Global biogeography of multidimensional marine biodiversity hotspots

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Objective

Efforts to curb marine biodiversity loss have gained momentum through global agreements extending protections across national waters and the High Seas. However, it remains unclear how to capture the multidimensionality of "biodiversity" and prioritize conservation accordingly.

Methods

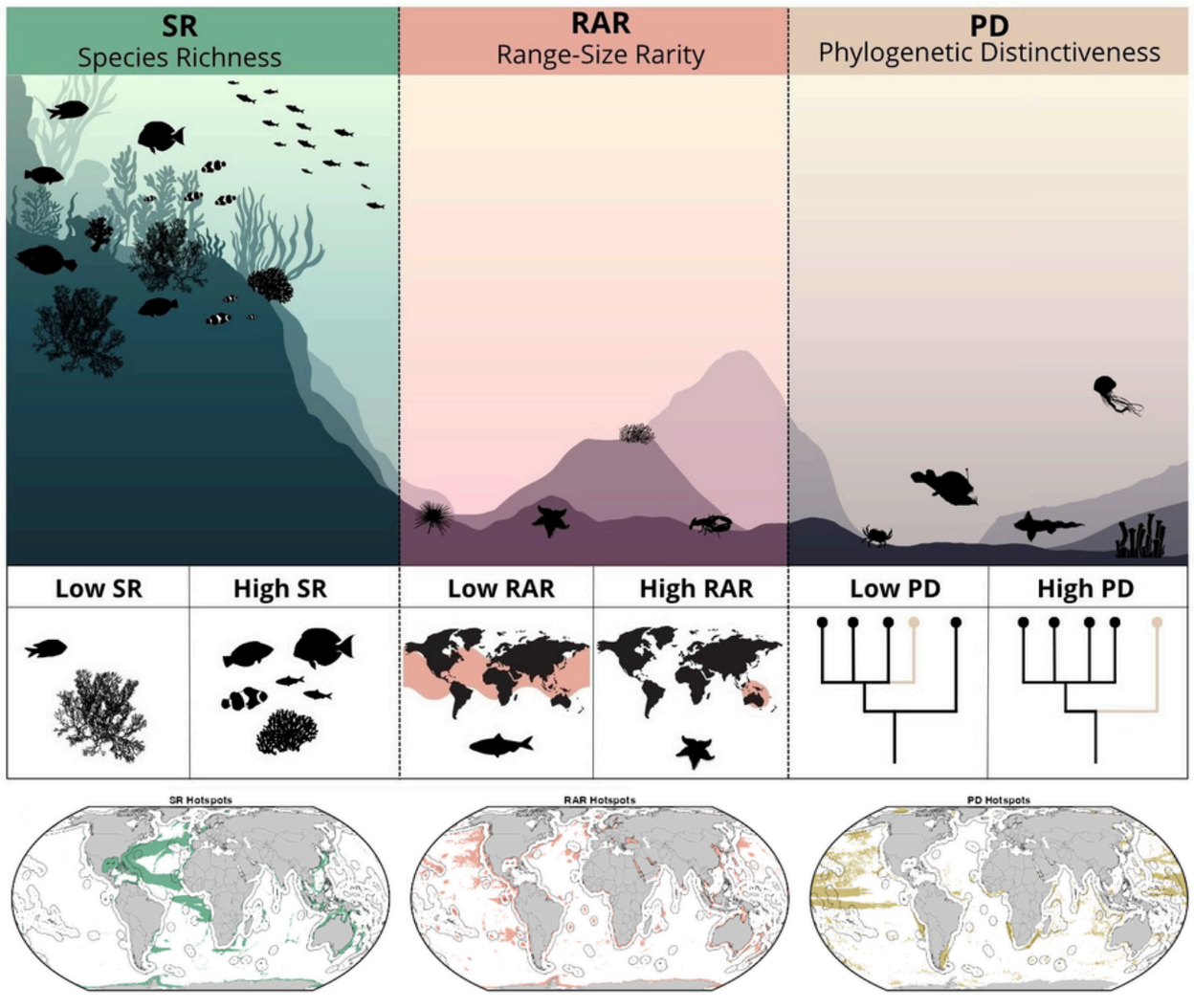
- Using AquaMaps 2.0 species distribution models for 31,426 marine taxa
- Hotspots: upper 5% of species richness, range-size rarity and phylogenetic distinctiveness
- Calculated separately for benthic/demersal and pelagic assemblages within EEZs and the High Seas,
- Overlays with cumulative human impact and marine protected areas

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What are biodiversity hotspots?

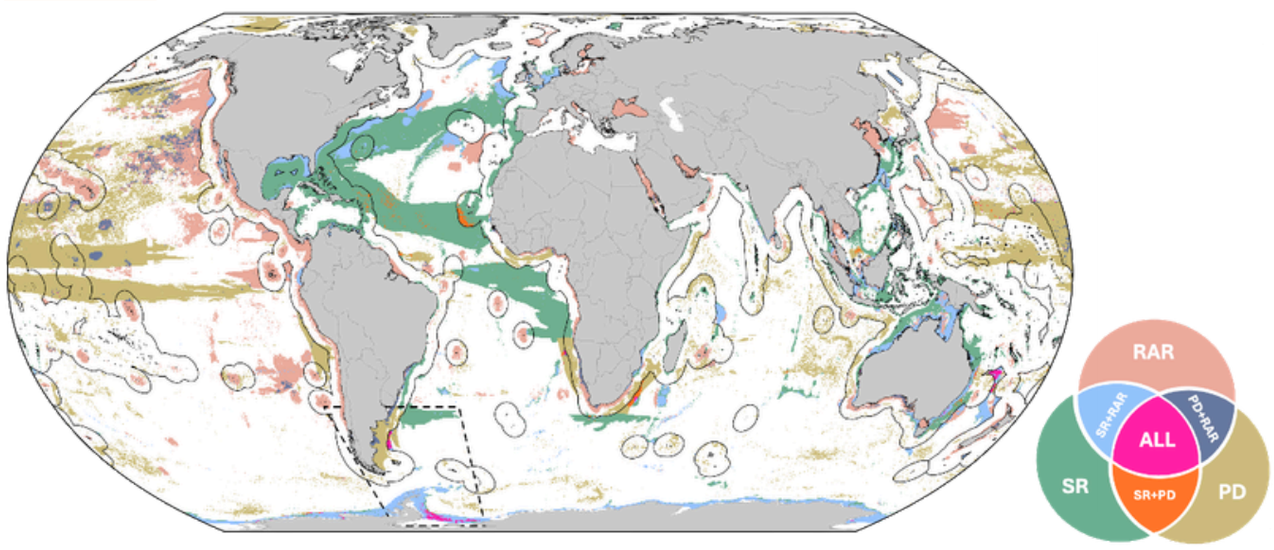
Fig. 1 Facets of biodiversity



Hotspot: Areas with unusually high biodiversity compared with surrounding ocean. Hotspot definition depends on the goal.

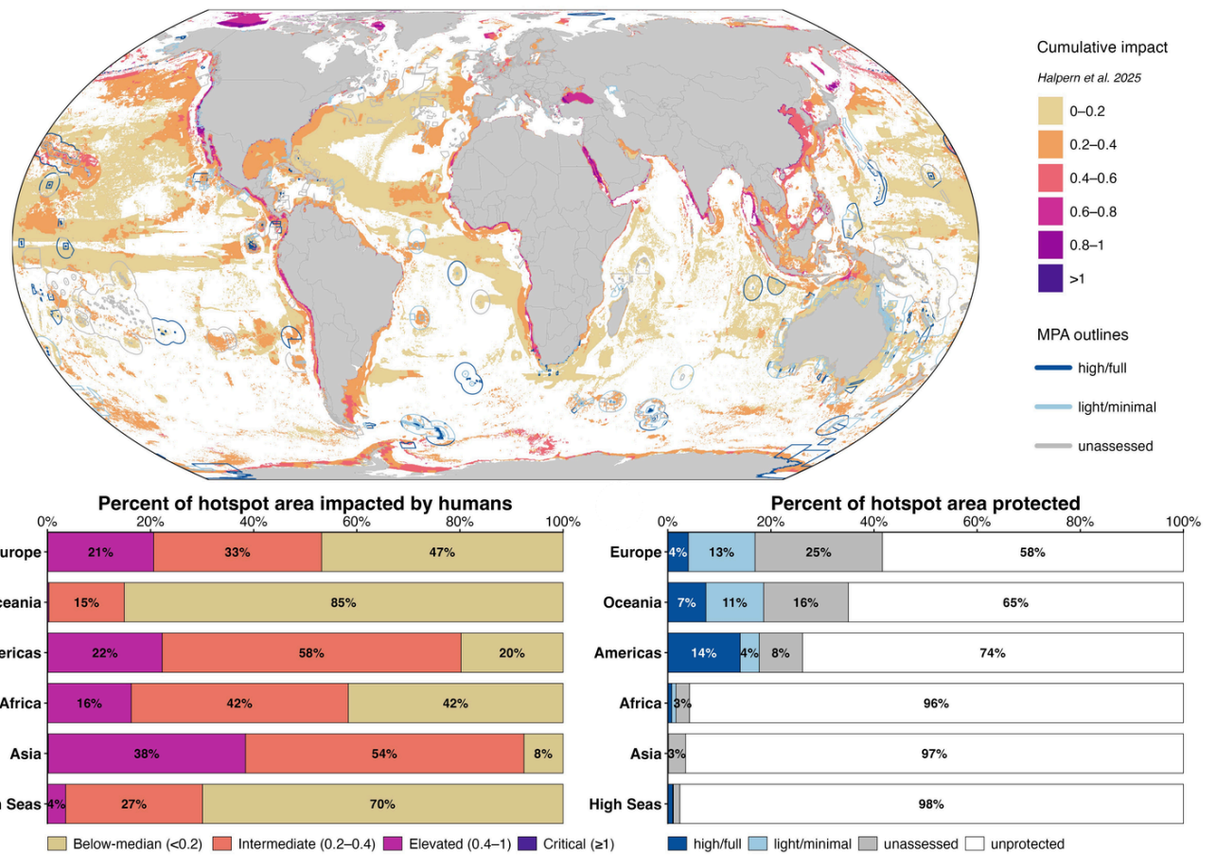
Where are multidimensional biodiversity hotspots?

Fig. 2 Current biodiversity hotspots and critical habitats



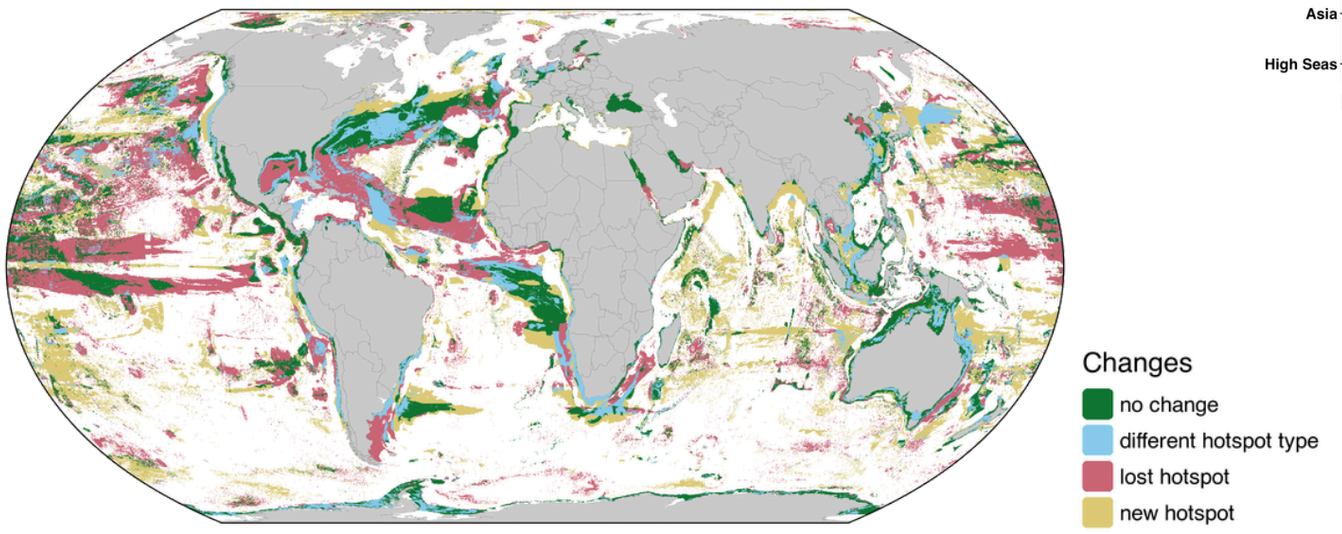
How well are biodiversity hotspots protected?

Fig. 3 Human impact & level of protection



How will hotspots look like in the future?

Fig. 4 Changes in hotspots by 2050 under SSP5-8.5



Applications

- Priority areas for BBNJ MPAs
- Connectivity between waters within EEZs and the High Seas
- Combining future changes to evaluate hotspot stability over time under changing climate conditions
- Assessment of are stability/resilience