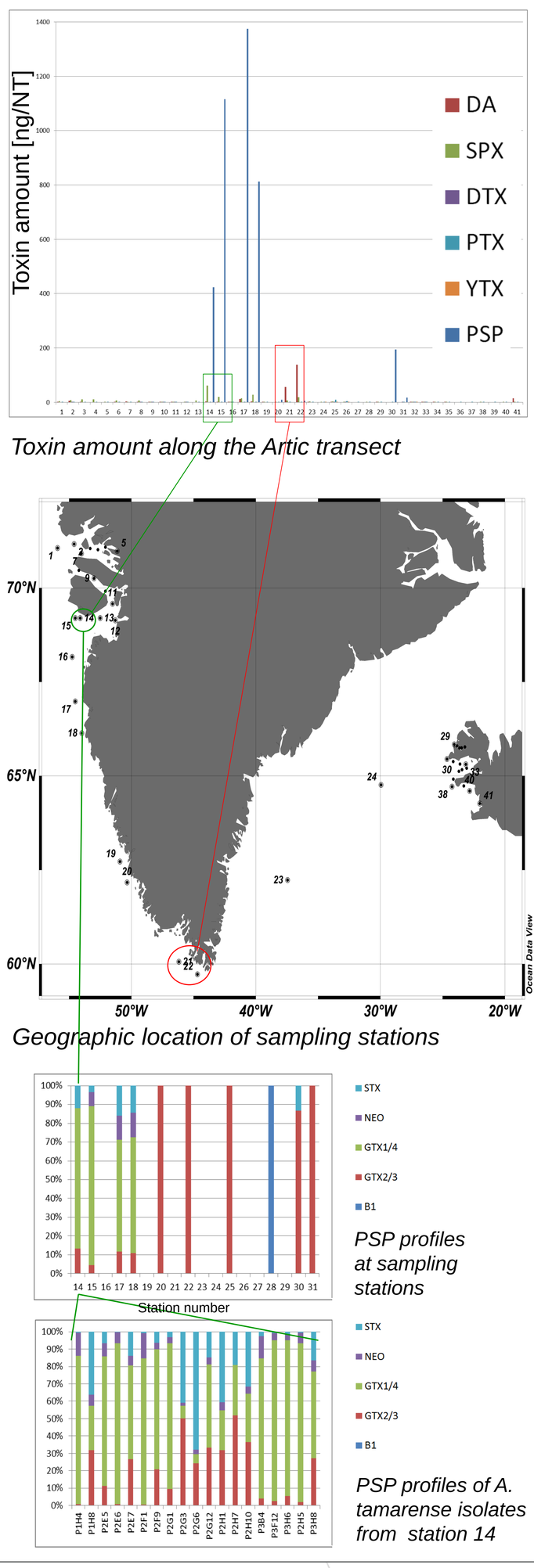
Bernd Krock[1], Urban Tillmann[1], Allan D. Cembella[1], Gustavo A. Lovrich[2], C. Marcela Borel[3]

Comparison of Phycotoxin Data from Field Surveys in the North and South Atlantic

Introduction

The objective of this work was to compare the occurrence of toxic microalgae in the North and South Atlantic. Two research expeditions were carried out: A transect from Ushuaia (Tierra del Fuego) to Mar del Plata (Argentina) in March/April 2012 and from Uummannaq Fjord (Greenland) to Reykjavík (Iceland) in July/August 2012. In both expeditions plankton samples were collected and additionally sediment samples were taken in the southern Atlantic where possible.



Toxin amount along the Artic transect

Geographic location of sampling stations

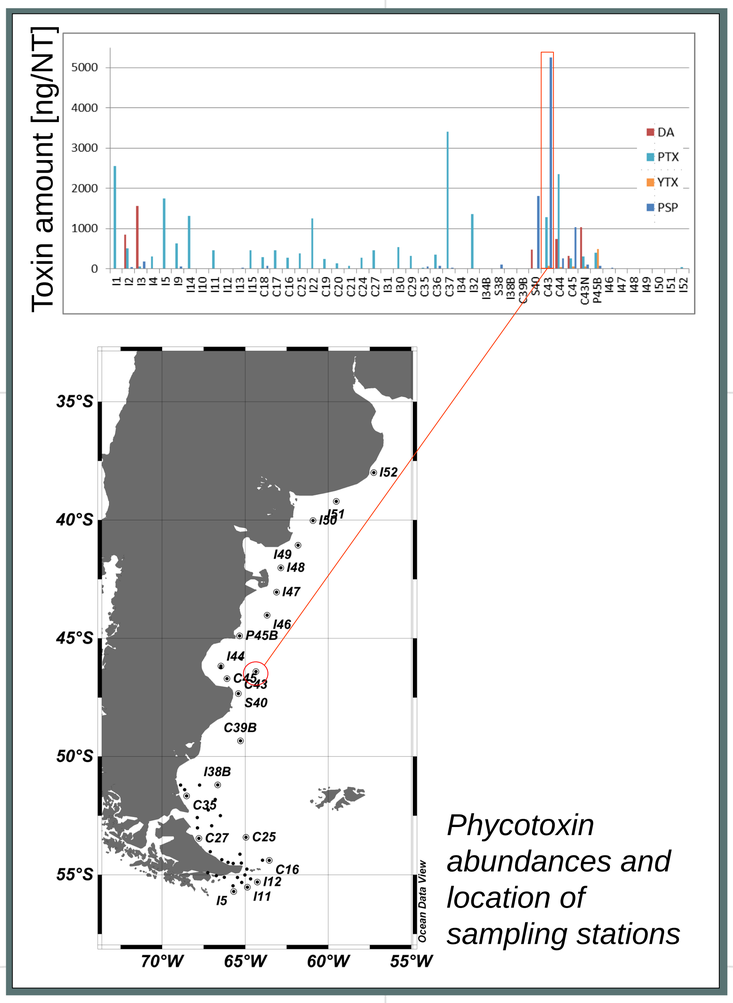
PSP profiles at sampling stations

PSP profiles of A. tamarense isolates from station 14

The Artic transect

The toxins found in the northern transect were dominated by PSP, being the most abundant with values up to 1400 ng per net tow (NT), followed by domoic acid (DA) and spirolides (SPX). These results suggest a prevalence of *Alexandrium* and *Pseudo-Nitzschia* spp. among toxic microalgae, especially in the Disko Bay area. In contrast dinophysistoxins (DTXs) and pectenotoxins (PTXs) produced by *Dinophysis* spp. and yessotoxin (YTX) produced by *Protoceratium reticulatum*, *Lingulodinium polyedrum* or *Gonyaulax spinifera* were only detected sporadically and at low concentrations < 50 ng/NT.

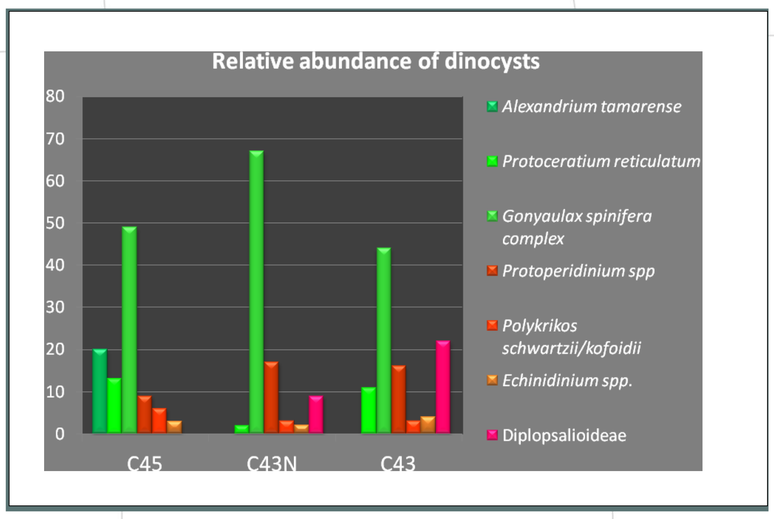
The PSP toxin profiles measured in the Disko Bay area very well matched the toxin profiles of several *Alexandrium tamarense* strains isolated at station 14, which are characterized mainly by gonyautoxins (GTXs) 1-4, low percentages of neosaxitoxin (NEO) and saxitoxin (STX) and the absence of N-sulfocarbamoyl toxins. These data are consistent was earlier findings of Baggesen et al.[1]. Also the presence of toxic *Pseudo-Nitzschia* has been described recently[2].



Phycotoxin abundances and location of sampling stations

The Argentinean transect

Generally toxin abundances were higher in the southern than in the northern Atlantic. The predominant toxin group found in Argentinean shelf waters up to concentrations of 3500 ng/NT were PTXs, dominated by PTX-2. PTXs were found in the entire Tierra del Fuego and Southern Patagonia regions up to the San Jorge Gulf (stations I1 to P45B). A very productive region was the San Jorge Gulf, which was charterized by nutrient rich, cold waters from the south overlayed by warm, nutrient depleted coastal waters. In this region (stations C43 to P45B) a massive bloom of non-toxic *Ceratium* spp. was observed, but also highest toxins concentrations of the entire transect with PSP concentrations >5000 ng/NT. From Station C43 two strains of *A. tamarense* were isolated, displaying the same toxin profiles as already described for Argentinean coastal strains[3], and two YTX-producing *P. reticulatum* strains.



Dinocysts of potential toxic species were also found in sediment samples of San Jorge Gulf with the *Gonyaulax spinifera* complex dominating at the three analyzed stations. However, there is a significant difference between the cyst assemblage of the station C45, in the central area of the San Jorge Gulf, and the mouth area of the Gulf (stations C43 and C43N). Cysts of the *Alexandrium* spp. are constrained to the sediments of the inner gulf, and their abundance follows the abundance of *G. spinifera* complex in this sample. *P. reticulatum* cysts reach the highest proportion (only ~13 % of the total cyst population) at this inner station.

At stations C43 and C43N, heterotrophic dinocysts occupy one half of the cyst populations, and *Echinidinium* spp. (paleontological taxa of unknown biological affinity), were found at these stations in low proportions.

Interestingly vegetative cells of *A. tamarense* were isolated at station C43 where the highest PSP toxin concentrations were measured, but no *Alexandrium* cysts could be detected in the sediment. In contrast *Alexandrium* cysts were found at station C45, where moderate PSP levels were measured.

Acknowledgements:
This work was financed by the HGF through the research programmes MARCOLPOLI and PACES and is part of the GEOHAB CORE research project on HABs in Fjords and Coastal Embayments and the binational project MINCyT-BMBF (AL/11/03-ARG 11/021).

References:

1) Baggesen C., Moestrup Ø., Daugbjerg N., Krock B., Cembella A.D., Madsen S., 2012. Harmful Algae **19**, 108-116..
2) Hansen L.R., Soylu S.í., Kotaki Y., Moestrup Ø., Lundholm N., 2011. Harmful Algae **10**, 689-696.
3) Montoya N.G., Fulco V.K., Carignan M.O., Carreto J.I., 2010. Toxicon **56**, 1408-1418.

Alfred-Wegener-Institut
Helmholtz-Zentrum für
Polar- und Meeresforschung

www.awi.de

1) Alfred Wegener Institute
Am Handelshafen 12
27570 Bremerhaven, Germany

2) Centro Austral de Investigaciones Científicas (CADIC-CONICET)
Houssay 200
Ushuaia - Tierra del Fuego, Argentina

3) INGEOSUR (CONICET-UNS)
San Juan 670
Bahía Blanca, Argentina