The nature of the Cenomanian-Turonian turnover in marine reptiles

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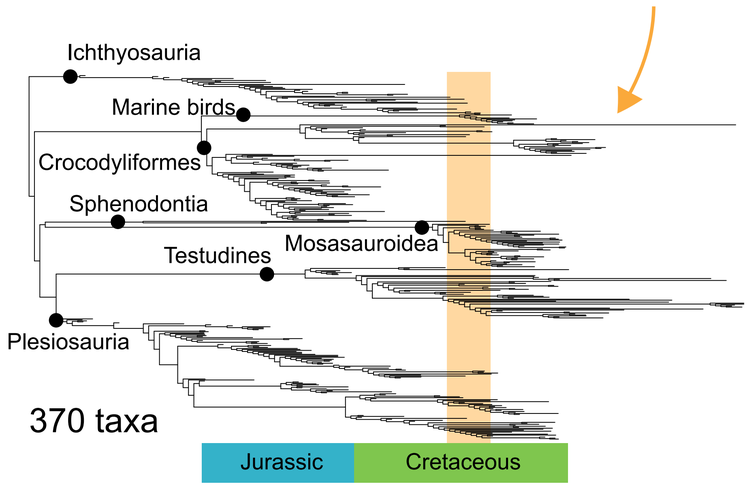
A concentration of turnovers among marine reptiles

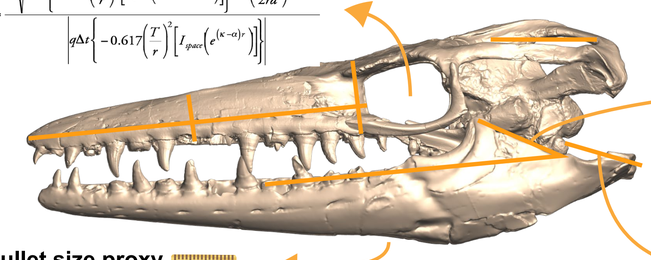
extinction of ichthyosaurians
extinction of pliosaurids
radiation of mosasauroids
diversification of polycotylids
diversification of chelonioids
diversification of marine birds

Our goal is to assess how these extinctions happened, by looking at **extinction clustering** (with Fritz & Purvis' D on a supertree) and the **distribution of functional proxies**



Vision range
Solving the inversion of Nilsson et al 2014

$$A = \frac{R\sqrt{q\Delta t\left\{0.617\left(\frac{T}{r}\right)^2\left[I_{space}\left(2-e^{(\kappa-\alpha)r}\right)\right]\right\}+2\left(\frac{TM}{2rd}\right)^2 X\Delta t}}{\left|q\Delta t\left\{-0.617\left(\frac{T}{r}\right)^2\left[I_{space}\left(e^{(\kappa-\alpha)r}\right)\right]\right\}\right|}$$



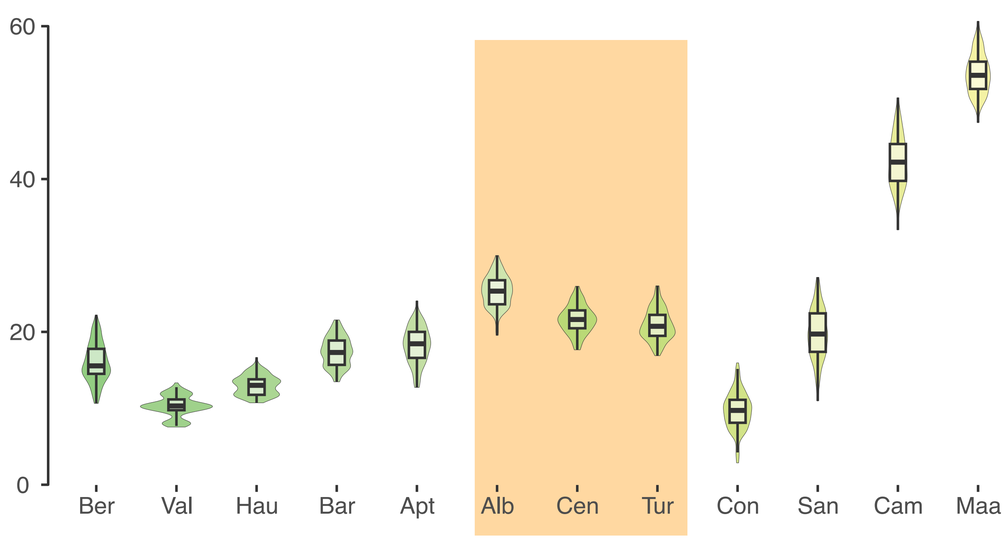
Bite force proxy
Mechanical advantage @ mid snout
x
log(adductor muscle thickeness)²

Gullet size proxy
log(snout width anterior to orbit)

Snout opening speed proxy
Snout surface / retroarticular length²

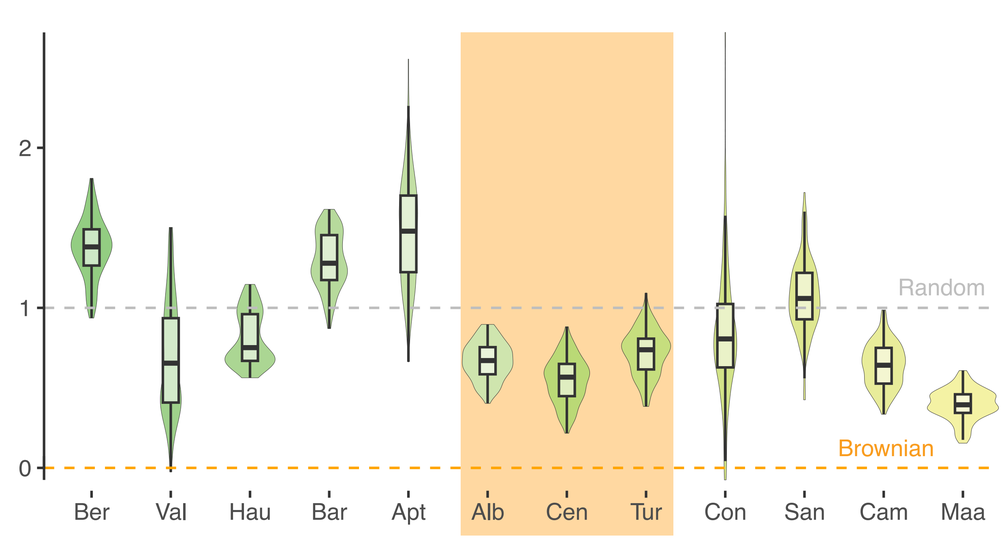
Elevated rates of extinction

Extinction severity (% per stage upper boundary)



'Fairly' targetted extinctions

Fritz & Purvis' D (per stage upper boundary) says if taxa going extinct are closely related (Brownian, 0) or randomly distributued in the tree (1)



Convergence maintained the mean shape but extinctions reduced its range

We found no significant differences in distributions Before (Early Cretaceous) VS After (Coniacian-Maastrichtian) in any of the proxies. However, the range and the variance were reduced, significantly so for gullet size and vision range.