

Structure and impact of the Kuroshio nutrient stream

*Kosei Komatsu^{1,2}, Yutaka Hiroe³

1. Graduate School of Frontier Sciences, The University of Tokyo, 2. Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwa, Japan, 3. Seikai National Fisheries Research Institute, Japan Fisheries Research and Education Agency, Nagasaki, Japan

Recently the Kuroshio has drawn attention as an important supply route of nutrients in the western North Pacific. However, it is unknown whether nutrient concentrations are enhanced along the jet on isopycnal surfaces, as is the case for the “nutrient stream” along the Gulf Stream. We aim to ascertain the structure of nutrient concentration enhancement along the Kuroshio jet and to estimate the impact of nutrient transport downstream to the Kuroshio-Oyashio interfrontal zone (KOIZ), which is a highly productive region and a major global fishing ground. Recent multiple- transects and retrospective analyses of historic hydrographic data have revealed that the along-jet maximum nitrate concentration appears only in spring on the isopycnal surface $25 < \sigma_{\theta} < 26$ in the downstream region of the Kuroshio. The Kuroshio nutrient stream contributes significantly to productivity in the euphotic layer along its downstream trajectory, in conjunction with enhanced vertical turbulence. Analysis of the budget of epipycnal nitrate transport across transects that enclosed the KOIZ suggests that the Kuroshio nutrient stream has a non-negligible potential to significantly impact high productivity in the KOIZ.

Keywords: Kuroshio nutrient stream, Kuroshio-Oyashio interfrontal zone, epipycnal transport