

Spatial and temporal distribution of Desmostylia (Mammalia) and implications on its evolution and extinction

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Desmostylia is one clade of extinct aquatic mammals with no close living relative. Its fossil records are known from the uppermost Eocene to Miocene marine strata in the North Pacific Rim and its paleoecology is still debated. One reason of this was due to a paucity of available data concerning geographic distributions and time ranges of its taxon. However, currently, more data have become available, making analyses of spatial and temporal distributions of various desmostylians possible. Accordingly, we summarize occurrence records of desmostylians and discuss the significance and implications of their spatial and temporal patterns for their paleoecology. We reviewed previous reports of desmostylian occurrences based on the literature and a database and mapped them by stage and taxon. The result showed that the temporal range of definite desmostylian records is from around the Eocene/Oligocene boundary through 10 Ma. Furthermore, it was confirmed that Desmostylidae had a wider geographic distribution than Paleoparadoxiidae and was adapted to very cold environments. In addition, it was suggested that *Cornwallius*, a basally-diverging member of Desmostylidae, went extinct possibly through competition with more derived *Desmostylus*. The last desmostylian that survived into the late Miocene in the North Pacific Rim was *Desmostylus* spp. *Desmostylus* became completely extinct likely due to a rapid decrease of shallow marine areas associated with a major marine regression at around 10 Ma.

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