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Anhang

Autor: [s.n.]

WOHLFARTH B. and SCHNEIDER A.-M., 1991. Late Glacial and Holocene Litho- and Biostratigraphy of Lake Biel, Western Switzerland. *Bull. Soc. vaud. Sc. nat 80.4:* 435-457

Annexe II

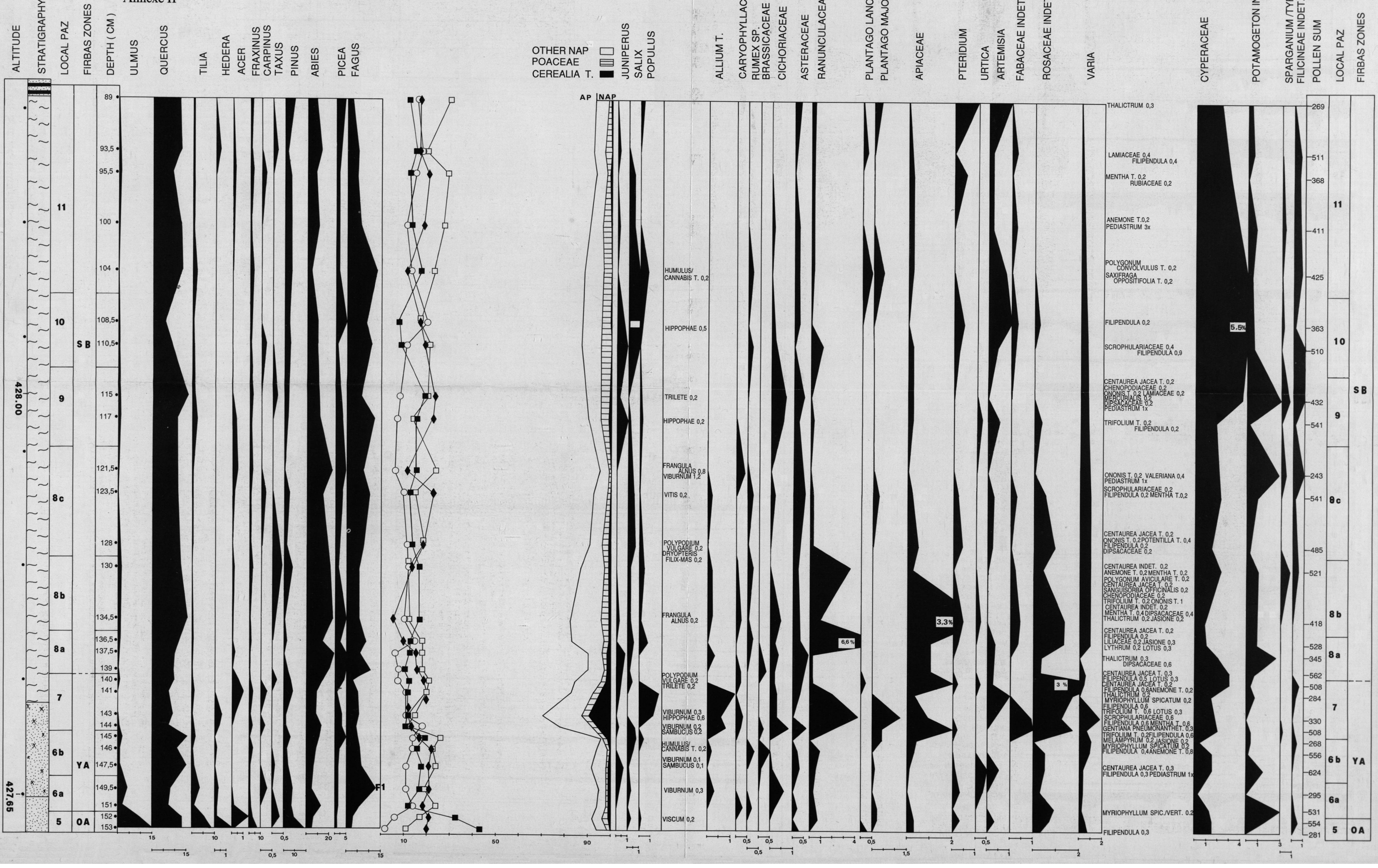

Figure 11. – Sutz IV, core 2/7, simplified pollen diagram of the Middle and Late Holocene. See Fig. 3 for the location of the core and Fig. 8 for the legend.

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Annexe II

Figure 9. – Sutz IV, core 2/7, simplified pollen diagram for the Late Glacial and Early Holocene. See Fig. 3 for the location of the core and Fig. 8 for the legend.

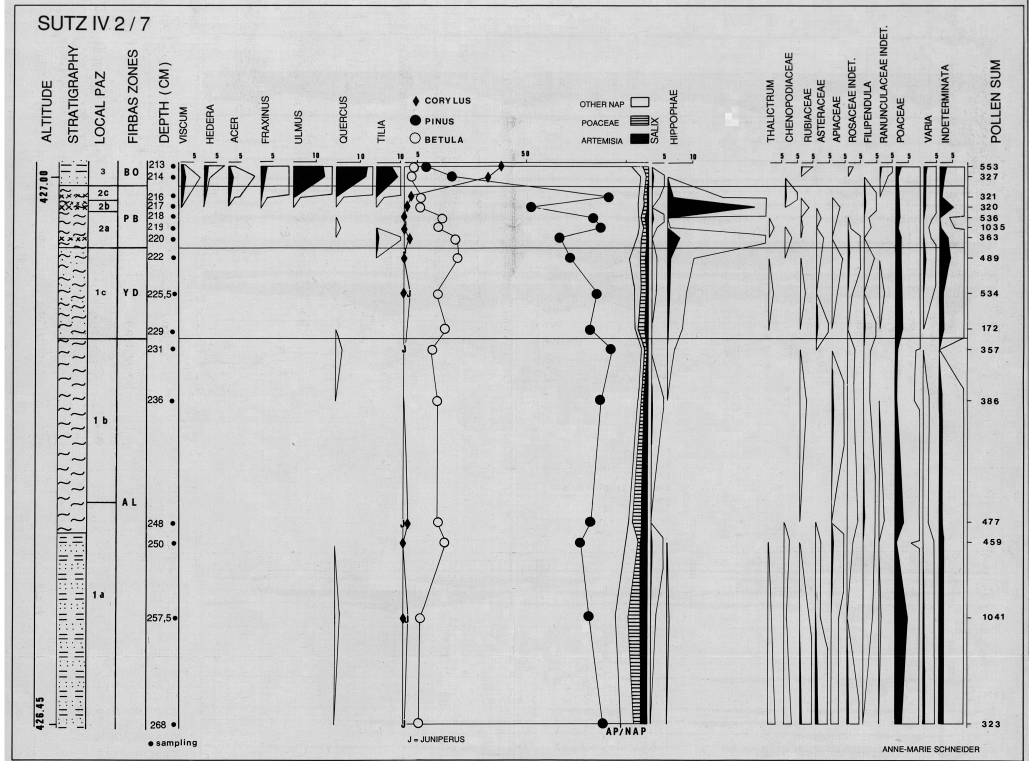
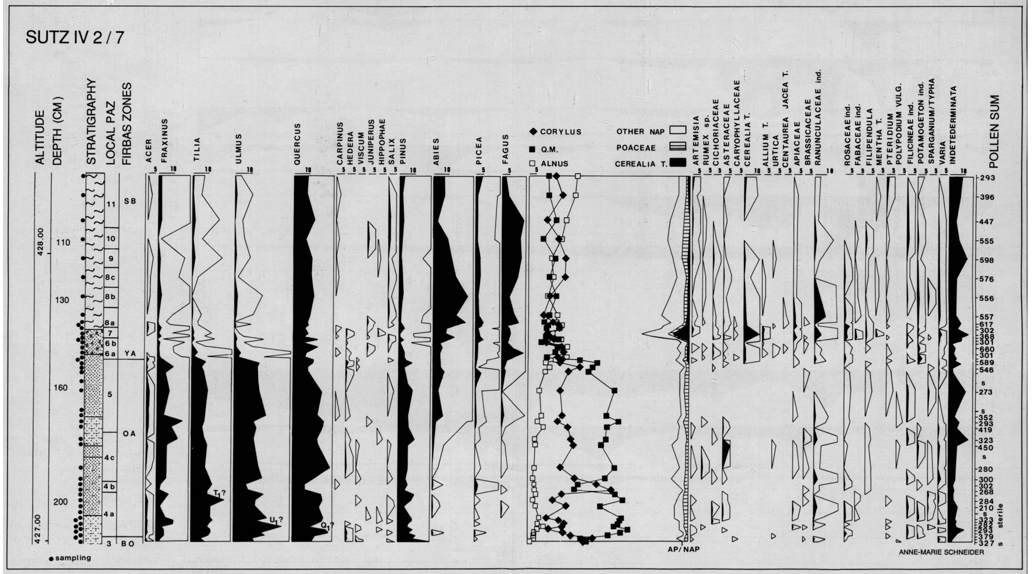


Figure 10. – Sutz IV, core 2/7, simplified pollen diagram of the Early Holocene. See Fig. 3 for the location of the core and Fig. 8 for the legend.



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Annexe I

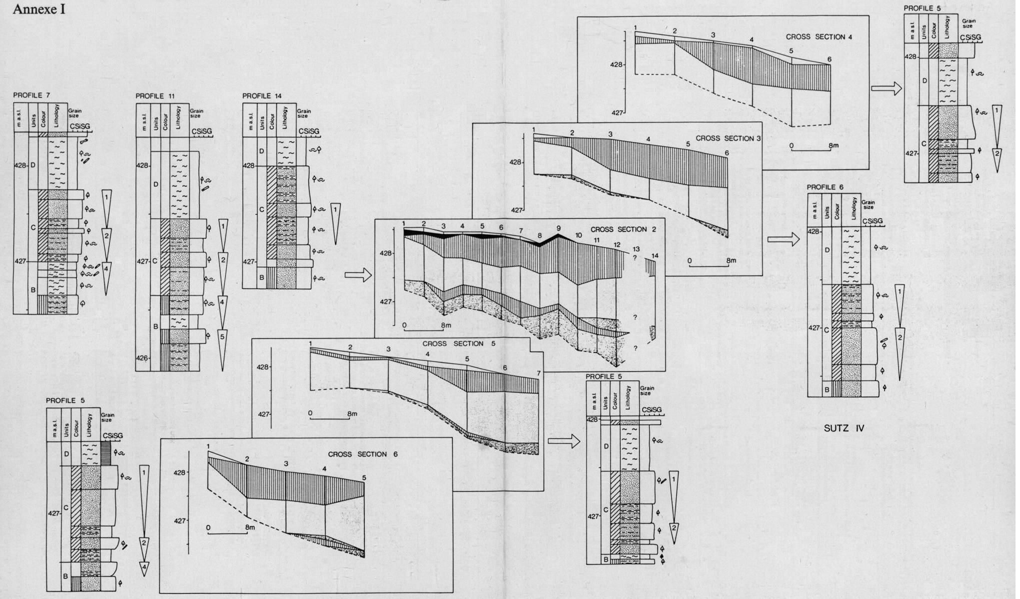

Figure 4. – Sutz IV, cross sections 2 - 6. The sequences in Sutz can be divided into different units (A - F) according to colour, grain size differences and the amount of organic material; here units B, C, and D are present. By comparing all layers within one cross section to the neighboring cross section it was possible to establish five sedimentary "cycles", each displaying a coarsening upward sequence. See Fig. 3 for the location of the cross sections and Fig. 8 for the legend.

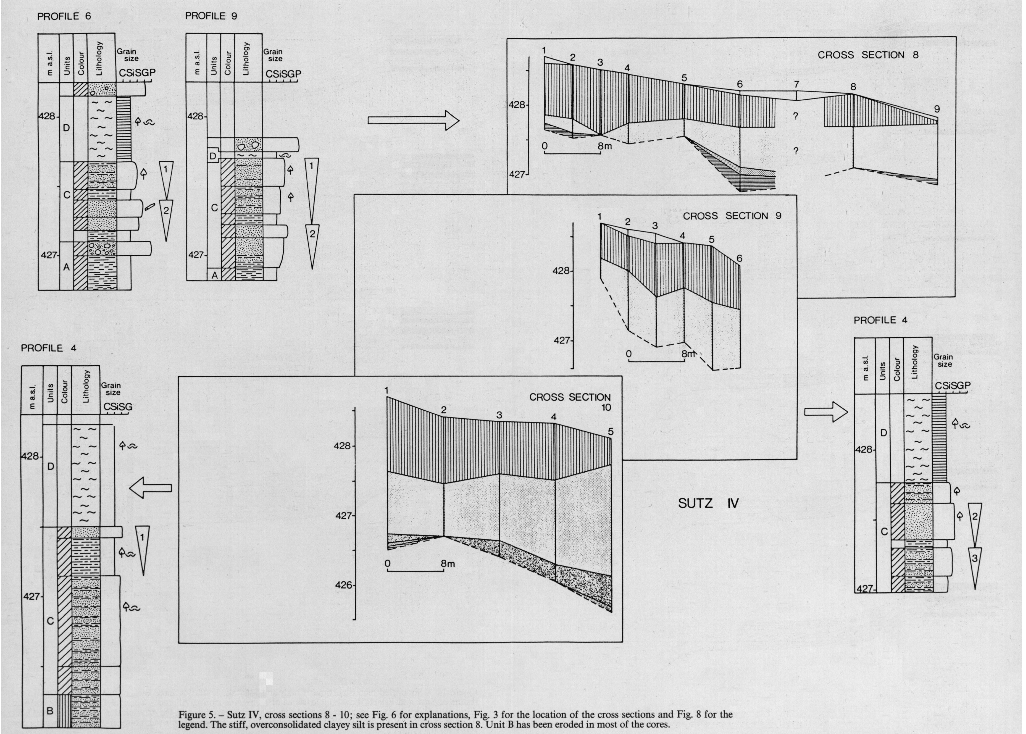

Figure 5. – Sutz IV, cross sections 8 - 10; see Fig. 6 for explanations, Fig. 3 for the location of the cross sections and Fig. 8 for the legend. The stiff, overconsolidated clayey silt is present in cross section 8. Unit B has been eroded in most of the cores.

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Annexe I

Table 1. – Correlation of the Local Pollen Assemblage Zones (LPAZ) in Lake Biel with the Regional Pollen Assemblage Zones proposed by AMMANN (1989) for the Swiss Plateau; the vegetational development is described in comparison with other studies in the surroundings.

LOCAL POLLEN ASSEMBLAGE ZONES LAKE BIEL (LPAZ)		REGIONAL POLLEN ASSEMBLAGE ZONES PROPOSED FOR THE SWISS PLATEAU (AMMANN 1989, table 17 and and 19)	VEGETATION DEVELOPMENT (AMMANN 1989, MATTHEY 1958, 1971, 1988, WEGMUELLER 1966, 1986)	FIRBAS ZONES (BIOZONES)	TIMESCALE ^{14}C yrs BP.
Alnus - PAZ	11		wide spread alder forests, recovering of the mixed oak forest taxa		
Alnus - Corylus - Betula - PAZ	10		lowest values of mixed oak forest taxa		
Corylus - mixed oak forest - Alnus - PAZ	9	FAGUS - (ABIES) -	wide spread fir and spruce in the Jura mountains; alder, hazel, birch and mixed oak	SUBBOREAL	
Abies - PAZ	8c 8b 8a	ALNUS - PAZ	forests fluctuate and are important. During LPAZ 9 fir looses ground. decrease of human influence		
Cerealia Type - Apophytes - PAZ	7		mixed oak forests still subdominant, decrease of Tilia and Ulmus archaeological layers present?	YOUNGER ATLANTIC/ SUBBOREAL TRANSITION	
Alnus - Corylus -	6b				5 000
Fagus - PAZ	6a		first Cerealia in Lake Biel decrease of the mixed oak forest taxa	YOUNGER ATLANTIC	6 000
Mixed oak forest - Abies - Alnus - PAZ	5	QUERCETUM MIXTUM -	expansion of alder, spruce, fir, birch, mixed oak forests are still important	OLDER	
Mixed oak forest - Corylus - PAZ	4c 4b 4a	CORYLUS - PAZ	hazel decreases and mixed oak forests increase. Spruce, fir and birch immigrate to the Jura mountains and to the Prealps	ATLANTIC	8 000
Corylus - Ulmus Quercus - PAZ	3	CORYLUS - QUERCETUM MIXTUM - PAZ	hazel woods, mixed oak forests, ivy and misteltoe are frequent, ash and maple immigrate	BOREAL	9 000
Pinus - Betula - Thermophilous - PAZ	2c 2b 2a	PINUS - BETULA - CORYLUS - PAZ	dense birch and pine forests, local presence of buckthorne, immigration of hazel, alder, oak, elm and lime	PREBOREAL	10 000
Pinus -	1c	PINUS - GRAMINEAE - NAP - PAZ	wide spread and dense pine forests	YOUNGER DRYAS	11 000
Betula - PAZ	1b 1a	PINUS - BETULA - PAZ	dense forests of birch and pine	ALLERØD	

Table 2. – Description of the different units and "cycles", the pollen significance and the depositional environment during the Late Glacial and Holocene at Sutz.

UNIT		SEDIMENT DESCRIPTION (see Fig. 4, 5 and 13)	POLLEN SIGNIFICANCE (see Fig. 9, 10, 11)		DEPOSITIONAL ENVIRONMENT HYDRODYNAMIC CONDITIONS	BIOZONES (Firbas)
E		dark brown clayey silt with abundant plant remains (seeds, nuts, twigs, leaves), charcoal, bone and ceramic fragments			erosion by contemporary erosion and reworking of the archaeological sediments	SUBBOREAL
D		laminated light grey lake marl with abundant plant and mollusc remains, charcoal fragments on top	high values of Abies, Picea, Fagus; low values of Ulmus, Tilia and Hedera		quiet, protected bays, low wave energy	
C	cycle 1	- coarse sand with plants & molluscs	fall of mixed oak taxa, rise of Alnus, first peak of Fagus	↑	high wave energy	SUBBOREAL/ YOUNGER ATLANTIC TRANSITION
		- fine sand with oncoids, plants & molluscs - alternating layers of fine sand and clayey silt	Abies present; increasing values of Fagus and Picea		increasing wave energy	
		- clayey silt			low wave energy	OLDER ATLANTIC
	cycle 2	- fine sand/coarse sand to gravel with plants and molluscs - alternating layers of fine sand (4cm thick) and clayey silt (2cm thick), plants and molluscs	no Fagus, Abies or Picea	↑	high wave energy and erosion of many older layers	
		- alternating fine sand and clayey silt layers (each 2cm thick), plants, molluscs			low wave energy	BOREAL
	cycle 3	- alternating layers of thick fine sand (5cm) and thin clayey silt layers (2cm) - alternating layers of fine sand and clayey silt layers (each 5cm thick)	no pollen samples analysed		increasing wave energy	??BOREAL/PREBOREAL
B	cycle 4	- fine sand alternating with clayey silt (offshore) and coarse sand (onshore)		↑	increased hydrodynamic conditions and erosion of older layers	
		- light coloured lake marl with plants and wood fragments	decrease of NAP spectra, Corylus and other thermophilous taxa appear		low hydrodynamic conditions, protected environment	PREBOREAL
		- light coloured lake marl with organic debris, carbonate concretions & detrital clasts (Sutz IV, 2/7) and alternating fine sand and clayey silt (Sutz V, 3/4)	increase of NAP percentages	↑	increased hydrodynamic conditions/ increased run off	YOUNGER DRYAS
		- light coloured lake marl with scarce plant remains and mollusc debris	dominance of Pinus over Betula		low hydrodynamic conditions, protected environment	ALLEROED
	cycle 5	- coarse sand with plant and wood remains	variety of NAP taxa and presence of few helipohilous plants together with Allerød spectra	↑	increased wave energy and high hydrodynamic conditions causing erosion and redepostion of older layers	REWORKED ALLEROED
		- thick fine sand layers (5cm) alternating with thin clayey silt layers (2cm) - thin fine sand layers (2cm) alternating with thin clayey silt layers (2cm)	no pollen samples analysed		low wave energy	
A		- coarse sand and gravel - stiff greyish clayey silt with small rounded stones of gravel size	reworked pollen spectra			GLACIAL

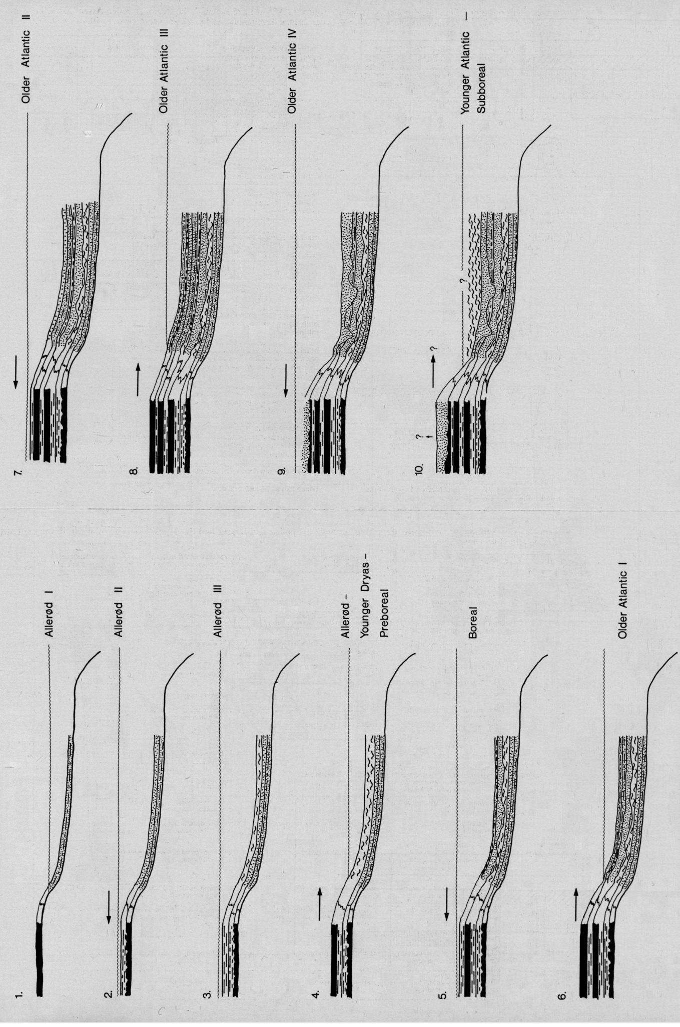


Figure 14. – Simplified reconstruction of high and low lake levels for Lake Biel, obtained by correlating the results of Sutz and Erlach. Low lake levels can be observed during Allerød - Younger Dryas - Preboreal and during the Older Atlantic biozone. High lake levels can be traced during the Allerød, the? Boreal and the Older Atlantic biozone. No indications for lake level stands can be given from the Younger Atlantic onwards. See Fig. 8 for the symbols.

Figure 4.-Diagramme des concentrations absolues

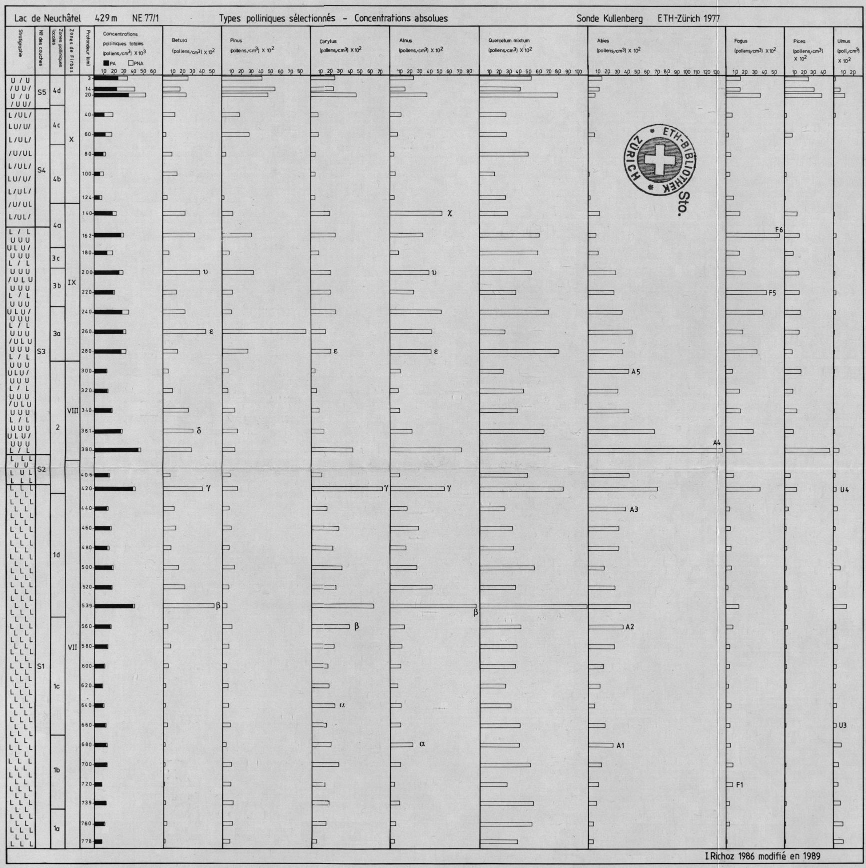
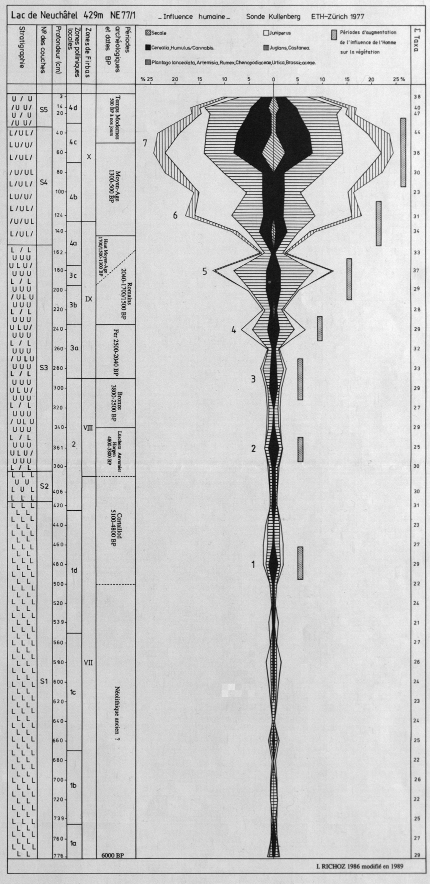
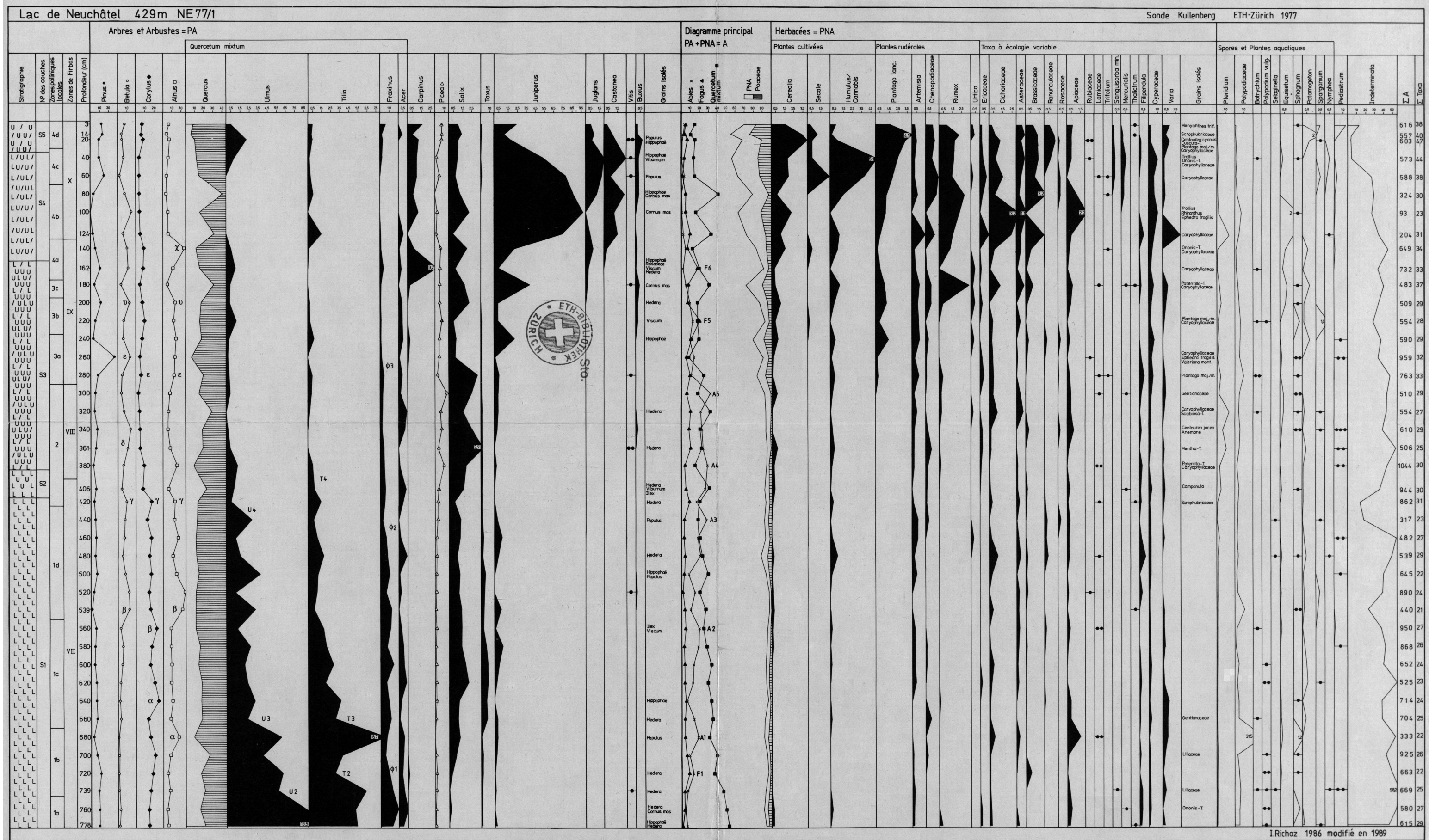


Figure 5.-Diagramme de l'influence humaine



RICHOZ I., GAILLARD M.-J., 1989. Histoire de la végétation de la région neuchâteloise de l'époque néolithique à nos jours. Analyse pollinique d'une colonne sédimentaire prélevée dans le lac de Neuchâtel (Suisse). *Bull. Soc. vaud. Sc. nat. 79.4*: 355-377.

Figure3.-Diagramme des pourcentages relatifs



RICHOZ I., GAILLARD M.-J., 1989. Histoire de la végétation de la région neuchâteloise de l'époque néolithique à nos jours. Analyse pollinique d'une colonne sédimentaire prélevée dans le lac de Neuchâtel (Suisse). *Bull. Soc. vaud. Sc. nat.* 79.4: 355-377.