Bull. Soc. belge Géologie	T. 87	fasc. 1	pp. 49-54	2 fig.	Bruxelles 1978
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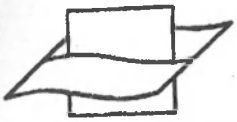

NEW EVIDENCES ON THE MARINE HOLOCENE IN THE WESTERN BELGIAN COASTAL PLAIN (*)

by Cecile BAETEMAN (**)

ABSTRACT. - Investigations in the coastal plain yielded new data regarding the stratigraphy of the marine Holocene and the evolution of the plain during the Atlantic and Subboreal periods. Formely it was accepted that the Calais sediments were deposited during one single transgression. However at least four distinct transgressions were found belonging to the Calais Member. By means of 14C datings the development of the Western coastal area is briefly considered.

INTRODUCTION.

The Belgian coastal plain is mainly covered by marine Holocene deposits resulting from transgressive and regressive intervals or phases of increasing and decreasing transgressive intervals during the last 10.000 years.

The names Calais and Dunkerque, introduced by G. DUBOIS (1924) have been adopted in the Belgian literature to subdivide the marine Holocene. The Calais and Dunkerque deposits can easily be distinguished from each other by the occurrence of an important peatlayer between both, the so-called surface peat (tourbe de surface).

F. HALET (1931) noticed several peatlayers at different levels in the Calais sediments and related them to standstills during the formely named flandrian transgression. This aspect was taken up later by R. TAVERNIER (1943) and R. TAVERNIER & F. MOORMANN (1954).

However more recent research on Holocene stratigraphy was entirely dealing with the Dunkerque sediments, neglecting the Calais deposits. Several transgressive and regressive phases were distinguished, almost based on lithological units and some archaeological data (R. TAVERNIER, 1954, J. AMERYCKX, 1960). The Calais deposits, also named "Atlantische Waddenafzettingen" or "sables pissards" were untill now considered as one sedimentation sequence deposited by one single transgression. Even in recent literature the concept of transgressive phases has even been excluded in periods older than the Subatlantic (A. OZER, 1976, p19).

The knowledge about the Calais sediments has always been mentioned in a paragraph copied by several authors from 1943 untill 1976 : "The most important evidence during the Atlanticum was the

(*) This work has been carried out in the framework of a PhD Thesis in preparation.

(**) Geological Survey of Belgium.

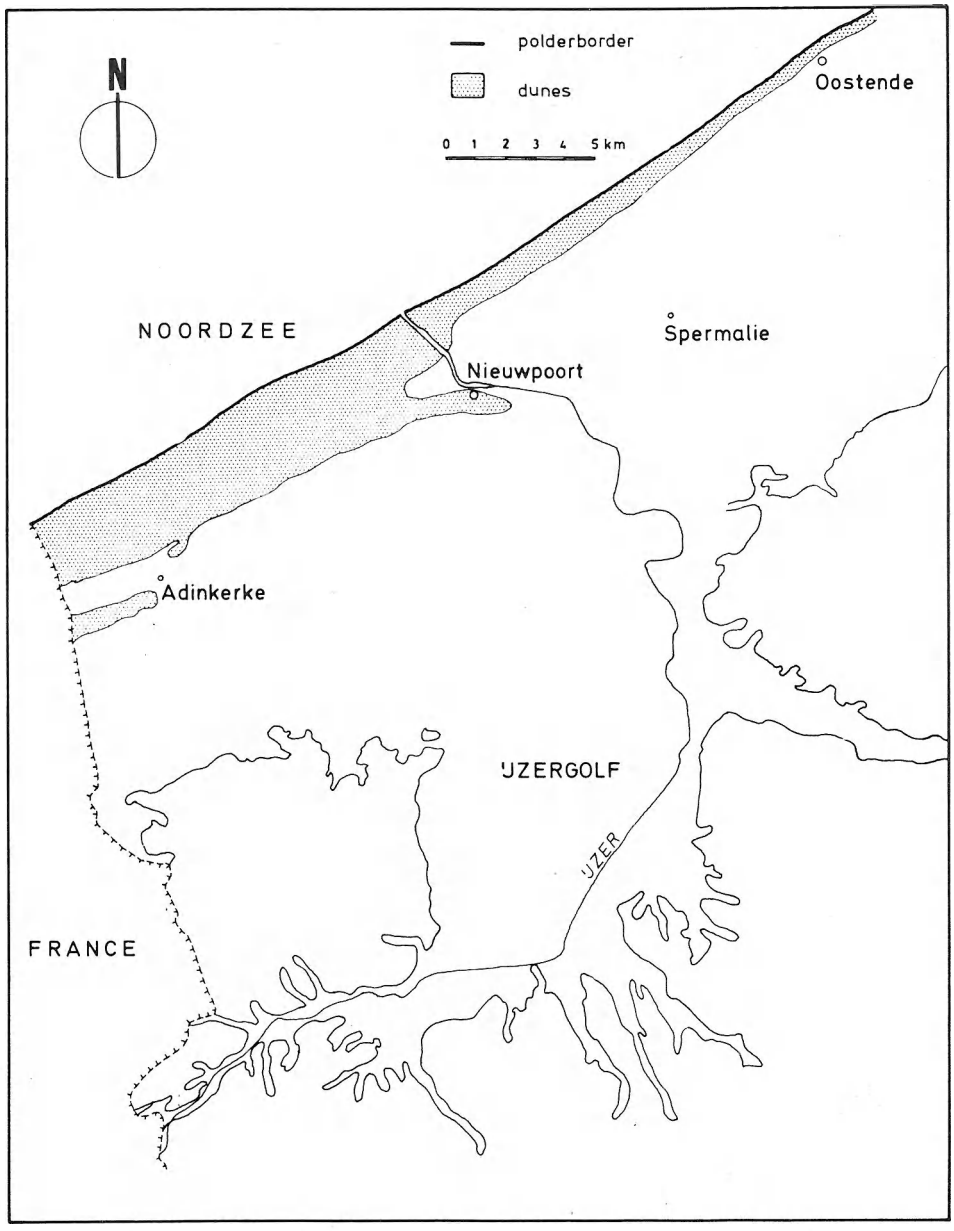

Fig. 1. - Location map of the Western Coastal plain.

enlargement of the Strait of Dover and the Flandrian transgression depositing the "Assise de Calais" consisting mainly of sands with clay at the upper part" (J. AMERYCKX, 1960, 1961; F. MOORMANN, 1951; A. OZER, 1976; R. PAEPE, 1960, 1971a; R. TAVERNIER, 1943, 1947, 1948, 1954; R. TAVERNIER & J. AMERYCKX,1958,1970;R.TAVERNIER & F. MOORMANN, 1954).

STRATIGRAPHY OF THE CALAIS MEMBER.

The coastal plain formed a sensible area to registrate the evidences of the sea-level movements during the Holocene. However the sequences of stratified and reference layers reflecting the sea-level movements do not occur all over the plain and are different from place to place. Another difficulty to establish a subdivision of the Calais sediments (which was already done in the Netherlands, Germany and England) was the lack of open sections (A. OZER, 1976).

To ascertain if those "Atlantische Waddenafzettingen" which in fact represent about 4.000 years in the marine Holocene, are really to be considered as one big sedimentation sequence deposited by one single transgression, a detailed mapping has been established. The plain between Oostende and the French border was investigated by means of undisturbed cored handdrillings (fig. 1).

The coastal plain is determined by the occurrence of marine Holocene sediments belonging to the Flandrian stage which comprises the Calais member, the Dunkerque member, the Holland Peat member and the Coastal barrier member (R. PAEPE et al., 1975).

The Calais member is relatively very thick as compared to the Dunkerque member. Its thickness is ranging from 0,5 m nearby the polderborder up to 20 m or even more nearby the present coast. In this studied area the Holocene sediments are resting directly upon the Tertiary substratum with no evidence of a basispeat.

The wole area is to be divided into several main landscapes with each a different depositional sedimentary environment.

In the very West of the area, nearby the French border the Calais member only exists of grey sand with few significant structures, reaching a thickness up to 20 m. Peat intercalations or significant claylayers are lacking completely. In fact, this sandy facies was originally used to define the Calais sediments.

In the area nearby Oostende, the sandy facies is dominating, but beside the upper peatlayer a second one is occurring at -5,5 m O.P. (*). The area in the surroundings of the river IJzer shows a quite different aspect of the Calais member. In the region of Spermalie, the Calais member occurs mainly of a blue grey clay which is splitted up by several peatlayers occuring at -7,0 m (not dated), -5,50 m, -3,50 m, -2,50 m and the former surface peat almost from -1 m till +1 m (fig. 2). Dieper than -8 m the sandy facies is dominating again. In the area to the west of the river IJzer the blue grey clay is also occuring until -8 m with quite a lot of sandy gullies. Beside the more or less continuous upper peatlayer a second one is found at a depth of -3 m. In the vicinity of the river peatlayers are lacking completely and an estuarine environment is dominating, characterized by a sandy facies with numerous moluscs.

The areal distribution of the Calais member shows different depositional sedimentary environments all over the plain. But also the lithostratigraphy of the Calais member is different between the area nearby the mainland and nearby the polderborder.

Nearby the mainland the Calais member is represented by an alternation of peat and clay until -8 m. Below this level, only the sandy facies is present. It is remarkable that approaching more and more the actualcoast, this sandy facies is occurring at a higher level,

(*) The Belgian ordinance datum level at Oostende (O.P.) is 2.33 m lower than the Dutch ordinance datum level (N.A.P.).

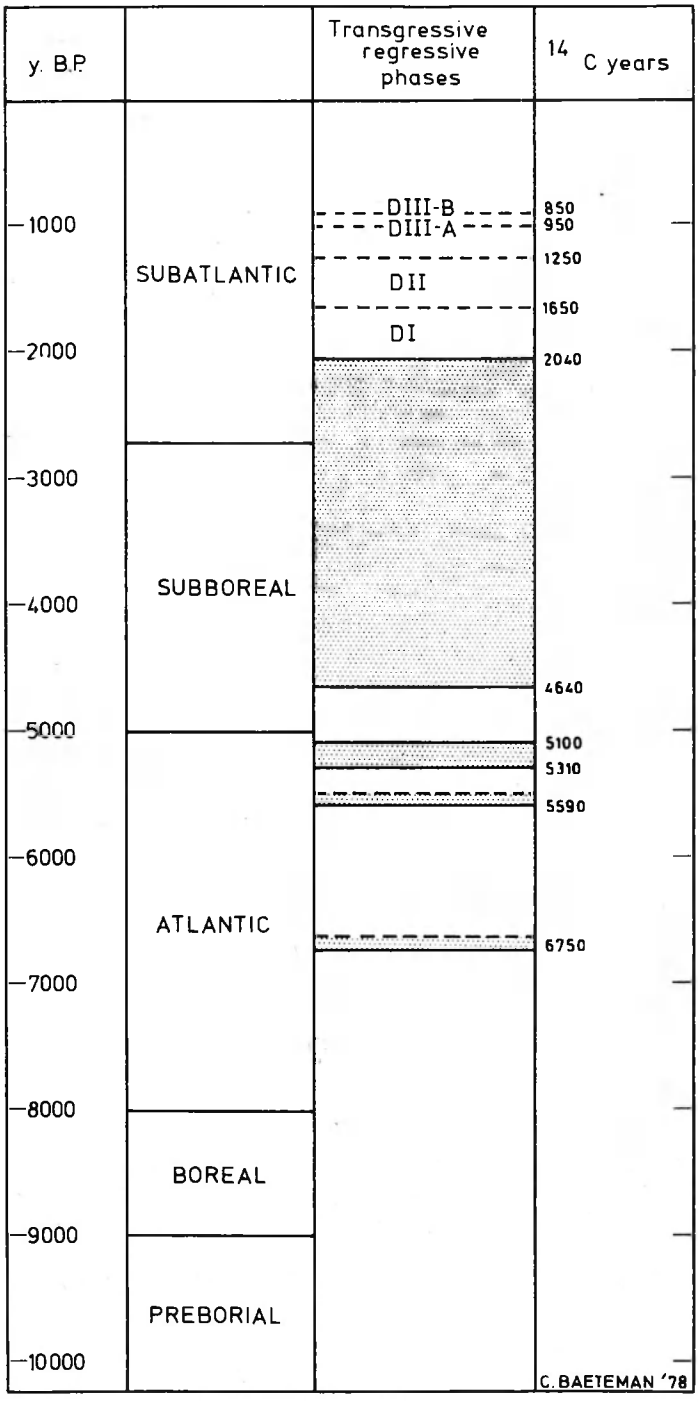

Fig. 2. - Chronological timescale.

so that nearby the actual coast the Calais member is represented only by the sandy facies, while clay and peat intercalations are lacking.

PALAEOGEOGRAPHICAL IMPLICATIONS.

At the beginning of the Holocene the coastal plain has been filled up rather quickly under pronouncedly marine conditions and the dominating sandy textures implies the involvement of high energies from the open sea. After the first regression which is still somewhat older than 6750 ^{14}C.y.B.P. the plain shows a different depositional environment. It became a tidal flat and salt march which were characterized by numerous creeks. These environments require the establishment of a coastal barrier system, at least since about 6750 ^{14}C.y.B.P.. When the direct marine influence was decreasing in the periods around 5590 ^{14}C.y.B.P. and around 5310 ^{14}C.y.B.P. the mudflats and marshes developed into slightly brackish swamps in which reed could start growing and later on peat could develop. In the period around 4640 ^{14}C.y.B.P. the direct marine influence decreased very much so that almost the whole plain and even areas now submerged by the sea, could be covered by peat. This peat was able to continue to grow until 2040 ^{14}C.y.B.P. without any or very little direct marine influence. Therefore, during that period the plain must have been protected from the open sea by a well closed coastal barrier system situated in the actual sea and the eventually sea-level movements during that period are not indicated in the plain itself.

BELQUA Meeting
GENT
10 January 1978

ACKNOWLEDGEMENTS.

The author wishes to express her sincere thanks to Prof. R. VANHOORNE for kindly providing the radiocarbon data.

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