New knowledge on and threats to marine biodiversity

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Increasing knowledge on marine biodiversity

New field observations and models are improving our understanding of life in the oceans, associated resources, and where, how and why these aspects of biodiversity are changing. Indicators of progress in discovering biodiversity can be obtained from two major databases: the World Register of Marine Species (WoRMS) and Ocean Biodiversity Information System (OBIS), both maintained by a global collaboration among the scientific community.

Over 240,000 accepted species names are recognized in WoRMS, and 160,000 of these species have distribution data available in OBIS. Taxonomic research both synonymizes names and describes new species, thereby reducing and increasing the number of accepted species names respectively. Assessments suggest about one third of marine species remain to be discovered (Appeltans et al., 2012; Costello and Chaudhary, 2017).

Examples of newly described species include mammals, fish, microbes, algae, parasites and a diversity of invertebrates living from the surface to deep-sea[8]. Most species have been described since the 1950s and new species continue to be discovered at a rate of ~2,000 per year in all the ocean basins, both in deep-sea and coastal zones and in previously well-studied areas (Figure 2.8).

The publication of marine biodiversity data continues to increase the number of data records and species (Figure 2.9a–b). New technologies, including satellites, drones, underwater cameras, bio-loggers tracking animal movements, artificial intelligence, and molecular methods such as eDNA, will continue to expand the range of data available (Dornelas et al., 2019). However, there is a time lag before data are published which could be shortened through increased adoption of online data publication, as well as better incentives to publish primary data. Shortening this gap would enable more timely data analyses to better understand trends in marine biodiversity, which is crucial as climate change is now driving rapid changes in species distributions. Furthermore, there is a decline in the number of newly reported species in all ocean regions (Figure 2.9c) that may reflect continued geographic and taxonomic sampling bias. Thus, while there is unprecedented and increasing availability of standardized marine biodiversity data online, many new species are still being discovered, and geographic and temporal data gaps still constrain our ability to fully detect changes in marine biodiversity on a global scale.

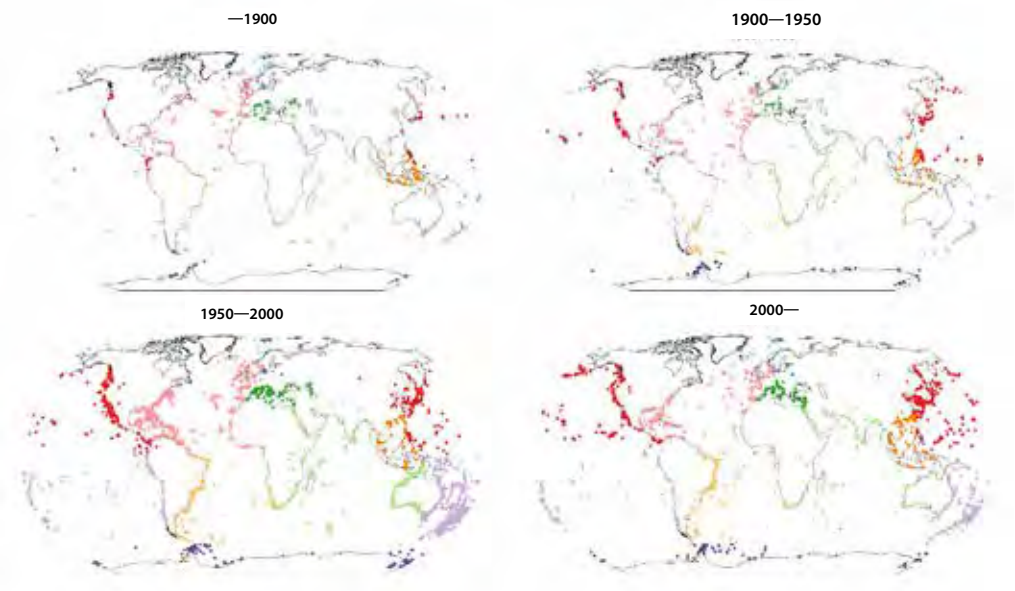

Figure 2.8. World map of type localities of 23,745 marine species over four time periods (prior to 1900, 1900–1950, 1950–2000 and since 2000) based on data from the World Register of Marine Species published in the Ocean Biodiversity Information System. Type localities are where the 'type specimens' from which a species was first named were collected. This shows how marine species new to science continue to be discovered throughout the world's oceans.*Source:* WoRMS Editorial Board, 2021. Type locality distributions from the World Register of Marine Species. Available from: http://www.marinespecies.org at VLIZ, accessed at https://obis.org/dataset/b74b429a-4052-4f5b-bff3-fe0b5a2e8669.

8 https://lifewatch.be/en/worms-top10-2021

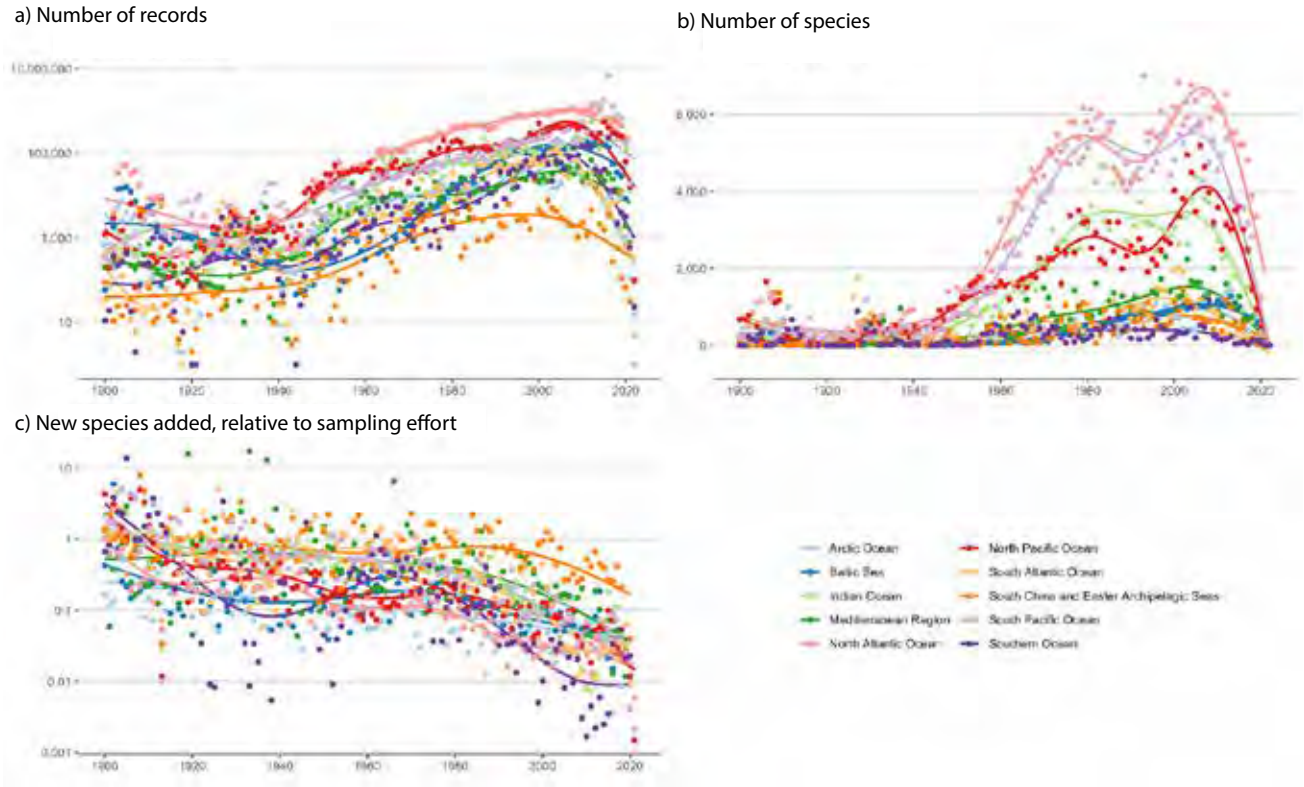

Figure 2.9. The number of records, total species and newly added species relative to sampling effort (equal area grid cells x months), per year by ocean region, based on the Ocean Biodiversity Information System. *Source:* OBIS, 2022. Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. www.obis.org

Threats and risks to species and habitats

Climate change will continue to drive shifts in the distribution of thousands of marine species, with local extirpation of species and changes to local ecosystems, including regional declines of coral reef and kelp forest ecosystems. Anthropogenic climate warming has been correlated with observed (as predicted) shifts of thousands of marine species from low to mid latitudes, resulting in decreasing numbers of species in low latitudes and an increasing number in high latitudes, especially in the northern hemisphere (Chaudhary et al., 2021). However, the major extinction risk to marine biodiversity remains fishing, both directly and through bycatch and trawling impacts on seabed habitats (Maxwell et al., 2016; O'Hara et al., 2021).

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