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Challenge to the mantle beyond the Moho

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Deep Sea Drilling Vessel CHIKYU, which is capable of drilling down to 7000m depth from the ocean floor, will challenge to completely penetrate the oceanic crust, which covers 60% of the Earth's surface, to cross the Moho discontinuity, which is the boundary between the crust and the mantle, and to directly probe the mantle that makes up 70% of the Earth's mass.
The formation of oceanic crust at the mid-ocean ridges is the base of the plate tectonic cycle and the principal mechanism of heat and material transfer from the Earth's interior to the surface. The majority of the magma generated by mantle melting at the ocean ridges is emplaced and solidifies to form gabbroic rocks in the lower oceanic crust. However, there remains a near complete lack of direct evidence for accretion occurring beneath the volcanic layer of the oceanic crust.
The Moho discontinuity is a sharp seismological boundary that generally separates rocks having Vp of 6?7 km/s from those with velocities of about 8 km/s. However, petrological nature of the Moho has been controversial; an isochemical phase transition boundary between gabbro and eclogite, a chemical boundary between mafic rocks and peridotitic rocks, or a boundary between serpentinized peridotite and fresh/anhydrous peridotite? In addition, observation of the Oman ophilite, a possible analogue of the fast-spreading lithosphere, suggests that the Moho of this ophiolite may be represented by gabbro/peridotite transition, and yet it is highly variable in sharpness of transition.
Drilling into the upper mantle is fundamentally important, as analyses of fresh abyssal peridotites should provide key to decoding the geochemical and physical properties of the uppermost mantle and further to understanding the evolution and chemical cycle of the solid Earth.