

Dissolved methane in Belgian Coastal Waters

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CH₄ emission from open ocean is marginal
CH₄ emission from coastal waters is higher







nature
geoscience

ARTICLES

<https://doi.org/10.1038/s41561-021-00715-2>



Half of global methane emissions come from highly variable aquatic ecosystem sources

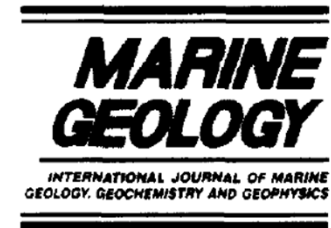
Judith A. Rosentreter ^{1,2} , Alberto V. Borges³, Bridget R. Deemer ⁴, Meredith A. Holgerson^{5,6,7}, Shaoda Liu^{2,8}, Chunlin Song^{9,10}, John Melack¹¹, Peter A. Raymond², Carlos M. Duarte ^{12,13}, George H. Allen ¹⁴, David Olefeldt ¹⁵, Benjamin Poulter ¹⁶, Tom I. Battin¹⁷ and Bradley D. Eyre ¹

Why Belgian coastal waters ?

High organic matter deposition in sediments



Marine Geology 144 (1997) 131–146



Recent sedimentation and organic carbon burial in a shelf sea:
the North Sea

Henk de Haas *, Wim Boer, Tjeerd C.E. van Weering

Why Belgian coastal waters ?

High organic matter deposition in sediments

Presence of gassy sediments & peat deposits



PERGAMON

Continental Shelf Research 22 (2002) 2291–2301

CONTINENTAL SHELF
RESEARCH

www.elsevier.com/locate/csr

Very high-resolution seismic mapping of shallow gas in the
Belgian coastal zone

T. Missiaen^{a,*}, S. Murphy^{b,1}, L. Loncke^a, J.-P. Henriët^a

Why Belgian coastal waters ?

High organic matter deposition in sediments

Presence of gassy sediments & peat deposits

High biomass of *Phaeocystis* (DMSP → CH₄ ?)



Contents lists available at SciVerse ScienceDirect

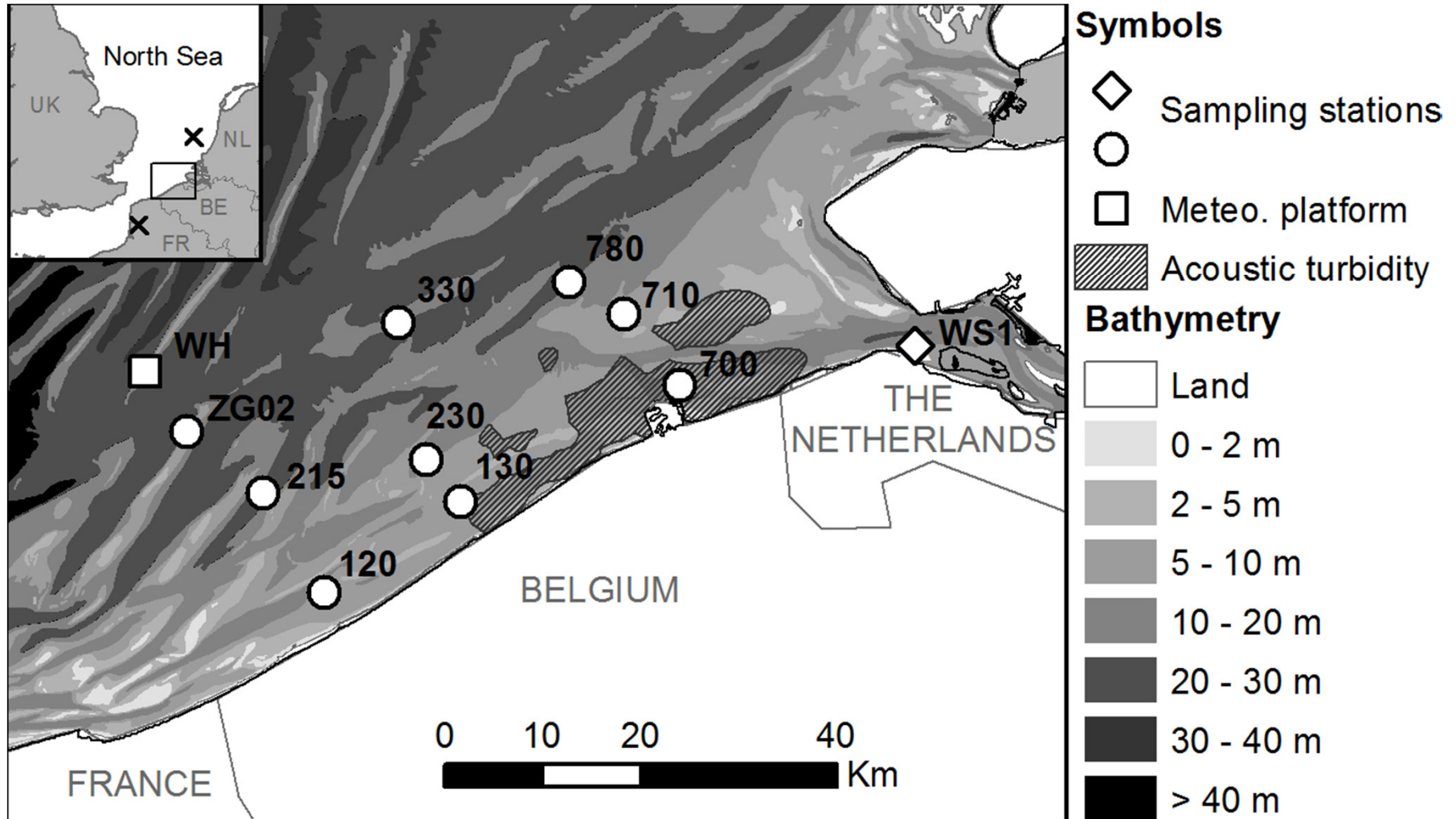
Journal of Sea Research

journal homepage: www.elsevier.com/locate/seares



Characterization of *Phaeocystis globosa* (Prymnesiophyceae), the blooming species in the Southern North Sea

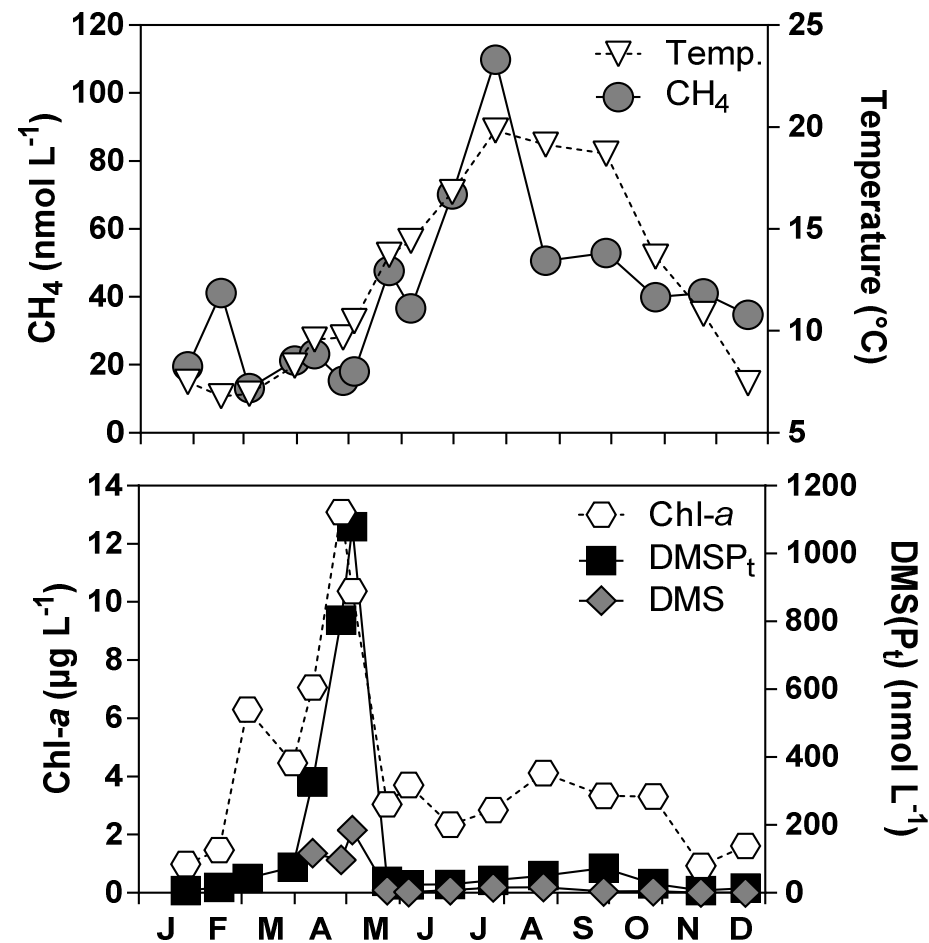
Véronique Rousseau ^{a,*}, François Lantoiné ^b, Francisco Rodriguez ^{c,1}, Florence LeGall ^c,
Marie-Josèphe Chrétiennot-Dinet ^b, Christiane Lancelot ^a



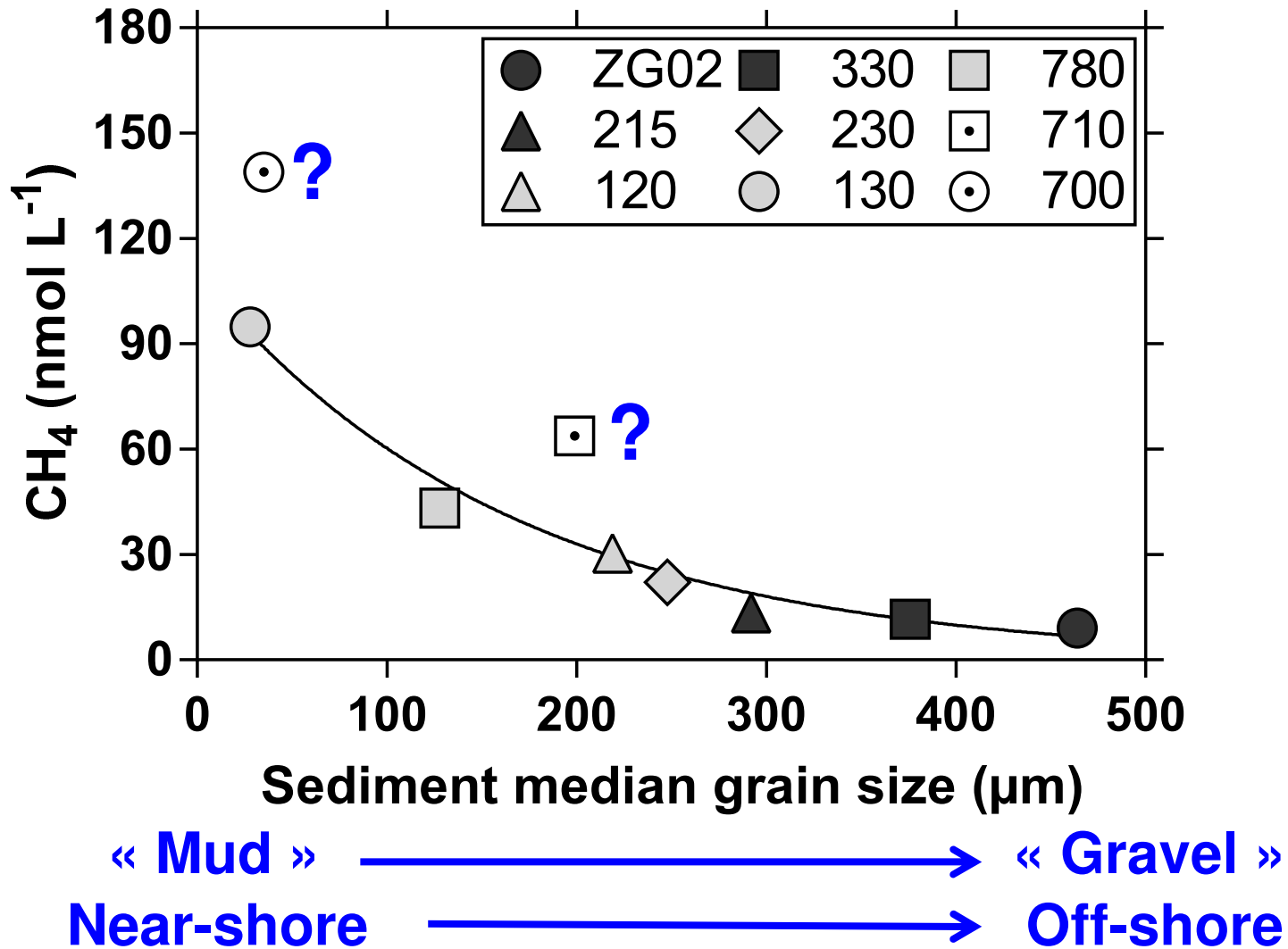
Seasonal variations

Temperature control of methanogenesis

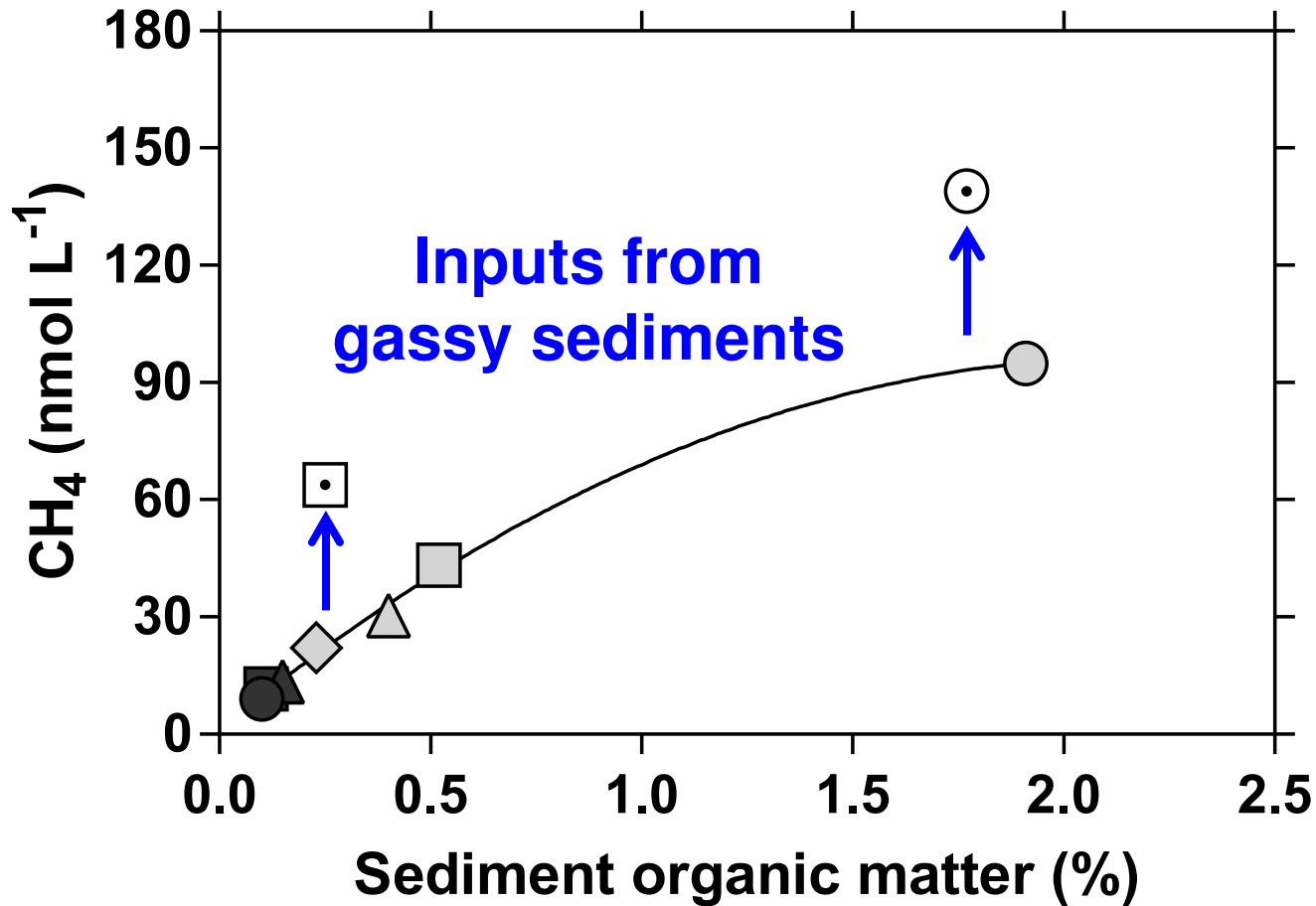
No evidence of $\text{DMSP} \rightarrow \text{CH}_4$



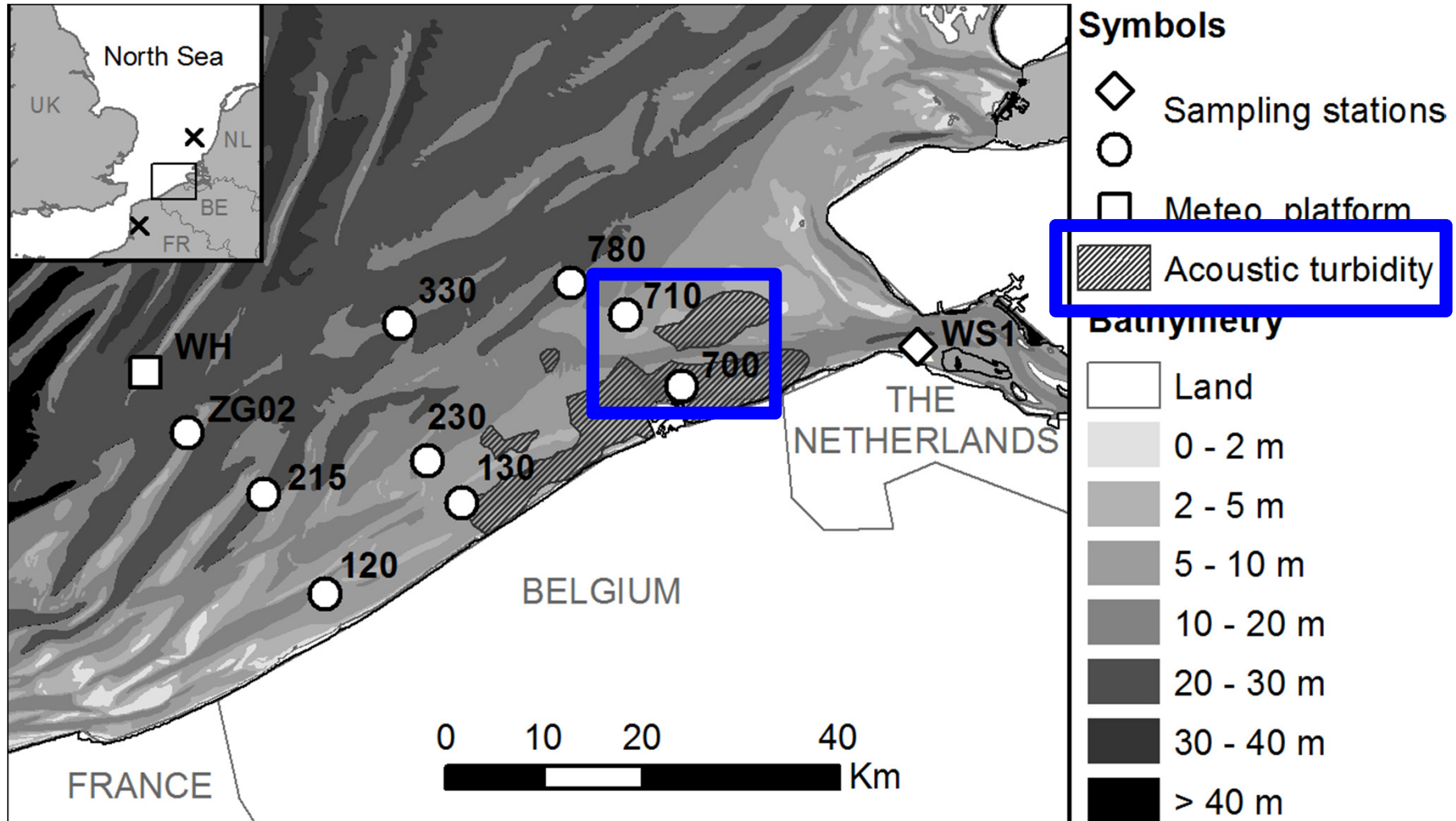
Spatial variations Related to sediment characteristics



Spatial variations Related to sediment characteristics



« Organic rich »  « Organic poor »

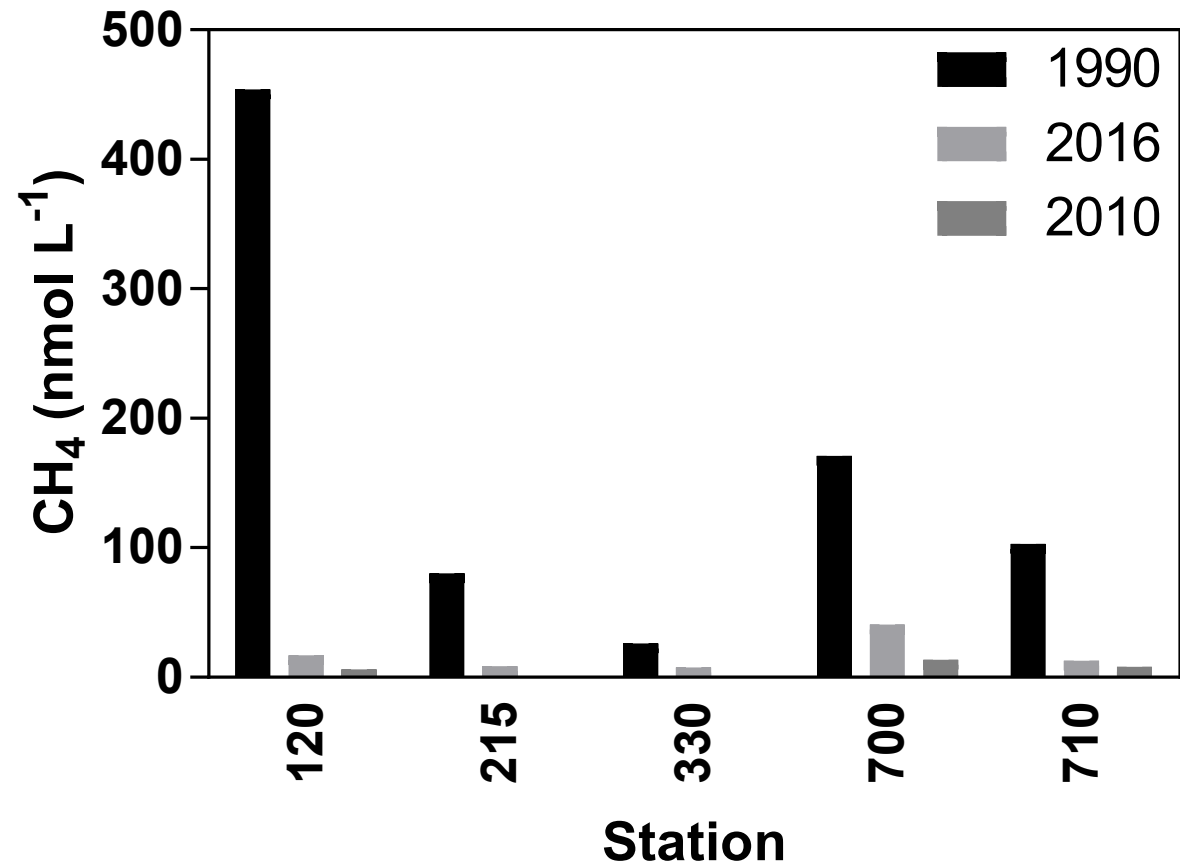


Long-term changes ?

Decrease of eutrophication since 1990

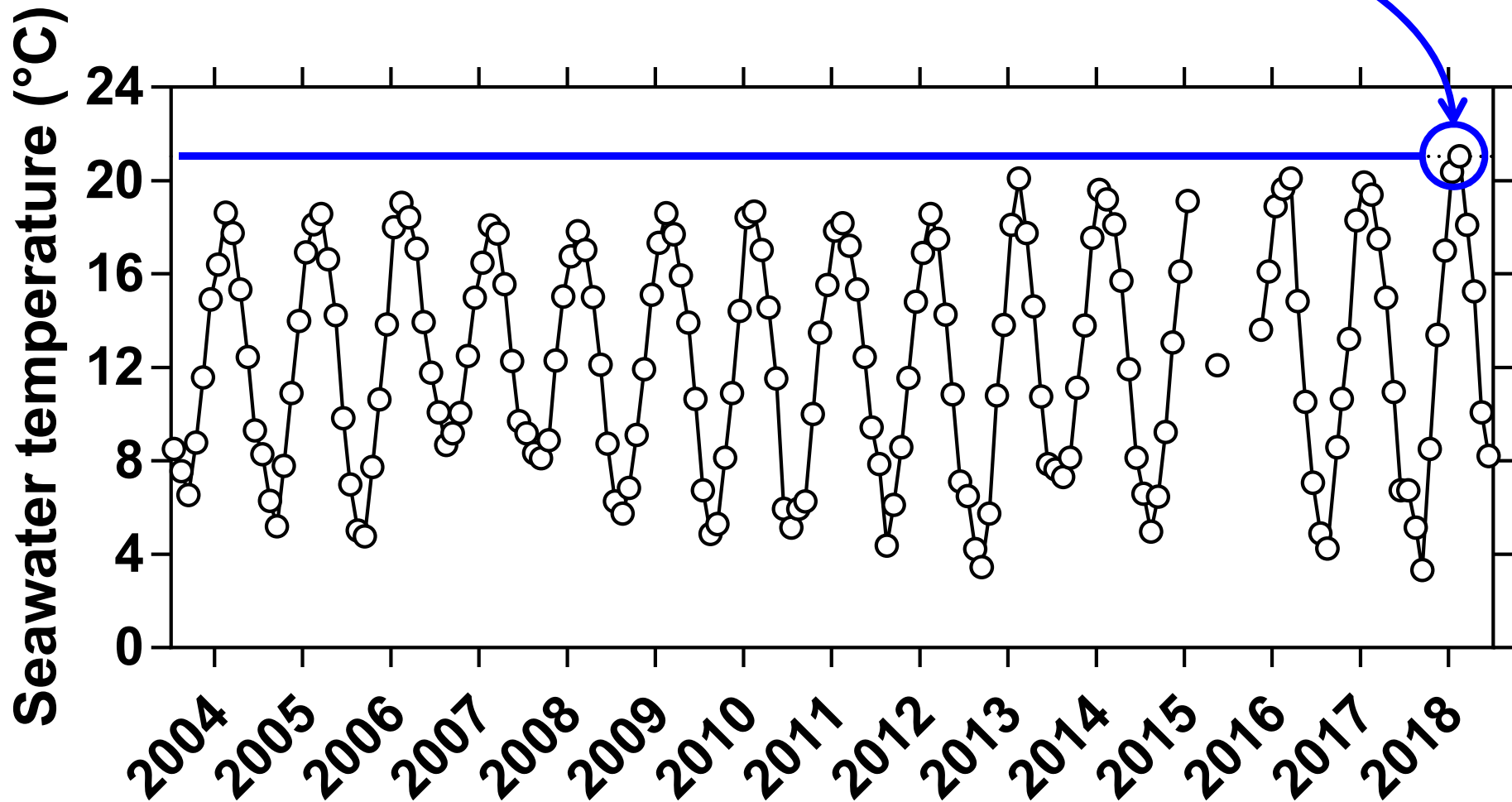
Decrease of organic matter production

Decrease of sedimentary methanogenesis



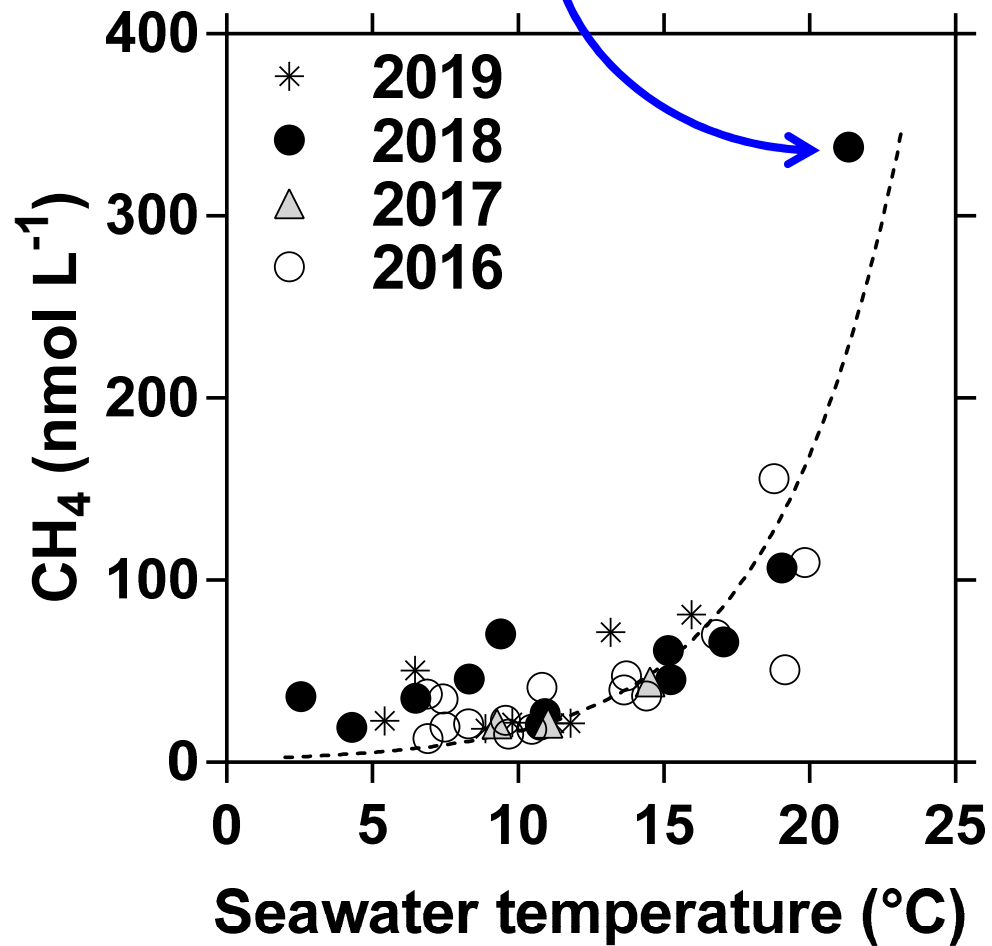
Future changes ?

European heatwave of 2018



Future changes ?

European heatwave of 2018



Continental Shelf Research 190 (2019) 104004



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Continental Shelf Research

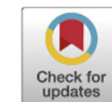
journal homepage: <http://www.elsevier.com/locate/csr>



Research papers

Response of marine methane dissolved concentrations and emissions in the Southern North Sea to the European 2018 heatwave

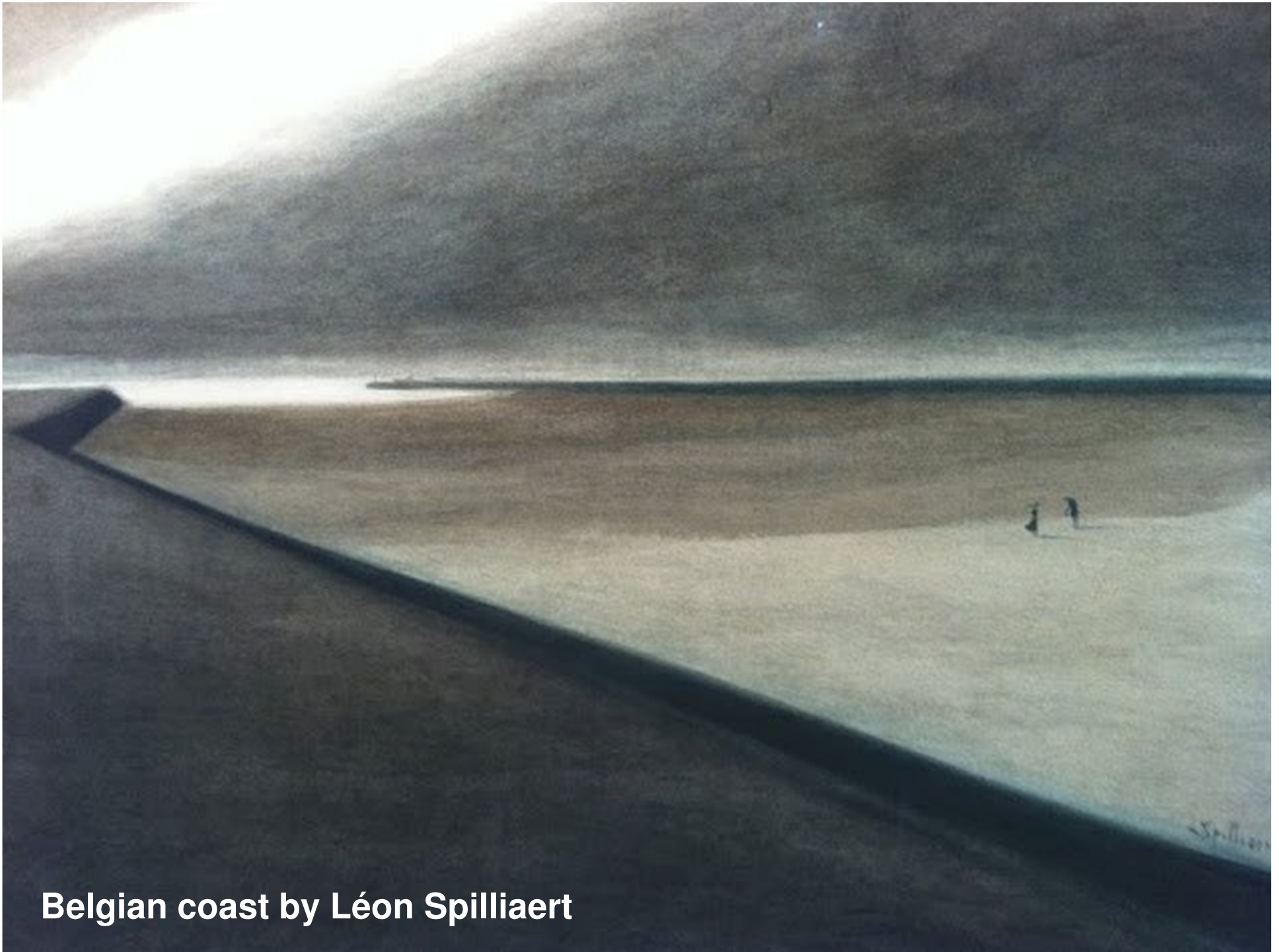
A.V. Borges^{a,*}, C. Royer^{a,b}, J. Lapeyra Martin^b, W. Champenois^a, N. Gypens^b





Productivity and Temperature as Drivers of Seasonal and Spatial Variations of Dissolved Methane in the Southern Bight of the North Sea

Alberto V. Borges,^{1*} Gaëlle Speeckaert,^{1,2} Willy Champenois,¹
Mary I. Scranton,³ and Nathalie Gypens²



Belgian coast by Léon Spilliaert