

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

Philippe Massicotte<sup>1</sup>, Rainer Amon<sup>2,3</sup>, David Antoine<sup>4,5</sup>, Philippe Archambault<sup>6</sup>, Sergio Balzano<sup>7,8,9</sup>, Simon Bélanger<sup>10</sup>, Ronald Benner<sup>11,12</sup>, Dominique Boeuf<sup>7</sup>, Annick Bricaud<sup>13</sup>, Flavienne Bruyant<sup>1</sup>, Gwenaëlle Chaillou<sup>14</sup>, Malik Chami<sup>15</sup>, Bruno Charrière<sup>16</sup>, Jingan Chen<sup>17</sup>, Hervé Claustre<sup>5</sup>, Pierre Coupel<sup>1</sup>, Nicole Delsaut<sup>16</sup>, David Doxaran<sup>18</sup>, Jens Ehn<sup>19</sup>, Cédric Fichot<sup>20</sup>, Marie-Hélène Forget<sup>1</sup>, Pingqing Fu<sup>21</sup>, Jonathan Gagnon<sup>1</sup>, Nicole Garcia<sup>22</sup>, Beat Gasser<sup>23</sup>, Jean-François Ghiglione<sup>24</sup>, Jacques Giraudeau<sup>25</sup>, Gaby Gorsky<sup>19</sup>, Michel Gosselin<sup>19</sup>, Priscillia Gourvil<sup>26</sup>, Yves Gratton<sup>27</sup>, Pascal Guillot<sup>28</sup>, Song Guisheng<sup>19</sup>, Hermann J. Heipieper<sup>29</sup>, Serge Heussner<sup>16</sup>, Stan Hooker<sup>19</sup>, Yannick Huot<sup>19</sup>, Violaine Jacq<sup>30</sup>, Christian Jeanthon<sup>7</sup>, Wade Jeffrey<sup>31</sup>, Fabien Joux<sup>19</sup>, Kimitaka Kawamura<sup>32</sup>, Bruno Lansard<sup>33</sup>, Edouard Leymarie<sup>5</sup>, Heike Link<sup>34</sup>, Connie Lovejoy<sup>19</sup>, Claudie Marec<sup>19</sup>, Dominique Marie<sup>7</sup>, Johannie Martin<sup>19</sup>, Guillaume Massé<sup>1,35</sup>, Atsushi Matsuoka<sup>1</sup>, Alexandre Mignot<sup>19</sup>, William L. Miller<sup>36</sup>, Juan-Carlos Miquel<sup>19</sup>, Alfonso Mucci<sup>19</sup>, Kiyomi Ono<sup>37</sup>, Eva Ortega<sup>19</sup>, Christos Panagiotopoulos<sup>22</sup>, Tim Papakyriakou<sup>19</sup>, Julien Para<sup>19</sup>, Marc Picheral<sup>5</sup>, Dieter Piepenburg<sup>19</sup>, Louis Prieur<sup>38</sup>, Patrick Raimbault<sup>22</sup>, Joséphine Ras<sup>5</sup>, Rick A. Reynolds<sup>39</sup>, André Rochon<sup>19</sup>, Jean-François Rontani<sup>22</sup>, Catherine Schmechtig<sup>40</sup>, Sabine Schmidt<sup>25</sup>, Richard Sempéré<sup>22</sup>, Yuan Shen<sup>11,41</sup>, Nathalie Simon<sup>19</sup>, Guishen Song<sup>42,43</sup>, Dariusz Stramski<sup>39</sup>, Dave Stroud<sup>19</sup>, Eri Tachibana<sup>37</sup>, Alexandre Thirouard<sup>19</sup>, Imma Tolosa<sup>23</sup>, Jean-Éric Tremblay<sup>1</sup>, Mickael Vaïtilingom<sup>44</sup>, Daniel Vaultot<sup>7,45</sup>, Frédéric Vaultier<sup>22</sup>, John K. Volkman<sup>46</sup>, Jorien E. Vonk<sup>47</sup>, Vanessa Wright/McKague<sup>19</sup>, Huixiang Xie<sup>42</sup>, Guangming Zheng<sup>39</sup>, and Marcel Babin<sup>1</sup>

<sup>1</sup>UMI Takuvik, CNRS/Université Laval, Québec, QC Canada

<sup>2</sup>Department of Marine and Coastal Environmental Science, Texas A&M University Galveston Campus, Galveston, Texas, 77553, USA.

<sup>3</sup>Department of Oceanography, Texas A&M University, College Station, Texas, 77843, USA

<sup>4</sup>Remote Sensing and Satellite Research Group, School of Earth and Planetary Sciences, Curtin University, Perth, WA 6845, Australia

<sup>5</sup>Sorbonne Université, CNRS, Laboratoire d'Océanographie de Villefranche, LOV, F-06230 Villefranche-sur-Mer, France

<sup>6</sup>ArcticNet, Québec Océan, UMI Takuvik, CNRS, Université Laval, Québec, QC, Canada

<sup>7</sup>UMR 7144, CNRS/Sorbonne Université, Station Biologique, 29680 Roscoff, France

<sup>8</sup>Present address: Stazione Zoologica Anton Dohrn Napoli (SZN), Naples, Italy

<sup>9</sup>NIOZ Royal Netherlands Institute for Sea Research, Den Burg, Netherlands

<sup>10</sup>Département de Biologie, Chimie et Géographie (groupes BORÉAS et Québec-Océan), Université du Québec à Rimouski, 300 allé des Ursulines, Rimouski, QC, G5L 3A1

<sup>11</sup>School of the Earth, Ocean and Environment, University of South Carolina, Columbia, South Carolina, 29208, USA

<sup>12</sup>Department of Biological Sciences, University of South Carolina, Columbia, South Carolina, 29208, USA

<sup>13</sup>Sorbonne Université, CNRS, Laboratoire d'Océanographie de Villefranche, LOV, F-06230 Villefranche-sur-Mer, France (retired)

<sup>14</sup>Quebec Océan, Institut des Sciences de la mer de Rimouski, Université du Québec à Rimouski, 310 allée des Ursulines, Rimouski, Qc, G5L 3A1

<sup>15</sup>Sorbonne Université, CNRS-INSU, Laboratoire Atmosphères Milieux Observations Spatiales (LATMOS), Boulevard de l'Observatoire, CS 34229, 06304 Nice Cedex, France

<sup>16</sup>Centre de Formation et de Recherche sur les Environnements Méditerranéens (CEFREM, UMR CNRS UPVD 5110), 52 Avenue Paul Alduy, 66860 Perpignan Cedex, France

<sup>17</sup>SKLEG, Institute of Geochemistry, Chinese Academy of Sciences, 99 West Lincheng Road, Guiyang, Guizhou 550081, P.R. China

<sup>18</sup>Laboratoire d'Océanographie de Villefranche UMR7093 CNRS/SU, F-06230, Villefranche-sur-Mer, France

<sup>19</sup>unidentified

<sup>20</sup>Department of Earth and Environment, Boston University, Boston, Massachusetts, 02215, USA

<sup>21</sup>Institute of Surface-Earth System Science, Tianjin University, Tianjin, China

<sup>22</sup>Aix Marseille Univ, Université de Toulon, CNRS, IRD, Mediterranean Institute of Oceanography (MIO) UM 110, Marseille, France, 13288, Marseille, France.

<sup>23</sup>International Atomic Energy Agency-Environment Laboratories, 4, quai Antoine 1er, MC 9800 MONACO

<sup>24</sup>CNRS, Sorbonne Universités, UMR 7621, Laboratoire d'Océanographie Microbienne, Observatoire Océanologique de Banyuls, France

<sup>25</sup>Univ. Bordeaux, CNRS, EPOC, EPHE, UMR 5805, F-33600 Pessac, France

<sup>26</sup>FR2424, CNRS/Sorbonne Université, Station Biologique, 29680 Roscoff, France

<sup>27</sup>INRS-ETE, Québec, Qc, Canada

<sup>28</sup>ISMER, UQAR, Rimouski, Qc, Canada

<sup>29</sup>Department of Environmental Biotechnology Permoserstraße 15 D-04318 Leipzig, Germany

<sup>30</sup>JE SAIS PAS CE QU'ELLE EST DEVENUE

<sup>31</sup>Center for Environmental Diagnostics & Bioremediation, University of West Florida, 11000 University Parkway, Pensacola, FL 32514 USA

<sup>32</sup>Chubu Institute for Advanced Studies, Chubu University, Kasugai, Japan

<sup>33</sup>Laboratoire des Sciences du Climat et de l'Environnement, UMR 8212 CEA-CNRS-UVSQ, IPSL and Université Paris-Saclay, CEA-Orme des Merisiers, Bat 714, 91190 Gif-sur-Yvette, France

<sup>34</sup>Department Maritime Systems, University of Rostock, 18059 Rostock, Germany

<sup>35</sup>UMR Locean, CNRS/Sorbonne Université/MNHN/IRD, Concarneau, France

<sup>36</sup>Department of Marine Sciences, 325 Sanford Drive, University of Georgia, Athens, GA 30602

<sup>37</sup>Institute of Low Temperature Science, Hokkaido University, Sapporo, 060-0819, Japan.

<sup>38</sup>CNRS, LOV, F-06230 Villefranche-sur-Mer, France

<sup>39</sup>Marine Physical Laboratory, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA, USA.

<sup>40</sup>OSU Ecce Terra - UMS 3455 Sorbonne Université 4, Place Jussieu 75 252 Paris Cedex 05, France

<sup>41</sup>State Key Laboratory of Marine Environmental Science, College of Ocean and Earth Sciences, Xiamen University, Xiamen, Fujian, P. R. China

<sup>42</sup>Institut des sciences de la mer de Rimouski, Université du Québec à Rimouski, Rimouski, Québec, Canada

<sup>43</sup>School of Marine Science and Technology, Tianjin University, Tianjin, 300072, China

<sup>44</sup>Université des Antilles Pointe-à-Pitre, Guadeloupe, France

<sup>45</sup>Asian School of the Environment, Nanyang Technological University, Singapore

<sup>46</sup>CSIRO Marine and Atmospheric Research and CSIRO Wealth from Oceans National Research Flagship, GPO Box 1538, Hobart, Tasmania 7001, Australia

<sup>47</sup>Department of Earth Sciences, Vrije Universiteit Amsterdam, The Netherlands

**Correspondence:** Marcel Babin (marcel.babin@takuvik.ulaval.ca)

**Abstract.** xxxx

## **1 Introduction**

## **2 Study area, environmental conditions and sampling strategy**

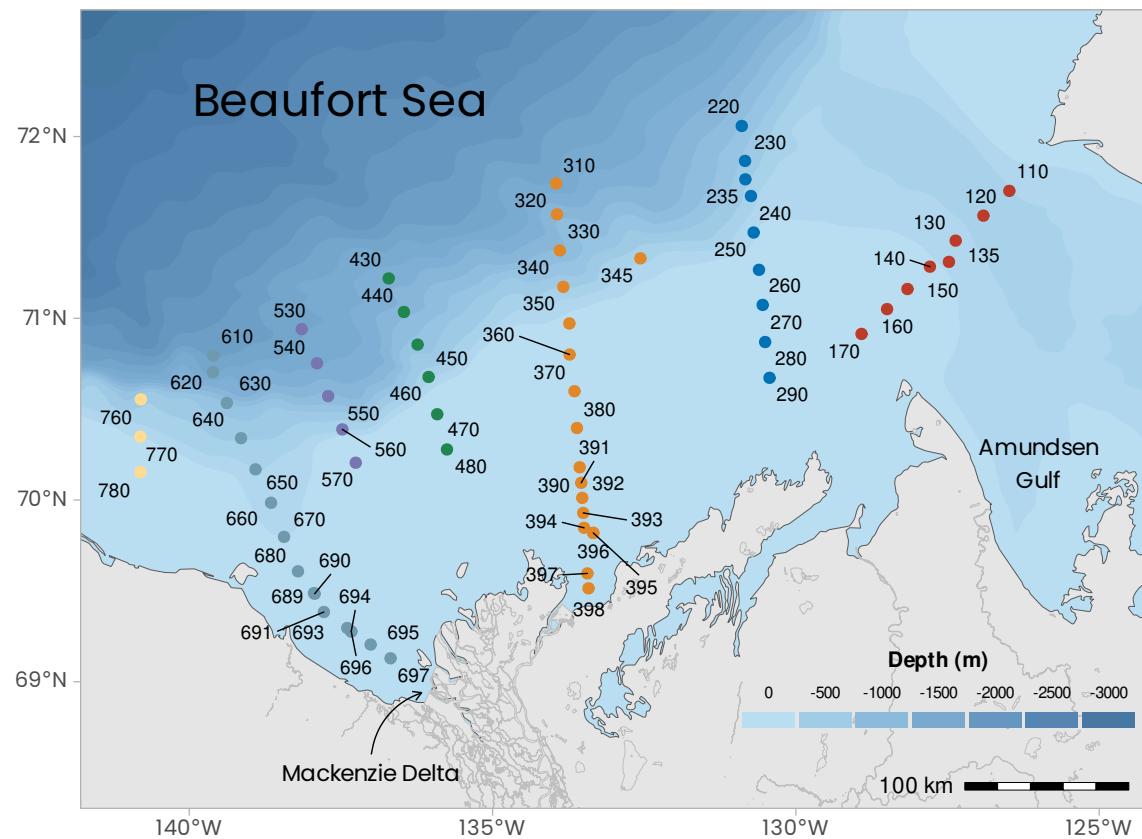
### **2.1 Study area and environmental conditions**

### **5 2.2 Sampling strategy**

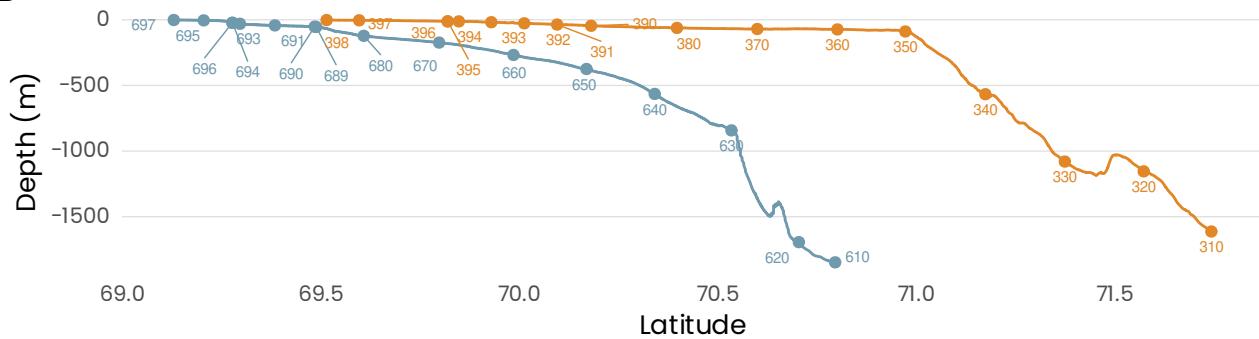
#### **2.2.1 CTD and rosette deployments**

### 3 Figures

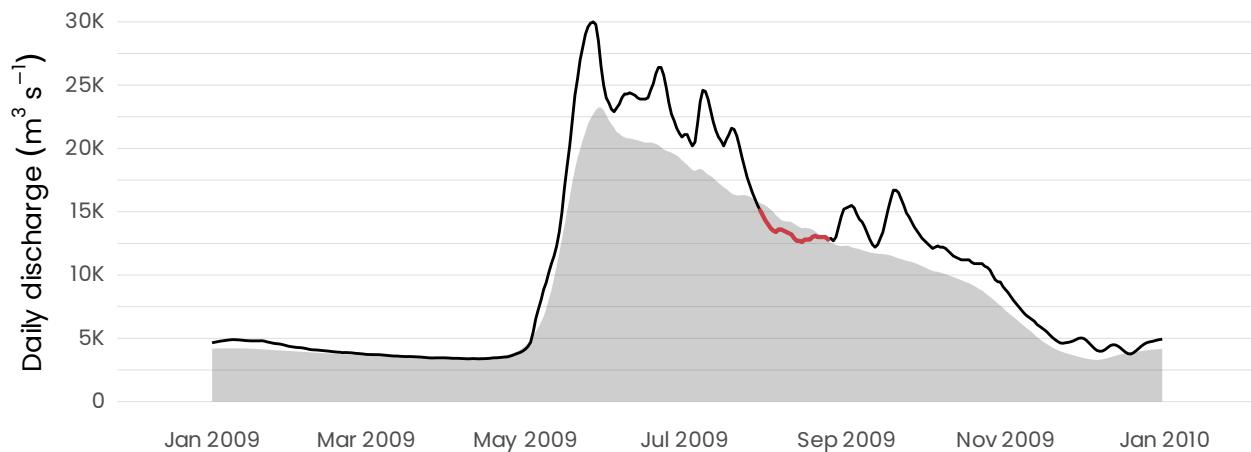
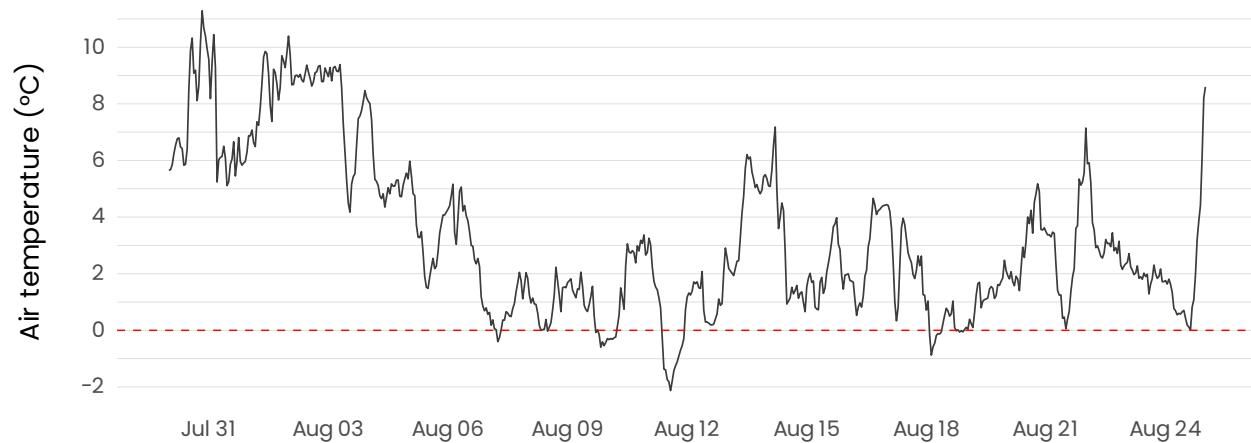
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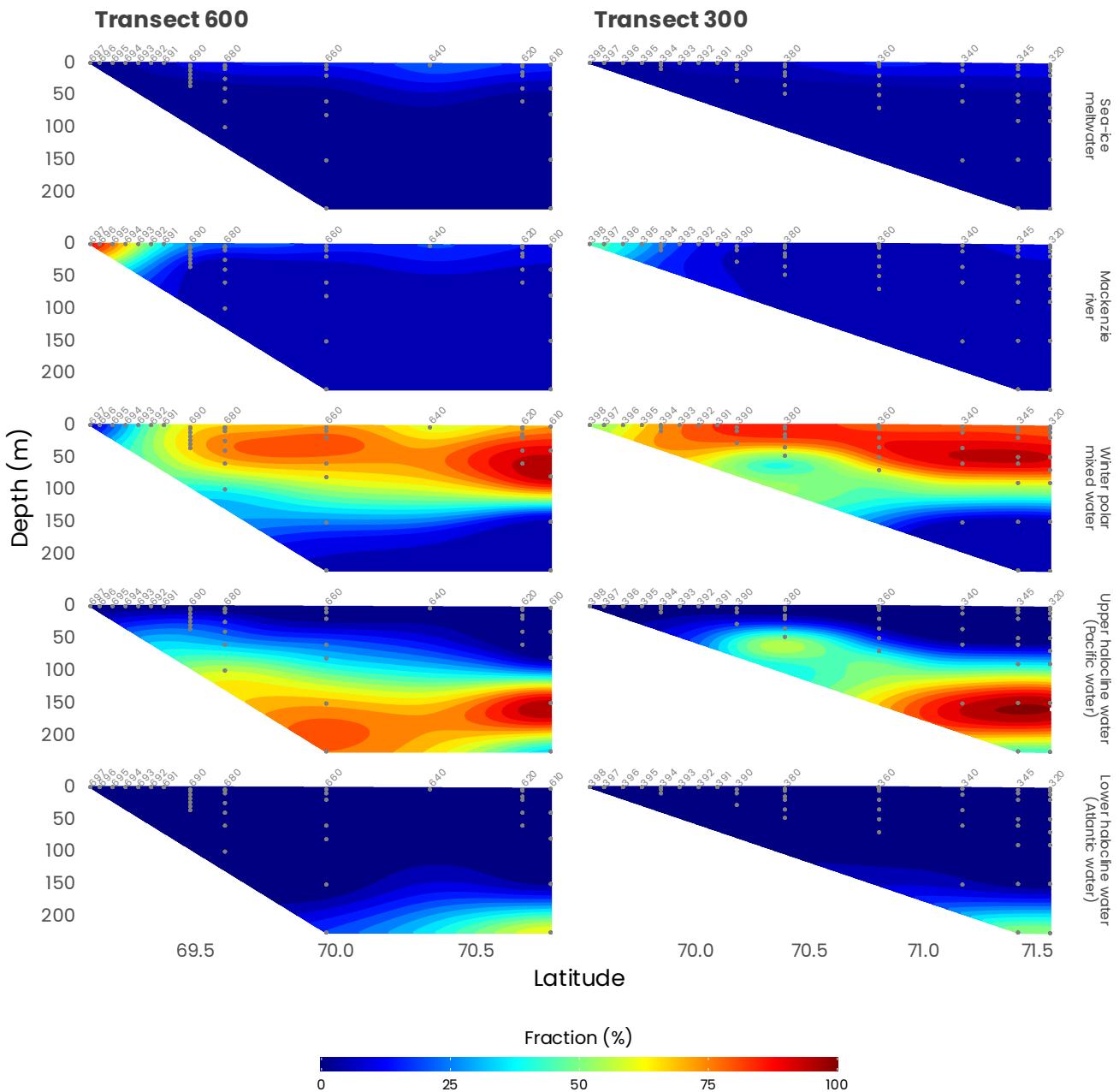
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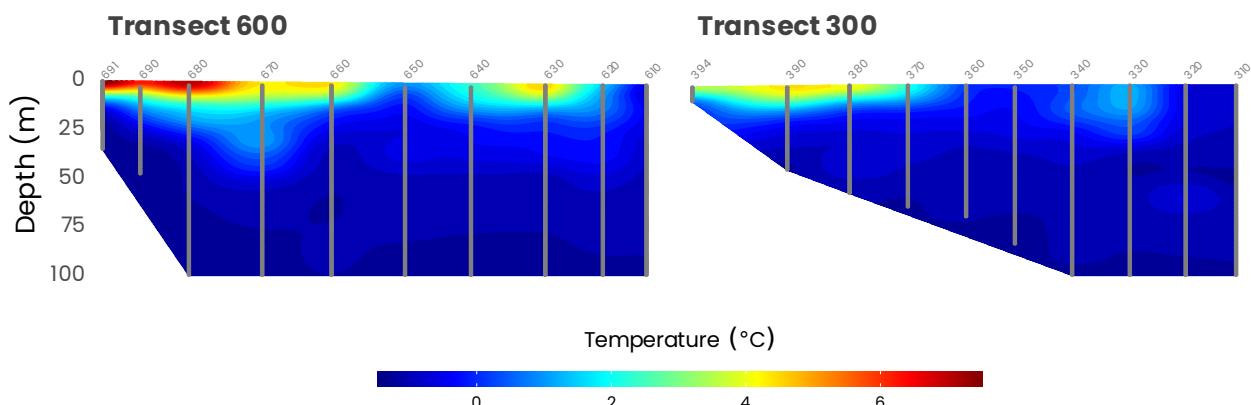
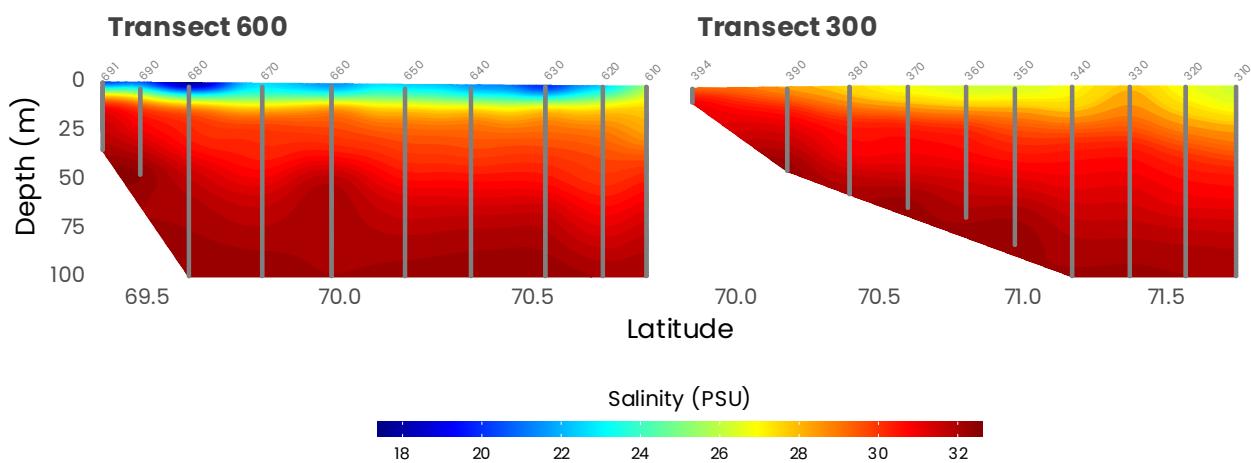
**Figure 1.** (A) Localizations of the sampling sites visited during the MALINA 2009 campaign. The colors of the dots represent the seven transects visited during the mission. (B) Bathymetric profiles for transects 600 and 300. Bathymetric data from GEBCO (<https://download.gebco.net/>).

**A****B**

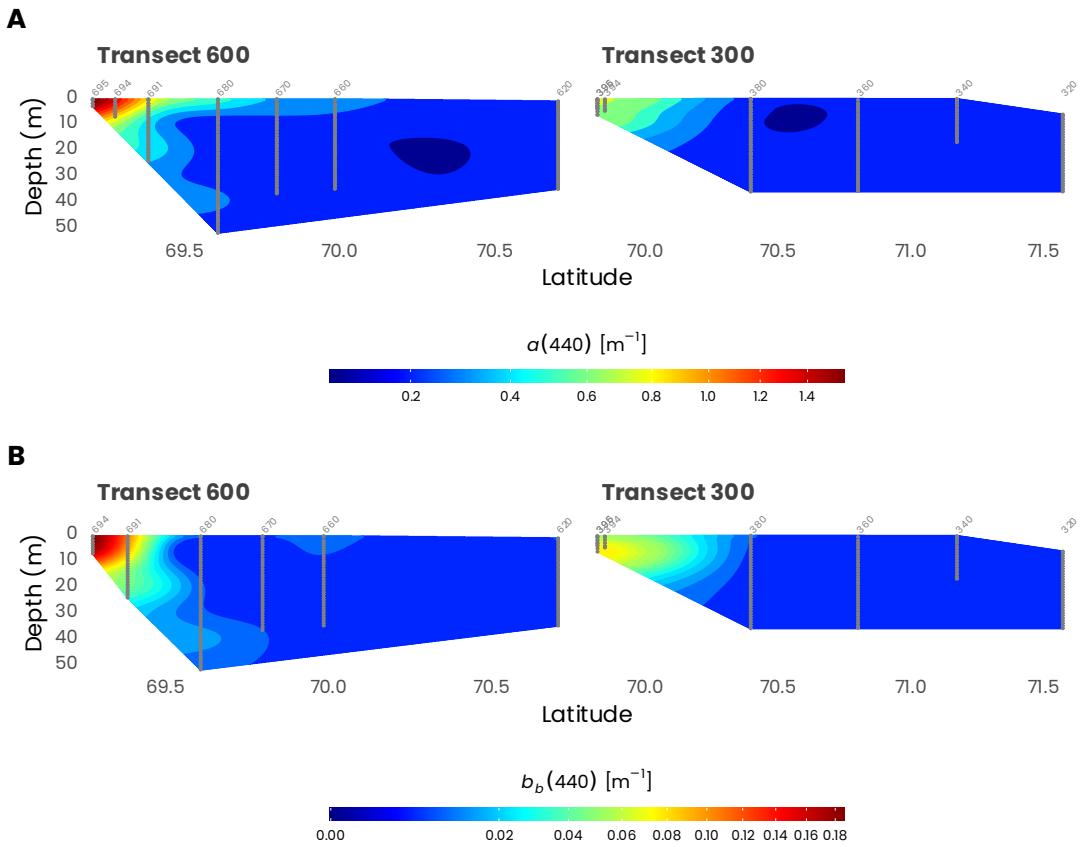
**Figure 2.** (A) Daily discharge of the Mackenzie river at the Arctic Red River junction (station 10LC014). The black line corresponds to the 2009 discharge whereas the colored segment identifies the period of the MALINA campaign. The shaded area is the mean discharge calculated between 1972 and 2016.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



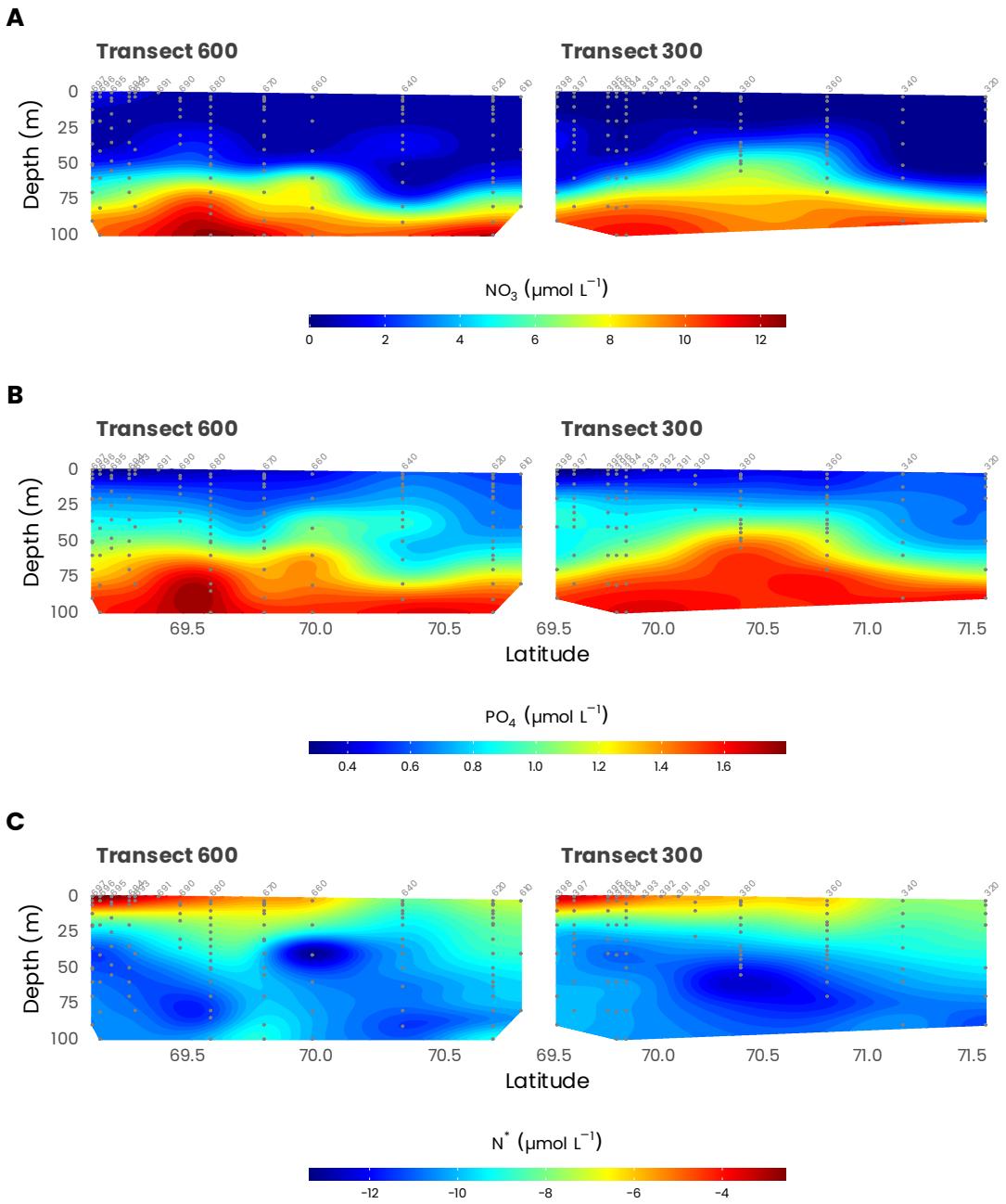
**Figure 3.** Distribution of source water types along transects 600 and 300 (see Fig. 1). Station numbers are identified in light gray on top of each panel.

**A****B**

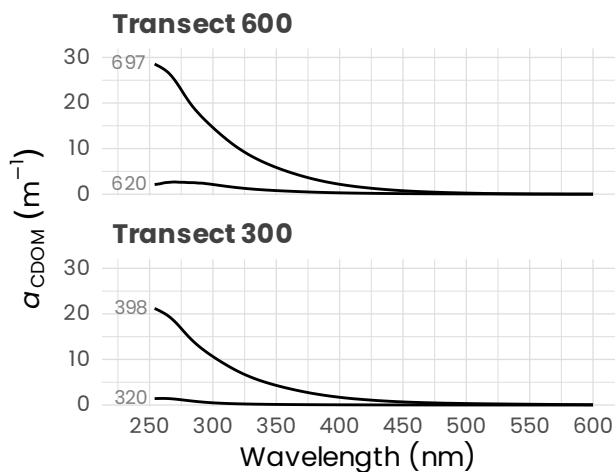
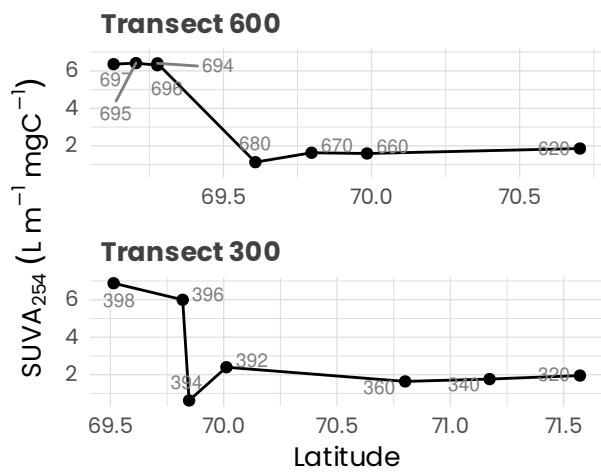
**Figure 4.** Cross-sections of temperature (A) and salinity (B) measured by the CTD (gray dots) along transects 600 and 300. Station numbers are identified in light gray on top of each panel.



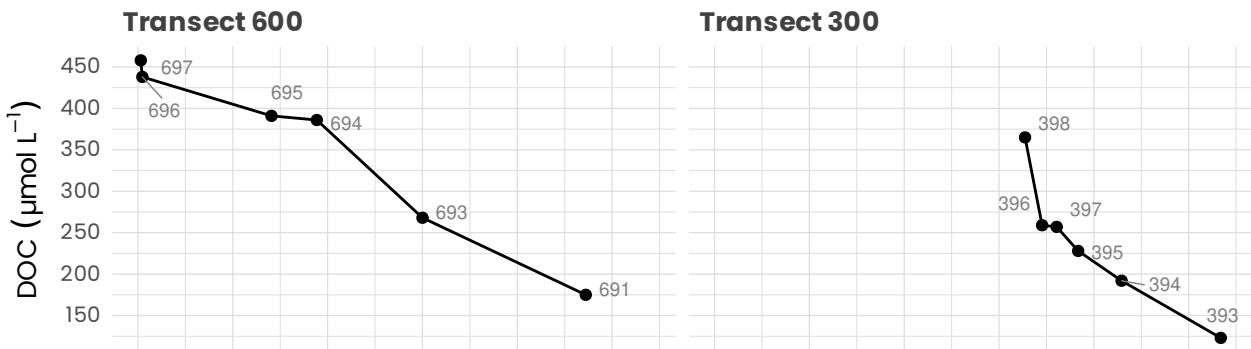
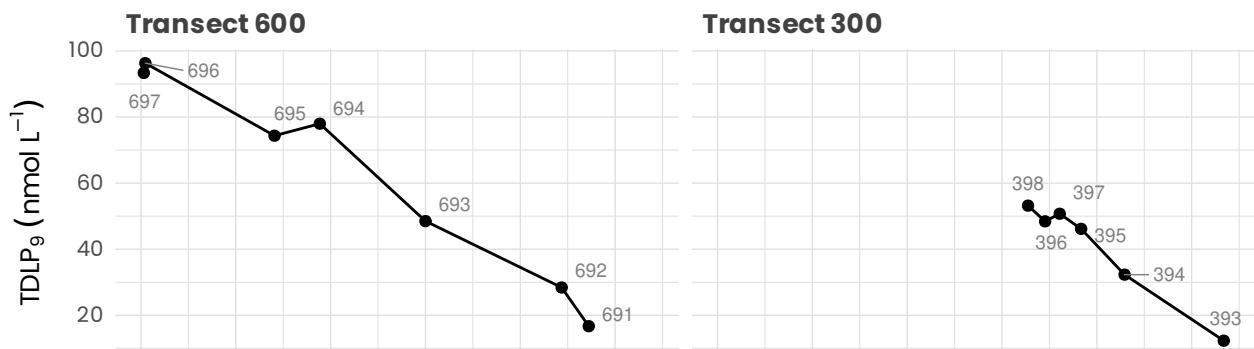
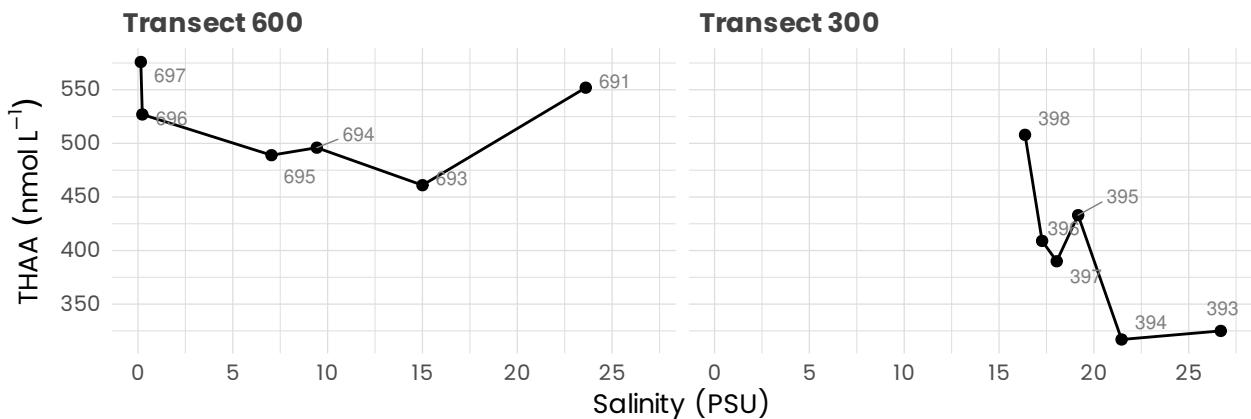
**Figure 5.** Cross-sections of  $a(440)$  (**A**) and (**B**)  $b_b(440)$  measured using an AC9 and BB9 along transects 600 and 300. Station numbers are identified in light gray on top of each panel.



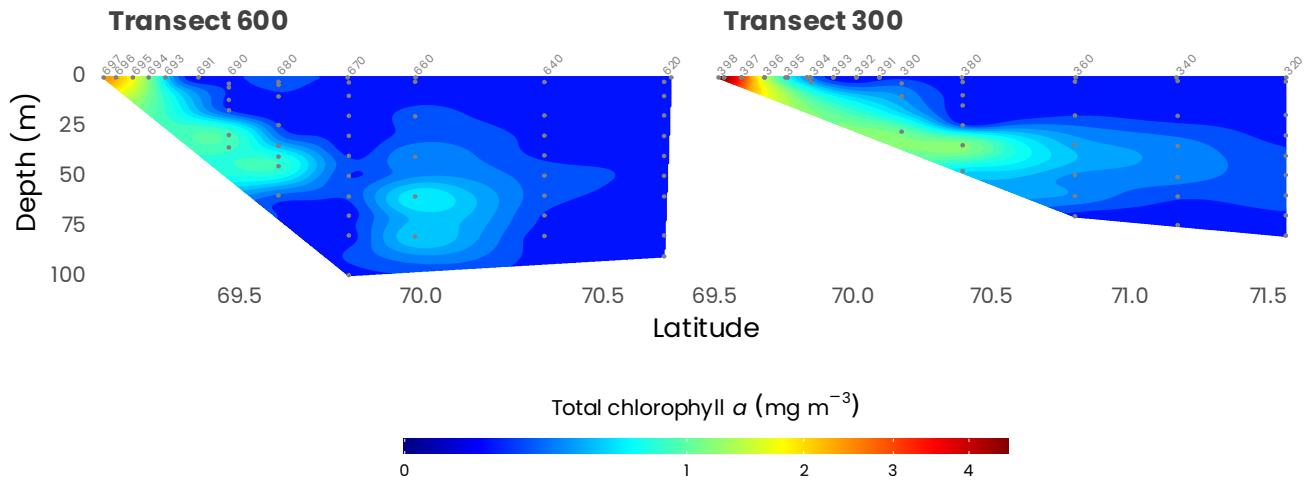
**Figure 6.** Cross-sections of (A)  $\text{NO}_3^-$  and (B)  $\text{PO}_4^{3-}$  measured from niskin bottles (gray dots) along transects 600 and 300. (C)  $\text{N}^*$  defined as  $\text{N} - \text{rP}$  with  $\text{r} = \text{N/P} = 13.1$  (see the text for the details). Station numbers are identified in light gray on top of each panel.

**A****B**

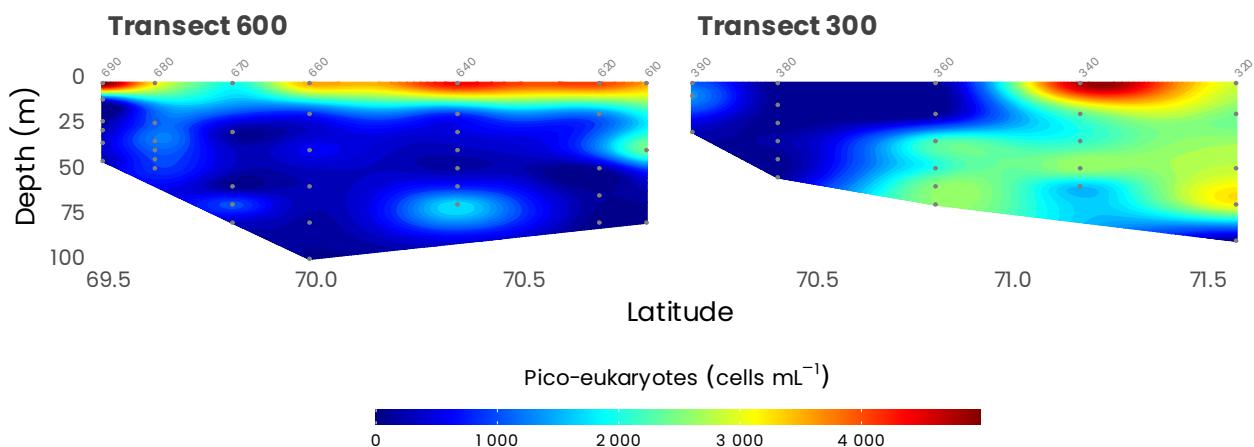
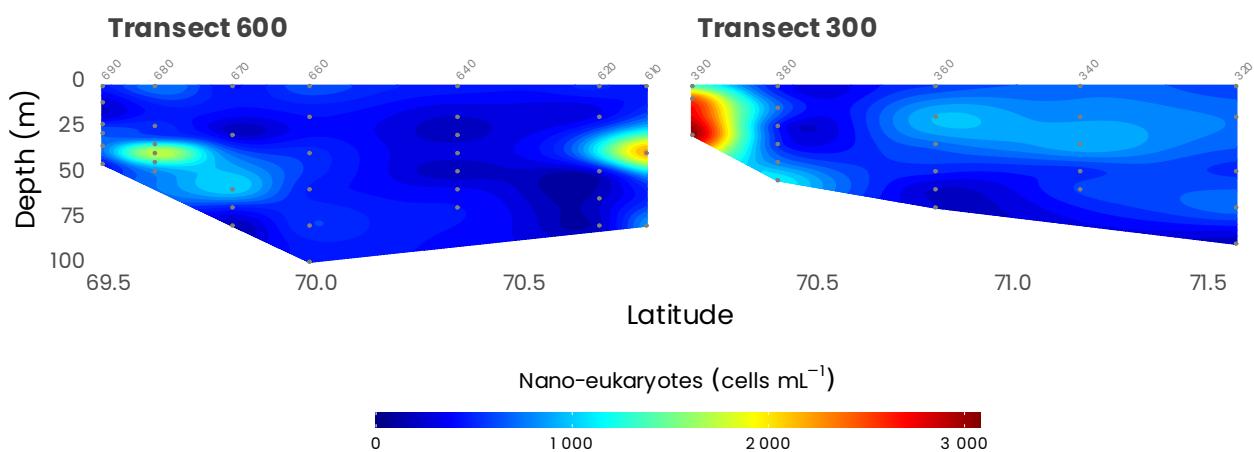
**Figure 7.** **(A)** Absorption spectra between 254 and 600 nm of chromophoric dissolved organic matter ( $\alpha_{CDOM}$ ) measured at the surface for the northern and southern stations of the transects 600 and 300. **(B)** Specific UV absorbance at 254 nm ( $SUVA_{254}$ , i.e. absorption of light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

**A****B****C**

**Figure 8.** Concentrations of (A) dissolved organic carbon (DOC), (B) total dissolved lignin phenols (TDLP<sub>9</sub>), 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.

**A****B**

**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**

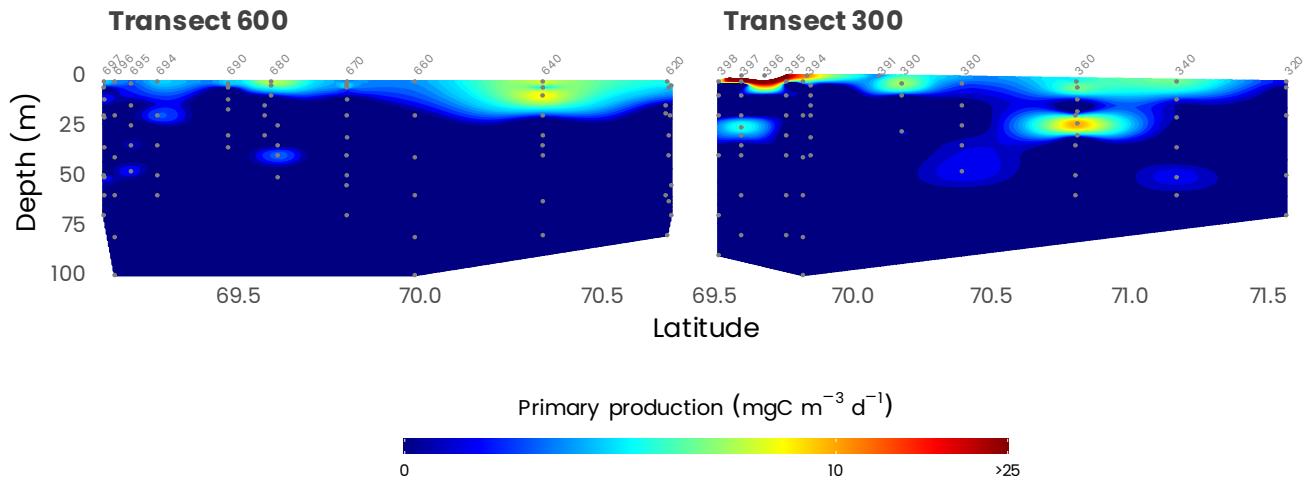
## Clone libraries

**B**

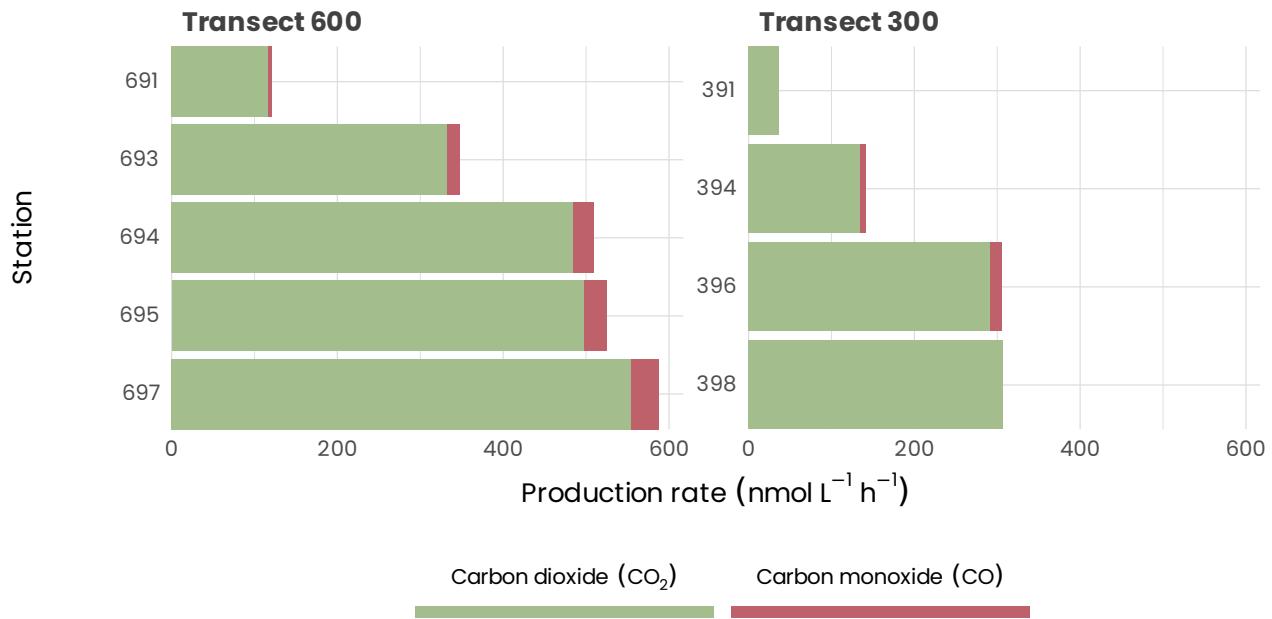
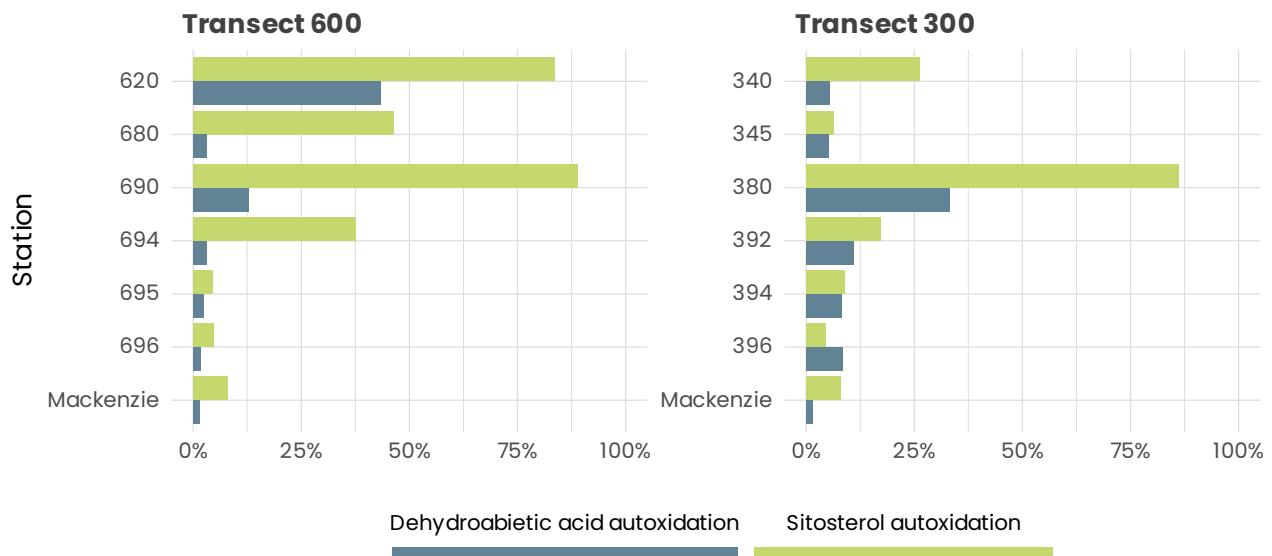
## Cultures



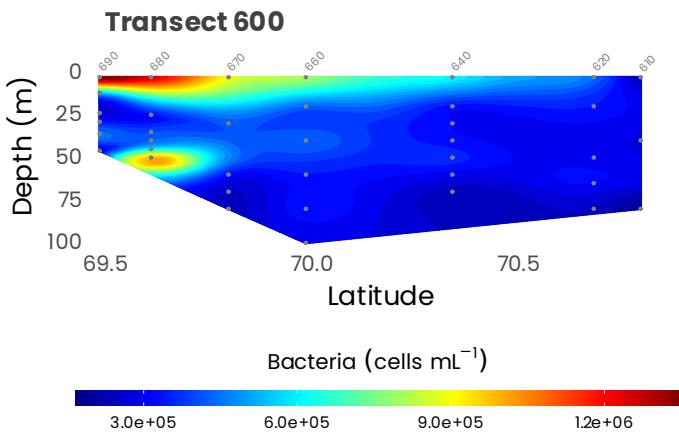
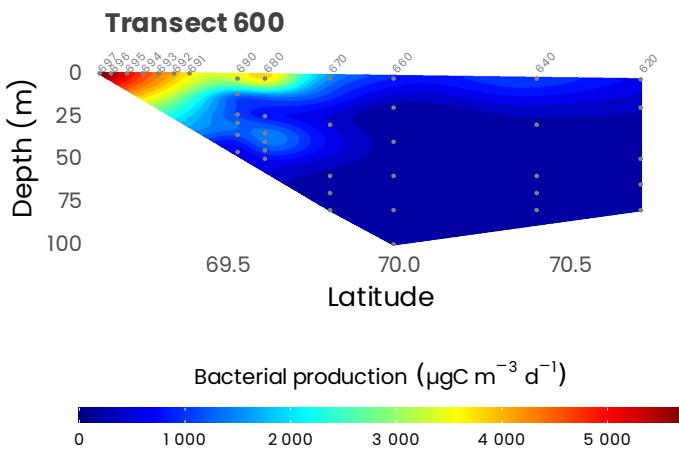
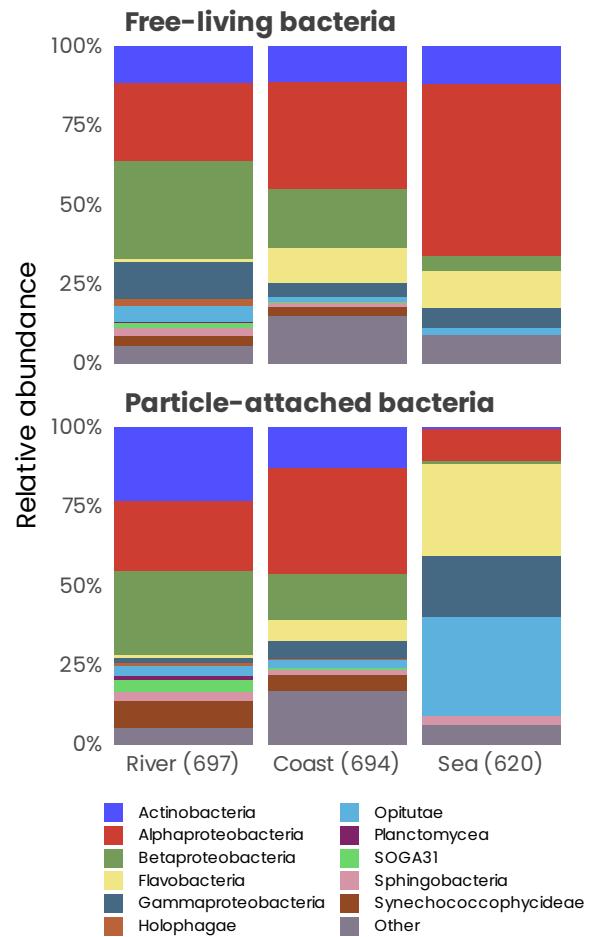
**Figure 11.** (A) Taxonomic composition of populations of photosynthetic pico- and nano-eukaryotes sorted flow cytometry from clone library sequences (Balzano2012a). (B) Taxonomic composition of cultures of phytoplankton isolated during the MALINA cruise (Balzano2012b).



**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.

**A****B**

**Figure 13.** (A) CO and  $\text{CO}_2$  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.

**A****B****C**

**Figure 14.** **(A)** Cross-sections of bacterial abundance measured from flow cytometry and **(B)** bacterial production measured from XXX 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.

#### 4 Code and data availability

TODO

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

*Acknowledgements.* xxxx

## **References**