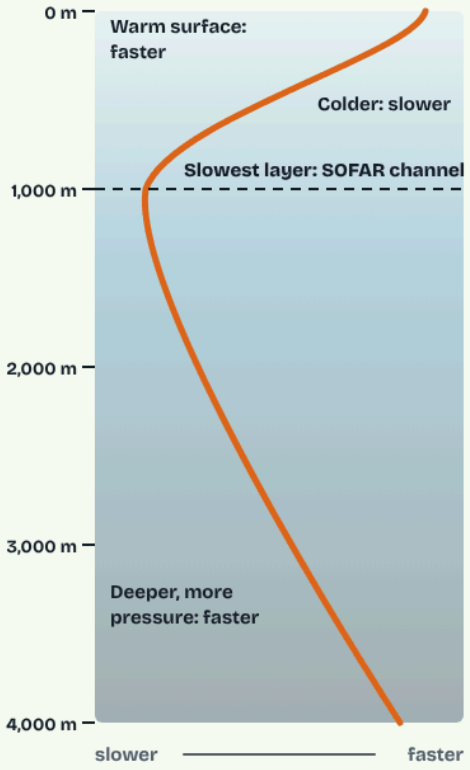
That is why

Why doesn't sound reach everywhere in the ocean?

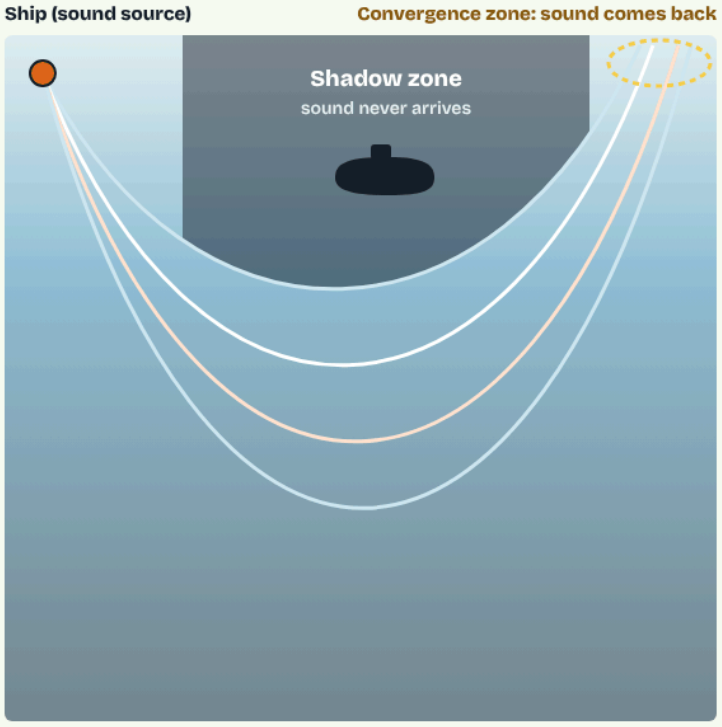
Sound bends toward slower water. Its paths curve away from some places, leaving silent shadow zones.

A Speed changes with depth



Typical open-ocean profile; depths vary.

B Sound bends toward slower water



Paths are not to scale: in the deep ocean the sound may return tens of kilometres away.

C What it means

1 Refraction

Like light bending in water, sound bends each time its speed changes. Small bends add up to big curves.

2 Places to hide

A submarine in a shadow zone can be close by and still not be heard.

3 Sound highways

In the SOFAR channel, sound keeps bending back to the slowest layer and can travel thousands of kilometres.

Sound in seawater: about 1,500 m/s, more than 4 times faster than in air.

Sound doesn't fill the sea evenly. It follows curved paths.

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