

Cruise HE 288 with RV Heincke

Bremerhaven – Svalbard – Bremerhaven

May 17 to June 6, 2008



The scientific objectives of the HE-288 cruise with RV Heincke were related to basic research on geochemical cycles of nutrients, trace gases and fluxes in the water column and through the sediment-water interface in coastal regions off Svalbard. For these objectives water and sediment samples were gathered by Rosette Water Sampler, Submersible Pump, Multicorer, Bottom Water Sampler as well as a Benthic Chamber System.

The investigations of the water column at Storrega Slide as well as off Svalbard allows, if combined with result from previous cruises, to decipher regional variations of fluxes through the sediment-water interface.

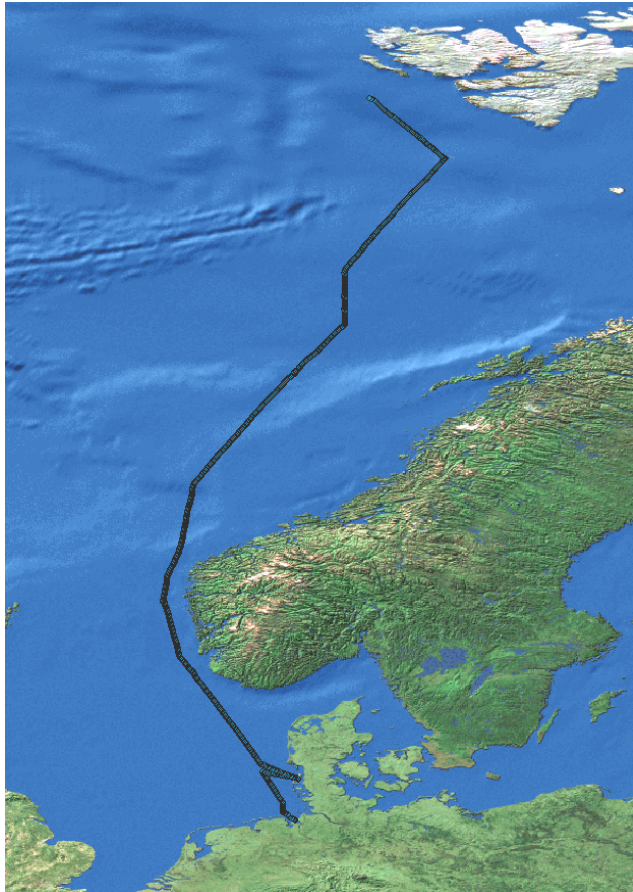
The cruise started at May 17 in Bremerhaven and ended at June 6 in Bremerhaven.

Name and address of scientist in charge: **Prof. Dr. Michael Schlüter**

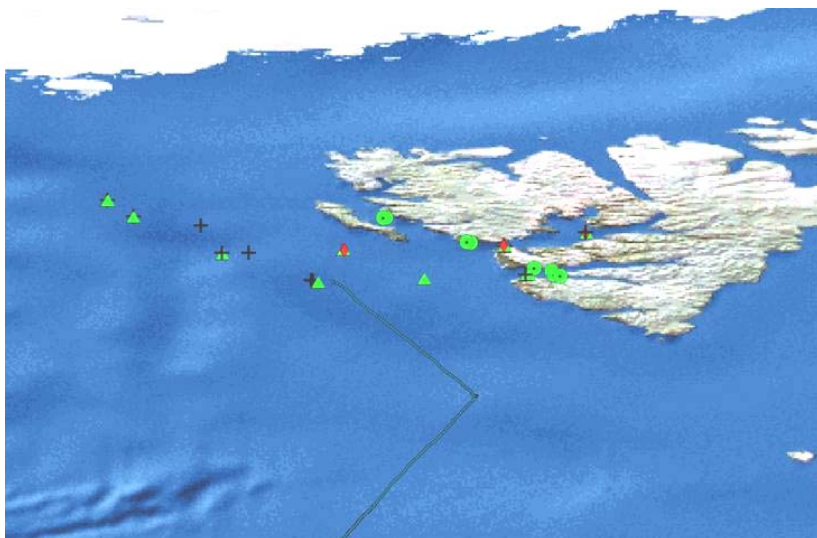
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Cruise Track Bremerhaven – Svalbard



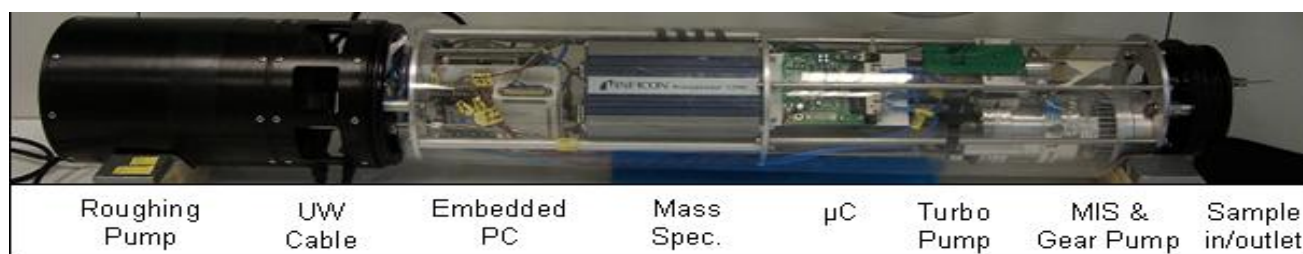
Sampling sites off Svalbard



Cross: Multicorer, Triangle=CTD/Rosette, Circle Pump Cast, Diamond =Bottom Water Sampler.

Sampling and analysis

During the transit from Bremerhaven to Svalbard we gathered surface waters derived by the shipboard pump for analysis of the gas composition (e.g. oxygen, methane, nitrogen etc.). For this purpose we applied a membrane inlet mass spectrometer (see figure below). The Radon-222 activity was analysed by a RAD 7 radon monitor.



Membrane Inlet Mass Spectrometer (MIMS) for analysis of gases in surface waters.

At the sampling sites of Svalbard we used a CTD/Rosette Sampler for investigations of O₂, methane, nutrients as well as naturally occurring radio nuclides including radon and radium. In addition to the Rosette Sampler a Bottom Water Sampler was applied to derive high resolution profiles close to the sediment water interface. At Storrega Slide (at 64°46.26'N, 5° 0.53'E) water profiles by CTD/Rosett Sampler were obtained.



Bottom Water Sampler applied for investigation of concentration profiles close to the sediment water interface.

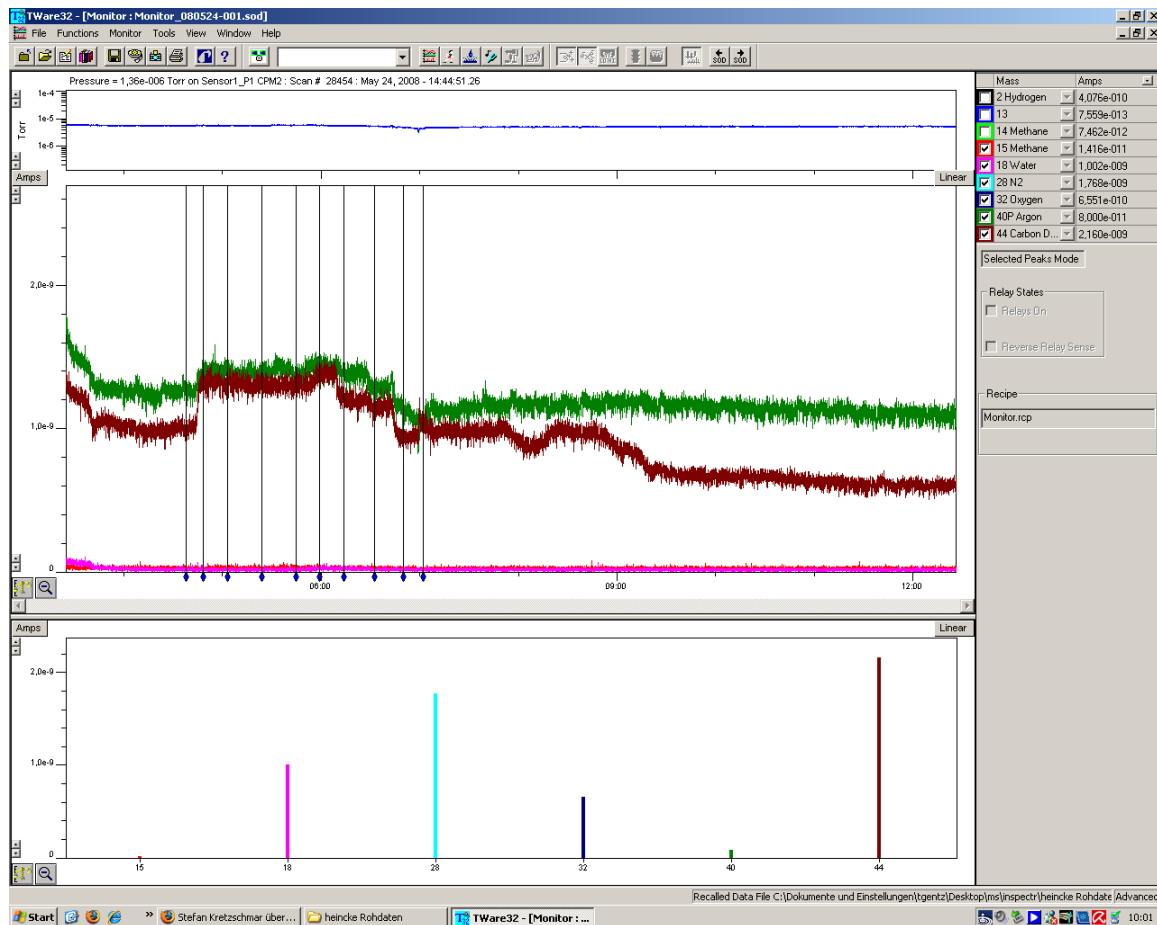
For studies about the spatial distribution of the concentration of Radon as well as methane in the bottom water we applied a submersible pump and online analysis by MIMS and the Rad 7 Radon Monitor. The pump was lowered to about 10m above seafloor and water samples were obtained along track lines while the ship steamed with low speed.

Sediment samples were obtained by a Multicorer. At one site in the van Mijenfjorden a Benthic Chamber System was deployed for measurements of benthic fluxes.

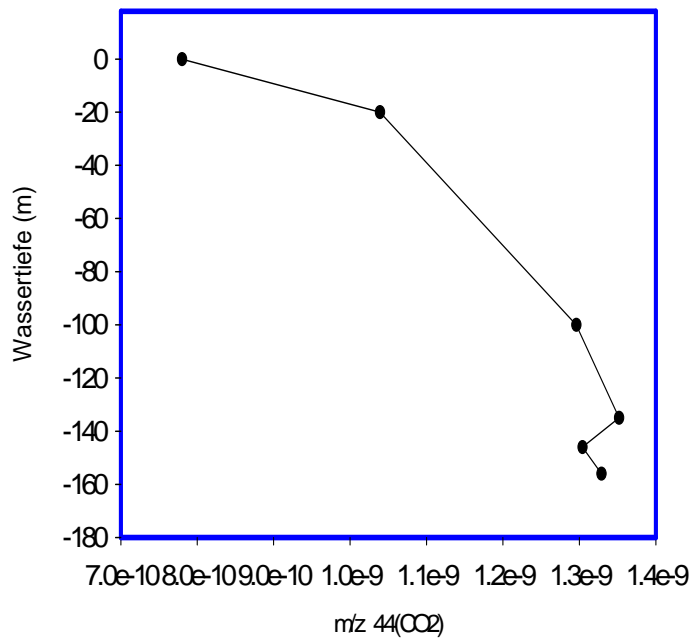
First results.

Along the cruise track Bremerhaven-Svalbard-Bremerhaven only rather small variations of radon, methane etc. concentrations were observed for surface waters. Slightly enhanced Rn-222 activities were observed off Sylt (Germany). Off Svalbard gas concentrations in surface waters were rather low as well.

In the water column vertical variations of gas concentrations were detected. The figure below shows CO₂ and Ar profiles analysed by the online mass spectrometer.

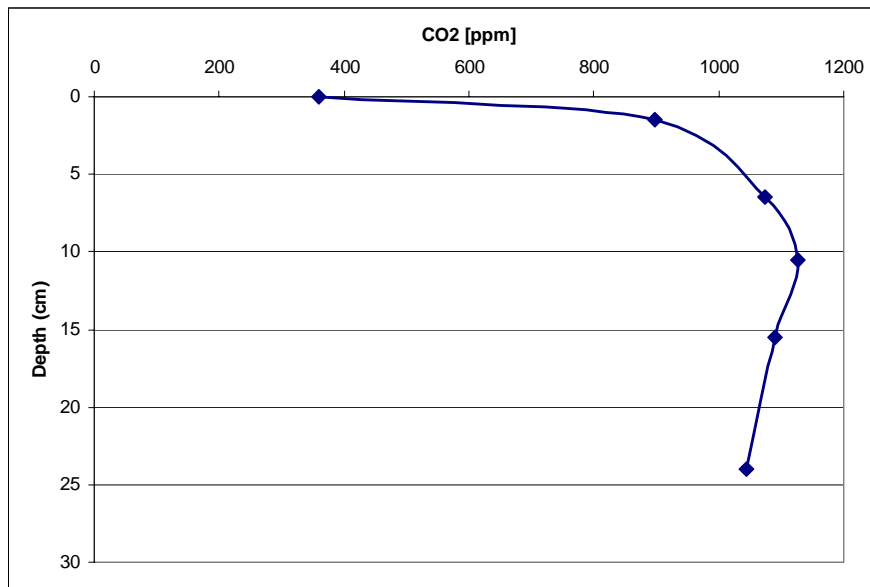


CO₂ and Argon Analysis of water samples obtained from different water depths by the submersible pump (24.5.2008).



CO₂ profile in the water column derived by the MIMS.

In the pore water of surface sediments gradients of nutrients as well as CO₂ were measured (see figure below). Furthermore, at some sites enhanced concentrations of dissolved Fe in the pore water indicates intense remineralisation of organic matter.



CO₂ profile in pore water of surface sediments.

Preliminary Conclusion

Although we expected some more pronounced lateral concentration gradients in surface waters, the first results we obtained during the HE-288 cruise are very suitable for planning of upcoming expeditions. The data obtained off Svalbard revealed regional differences in benthic fluxes and of the intensity of remineralisation of organic matter. Combined with previous data sets and data derived during upcoming cruises this may allow to calculate spatial budgets on the fluxes of nutrients back into the bottom water.

Sampling sites off Svalbard.

Station	Date	Lat_dec	Long_dec	Depth [m]	Gear
HE288/225-1	23.05.2008	77.5125	10.8097	974.2	CTD/rosette water sampler
HE288/226-1	24.05.2008	77.5063	10.5494	1223.5	CTD/rosette water sampler
HE288/226-2	24.05.2008	77.5208	10.4644	1255.8	Multi corer
HE288/226-3	24.05.2008	77.5352	10.4413	1260.7	Multi corer
HE288/227-1	24.05.2008	77.5630	12.4175	108.9	CTD/rosette water sampler
HE288/228-1	24.05.2008	77.7438	14.3536	81.1	Submersible Pump
HE288/228-1	24.05.2008	77.6894	14.6580	55.2	Submersible Pump
HE288/229-1	24.05.2008	77.6333	14.2016	165.9	CTD/rosette water sampler
HE288/229-2	24.05.2008	77.6441	14.2258	164.2	CTD/rosette water sampler
HE288/229-3	24.05.2008	77.6430	14.2575	162	CTD/rosette water sampler
HE288/230-1	25.05.2008	77.6277	14.7027	90.2	Submersible Pump
HE288/230-1	25.05.2008	77.6086	14.8047	77.0	Submersible Pump
HE288/231-1	25.05.2008	77.6350	14.2036	165.6	Multi corer
HE288/232-1	25.05.2008	78.6294	11.7511	96.1	Submersible Pump
HE288/232-1	25.05.2008	78.6266	11.6994	99.7	Submersible Pump
HE288/233-1	26.05.2008	78.9400	6.8438	1442.7	CTD/rosette water sampler
HE288/233-2	26.05.2008	78.9402	6.8444	1441.4	CTD/rosette water sampler
HE288/233-3	26.05.2008	78.9405	6.8608	1433.0	Multi corer
HE288/233-4	26.05.2008	78.9416	6.8688	1424.3	CTD - Seabird
HE288/233-5	26.05.2008	78.9411	6.8500	1437.7	CTD/rosette water sampler
HE288/234-1	26.05.2008	78.6483	7.3180	1390.8	Multi corer
HE288/234-2	26.05.2008	78.6488	7.3072	1390.9	CTD/rosette water sampler
HE288/235-1	27.05.2008	78.4913	8.4972	1402.7	Multi corer
HE288/236-1	27.05.2008	78.0027	8.8713	1397.4	CTD/rosette water sampler
HE288/236-2	27.05.2008	78.0130	8.8716	1391	Multi corer
HE288/237-1	27.05.2008	78.0088	9.3416	731.5	Multi corer
HE288/238-1	27.05.2008	78.0747	10.9947	215.8	CTD/rosette water sampler
HE288/238-2	27.05.2008	78.0761	11.0013	444.8	CTD/rosette water sampler
HE288/238-3	27.05.2008	78.0669	11.0133	439.4	Trace element water sampler
HE288/238-3	27.05.2008	78.0686	11.0147	217.5	Trace element water sampler
HE288/238-3	27.05.2008	78.0669	11.0144	218.9	Trace element water sampler
HE288/238-4	27.05.2008	78.0669	11.0261	218.1	Trace element water sampler
HE288/238-4	27.05.2008	78.0694	11.0269	219.6	Trace element water sampler
HE288/238-5	28.05.2008	78.1338	13.8358	345.1	Multi corer
HE288/238-6	28.05.2008	78.1338	13.8388	344.3	Multi corer
HE288/238-7	28.05.2008	78.1341	13.8416	352.1	CTD/rosette water sampler
HE288/238-8	28.05.2008	78.1441	13.8344	341.5	CTD/rosette water sampler
HE288/238-9	28.05.2008	78.1608	13.8175	368.2	Trace element water sampler
HE288/238-9	28.05.2008	78.1375	13.8227	387.9	Trace element water sampler
HE288/240-1	28.05.2008	78.1966	13.2336	55.8	Submersible Pump
HE288/240-1	28.05.2008	78.2016	13.1738	45.3	Submersible Pump

HE288/241-1	28.05.2008	78.3686	15.2605	259.4	CTD/rosette water sampler
HE288/241-2	28.05.2008	78.3680	15.2697	261.8	CTD/rosette water sampler
HE288/241-3	28.05.2008	78.3669	15.2580	260.6	Trace element water sampler
HE288/241-3	28.05.2008	78.3669	15.2541	262.3	Trace element water sampler
HE288/241-3	28.05.2008	78.3666	15.2544	262.0	Trace element water sampler
HE288/241-4	28.05.2008	78.3750	15.2502	264.4	Multi corer