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Im Südschwarzwald ist die Allerödschwankung stratigraphisch, durch den Laacher Bimstuff, ebenfalls gut gesichert: Allerödzeit (II) und Jüngere Dryaszeit (III) umfassen die Kiefernzeit. Da Anhaltspunkte für eine Zuordnung zur Böllingschwankung (Ib/Ic) bisher fehlen, ist der genaue Zeitpunkt der Wiederbewaldung und der Beginn der Allerödzeit (II) noch unklar.

Im französischen Zentralmassiv ist die Verknüpfung mit der Allerödschwankung zwar noch nicht eindeutig gesichert, Allerödzeit (II) und Jüngere Kiefernzeit (III) fallen aber sehr wahrscheinlich in die Kiefern-Birkenzeit. Ein C¹⁴-Datum, das dieser Auffassung widerspricht, wird diskutiert. Für die Zuordnung zur Böllingschwankung finden sich bisher keine Hinweise, so dass auch der genaue Zeitpunkt der Wiederbewaldung noch unbekannt ist.

Der Vortrag ist, in ungekürzter Form und mit Abbildungen, in «Pollen et Spores» 5 (1963) wiedergegeben.

Floristic and glaciologic sequence (from Donau to Mindel) in a complete diagram of the Leffe deposit

By F. LONA

The study of the median part of the Leffe deposit in 1950 (LONA) gave a picture (see Fig. 1) of the forest and climatological sequence under the Mindel und Günz glaciations, comprehending a preceding glaciation that I referred to Donau because seemingly comparable with the Donau geologically evidenced by EBERL (see LONA 1950, p. 170) in the northern Alps. We had on that occasion the first confirmation of the existence of EBERL's Donau-glaciation.

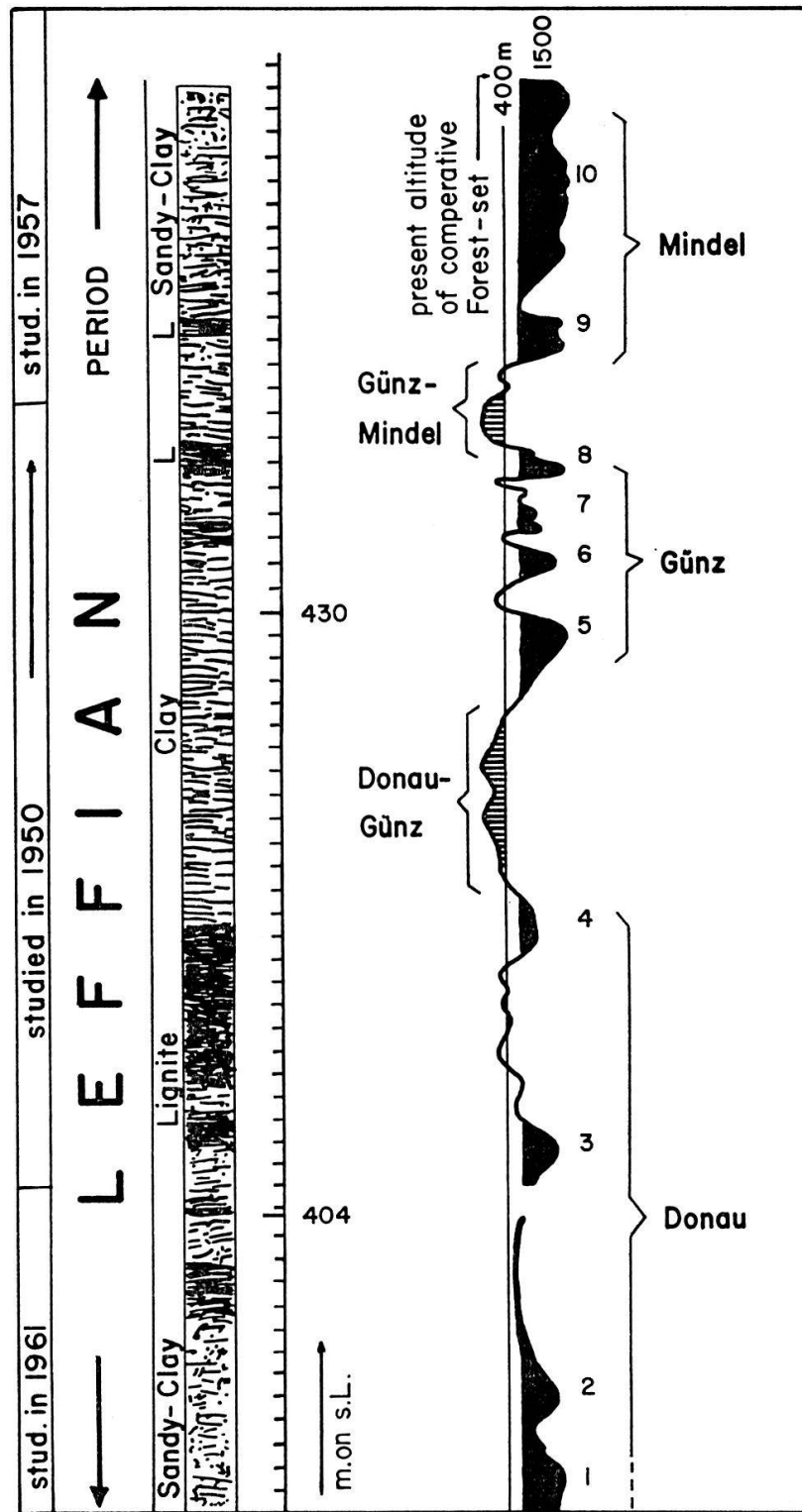
The series was uninterrupted and it gave us minute data on the Donau-Günz Interglacial, Günz-Interstadials and other periods.

In a second work (LONA and FOLLIERI) we studied the superior part of the deposit with detailed data on Mindel glaciation and Günz-Mindel Interglacial.

Recently I was able to bore the deepest part of the deposit, reaching the base of the basin. In this part, as revealed by the diagram, other two cold climatic oscillations are present. This was established—as in the previous researches—by pollinological method, revealing the forest vegetational characteristics, and consequently the climatologic ones.

I propose to refer the ancient cold phases of Leffian period still to the Donau glaciation. So now Donau shows at least four cold periods. The life of the Leffe basin begins with these ancient Donau phases; the characteristics of the glacial period will be reported elsewhere with more details.

Fig. 1



The nomenclature and limits of our Donau are merely conventional because we don't know whether EBER's Glaciation is referable to all these four Leffian phases. The problem is going to be studied more extensively in our Institute.

Let us note that these Donau cold phases do not appear so severe as some Günz and especially Mindel ones. The Interstadials are relatively fresh. In the Interstadials of the ancient Donau, we found several species which are not common in more recent periods; so, for example, *Celtis*, *Myrica*, *Eucomia*, *Ketelleria*, *Pinus haploxylon* "sensu stricto", cf. *Podocarpus* and, in some periods, we also can see unusually high percentages of *Fagus*. These species are very rare or even absent in the pre-Donau Leffian series. On the other hand in the low Donau we found very rare pollen grains of *Carya*. In the cold periods we found a representative picture of *Picea*-forest with *Pinus*. In the entire series representing the period, that we may call "Leffian", we see ten cold phases, as shown in Fig. 1.

Comparative diagrams of some Pliocene-Pleistocene marine sediments in the Po-Valley and the continental deposit of Leffe (Bergamo)

By F. LONA

On the base of several series of pollen analysis, a diagram was performed which represents the probable connection with some marine deposits located near Parma and the Leffe (Bergamo) deposit. In Fig. 2 we note that the Rio Ferraio deposit (Parma Appennine) corresponding to "Calabrian" (LONA unpubl.) is partially correlated with the Leffe deposit.

Another Appennine deposit (Castell'Arquato) was studied on its part underlying the Calabrian and the well known *Amphistegina*-conglomerate up to date ascribed to the upper Pliocene (LONA, 1962). Below this *Amphistegina* layer we found a sandy-clay whose pollen content is representative of a rather cold period. I indicate it as "Arquatian".

Sciadopytis is one of the species (6%) that characterizes the boundary period (mild oceanic climate) between Arquatian and *Amphistegina* layers. *Sciadopytis* is not found in such percentage neither in Calabrian nor in the corresponding Leffian period.

We let open the question whether this period (comprehending *Amphistegina* conglomerate and Arquatian phase found in the *Amussium* clayey-sand) is really pertaining to the upper Pliocene (Astian faces) or if this may be