

Non-invasive Methods to Investigate Sleep in Northern Elephant Seals (*Mirounga angustirostris*)

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Sleep is an important mechanism to ensure the health and survival of animals across a large variety of species. It is vital for recovering and repairing an organism's body whereas a lack of sleep can lead to health issues including low productivity and a weakened immune system.

Sleeping in open waters comes with challenges such as a lack of air, thermoregulation in cool waters, and vulnerability to predators. Northern elephant seals (*Mirounga angustirostris*) sleep on land and are highly adapted to sleep out at sea as well. They sleep in long apneas on both land and in seawater where both sleep environments resemble humans with periods of slow-wave sleep (SWS) and Rapid Eye Movement sleep (REM). The brain of an elephant seal has developed a strong resistance to oxygen deprivation. However, the unique sleep patterns of marine mammals have only been studied with invasive methods. It is unknown how they can withstand long periods of oxygen deprivation without irreversible damage to their brain. This study employs non-invasive methods to investigate the sleep patterns of freely moving northern elephant seals and aims to establish the behavioral and electrophysiological correlates of sleep.



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