

Tsunami horizontal current detected from navigating ship records

*Daisuke Inazu¹, Tsuyoshi Ikeya¹, Takuji Waseda², Toshiyuki Hibiya², Yoshinori Shigihara³

1. Tokyo University of Marine Science and Technology, 2. The University of Tokyo, 3. National Defense Academy

We investigated ship navigation records near the source region of the 2011 Tohoku tsunami. The data during 40 minutes after the tsunami generation showed notable deviation of ship heading from course over ground during the tsunami passage at the respective vessels. We found there are good agreement in both amplitude and phase between the ship velocity components and simulated tsunami velocity components in the direction normal to the ship heading. An equation of motion was examined for offshore movable floating body due to wave drag and inertia forces. Then we explain that the ship movement in direction normal to the heading can show immediate response to the tsunami current, and relative velocity between the ship and the tsunami current immediately become zero as well. This indicates the movement velocity of navigating ships in the direction normal to the heading derived from AIS data will work as an offshore tsunami current meter.

Keywords: tsunami current, navigating ship