AIQUA
Associazione Italiana per lo
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CNR
C. S. per la Geodinamica delle
Catene Collisionali

VILLAFRANCHIAN ON STAGE

COMPLETE REVISION OF THE TYPE AREA, FOLLOWED BY EXTENSIVE AND IN-DEPTH REVISIONS OF THE MAMMALIAN FAUNAS, PALYNOLOGY, MAGNETOSTRATIGRAPHY OF CLASSICAL LOCALITIES AS WELL AS NEW SECTIONS IN CENTRAL AND NORTHERN ITALY, SPAIN, ROMANIA, RUSSIA

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The international meeting, Organized by F. Carraro (University of Turin) et al., was attended by 120 scientists from various countries. Some 50 presentations were given and a carefully organized excursion to the type localities followed.

In synthesis, the revision gave the following results

The Villafranchian stage was proposed by Pareto in 1865, after a number of Vertebrate remains had been found during the excavation of the trench for the Turin-Asti railway in the area between Villanova and Villafranca.

The AIQUA proposed a revision of this important stage as one of its medium-term objectives, in order to provide researchers with an update definition. This revision is divided into three phases:

(1) survey for a detailed, and hitertho lacking, geological map of the type area. The map separates outcrops from interpolations; the cartographic data are currently been digitalized and form the nucleus of an ad hoc data-base. On the basis of gathered data an interpretative stratigraphic-structural model is proposed;

(2) a critical reevaluation of the large amounts of paleontological material put together in the course of a century of research. Particularly difficult has proved to be the positioning of the numerous vertebrate remains gathered during the last century, for which a precise location is unknown; this has been reconstructed on the basis of historical research. Research has shown that two separate routes were originally planned and built for the railway between Villanova and Villafranca and that findings come from both, together with the numerous sand quarries opened in the vicinity. Paleontological data has also been gathered into a data-base; this contains all information concerning each finding, both original and deriving from research, and useful for defining the type, the stratigraphic position, the systematic significance and its current museum location;

(3) analysis of data collected during the previous phases by specialists operating in different fields; comparison of the different interpretations; comparison of these interpretations and the interpretative model proposed.

Within the type-series which Pareto proposed as Villafranchian stage (1865), the present survey has identified two main complexes, separated by an erosional surface (the Cascina Viarengo Surface). The Lower Complex is made up of (from bottom to top) two lithostratigraphic units: the Ferrere Unit, composed of coarse yellow sands, with local shifts to fine gravel lenses, characterized by oblique and prevalently planar laminae; the thickness varies from 5 to 25 m. Its paleontological content is made up of numerous remains of continental vertebrates, in particular Mastodonts, as well as marine Molluscs; the majority of proboscideans come from this unit. In general the Ferrere Unit is interpreted as being one deltaic system in the progradation phase, interfingered with beach sediments. It is apparently assignable to the Middle Pliocene. The relationship with lower-lying marine sediments is one of substantial sedimentary continuity. On the basis of clast lithology (prevalently quartzite and "anagenites", i.e. Permian quartzite conglomerates) it is possible to state that these sediments are genetically linked to the Tanaro basin.

The most recent term of the Lower Complex is the San Martino Unit, an heterogeneous formation made up of silty-clayey sediments in substantial stratigraphic continuity with the lower-lying Ferrere Unit. The majority of well-known Villafranchian paleontological remains come from this unit. In particular it has been possible to prove beyond doubt that the remains of *Mastodon arvernensis*, *Stefanorhynus jeanvireti*, *Mesophitecus monspessulanum*, *Leptobos stenometopon*, *Mauremys* sp., *Tapirus arvenensis*, *Sus minor*, *Cervus pardinensis* and *Eucladoceros* sp. belong to this unit. The rich palynologic assemblage indicates an association composed of alternatingly dominant groups of Taxodiae (t. *Taxodium*), *Glyptostrobus*, t. *Sequoia*, *Sciadopitys*, *Nyssa*, *Myrica*, Celestraceae, Hamamelidaceae triculpate (such as *Parrotia*, *Hamamelys* and *Distylium*). The Mediocratic group is also sizeable, while values of *Cedrus* + *Tsuga* and montane elements (*Picea*, *Abies*, *Fagus*, *Betula*) are modest.

The only magnetostrtigraphical data available for the Villafranchian type-series refer to this unit; data produced and interpreted by Lindsay et al. (1987) in the RDB quarry identifies the central part of the Gauss chron, with a trace of the Mammoth and Kaena events separated by a normal magnetozone.

The Upper complex is also made up of two units: the basal one which lies directly above the Cascina Viarengo Erosional Surface is called Cascina Gherba Unit. It is made up of sandy or sandy-gravelly deposits prevalently grey or whitish, with large scale concave and oblique laminar stratification. This forms a sub-tabular body the thickness of which varies from 4 to 15 m. No paleontological remains are known to have been recovered in the past and with certainty in these sediments, which in terms of lithofacies and geometry appear to derive from the sedimentation of a water way with meanders in a plain.

The next unit (Maretto Unit) is made up of alternate layers of ash-grey clayey loams with occasional sands, interpretable as the product of the sedimentation in alluvial plains. During the recent revisional phase a fragment of *Cervus* horn and *Rhinoceros* tooth were found, together with remains of *Sus* sp. and *Bos* sp. On the basis of a reevaluation of the abundant historical data available, it appears that the teeth of *Elephas gromovi -meridionalis* found during the construction of the railway can belong to this unit, while no Molluscae were identified. The pollen content of the Moretto Unit is poor and is represented by an association very similar to the current one; recurring species are *Corylus, Pinus*, Chenopodiaceae, Cichorisideae and more rarely *Tsuga*, prevalently at the base of the sequence. The Upper Complex is truncated towards the top by an erosional surface.

The Villafranchian type-series presents a sedimentary hiatus, emphasized by a slight angular discordance. Furthermore the data resulting from the revision of the rich paleontological content, indicate a Middle Pliocene-Upper Pliocene or Lower Pleistocene age, which is very different from that proposed by Pareto, who suggested a Pleistocene age (figure 1).

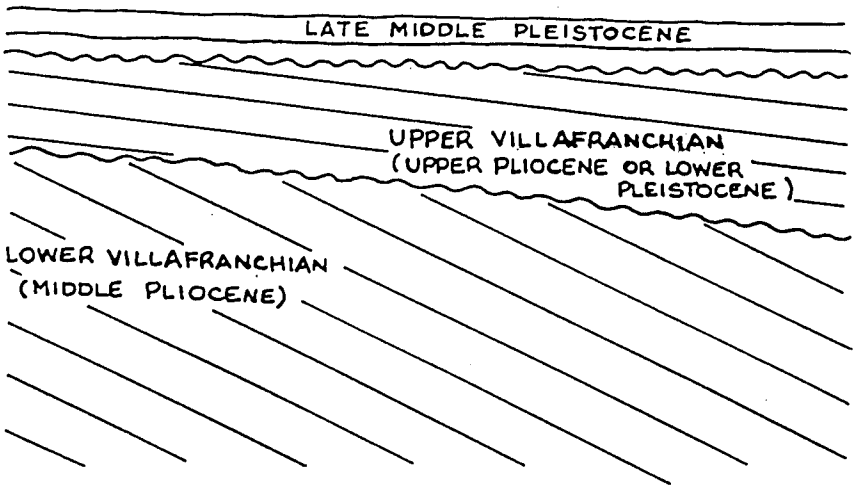

Fig.1. New interpretation of the type section of Villafranchian