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Pleistocene mega-floods in the Northeast Pacific

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Variations in freshwater inputs to the oceans are known drivers of ocean and climate change. Late Pleistocene mega-floods from the Laurentide ice sheet and glacial Lake Agassiz (North America) likely disrupted the North Atlantic Deep Water formation and caused abrupt cooling. Similar events may have occurred in the North Pacific drainage. Massive discharges of freshwater from the glacial lake Missoula are thought to have sculpted the so-called Channeled Scablands of eastern Washington and debouched via the Columbia River near 46^{o}N. The dynamics and timing of these north Pacific mega-flood events remain poorly constrained, however, and the consequences of such discharges of freshwater in the northeast Pacific regional circulation remains unknown. Debate centers on whether these events occurred as a few brief (scale of weeks) but massive events, or as a $\sim$2000-year sequence of smaller but repeating jökulhlaups events. Here we constrain the timing, mechanism, and impact of mega-floods in the northeast Pacific during the last glacial cycle based on oxygen isotopes and radiocarbon in foraminifera and abundances of freshwater diatoms in marine sediments. Preliminary results indicate that anomalous freshwater plumes reduced surface-ocean salinities by 5-10 PSU more than 400 km to the south of the Columbia River (off northern California) frequently from 16,000 to 31,000 cal-yr BP. Mega-flood events were common during the advance of the Cordilleran Ice Sheet, prior to the existence of glacial lake Missoula, and the interval of flooding lasted 5-7 times longer than previously estimated.