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North Pacific late-glacial biological processes as viewed through the Sea of Okhotsk window

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High latitude glacial oceans have been proposed as the portal through which important glacial-interglacial exchanges of carbon dioxide occurred. The Sea of Okhotsk has been linked to glacial high latitude oceans because their radiolarian assemblages share a common dominant species. The modern Sea of Okhotsk produces globally unique high accumulation rates of deep versus shallow-living radiolarians. In northwest Pacific sediments accumulation rates of deep-living radiolarians decrease and shallow-living radiolarians increase dramatically between late Pleistocene and Holocene while opal accumulation rates (overwhelmingly diatoms) remain little changed. This suggests that the vertical distribution of radiolarians in the glacial northwest Pacific was similar to that in the Sea of Okhotsk today. Such a biological structure supporting high primary productivity in a thin (12m.) mixed layer underlain by 150m with low heterotrophic consumption would produce a strong biological pump. Today unutilized phosphate and nitrate exist in the northwest Pacific but are fully utilized in the Sea of Okhotsk. This suggests that biological processes in the glacial northwest Pacific produced a stronger biological pump than today and through a fuller utilazation of nutrients contributed to the glacial drawdown and Holocene build up of atmospheric carbon dioxide