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MAŁGORZATA LATAŁOWA

TYPE REGION P-u: BALTIC SHORE, W PART WOLIN ISLAND

For the purposes of the IGCP-158 B programme, Wolin Island has been classified as belonging to the Baltic Shore region. However, because of the island's special character, its great variety, and the fact that it has been fairly well investigated, it was decided to treat this area as a subregion and present the results therefrom separately.

Wolin is the most north-westerly point of Poland. It is separated from the mainland only by the waters of the Szczecin Lagoon to the south, and the river Dziwna to the east; along its western edge the narrow river Swina separates it from the island of Uznam.

The island's structure consists of two parts: a Pleistocene base formed by a terminal moraine upland which came into existence as the ice-sheet receded during the Gardno-Wolin (= Copenhagen) phase of the Vistulian Glaciation, and a Holocene part formed mainly as a result of various kinds of alluvial and biogenic deposition and dune-forming processes. Intensive shore-line erosion has been of great importance in determining the present-day shape of Wolin.

Palaeobotanical studies have been undertaken at 5 localities: in the Pleistocene part at a small oligotrophic lake (1), a large eutrophic lake (2), and a raised bog (3); in the Holocene part at a low bog (4) and the culture layers of the Early Medieval port (5). Two localities (3 and 4) are reference sites (Latałowa 1985, 1986, 1987).

Area: 254 km^2.

Altitude: 0—115 m a.s.l.

Climate: mean annual temp. 8.1°C, mean January —0.6°C, mean July 17.7°C, annual temperature amplitude 18.3°C; mean annual precipitation 628 mm; winter starts in mid-January and lasts approximately 40 days; snow cover (5—10 cm) persists on average for 30—50 days; throughout the year, strong winds blow mainly from the west. Wolin's climate is more marine than that of any other region in Poland.

Geology: the island is built mainly of Quaternary deposits; under these, Zechstein and also Mesozoic and Tertiary formations have been found.

Topography: the island's relief is very varied — the central part comprises an upland of terminal moraine, which ends in high cliffs (80 m a.s.l.) on both the sea and lagoon sides; the upland is dissected by a series of channels containing lakes; the lower lying areas are covered mainly by sand-dunes and bogs.

Archaeology: first archaeological findings from the Mesolithic, noumerous from the Neolithic; the most intensive settlement phase at the end of the Bronze Age (Lusatian culture) and in the early Middle Ages.

Population: average 160 people km^{-2}, 89% in towns.

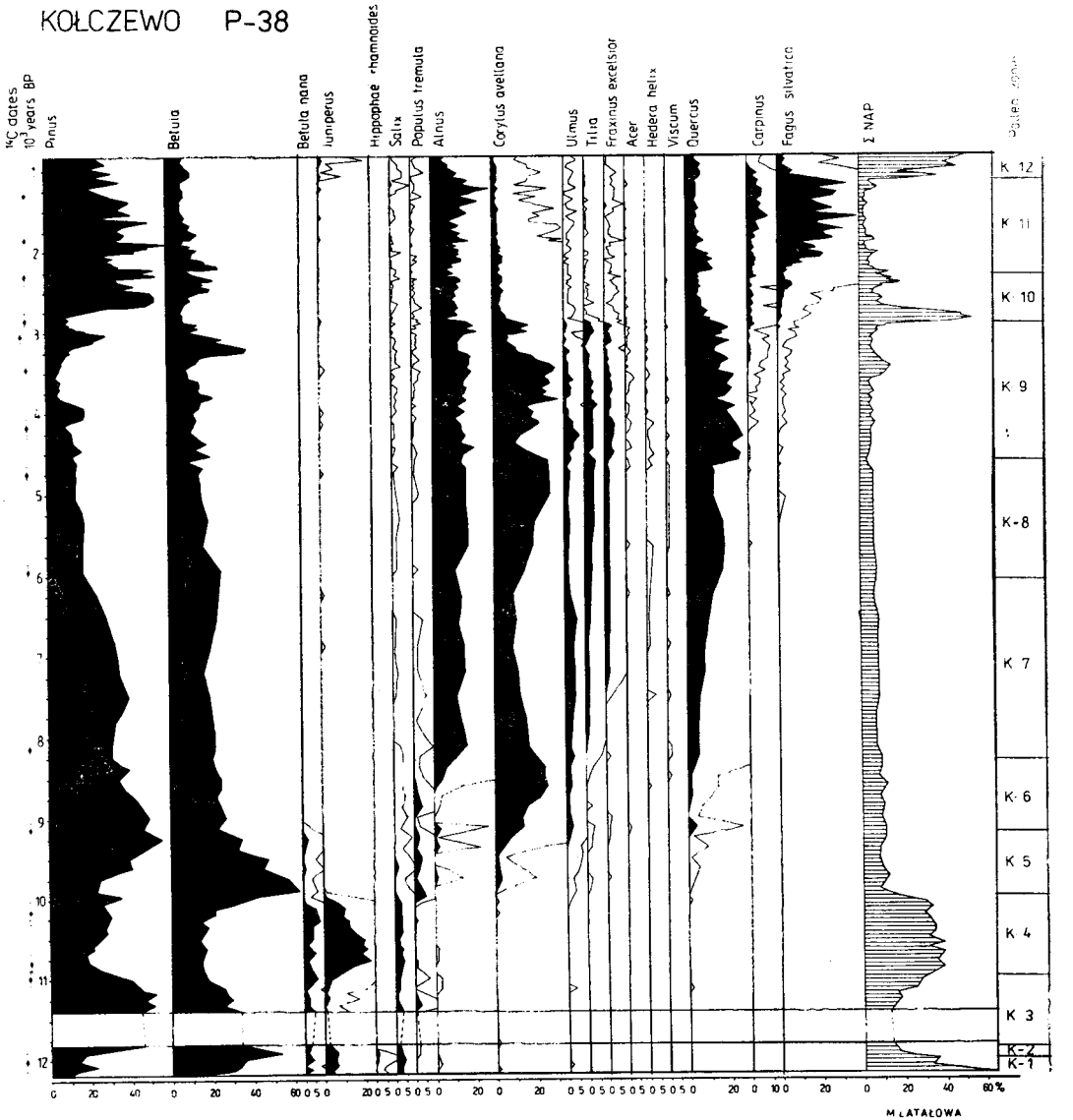

Fig. 1. Simplified pollen diagram from Kołczewo reference site

Vegetation: pine forests are dominant among the woodland communities and grow mainly on the dune-covered areas in the eastern and western parts of the island; the most important upland communities are acidophilous beech forests (*Luzulo pilosae-Fagetum*) and mixed woodland *Fago-Quercetum* and *Pino-Quercetum*. Reeds communities dominate the low-lying terrain along the Szczecin Lagoon shore.
Soils: mostly podzols; besides these there are acidic brown soils at various stages of podzolization, and bog soils.
Land use: forests 21.2%, agriculture 20.7%, pastures and meadows 15.1%, orchards 0.3%, wasteland and urban area 42.7%; structure of cultivation — corn 60% (mainly rye and barley), potatoes 19%, pasturage crops 15%.

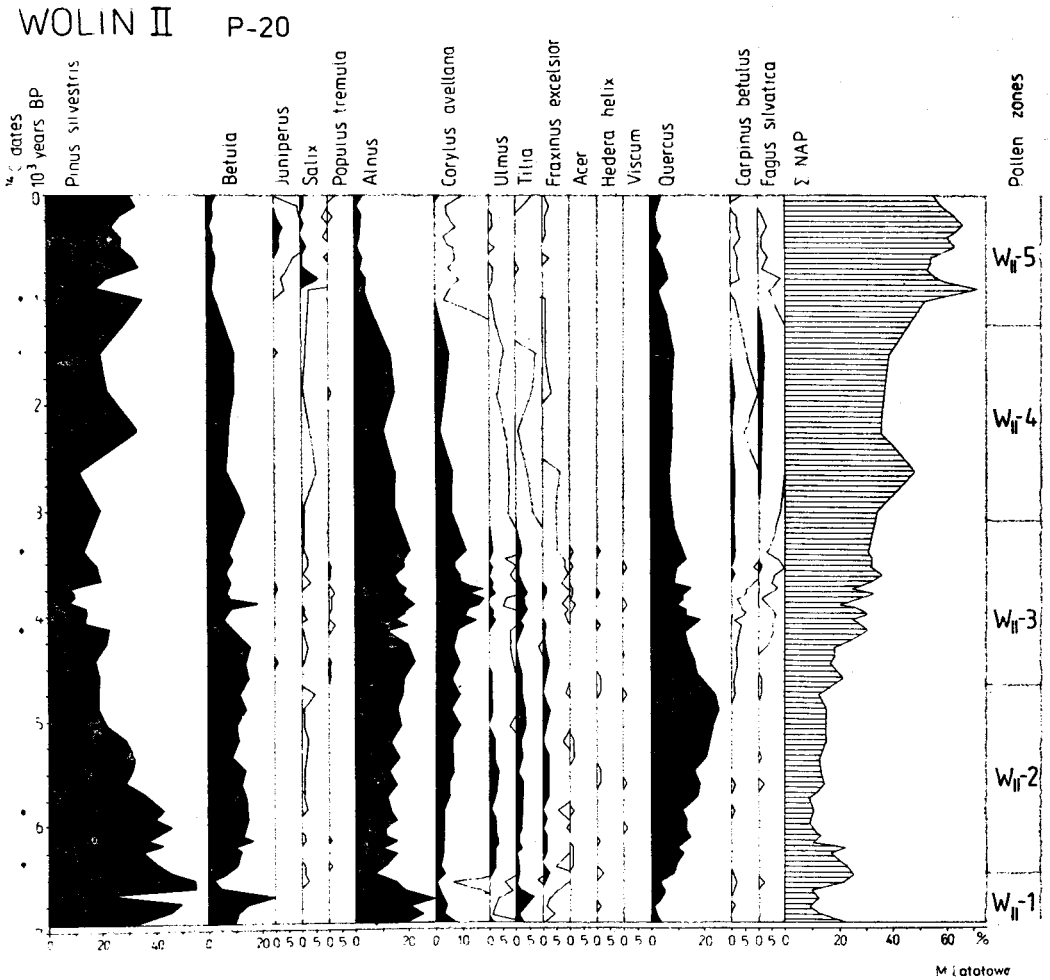

Fig. 2. Simplified pollen diagram from Wolin II reference site

Reference site „Kołczewo" (3) — Pleistocene part of the island: 14°40'E 53°55'N, elevation 15 m a.s.l., age range 12000—800 B.P., peat-bog.

In the Late Glacial this was a shallow water body which at the start of the Holocene became overgrown with mesotrophic mossy communities. Subsequently, c. 3000 years ago it was transformed into a raised bog. At present, after reclamation, a pine wood covers this area.

12 „site pollen assemblage zones" have been described (Fig. 1):

? —12000 B.P., K-1, *Betula-Juniperus*-NAP paz
12000—11800 B.P., K-2, *Betula-Hippophaë* paz
11800—11000 B.P., K-3, *Pinus-Betula-Populus* paz
11000—10000 B.P., K-4, *Juniperus-Betula nana-Artemisia-Empetrum* paz
10000— 9200 B.P., K-5, *Pinus-Betula-Populus-Urtica* paz
9200— 8300 B.P., K-6, *Pinus-Corylus-Ulmus* paz
8300— 6100 B.P., K-7, *Quercus-Ulmus-Tilia-Corylus* paz
6100— 4600 B.P., K-8, *Corylus Quercus-Tilia-Fraxinus* paz
4600— 2900 B.P., K-9, *Quercus-Corylus-Tilia-Ulmus-Fraxinus* paz

2900— 2300 B.P., K-10, *Pinus-Fagus-Poaceae* paz
2300— 1200 B.P., K-11, *Fagus-Pinus-Carpinus* paz
1200— 800 B.P., K-12, *Pinus-Poaceae-Cerealia-Juniperus* paz

Reference site „Wolin II" (4) — the Holocene part of the island: 14°40'E 53°50'N, elevation < 5 m a.s.l., age range 7300—0 B.P., peat-bog.

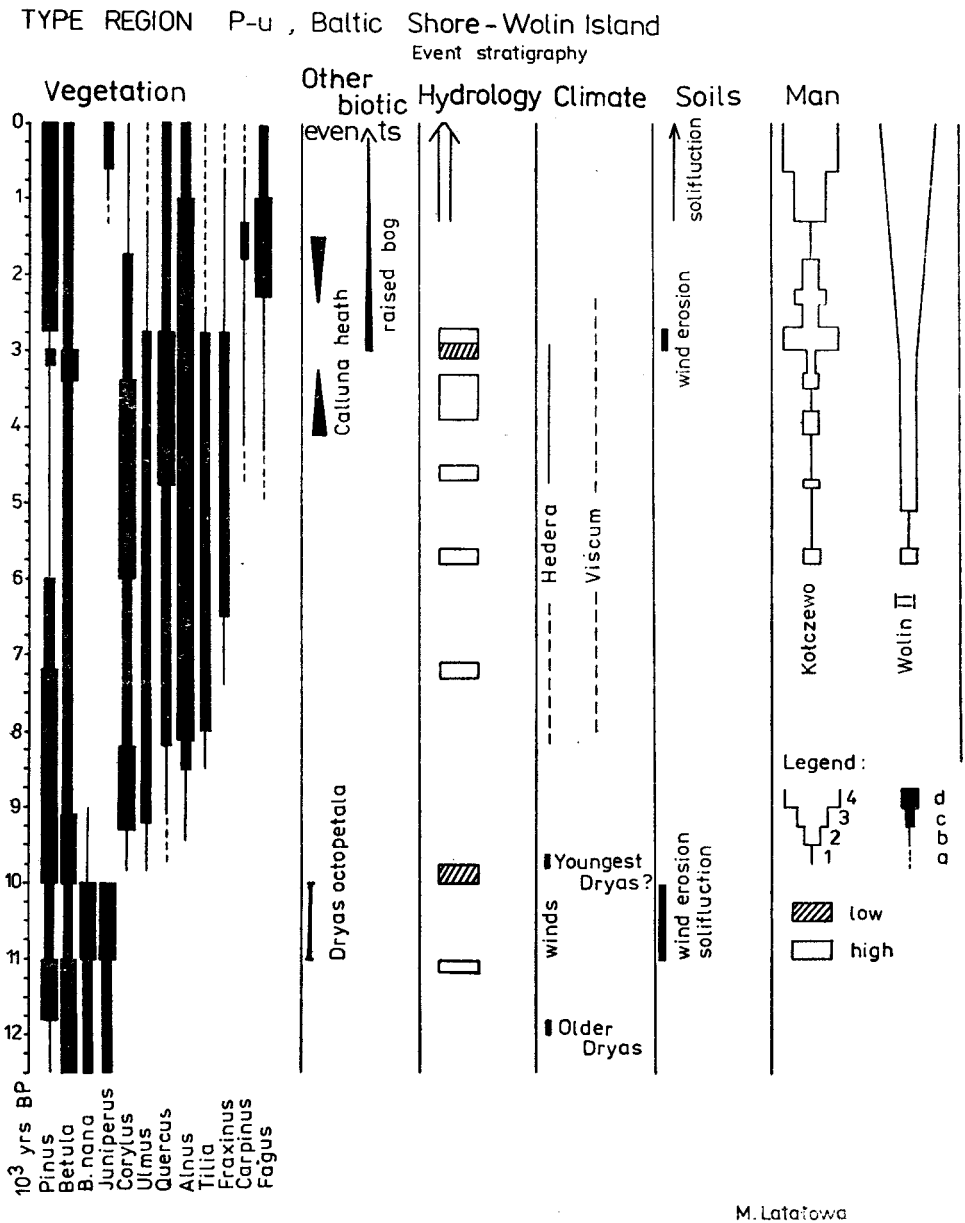

Fig. 3. Table „event stratigraphy". Vegetation — spread of trees and some of shrubs: a — presence hypothetical or slight, b — present, c — expansion or important part, d — common. Man — human impact: 1 — slight, 2, 3, 4 — increasing settlement and deforestation

Peat accumulation at this locality began c. 7300—years B.P. low-bog communities, typical of river valleys, have always been dominant here.

5 „site pollen assemblage zones" have been described (Fig. 2):

7300—6400 B.P., W_{II}-1, *Alnus-Pinus-Betula* paz
6400—4600 B.P., W_{II}-2, *Pinus-Quercus-Tilia-Uljus-Fraxinus-Pteridium* paz
4600—3200 B.P., W_{II}-3, *Corylus-Quercus-Tilia-Calluna* paz
3×200—1200 B.P., W_{II}-4, *Pinus-Fagus-Calluna* paz
1200— 0 B.P., W_{II}-5, *Pinus-Poaceae-Cerealia-Juniperus* paz

General patterns of the vegetational history (Fig. 3):

The morphogenetic differentiation of Wolin Island has led to a varied post-glacial vegetational succession. The pollen diagrams show that the vegetation of the Pleistocene and that of the Holocene part are quite different. (i.e. also Orwat 1958, Prusikiewicz & Noryśkiewicz 1966).

In the Pleistocene part:

— Late-Glacial sediments older than the Alleröd have been described; the vegetation in this phase (Bölling) was probably of the park-tundra type, where the patches of trees comprised birch and possibly pine;
— a climatic fluctuation during the Older Dryas reduced the importance of pine and caused *Hippophaë* thickets to spread;
— in the Alleröd open woodland with birch and pine expanded limiting the areas of tundra communities, including juniper thickets;
— in the Younger Dryas the vegetation reverted to tundra communities with *Juniperus, Artemisia, Empetrum* and with many species typical of the „Dryas floras" i.e. *Betula nana, Dryas octopetala,* several species of *Saxifraga* and *Helianthemum*;
— woodland with birch, pine and aspen expanded at the beginning of the Holocene;
— other tree species began to spread as follows:

	empirical limit	rational limit
Corylus	9800	9300
Ulmus	9900	9200
Alnus	9800	8600
Quercus	9800	8400
Tilia	8500	8100
Fraxinus	7500	7200
Carpinus	4100	3500
Fagus	4100	3000

— in this area soil conditions favoured the development of mesophilous deciduous forest; this is evidenced by the relatively high percentages of *Corylus* pollen (up to 35%) and *Tilia* (up to 10%) and the marked reduction in pine at the beginning of the Subboreal period;
— the low *Carpinus* curve in the diagrams indicates that woodland communities with this tree were never of much importance on Wolin Island;
— the spread of beech was strictly connected with earlier deforestation; this species reached its culmination when settlement let up during the Migration Period.

In the Holocene part:

— organic deposits began to accumulate c. 7000 B.P.;
— at first alder swamps was dominant;
— soil conditions did not favour the expansion of species with more demanding habitat requirements, hence the low values of *Corylus, Tilia, Ulmus*; oak-pine woods were probably prevalent;
— hornbeam and beech were never significant components in the woodlands of this area.

Anthropogenic changes:

Man has influenced the moraine uplands and the lower-lying south areas of Wolin, to varying extents. The first definite sings of Neolithic settlement appear synchronically. The first decline in the *Ulmus* curve has been dated at c. 5800 B.P., and slightly above this (c. 5600 B.P.), the first grains of *Plantago lanceolata* pollen usually appear.

The following settlement phases have been found in the Pleistocene part; their approximate dates are: 5800—5600, 4700, 4100—3800, 3500—3300, 3000—2700, 2400—2200 and 1300 (1200) to present day; the first *Cerealia* pollen appeared in level dated at around 3600 B.P., the first grain of *Secale* pollen at 3400 B.P. Corn cultivation began to be significant in the early Middle Ages; area under cultivation also increased slightly during the Lusatian culture period. Intensive settlement 3000—2700 B.P. brought about a complete change in the woodland communities. Contemporary deforestation commenced around 1200—1300 B.P.

The southern part of the island was almost certainly permanently settled from c. 5000 B.P.; animal husbandry was without question the dominant mode of farming. The first single grains of corn pollen appear from 5000 onwards, the first *Secale* pollen at c. 4100 B.P., together with that of *Centaurea cyanus*. Cultivation was not of importance before the Middle Ages. Intensive grazing in the woods caused their destruction and the development of heathland with *Calluna vulgaris* between 4100 and 1500 B.P. This part of the island was gradually deforested from about 4500 years ago; land with more fertile soil was deforested c. 3200 years ago. By the 10th century this area was already completely treeless.

Hydrological changes:

The hydrology of Wolin Island is dependent on a number of factors and the results obtained so far are not conclusive. The water level fell at the start of the Holocene and at about 3000 B.P., when the raised bog came into existence. The water table rose around 7300 B.P. in connection with the first phase of the littorina transgression. There were also a short-lived rises in the ground water level in consequence of deforestations at about 5800, 4700, 3900—3300, 2900—2700 B.P. and in the early Middle Ages.

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