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Freshwater transport through Fram Strait

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The transport of fresh and cold polar water southward through Fram Strait within the East Greenland Current (EGC) is a major, if not the main, oceanic pathway of freshwater entering the North Atlantic. A freshwater layer can close down deep convection in the sub polar gyres and hence influence the meridional overturning cell, also known as the Global Conveyer Belt. Rapid climate change can therefore be triggered by large freshwater anomalies. For the understanding of global climate knowledge of the magnitude and variability of the freshwater transport is therefore indispensable.

The Norwegian Polar Institute (NPI) has been making regular measurements in Fram Strait using moorings and hydrography since 1990. We will present estimates of the liquid fresh water flux from a combination of hydrographic and mooring data (at about 79N) from 1998 till 2004.We will also show the difficulties and error sources of these estimates. One of the biggest problems is to get very near surface measurements combined with the difficulties of instrumental damage and/or total mooring loss due to ice ridges and icebergs. Till 2003 the moorings therefore captured just the main core of the EGC above the continental slope. But since 2003, using a new type of mooring, we were able to also measure the near surface (up to 20m depth) variability in temperature and salinity on the inner (12.5W) East Greenland shelf .

The liquid freshwater transport shows a seasonal cycle with maximum in late summer and minimum in winter. The mean value relative to a salinity of 34.9 for the whole 1998-2004 period is 1000 kmˆ3/year or 0.032 Sv.