The late arrival of 2017-18 Japanese eel recruitment and its links to ocean circulation

*Yu-Lin Eda Chang[1], Yasumasa Miyazawa[1], Michael Miller[2], Katsumi Tsukamoto[2]

1. Application Laboratory, Japan Agency for Marine-Earth Science and Technology, 2. Department of Aquatic Bioscience, The University of Tokyo

In the year 2018, the Japanese eel (*Anguilla japonica*) recruitment almost vanished in Japan in the early recruitment season, and the eel catch peaked up in late recruitment period when the recruitment was usually small. Coincidently, the Kuroshio meander occurring south of Japan was revisiting since the previous event ends in 2005. The role of ocean circulation in 2018 unusual Japanese eel larvae recruitment was investigated using a three-dimensional particle tracking model, in which swimming behaviors of virtue larvae (v-larvae) was included in addition to passively drift by ocean currents. Similar results appeared in the simulation, showing none v-larvae arrival to the south of Japan in early recruitment period and increased substantially in the late recruitment period. The late arrival could be explained by the change of ocean circulation. The southward shifting and weak North Equatorial Current near spawning area, less Subtropical Countercurrent eddies, and weak Kuroshio during the early migration and recruitment period prevented v-larvae transport. In the late recruitment period, the Kuroshio was strengthened and strong near the East China Sea and south of Japan that transported v-larvae downstream efficiently. The maximum eel catch reduction in Tokai region where Kuroshio bifurcated offshore could be related to large meander. The Kuroshio large meander could potentially influence the local eel recruitment, but its actual role remained to be explored.

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