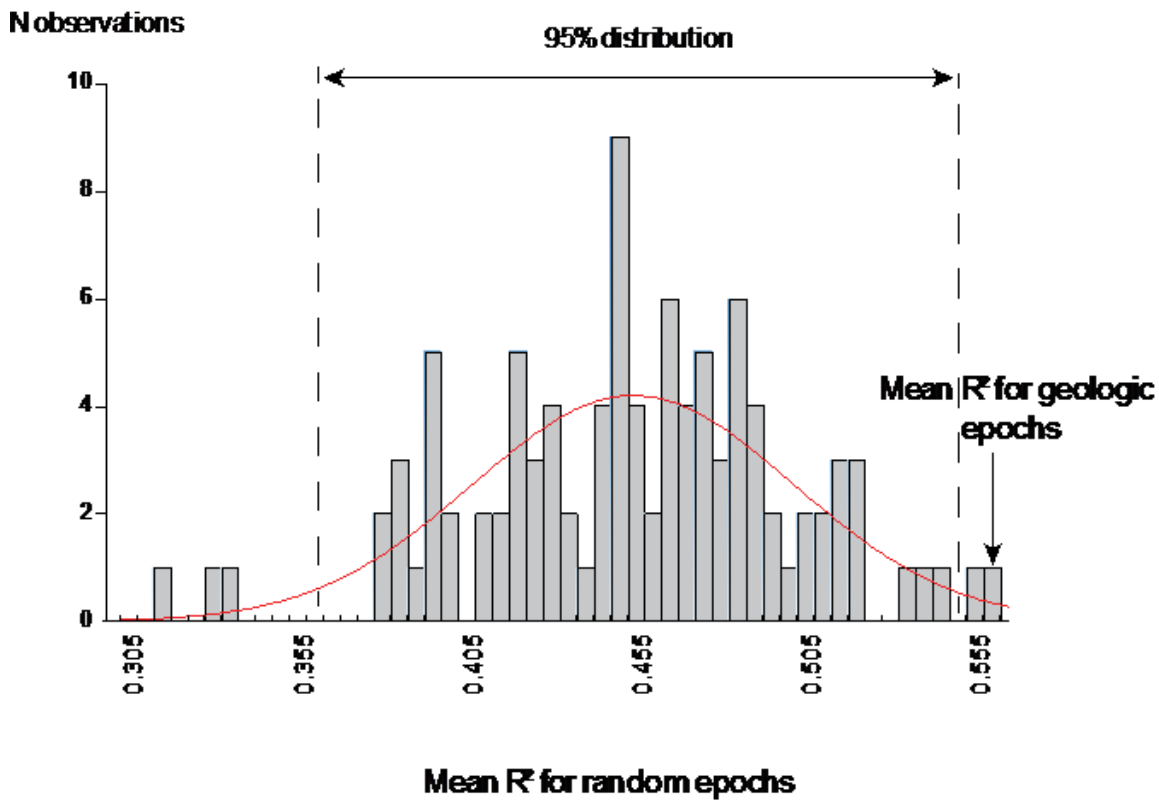


**Appendix S10** Defining age intervals randomly or equally instead of based on geological epochs: consequences for relationships between environment and *stELD*

In the main text we calculated *stELDs* of habitat species pools per each of seven geological epochs and related for each epoch *stELDs* to the present environment. Here we verify whether these relationships are stronger than those one would obtain if *stELDs* were calculated for time intervals defined without reference to geological epochs and hence paleoenvironments. We first generated 100 random sets of seven time intervals with borders between these intervals determined by integer values between 1 and 163 (1 Ma is taken as minimum duration of an ‘epoch’), covering the whole period of diversification in Dutch Angiosperms. We then used our core phylogeny (i.e. without randomly resolved polytomies) to calculate for each of the 100 sets of 7 time intervals *stELDs* for each of the 43 habitat types. For each of the 100 \* 7 time intervals created we regressed *stELDs* of habitat types against environmental factors. We retained the  $R^2$  and averaged them within each of the 100 random sets of time intervals. The averages ranged from 0.310 to 0.557 (mean 0.452, sd 0.047). Importantly, 99 of the 100 sets of random time intervals yielded environment/*stELD* relationships of lower  $R^2$  than did the time intervals defined based on geological epochs and their paleoenvironments (i.e.  $P = 0.01$ ) (Fig. S10).

We also defined age intervals based on seven ‘naïve’ epochs of even length (23.43 Ma each). Age of the crown node of Dutch angiosperms (164 Ma) was used as the starting point. We calculated a regression model (same settings as before) for each ‘naïve’ epoch and reported total  $R^2$  and  $P$ -values in Table S10. Note that environmental factors were much less strongly related to *stELDs* when these were quantified per ‘naïve’, equal-sized age intervals and not based on distinct geological epochs characterized by distinct paleoenvironments: ‘naïve’ epochs have lower  $R^2$  for six out of seven epochs.

**Figure S10** Histogram of the distribution of mean  $R^2$  coefficients from multiple regression analyses of environment/*stELD* relationships in 43 habitat types of Dutch angiosperms averaged for each of the 100 random sets of seven time intervals. Mean  $R^2$  coefficient of multiple regressions based on seven geological epochs (as in Table S10) equals 0.556 and is outside of the 95% interval of this distribution.



**Table S10** Analyses of relationship between standardized epoch-specific lineage diversities (*stELDs*) and five environmental factors in 43 habitat types of Dutch Angiosperms using two methods of definition of age intervals: geological epochs and ‘naïve’ epochs.

Geological epoch			Naïve epoch		
Time period (Ma)	R <sup>2</sup>	P	Time period (Ma)	R <sup>2</sup>	P
164-126	0.75	<0.001	164-140.57	0.62	<0.001
126-100	0.68	<0.001	140.57-117.14	0.54	<0.001
100-66	0.22	0.018	117.14-93.71	0.26	0.003
66-33.9	0.41	<0.001	93.71-70.28	0.36	0.002
33.9-23	0.59	<0.001	70.28-46.85	0.44	0.001
23-5.3	0.60	<0.001	46.85-23.42	0.33	0.001
5.3-0	0.64	<0.001	23.42-0	0.57	<0.001
Mean	0.56		Mean	0.44	