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SIGNALS, THRESHOLDS AND RYTHMS DURING THE PAST 150 KY.
Examples from South-West and Massif Central of France.

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South-West, Massif Central, France.

This work is based upon the study of climatic events recognized in South-West and Massif Central of France during the Upper Pleistocene. Conclusions presented here are deduced from deciphering of palaeoenvironmental modifications (physical and biological) and recognizing of their chronological position conforted by objective dating methods (LAVILLE et al , 1983 ; LAVILLE, RAYNAL, TEXIER, 1984 et 1985).

1 - Linking of phaenomenas :

Following the Upper Riss pleniglacial, the late interglacial (Riss-Würm = Eemian, 130 - 115 ky B.P.) introduces a major biostasic period and sets up a high inertia climatic system characterized by a relative morphologic stability.

Between 115 and 105 ky B.P., a high intensity climatic crisis breaks the climatic balance. This break, particularly well recorded by physical and biological environments, is the signal of the setting up of the Würmian climatic system . It marks the beginning of Lower Würm.

However, former interglacial system inertia is such that we observe after, at several times, a temporary come back of temperates conditions, with decreasing intensity. Thus, between 105 and 75 ky B.P., progressive oscillations toward the full glacial bring on a high instability in morphosedimentary modes (rhexistasic trend) and engage a processus of modification in animal and vegetal associations. Around 70 ky B.P., a climatic threshold is topped which sanctions the setting up of pleniglacial conditions. These, interrupted by humidity crisis, stand till the Würmian interstage which marks the end of Lower Würm.

As the former interglacial, but with a shorter duration and a lower intensity, the Würmian interstage (43-35 ky B.P.) breaks the pleniglacial climatic equilibrium of Lower Würm. The second term of the interstage, all things considered, could be the signal of the beginning of next glacial stage : in this case, the third term (Les Cottés) should be considered as the second phase (temperate) of Upper Würm. This hypothesis requires confirmation.

Between 35 and 15 ky B.P., the climatic events of the Upper Würm follow one another according to a scenario identical with that described for Lower Würm, but with a more contracted duration. Following a shorter period of instability, pleniglacial conditions are set up after passing a threshold, which age is different according to the geographical location (28-24 ky B.P.) ; these conditions will stand till the beginning of the deglaciation dynamics.

The setting up of holocene interglacial conditions is progressive after 15 ky B.P., interrupted by short and abrupt cold pulsations : the last and coldest is Dryas III. During the Holocene, abrupt climatic changes are locally recognized, linked to abrupt changes in physical environment (i.e. domitic volcanism of the Chafne des Puys ; RAYNAL and DAUGAS, 1984).

2 - Nature of transitions and rythms :

Our present knowledge indicate that transitions from a glacial stage to a following temperate stage are generally perceived as abrupt ones : it is the case for the transition from Riss III to Riss-Würm, from Lower Würm to Würmian interstage. At the opposite, the transition from Upper Würm to Holocene appears relatively more progressive.

Climatic instability at the beginning of Lower Würm and Upper Würm demonstrates, at the opposite, that it is more difficult to break a temperate climatic equilibrium (interglacial or interstage). However, the "signal" of imbalance (i.e. first phase of Lower Würm) has an abrupt and intrusive characteristic (crisis in the ordinary meaning of P. ROGNON, 1983), well recorded in physical and biological environments, after what the pleniglacial conditions set up by steps until a threshold is topped. We observed this for former periods (TEXIER et al , 1983) and noticed too a change in climatic rythms which seem to become shorter and shorter as we approach the present times : but have we tools of adequate resolution to analyse such processes ?

3 - Range of recognized facts :

The sequence of recognized facts, confirmed by close oceanic datas , passes the regional limits. It obviously reflects a climatic mechanism generalized to northern hemisphere ; moreover, eastern continental sequences (i.e. La Grande Pile, Les Echets...) provide identical sequences. Based upon a multi-field research, it strongly demonstrates that the modifications undergone by the physical and biological environments and recorded in continental sediments, with a more or less high fidelity according to one's nature , are generally not aleatory and do transcribe a palaeoclimatic reality . It demonstrates that it is possible to establish a regional palaeoclimatic history, even with a lack of a long sequence in a privileged environment (lake, peat bog...), if a great number or correlated stratigraphies is available and if several objective datings allow to balance the extent of recognized events. Finally, we think that it brings decisive elements in the discussion provoked for some years about the Upper Pleistocene chronology and terminology : the late glacial stage do begin around 115 ky B.P. and lasts a hundred millenaries.

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