

Nature and precision of Neogene mammal chronology – Implications for the EEDEN Programme

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A multivariate method (disjunct distribution ordination, DDO) was applied to a large number of Miocene to Pleistocene localities with mammal faunas from Western Eurasia (Fig. 1). Information was taken at the species level.



Fig. 1: Geographic distribution of localities used in the analyses presented herein. Some localities East of Turkey and the Black Sea are not shown in this figure (from ALROY et al. 1998).

The method creates a sequence of taxonomic first and last appearance events that minimized the total range of each species (Fig. 2).

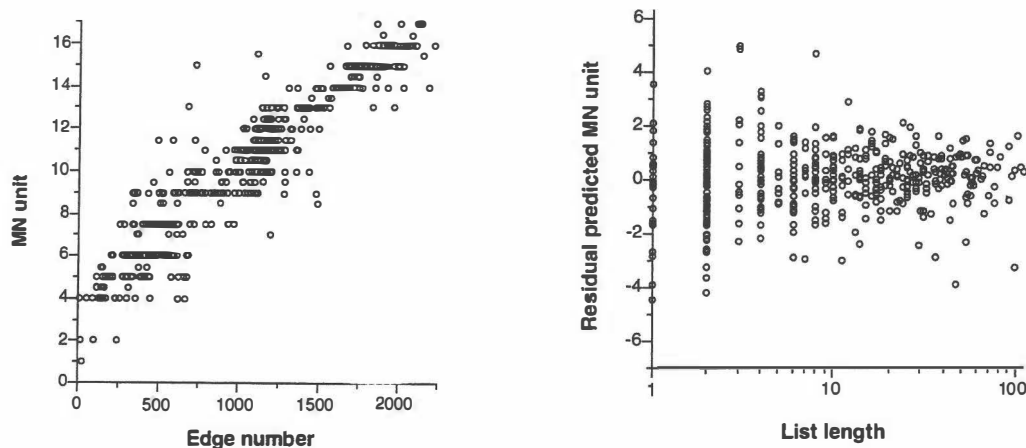


Fig. 2: Diagram on the left showing the correlation between concurrent edge positions and MN unit assignments of faunal lists. Edge numbers are based on a disjunction distribution ordination of the 654 lists in the combined data set. The ordination and the zone assignments reflect the same underlying temporal gradient. Diagram on the right showing the residual predicted MN unit assignments and list lengths: Longer lists show smaller residuals. Residuals are based on at least-squares fit to the relationship shown on the left side. List lengths are equal to the sum of the number of genera plus species in each list (from ALROY et al. 1998).

Comparison of the DDO sequence with the MN-zonation shows that the two systems give highly similar results in general, although the result may differ by up to four MN units for individual localities. Most of the disagreements between the methods involve faunal lists of inadequate length. The best results are obtained when all localities are included (rather than a geographically defined subset), leading to the conclusion that the MN-zonation can be applied outside the area for which it was created. The results as a whole suggest that the MN-zonation is robust but that it may by itself be less precise than has been commonly assumed.

REFERENCE LOCALITY*	MN UNIT	PREDICTED
St. Vallier	17	17
Triversa	16	16
Arondelli	16	16
Perpignan	15	15
Podlesice	14	14
El Arquillo 1	13	13
Los Mansuetos	12	12
Crevillente-3	11	11
Masia del Barbo	10	10
Can Llobateres	9	8
Anwil	8	7
Steinheim	7	6
Sansan	6	6
Pont Levoy	5	5
La Romieu	4	5
Wintershof-West	3	NO DATA AVAILABLE
Laugnac	2b	NO DATA AVAILABLE
Montaigu-le-Blin	2a	5
Paulhiac	1	NO DATA AVAILABLE

*Note: Reference Localities follow Mein, 1989

Tab. 1: MN unit reference localities: assigned and predicted unit referrals (from ALROY et al. 1998).

For research that does not rely on high resolution stratigraphy the MN-system offers a robust and widely understood basis. For many mammal localities it is currently the best applicable dating method. When available, direct dating and regional biostratigraphic zonations correlated directly with the global time scale offer considerably higher precision, however, and should be a priority for the EEDEN Programme and its databases.

References

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