University of Groningen

Marine benthic metabarcoding

Klunder, Lise Margriet

DOI:
[10.33612/diss.135301602](https://doi.org/10.33612/diss.135301602)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Klunder, L. M. (2020). *Marine benthic metabarcoding: Anthropogenic effects on benthic diversity from shore to deep sea; assessed by metabarcoding and traditional taxonomy*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.135301602>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Marine benthic metabarcoding

Anthropogenic effects on benthic diversity from shore to deep sea;
assessed by metabarcoding and traditional taxonomy

Lise Klunder

Royal Netherlands Institute for Sea Research

COLOFON

Marine benthic metabarcoding, Lise Klunder

ISBN: 978-94-034-2615-0

ISBN: 978-94-034-2614-3 (electronic version)

Copyright © 2020 Lise Klunder

All rights reserved. No part of this thesis may be reproduced, stored or transmitted in any way or by any means without the prior permission of the author, or when applicable, of the publishers of the scientific papers.

Layout and design by Anna Bleeker | persoonlijkproefschrift.nl

Printed by Ipskamp Printing | proefschriften.net

Cover design by Floortje Heres en Lise Klunder

Pictures by Marc Lavaleye, Furu Mienis, Gert Jan Dijkgraaf, Lise Klunder

rijksuniversiteit
 groningen

Marine benthic metabarcoding

Anthropogenic effects on benthic diversity from shore to deep-sea; assessed by metabarcoding and traditional taxonomy

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. C. Wijmenga
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op

vrijdag 30 oktober om 12.45 uur

door

Lise Margriet Klunder

geboren op 3 februari 1985
te Apeldoorn

Promotor

Prof. dr. P.J. Palsbøll

Copromotors

Dr. ir. H.W. van der Veer

Dr. J.D.L. van Bleijswijk

Beoordelingscommissie

Prof. dr. ir. T. van der Heide

Prof. dr. S. Creer

Prof. dr. F. Leese

TABLE OF CONTENTS

Chapter 1	Introduction	8
	PART I: Methodology	
Chapter 2	Metabarcoding workflow	18
	<i>Diversity of Wadden Sea macrofauna and meiofauna communities highest in DNA from extractions preceded by cell lysis</i>	
Chapter 3	Quantification	40
	<i>Quantification of marine benthic communities with metabarcoding is influenced by ecological and biological factors</i>	
	PART II: Application	
Chapter 4	Wadden Sea	60
	<i>Impact of mechanical Arenicola spp. dredging on the benthic fauna communities: assessed by a morphological and molecular approach</i>	
Chapter 5	North Sea	82
	<i>Impact of an artificial structure on benthic community composition in the southern North sea: assessed by a morphological and molecular approach</i>	
Chapter 6	Deep sea	104
	<i>A molecular approach to explore the background benthic fauna around a hydrothermal vent and their larvae: implications for future mining of deep-sea SMS deposits</i>	
Chapter 7:	Synthesis	126
	References	136
	Summary	158
	Samenvatting	164
	Dankwoord	170
	List of Publications	177