PLUS ÇA CHANGE - A MODEL FOR STASIS AND EVOLUTION IN DIFFERENT ENVIRONMENTS

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"Plus ça change, plus c'est la même chose" — The more that changes, the more it's the same thing.

The Plus ça Change Model proposes that morphological stasis is the usual response to widely fluctuating physical environments on geological timescales. The lineages that survive in a more changing environment on geological timescales are those that are relatively inert to each environmental twist and turn, in contrast to more sensitive lineages in less changing environments. The model predicts a tendency for continuous, gradualistic evolution on land in the tropics and in the deep sea, and for more stasis (and occasional punctuations) in shallow waters and temperate zones.

Key point: as the vast majority of the fossil record comes from dynamic shallow marine environments (with changing sea levels, substrates, mean temperatures, etc.), it is not surprising that many fossil lineages show approximate stasis and occasional punctuations. In these dynamic settings major morphological change is only expected when certain physical variables either exceed long-term, wide reflecting boundaries or contract to become narrowly fluctuating. In environments with narrowly fluctuating physical variables, biotic interactions may tend to have a greater influence on evolution.

Punctuated equilibrium could be being mistakenly perceived as the overwhelming pattern in the history of life because the environments in which gradualism predominates (on land in the tropics and in the deeper sea) are rarely preserved in the fossil record.

The evolutionary pattern *in a single lineage* is predicted to be stasis when there is greater environmental fluctuation, and net directional change and/or more widely fluctuating morphologies when environments are more narrowly fluctuating.

Given the Quaternary climate upheavals, relatively little evolution may be occurring worldwide at present compared with, say, 3 million years ago. The last 10,000 years of stable climate may not have been a sufficiently long interval of stability to relax the pressure for stasis. Evolution that *is* happening today might be easiest to detect on land in the tropics.

Many existing data sets probably contain clues that can be used in testing the model. A model such as this is, of course, bound to have many exceptions; it is only about tendency and relative frequency.