ICELAND-SCOTLAND OVERFLOW WATER FLOW FLUCTUATIONS OVER THE PAST 82 KA USING A NOVEL SEDIMENTOLOGICAL APPROACH.

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Sedimentological techniques for reconstructing past deep ocean circulation hinge on the principle that a near-bottom flow sorts sediments in response to current vigour. However, such techniques may become unusable when direct sediment supply rather than current sorting dominates the grain size distribution of the bottom sediments.Here I report new results illustrating a semi-quantitative reconstruction of Iceland-Scotland Overflow Water flow intensity fluctuations over the past ~82 ka. During most of the time interval studied delivery of sediments by ice-rafting was an important process, precluding the use of conventional sedimentological approaches. The innovative solution found exploits the differing sedimentation patterns at two adjacent core sites caused by the interaction of seabed morphology with the near-bottom flow.Maximum current vigour is recorded during the Holocene, a somewhat weaker flow in the late marine isotope stage 5, and virtual absence of current activity during the last glacial maximum. The results are consistent with earlier geochemical evidence. One of the most striking results, though, is the presence of significant near-bottom flow maxima in early glacial stage 4 (~70 ka) which appear to be synchronous with warm interstadial events 19 and 20 found in the ice-cores from the Greenland ice cap. These maxima, which occur at a time of virtually monotonic ice volume increase, confirm previous evidence and illustrate the sensitivity and role of deep water production in the Nordic Seas on millennial time scales. Finally, the results for stage 3 indicate disruption of deep water production in association with Heinrich events 4 and 5.