Similarities and differences between the Kuroshio Extension and a baroclinic jet in a channel

*Hideyuki Nakano[1], Hiroyuki Tsujino[1]

1. Meteorological Research Institute

There are many similarity in PV structure between the Kuroshio Extension (KE) and a baroclinic jet in a channel (hereafter, just a baroclinic jet). PV along the front has a sharp contrast in the upper layer and nearly homogeneous in the lower layer. For the baroclinic jet, it is proposed that PV contrast is generated due to the suppressed mixing across the front and vigorous mixing at their flanks, resulting in the formation of a eastward narrow jet. Despite the distribution similarity, it is difficult to apply the proposed mechanism directly to the formation of the KE. The PV contrast along the KE is the strongest at the separation and disappears into the interior Sverdrup region, suggesting that its primary source is from the western boundary rather than the barrier effect along the fronts. In fact, eddies reduce the PV contrast in the upstream part of the KE. In addition, the barrier effect is not so simple for the Kuroshio Extension. The KE is a blender for Kuroshio-origin water, whereas it is a barrier for other water masses in the upper layer. From these fact, it seems that the formation and maintenance of the Kuroshio Extension seems essentially different from those of the baroclinic jet. Some diagnostic approaches will be also discussed.

Keywords: Kuroshio Extension, baroclinic jets

