

## Franco-American research at the Villafranchian locality of Senèze (Haute-Loire, France): why are new enquiries needed?

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The fossil site of Senèze, located in the Auvergne volcanic province of the French Massif Central, is well-known for its mammalian fauna and its role as the reference locality for the Late Villafranchian, an important phase in the evolution of the European fauna. This site is an infilled volcanic explosion crater lake (maar), where fossils are found in volcanoclastic sediments that interfinger with lacustrine deposits at the lake margin. The Senèze mammals are generally considered to date from between 2.2 and 1.5 Ma, but several inconsistencies have been suggested within this range. There is growing opinion that the assemblage is not unitary, but is instead composed of two associations of different age. Numerous authors have recently commented on the relative age of the Senèze local fauna (or faunas), or have assigned it to several different places within the sequence of Villafranchian faunas. Clearly, as yet no agreement has been reached. Moreover, little is known of the geological setting or the processes of site formation.

Our Franco-American research project, co-directed by the three first authors, is re-examining Senèze for the first time in 60 years. The team effort has three main goals:

- to clarify the local geology of this complex site and determine the taphonomic processes which formed it;
- to utilize a combination of dating methods (ESR, Argon and palaeomagnetic correlation) to unequivocally establish the age of the site and its fauna;
- to collect additional mammalian fossils (especially of rare animals such as carnivores, primates and rodents) and samples of the non-mammalian biota, including vertebrates (e.g., birds and fishes), terrestrial and lacustrine invertebrates, pollen and diatoms from known points within the revised and dated stratigraphy.

Our work began in 2000, with topographic mapping, coring of exploratory bore-holes and mapping of geological sections. In addition to recovering some macromammalian specimens, the team has begun sampling for micromammals and pollen, as well as for palaeomagnetic indicators. Geochronometric analyses of ESR baseline data and samples from mammalian enamel, and also on the basalt predating the maar formation (using whole-rock K/Ar, given the sample petrology), are in progress.

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