

Foraging ecology of Baikal seals in Lake Baikal

Yuuki Watanabe¹, Eugene Baranov² and Nobuyuki Miyazaki³

¹*National Institute of Polar Research*

²*Baikal Seal Aquarium*

³*Atmosphere and Ocean Research Institute, The University of Tokyo*

Understanding what, how, and how often apex predators hunt is important due to their disproportionately large effects on ecosystems. In Lake Baikal with rich endemic fauna, Baikal seals appear to eat, in addition to fishes, a tiny (<0.1 g) endemic amphipod *Macrohectopus branickii* (the world's only freshwater planktonic species). However, its importance as prey to seals is unclear. Globally, amphipods are rarely targeted by single-prey-feeding (i.e., non-filter-feeding) mammals, presumably due to their small size. If *M. branickii* is energetically important prey, Baikal seals would exhibit exceptionally high foraging rates, potentially with behavioral and morphological specializations. Here, we used animal-borne accelerometers and video cameras to record Baikal seal foraging behavior. Unlike the prevailing view that they predominantly eat fishes, they also hunted *M. branickii* at the highest rates (mean, 57 individuals per dive) ever recorded for single-prey-feeding aquatic mammals, leading to thousands of catches per day. These rates were achieved by gradual changes in dive depth following the diel vertical migration of *M. branickii* swarms. Examining museum specimens revealed that Baikal seals have the most specialized comb-like post-canine teeth in the subfamily Phocinae, allowing them to expel water while retaining prey during high-speed foraging. Our findings show unique mammal-amphipod interactions in an ancient lake, demonstrating that organisms even smaller than krill can be important prey for single-prey-feeding aquatic mammals if the environment and predators' adaptations allow high foraging rates. Further, our finding that Baikal seals directly eat macroplankton may explain why they are so abundant in this ultra-oligotrophic lake.