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Sources and transport of Iron in the coastal waters of the Northern Gulf of Alaska

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The waters overlying the continental shelf and slope in the Gulf of Alaska (GoA) are some of the most productive waters in the world's ocean. It has been hypothesized that the high biomass observed in satellite imagery in the northwestern GoA in mid-summer is the result of the combination of high river runoff during this time of year into the Alaska Coastal Current, and the mixing of this coastal water rich in dissolved and leachable particulate iron with the HNLC waters of the adjacent GoA via mesoscale eddies. Here we report the distribution of Fe to show that coastal runoff is an important source of Fe to the GoA, in contrast to other coastal marine systems where shelf bottom sediments are the major Fe source to overlying waters. High concentrations of Fe were observed in the low salinity surface water of the coastal GoA during summer. Fine grain silt particles carried to the ocean by glacial melt water appear to be the major source of Fe in these waters.