Subarctic frontal zone and salinity minima in the North Pacific

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Multiple front structure and water masses within the Subarctic frontal zone in May 1984 are investigated. The strongest salinity front occurs near 39N which is the southernmost part of the Subarctic frontal one. Frontal activity can be observed along isopycnals below the pycnocline. The northern edge of the frontal zone (43N) remains vertical while the southern edge which starts from 39N at the surface shifts northward with depth. Therefore, the water masses within the frontal one have more Subarctic water characteristics in the upper layer and more subtropical water characteristics in the lower layer. Near 26.3 sigma theta, there is a third salinity minimum found below the local shallow salinity minimum (25l5 to 26.0 sigma theta0 and above North Pacific Intermediate Water. A cusp in theta/S indicates this middle salinity minimum is caused by a strong new intrusion which has not yet mixed turbulently or double diffusively. The horizontal extent of the middle salinity minimum coincides with Subarctic frontal zone. It is expected that this middle salinity minimum is related to frontal activities. This three-salinity-minimum structure is also found in different data sets from different seasons in the same area.