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Large scale switching of ice stream flow and trough mouth fan deposition outside Kongsfjorden, Svalbard

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The Western Svalbard continental margin is dominated by several trough mouth fans (TMFs). Outside Kongsfjorden, on the NW Svalbard margin, two overlapping TMFs have been identified. The oldest one is located on Sjubrebanken (the Sjubre Bank) and the adjacent slope, NW of Kongsfjorden. This is overlain and partly buried by a TMF associated with Kongsfjordrenna (the Kongsfjorden Trough). Based on seismic correlation to ODP well 911 on the southern Yermak Plateau, the Sjubrebanken TMF has been building out from around 2.7 Ma, gradually prograding from south to north. At around 0.78 Ma the TMF deposition switched to a much more southerly position where we today find the Kongsfjorden TMF. From this time the Sjubrebanken TMF has been gradually buried by contourite drifts and in the southern part by the Kongsfjorden TMF. A fast-flowing ice stream draining west out Kongsfjordrenna has probably been responsible for most of the mass transfer to the Kongsfjorden TMF. Based on the prograding pattern on the Sjubrebanken TMF, the direction of ice stream flow has here been more northwesterly. The large scale switching of TMF deposition implies a major switch in the ice stream flow direction outside Kongsfjorden at around 0.78 Ma. This was probably a result of continuous buildup of glacier-derived sediments on Sjubrebanken filling the available accommodation space, rather than internal changes in ice-sheet dynamics. When a new glacial period started at around 0.78 Ma, the easiest path to the shelf edge was to excavate a new trough through existing sediments to produce Kongsfjordrenna as seen today.