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Allometry and interspecific differences in facial cranium of Asian macaque monkeys

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Macaque fossils often show mosaic combinations of cranial features distinct to living species, confusing our efforts to reconstruct the evolutionary history of macaques. We employed the geometric morphometrics to explore the allometric trajectories of craniofacial shape in *M. fascicularis* and *M. fuscata*. The two species exhibit a single shared allometric trajectory in supero-inferior deflection of anterior face, suggesting that the differences in this feature are explained just by size variation. By contrast, the two parallel trajectories are demonstrated in craniofacial protrusion, meaning that *M. fuscata* has antero-posterior shorter face than *M. fascicularis* even if hypothetically they are comparable in size. Thus, the degree of the facial protrusion relatively to size is probably one of the critical features for phyletic evaluation of a given fossil specimen to living taxa, within the *fascicularis* group. Such approaches in varied macaques will contribute to solving controversies about phyletic interpretations of fossil macaques.

Keywords: *Macaca fascicularis*, *M. fuscata*, geometric morphometrics, allometric trajectory, crania