

ATLAS OF THE HOLOCENE NETHERLANDS

LANDSCAPE AND HABITATION SINCE THE LAST ICE AGE

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AMSTERDAM UNIVERSITY PRESS

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Edition

This atlas was originally published in 2011 in Dutch under the title *Atlas van Nederland in het Holoceen*, Amsterdam, Prometheus. In 2018 the 9th revised edition was published. The revision and this English edition were made possible by a financial contribution from the 'Mapping archaeological knowledge' programme of the Cultural Heritage Agency of the Netherlands.



Rijksdienst voor het Cultureel Erfgoed
Ministerie van Onderwijs, Cultuur en
Wetenschap



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Book design Suzan Beijer

Originally published in 2018 by Uitgeverij Prometheus, Amsterdam, as: *Atlas van Nederland in het Holoceen*, by P. Vos, J.G.A. Bazelmans, M. van der Meulen, H. Weerts. Copyright © 2018 by P. Vos, J.G.A. Bazelmans, M. van der Meulen, H. Weerts

First English edition 2020

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ISBN 978 94 6372 443 2

DOI 10.5117/9789463724432

NUR 933

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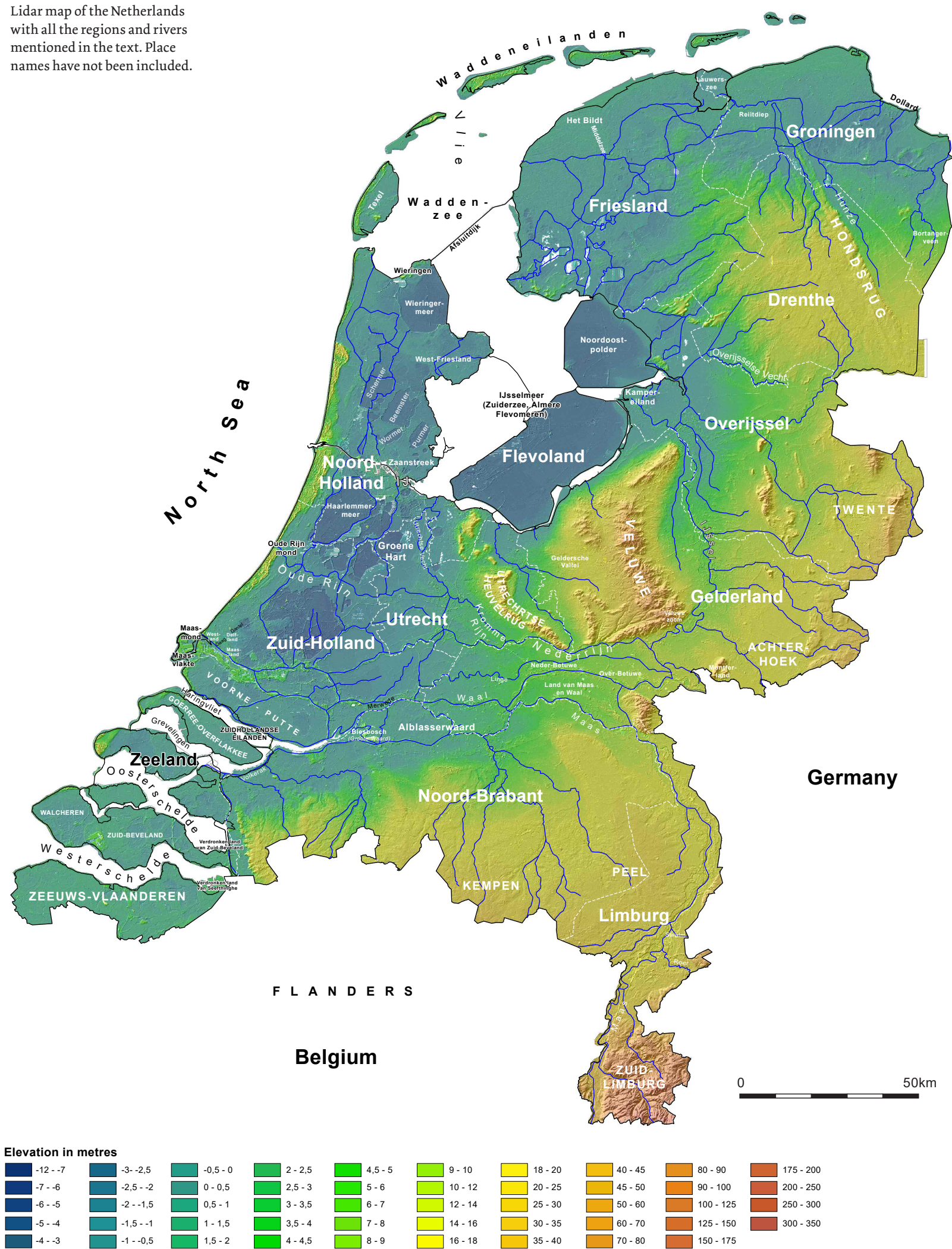
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Lidar map of the Netherlands with all the regions and rivers mentioned in the text. Place names have not been included.



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PREFACE

This Atlas presents thirteen reconstructions of the Dutch landscape and its habitation since the last ice age. They span a period that we refer to as the Holocene. The maps and accompanying texts provide a vivid illustration of how the Netherlands has changed beyond recognition in 11,700 years in response to sea-level rise, the transport of sand and clay from the sea and large rivers, peat expansion and – not least – the growing impact of humans.

Shortly before the start of the Holocene, the Netherlands was an indistinguishable part of a vast, cold and sparsely populated tundra that extended far into the present-day North Sea. Today, it is a densely populated country, almost entirely cultivated, and protected against threats from the sea and river waters by a complex system of dykes and embankments. It is hard to imagine a greater contrast. The *Atlas* covers a fascinating period: as the maps show, the landscape has long felt the impact of climate change, sea-level rise and human intervention. The history mapped out here does not of course offer any ready-made solutions to these pressing modern-day issues. It does, however, show the intended and unintended (sometimes disastrous) consequences of human intervention in the landscape and how people have sometimes succeeded, and sometimes failed, to overcome them.

The Netherlands has a rich tradition of map-making, from Blaeu's *Atlas Maior* to the *Bosatlas*. What is so unique about this atlas is the long timespan that it covers and the way it combines knowledge about human development and about our environment. We know a good deal about the origins, evolution and habitation of the Netherlands since the last ice age – the result of generations of work. Staff from Deltares, the TNO Geological Survey of the Netherlands and the Cultural Heritage Agency of the Netherlands (RCE) have pooled their knowledge to compile an atlas that is accessible both to the interested reader and to students at secondary schools and universities. This is in keeping with the aim of these organisations to effectively document the soil-related, geological, geomorphological, archaeological and cultural heritage characteristics of our subsoil and in so doing create the conditions whereby these values can be sustainably preserved.

Almost ten thousand copies of the Dutch edition of this atlas have sold since 2011. In line with the expectation expressed in the preface to that first edition, it has played a major role in recent years in discussions about what we still do not know about the evolution of the Dutch landscape. New insights have prompted the publication of a revised and expanded edition in 2018. This first English edition is an unaltered version of the 2018 edition.

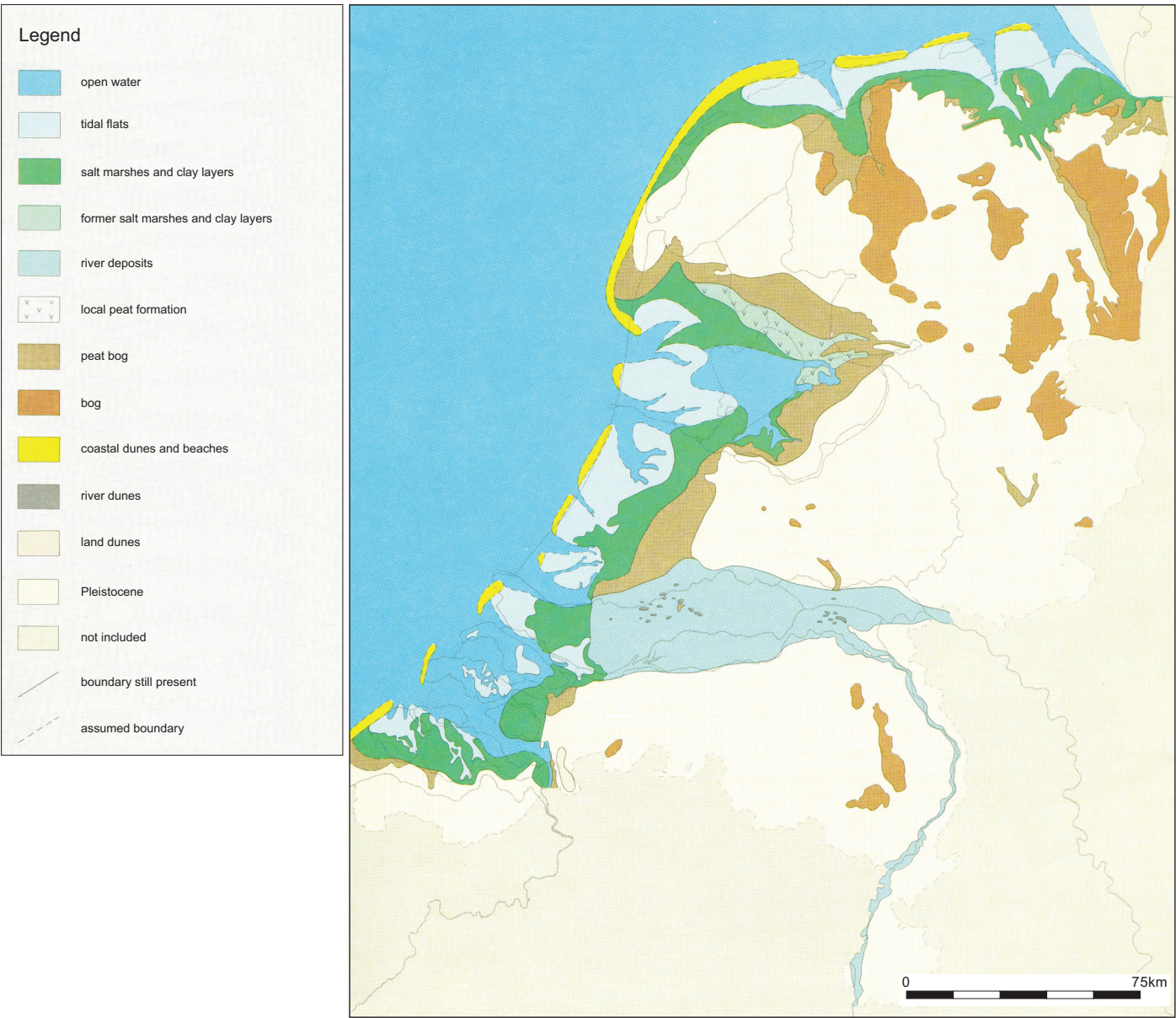
We would like to thank everyone who has made the production of this atlas possible.

The editors

INTRODUCTION

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FIG. 1 A map by Zagwijn from 1986, at its original published size: The Netherlands in the Late Atlantic (4100 BCE). Compare the new map for 3850 BCE on p. 45, with its conspicuously greater detail, the result of data and knowledge acquired over the past 30 years.



1 THE NETHERLANDS IN THE HOLOCENE

We don't often stop to think about it, but our landscape in the Netherlands has changed. Where we walk today, sand once drifted across a cold polar desert, rivers flowed between lakes and swamps, primeval forests stretched across vast expanses and the sea surged. The present-day Netherlands was formed over many thousands of years, shaped by sea currents, rivers, wind, land ice, flora and fauna. And, of course, humans have also contributed to the landscape in its present form. In past centuries we humans have become an important 'geological' force: in today's Netherlands it is almost impossible to point to an area where people *haven't* left their mark.

This book explains how the Dutch landscape has changed since the end of the last ice age, 11,700 years ago. This climate switch marked the beginning of the Holocene, the relatively warm geological epoch in which we are currently living. It was from this time on that the Netherlands slowly began to acquire the form that it has today.

To clearly illustrate how the present-day Netherlands evolved, Peter Vos and Sieb de Vries (TNO and Deltares) have created a set of thirteen palaeogeographical maps for this book. Each of these maps, which depict past geographical situations, presents a moment in time: they show how the different landscapes were distributed across the Netherlands. The maps are based on findings from tens of thousands of corings, plus a good deal of supplementary research on matters such as the age and formation of soil layers. The palaeogeographical maps lie at the heart of this atlas.

This is not the first time that a series of maps of the Holocene Netherlands has appeared. In 1986 W.H. Zagwijn of the National Geological Survey was the first to publish a similar series, albeit a rather basic one (fig. 1). Since that time a vast amount of geological data has been collected, which has helped to change our understanding of the formation of the Netherlands. This new information has been incorporated into another map series in *De ondergrond van Nederland* [The subsoil of the Netherlands] (2003). A series of eleven, much more detailed maps was created for the Cultural Heritage Agency of the Netherlands as part of *De nationale onderzoeksagenda archeologie* [The National Research Agenda for Archaeology] (2006) (version 1.0). An improved series appeared in 2011 in the first Dutch edition of this atlas (version 1.1), the result of a collaboration between Deltares, the TNO Geological Survey of the Netherlands and the Cultural Heritage Agency. Its publication marked the definitive replacement of Zagwijn's atlas as a standard reference work more than twenty years after its first appearance. In 2013 the first edition of the atlas was thoroughly revised as part of the Cultural Heritage Agency's 'Mapping archaeological knowledge' project (version 2.0). A comprehensive account of the background to the second revised edition can be found in Peter Vos'

PhD thesis, *Origin of the Dutch coastal landscape* (Utrecht, 2015). In this ninth printing of the *Atlas of the Holocene Netherlands*, all the maps have been revised once again in the light of the latest research findings (version 2.1), and two new maps have been added: for 250 BCE and 1250 CE.

Thanks to the wealth of information, the new maps are now different: they are more detailed than ever and represent a leap forward in relation to earlier reconstructions. The increased level of detail still has its limitations, however. In general, the maps in this atlas present a faithful picture at the regional level, but there are still uncertainties at the local level. For example, the landscapes and landscape changes shown in the maps don't allow us to make exact predictions pronouncements about the archaeological values we can expect at the local level. On the other hand, the maps can be useful when it comes to drawing up a research agenda. We now have much greater clarity about where we should conduct research, and what kind of research, in order to remove uncertainties.

This book differs in another respect from its predecessor. More so than in 1986, it looks at the central place that humans have occupied in the landscape. We address questions like: What kind of environment did our ancestors inhabit? How did they utilise the opportunities that the landscape offered? How did they respond to changes in the landscape? And how did they mould the landscape to suit their own purposes? The interaction between people and landscape is one of the main research themes within contemporary Dutch archaeology. This atlas therefore contains not only palaeogeographical information, as in 1986, but also archaeological and historical data. We have also added a reconstruction for the nineteenth century in order to better illustrate the role played by people, and a map for 2000 to make a comparison with today's situation easier.

The notes on the palaeogeographical maps begin each time with the natural forces that have shaped the landscape and then go on to discuss the role of humans. Human activity is explained in a case study, a story about a specific settlement that is representative of the period in question.

Several natural processes keep recurring in the notes on the maps: the relative rise in sea level, tides and wave action, the changing courses of rivers and the formation of large expanses of peat. These processes are discussed at length in the Introduction, within the context of climate change. Together with human intervention, they explain how the Dutch landscape was constantly changing and how it slowly acquired its present-day form.

Because the text contains quite a number of terms that won't be immediately familiar to everyone, a glossary is included in the back of the atlas.