# 学 位 論 文 内 容 の 要 旨

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## 学 位 論 文 題 名

Poleward transport of Circumpolar Deep Water off East Antarctica
（東南極沖における周極深層水の極向き輸送）

Circumpolar Deep Water (CDW) is the primary source of heat and salt for the Antarctic coast. In the meridional overturning circulation, the poleward CDW flux compensates for equatorward transport of Antarctic Surface and Bottom Waters. The onshore CDW intrusion is the leading cause of the accelerated ice shelf melting in West Antarctica. Meanwhile, in East Antarctica, stronger winds facilitate intensive sea ice production along the coast, and the onshore CDW flux interacts with both glacial melt and bottom water production. Our understanding of the ocean–atmosphere–cryosphere interaction is framed by the knowledge on deep ocean circulation, which governs the fate of CDW. However, the ocean circulation structure over the Antarctic margin, particularly to the south of the Antarctic Circumpolar Current, has been unconstrained because of in-situ data scarcity and inter-model discrepancy.

In this dissertation, I present a series of observational analyses focusing on the poleward transport of CDW off East Antarctica, including a ground-breaking finding on the deep ocean circulation in the Antarctic margin. Most of the description is based on compilations of in-situ data from ship, float, and biologging measurements, part of which I subjected by participating in research cruise or devising a novel utilization. Three key points follow: 1) the continental slope topography is essential for the poleward CDW flux as steering the structure of subpolar subgyres, 2) the isopycnal eddy advection achieves the cross-slope CDW transport, and 3) multidecadal variability of the poleward CDW flux is associated with the barotropic change of the Antarctic Circumpolar Current, the baroclinic change of the meridional overturning circulation, and the variability of the Antarctic Slope Current. These findings suggest that topography and isopycnal diffusion regulate the onshore CDW intrusion, providing a physical oceanography basis for the multidecadal-to-centennial climate projection, in which intensification of Southern Hemisphere westerlies is a dominant climatological driver.