Deep-sea mining and its impact on marine ecosystems and biodiversity

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Abstract:

The development in ocean mining and processing technology have led to a new boom in deep-sea mining as land mineral resources are being exhausted and the demand for metals has risen. As of 2022, the International Seabed Authority has signed 31 contracts to explore deep-sea mineral deposits. Deep-sea mining has again triggered controversies. On one hand, proponents argue that deep-sea mineral deposits can replace fossil fuels such as coal and save the planet. Opponents, on the other hand, argue that deep-sea mining will damage deep-sea ecosystems and their biodiversity. The author will expound the causes and effects of deep-sea mining.

Key words: deep-sea mining, deep sea ecosystem, biodiversity, International Seabed Authority, the United Nations Convention on the Law of the Sea

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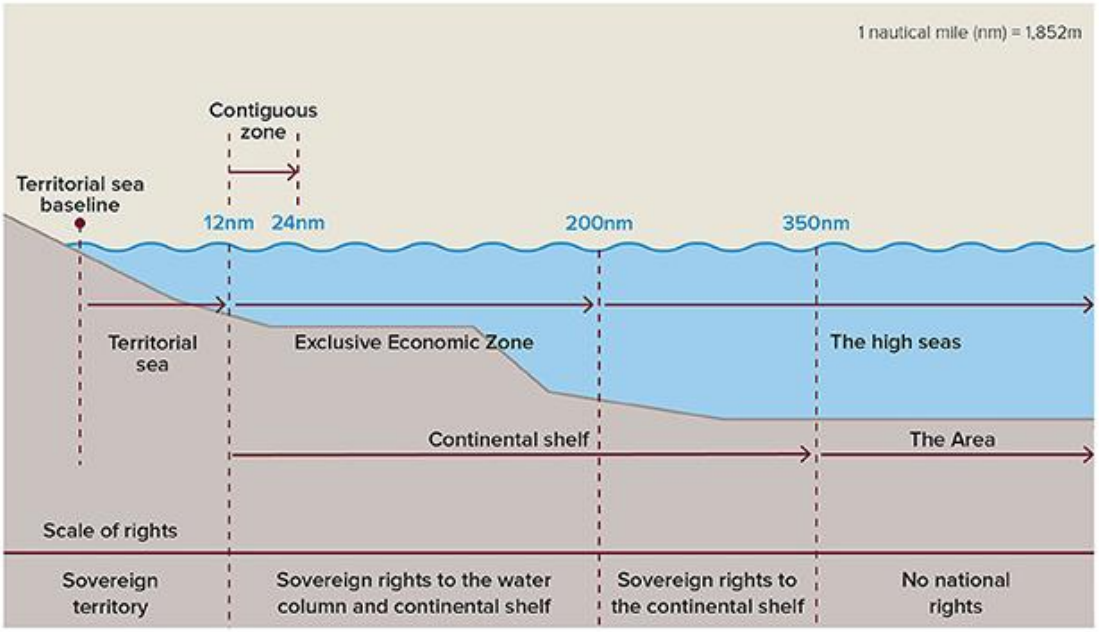
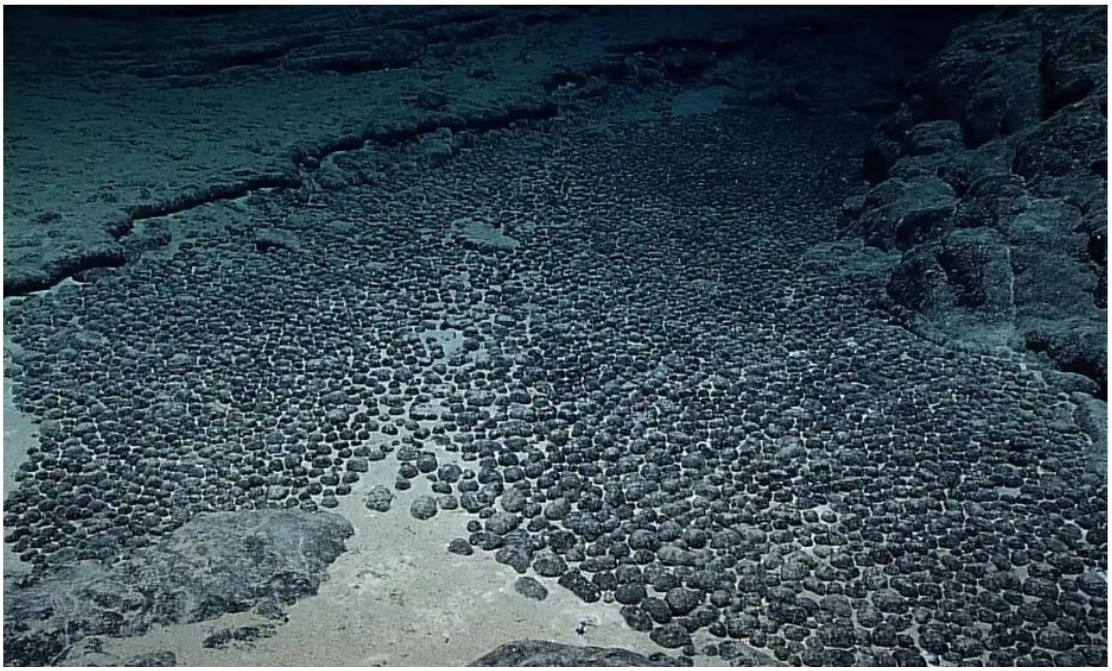
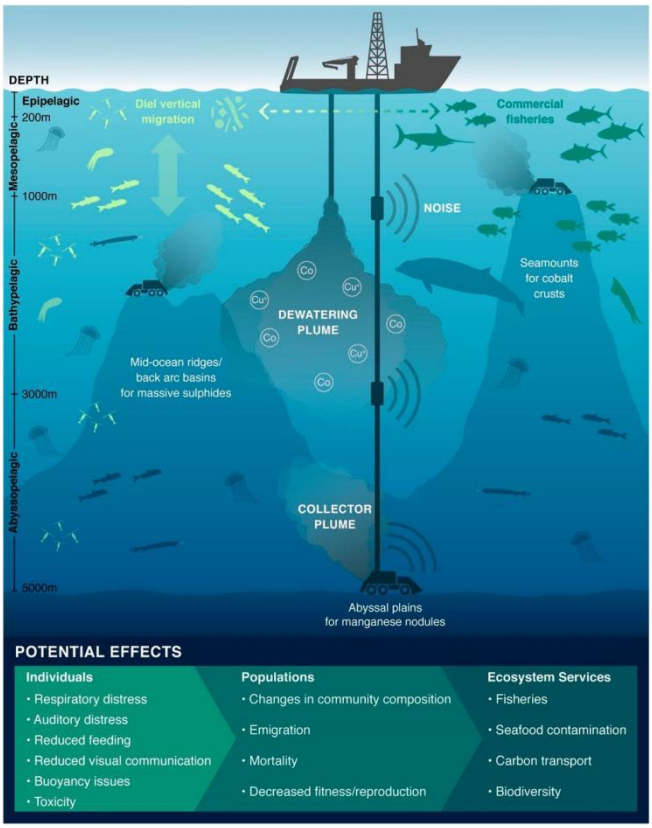


Photo source: Frontier



Manganese nodules in deep water off Hawaii. Photograph: OAA Office of Ocean Exploration and Research


DEPTH
Epipelagic
200m
Mesopelagic
1000m
Bathypelagic
3000m
Abyssopelagic
5000m
Diel vertical migration
Commercial fisheries
NOISE
Seamounts for cobalt crusts
DEWATERING PLUME
Mid-ocean ridges/ back arc basins for massive sulphides
COLLECTOR PLUME
Abyssal plains for manganese nodules
POTENTIAL EFFECTS
Individuals
• Respiratory distress
• Auditory distress
• Reduced feeding
• Reduced visual communication
• Buoyancy issues
• Toxicity
Populations
• Changes in community composition
• Emigration
• Mortality
• Decreased fitness/reproduction
Ecosystem Services
• Fisheries
• Seafood contamination
• Carbon transport
• Biodiversity