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Spatial Distribution of Dissolved Black Carbon in Surface Waters of the Pacific Ocean

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Pyrogenic carbon (PyC) is an important component in the global carbon cycle. PyC produced by biomass burning or fossil fuel combustion is transported to oceans by the atmosphere or rivers as particulate PyC (also called as particulate black carbon, PBC) and dissolved PyC (also called as dissolved black carbon, DBC). DBC concentration in reiverine waters has recently been reported to linearly correlate with abundance of dissolved organic carbon (DOC) and chromophotic dissolved organic matter (CDOM). However, spatial distributions and its controlling factors of DBC in marine environments have not been well-documented. In this study, spatial distributions of DBC and CDOM in surface waters of the Pacific Ocean were determined. DBC were analyzed using the benzene polycarboxylic acid (BPCA) method. CDOM were rich in the subarctic North Pacific compared to other oceanic regions. While, clear regional variation in DBC concentration was not evident. Thus, DBC concentration was not correlated with CDOM abundance in the surface waters of the Pacific Ocean. Such difference in distributional pattern between DBC and CDOM imply that (1) major factors controlling the DBC and CDOM abundance in surface waters of the open ocean are different, and (2) DBC is possibly minor component of CDOM in the open ocean.