

## **Determination Mechanisms of Spawning Points of the Japanese Eel: The Internal Tide Hypothesis**

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The spawning area of the Japanese eel was found to be along the southern West Mariana Ridge by collecting preleptocephali, eggs and spawning-condition adults. However, the exact spawning points where mature adult eels gather to reproduce have remained a mystery. To understand the characteristics of spawning point, we tested the relationship between their spawning points and the distribution patterns of internal tidal energy along the steep submarine slope and seamounts. We estimated their spawning dates and the vertical distribution of spawning using collection data of their eggs during 3 cruises of the R/V Hakuho Maru (KH-09-2, KH-11-6, KH-12-2). From the collection time of eggs and the time required from fertilization to hatching at optimum temperature, we estimated that the peak of spawning was 3 days before new moon. We examined correspondence among the collection locations of eggs/preleptocephali, the ADCP current data and the distribution of internal tide energy obtained from numerical simulations using the Princeton Ocean Model analyzed by Generic Mapping Tools. We found high-energy patches of internal tides at the upstream areas of the collection points of eggs/preleptocephali in all 3 cruises. There are topographical characteristics of pocket-like bays at the west side of high-energy patches and steep slopes on the east side. Internal waves may be amplified by these unique topographies and eels may find the spawning point by this high-energy of internal tides. Thus, we hypothesize that internal tide patterns may contribute to the mechanisms in which eels determine the spawning points in the open ocean.

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