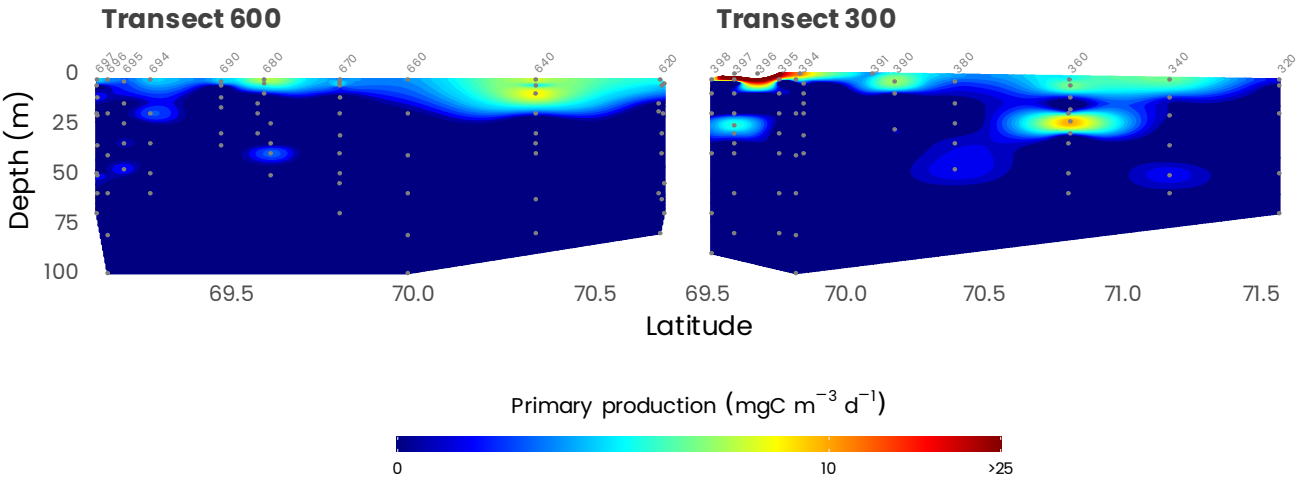


**Figure 12.** Cross-sections of primary production (gray dots) along transects 600 and 300. Station numbers are identified in light gray on top of each panel. Note that the color scale is presented on a log10 scale.

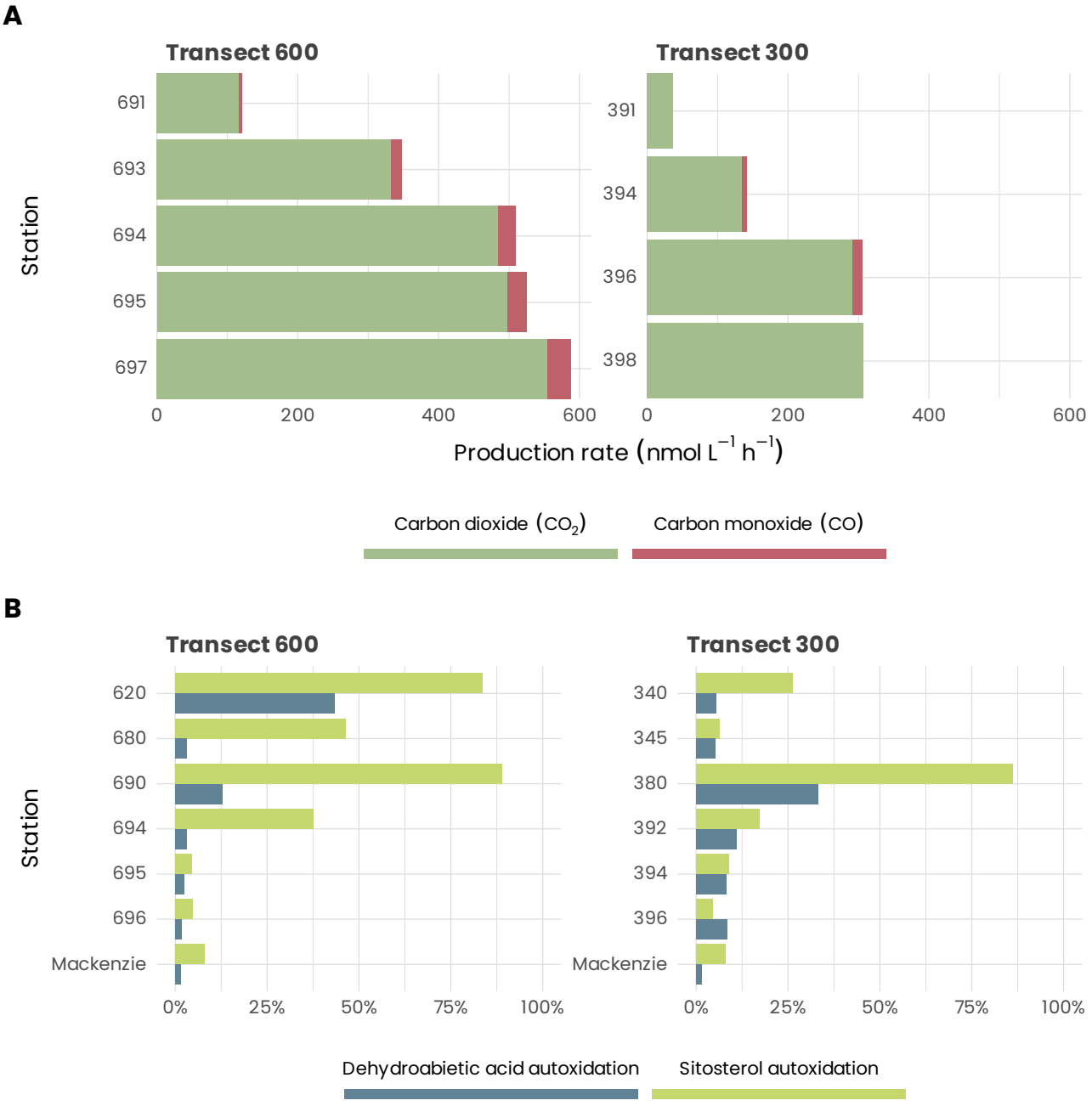


**Figure 13.** (**A**) CO and $CO_2$ production measured at 295 nm at surface for stations of transects 600 and 300. (**B**) Autoxidation of suspended particulate material for stations of transects 600 and 300.

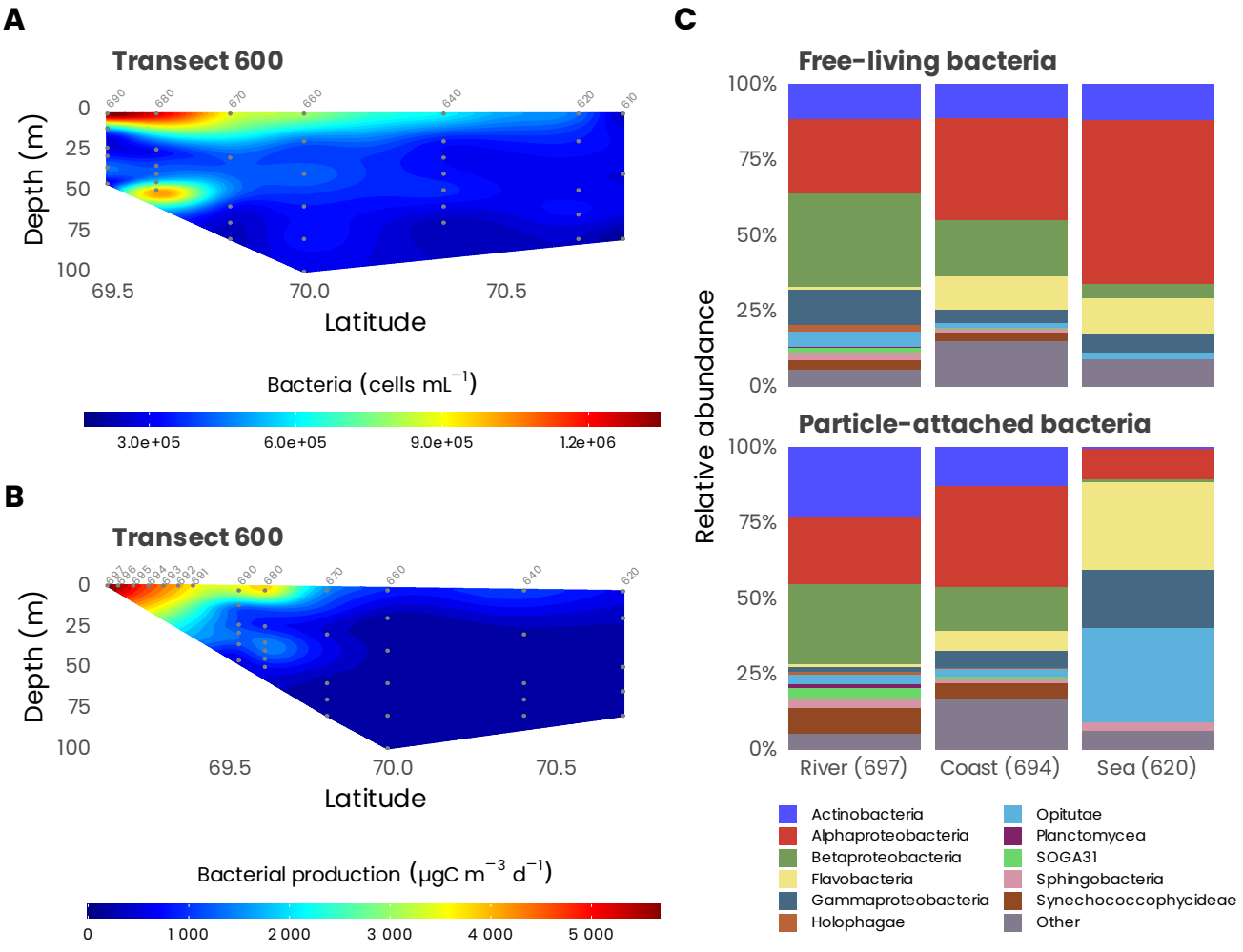


**Figure 14.** (**A**) Cross-sections of bacterial abundance measured from flow cytometry and (**B**) bacterial production measured along transect 600. Station numbers are identified in light gray on top of each panel. (**C**) Cumulative bar charts comparing the relative class abundances in particle-attached (PA) and free-living (FL) for a selected number of samples in transect 600.

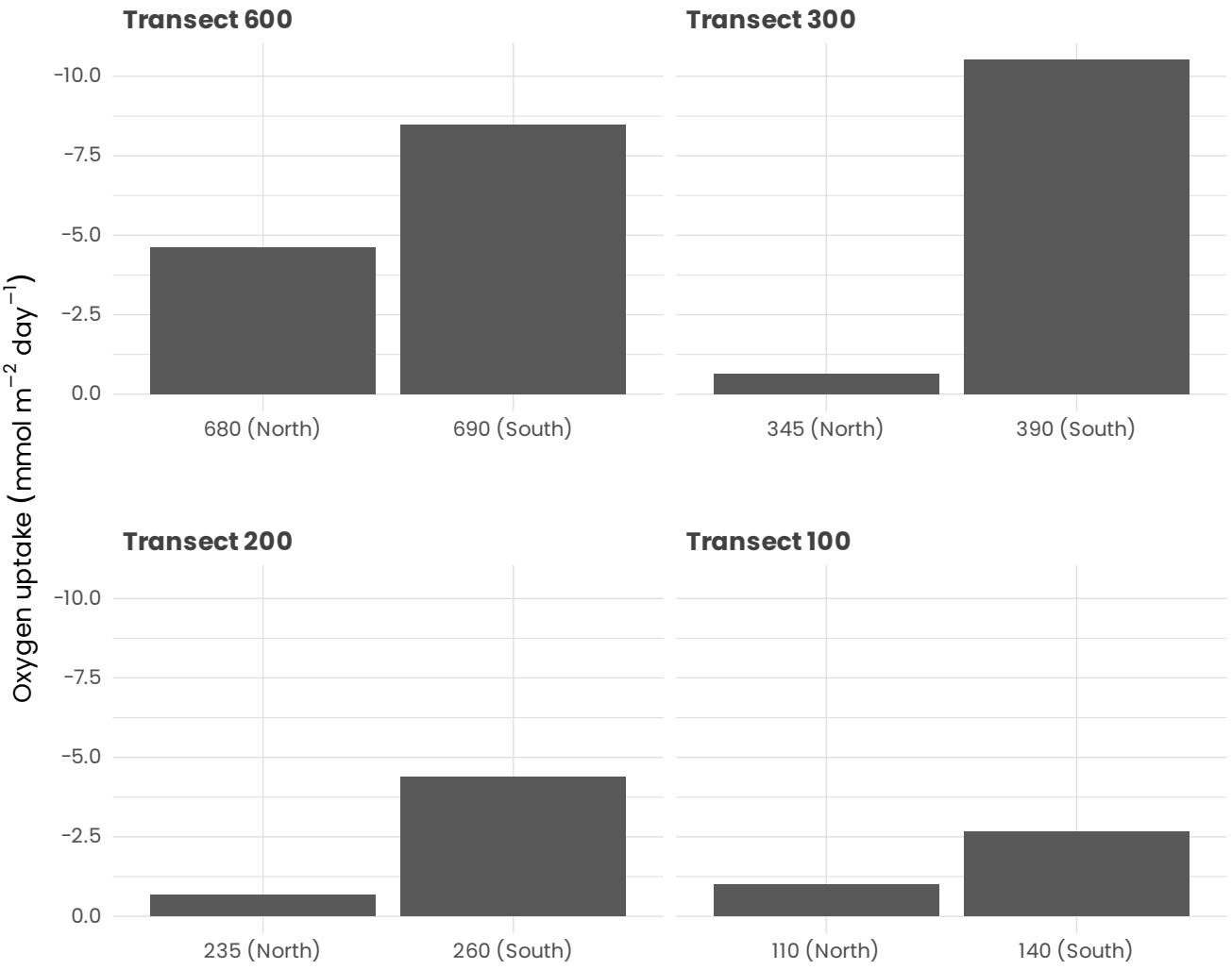


**Figure 15.** xxx

## 4 Code and data availability

TODO

*Author contributions.*

*Competing interests.* The authos declar no competing interests.

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