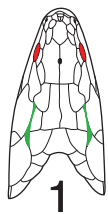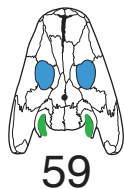Assemble time-calibrated phylogeny of 59 taxa with skull and orbit preservation bracketing water-land transition

1 ... 59
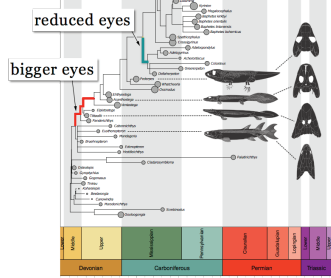
Measure orbits

Measure skull length

Randomly resolve phylogenetic uncertainties to generate 1000 trees; simulate evolution of size-corrected orbits for each tree

1 ... 1,000

use computational trait evolution to identify locations of selective regime change

reduced eyes

bigger eyes

Group socket lengths according to trait evolution results: before bigger eyes (finned); transitional; after transition (digited); after reverting to smaller eyes (adelospon-dyl-colosteid)

Estimate mean and standard deviation of pupil size for each group

Compute light fields for selected visual environments

Compute range and volume (for given sensory cone geometry), and their derivates for a 10 cm black target for each visual environment across finned and digited pupil means ± 1 standard deviation