

P1.07**Oceanic diel vertical movement patterns of blue sharks vary with water temperature and productivity to change vulnerability to fishing**

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Abstract

In the pelagic environment diel vertical movements (DVM) are widespread across taxa, from zooplankton ascending from day-time depths into surface layers at night to avoid visual predators, to apex predators following prey movements to maximise foraging opportunities. In this study, we satellite tagged adult (> 180 cm fork length, FL) blue sharks (*Prionace glauca*) in the North Atlantic Ocean to examine behavioural changes in response to the encountered environment, and as a consequence, determine potential risks of capture using pelagic longline fisheries data. Blue sharks displayed cyclic diel behaviour, with nighttime spent exclusively above 250 m depth and variable day-time depth use. Three different diel vertical behaviours were identified during the tracking period: (i) regular normal DVM (nDVM) (dawn descent – dusk ascent) for 55.7% of the tracking time, (ii) surface-oriented (occupation of surface waters both day and night; 22.8%) and (iii) deep depth-oriented nDVM (dawn descent – dusk ascent, with the majority (>50%) of daytime spent at depth; 17.5%). Importantly, diel behaviours generally occurred in different ocean regions with nDVM frequently observed in high latitudes, associated with cold, highly productive waters (e.g., North Atlantic Current/Labrador Current convergence zone, West African upwelling area), while depth-oriented nDVM was observed in warm, oligotrophic areas. Thus, day-time occupation of deeper waters significantly increased with higher water temperatures in the upper ocean layers (<100 m), and with increasing depth and decreasing concentration of the chlorophyll 'a' maximum. During nights of full moon blue sharks spent significantly more time in the depth range of longline hooks, while fishing effort and catches were also higher. We demonstrate that increased occupancy of surfacelayers driven by highly productive, cold waters and greater lunar illumination lead to higher capture risk. Understanding habitatspecific vulnerability to fishing in a commercially important pelagic shark species is essential for improving management and conservation measures

Keywords

Sharks, Fisheries, Behavioural Ecology, diel Vertical Movements