8.2 The role of artificial whale falls in research

Artificial whale falls - experimentally deployed carcasses or large mammal analogs—have become invaluable for studying ecological succession, microbial processes, and faunal colonization in controlled settings (Hilário et al., 2015; Moriya et al., 2016; Aguzzi et al., 2018; Silva et al., 2021). These experiments allow for high-frequency, long-term monitoring and manipulation, helping to overcome the rarity and unpredictability of natural whale falls. Artificial deployments have revealed new species, documented behavioral rhythms, and provided insights into the dispersal and adaptation of deep-sea organisms (Hilário et al., 2015; Aguzzi et al., 2018; Silva et al., 2021). Cow carcasses and whale bones in aquaria or shallow waters have also served as accessible models for testing hypotheses about community assembly and environmental influences (Hilário et al., 2015; Moriya et al., 2016).

8.3 Predicting whale fall distribution with whale migration data

Integrating whale migration and population data with oceanographic models offers a promising avenue for predicting the spatial and temporal distribution of whale falls. Such predictive frameworks could improve estimates of whale fall frequency, guide targeted exploration, and inform conservation strategies by identifying potential biodiversity hotspots and connectivity corridors (Smith et al., 2015). This approach is especially relevant as whale populations recover or shift in response to climate change and human impacts, potentially altering the distribution and ecological role of whale falls in the deep sea (Smith et al., 2015).

Addressing these gaps will deepen understanding of whale falls as dynamic, interconnected oases and their broader significance in deep-sea ecology and evolution.

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Conflict of Interest Disclosure

The authors affirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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