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Oil hydrocarbons and PAH in the Barents Sea sediments.



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Oil hydrocarbons and PAH in the Barents Sea sediments.

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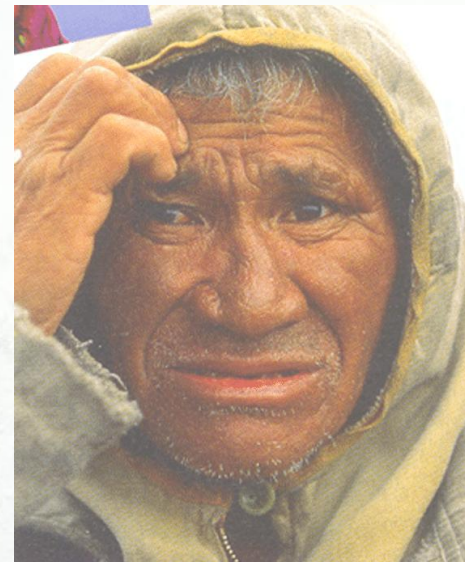
Funding:

AMAP secretariat and Nordic Council of Ministers

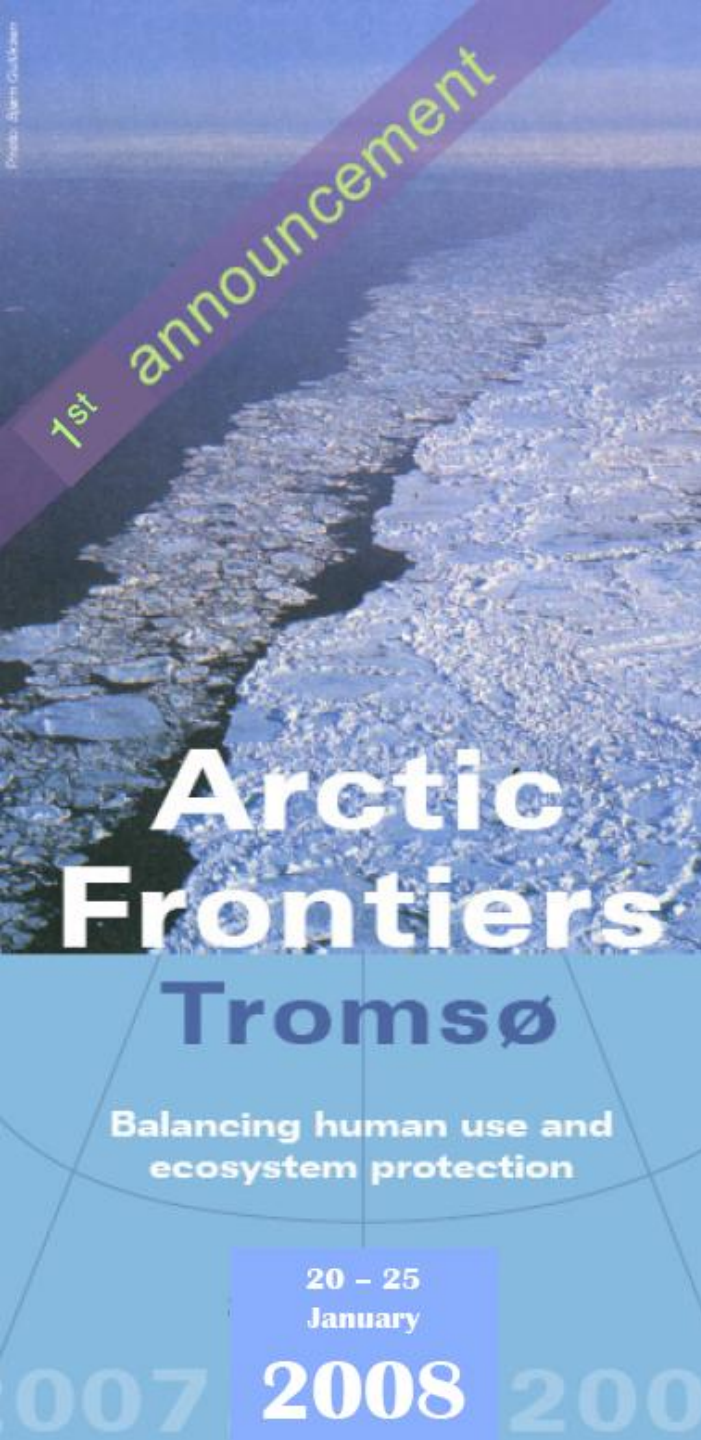
AMAP
Arctic Monitoring and
Assessment Programme

The Arctic Council's 2007 Assessment of Oil and Gas Activities in the Arctic

Arctic Monitoring and Assessment Programme (AMAP)
www.amap.no



AMAP
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1st announcement

Arctic Frontiers Tromsø

Balancing human use and
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January

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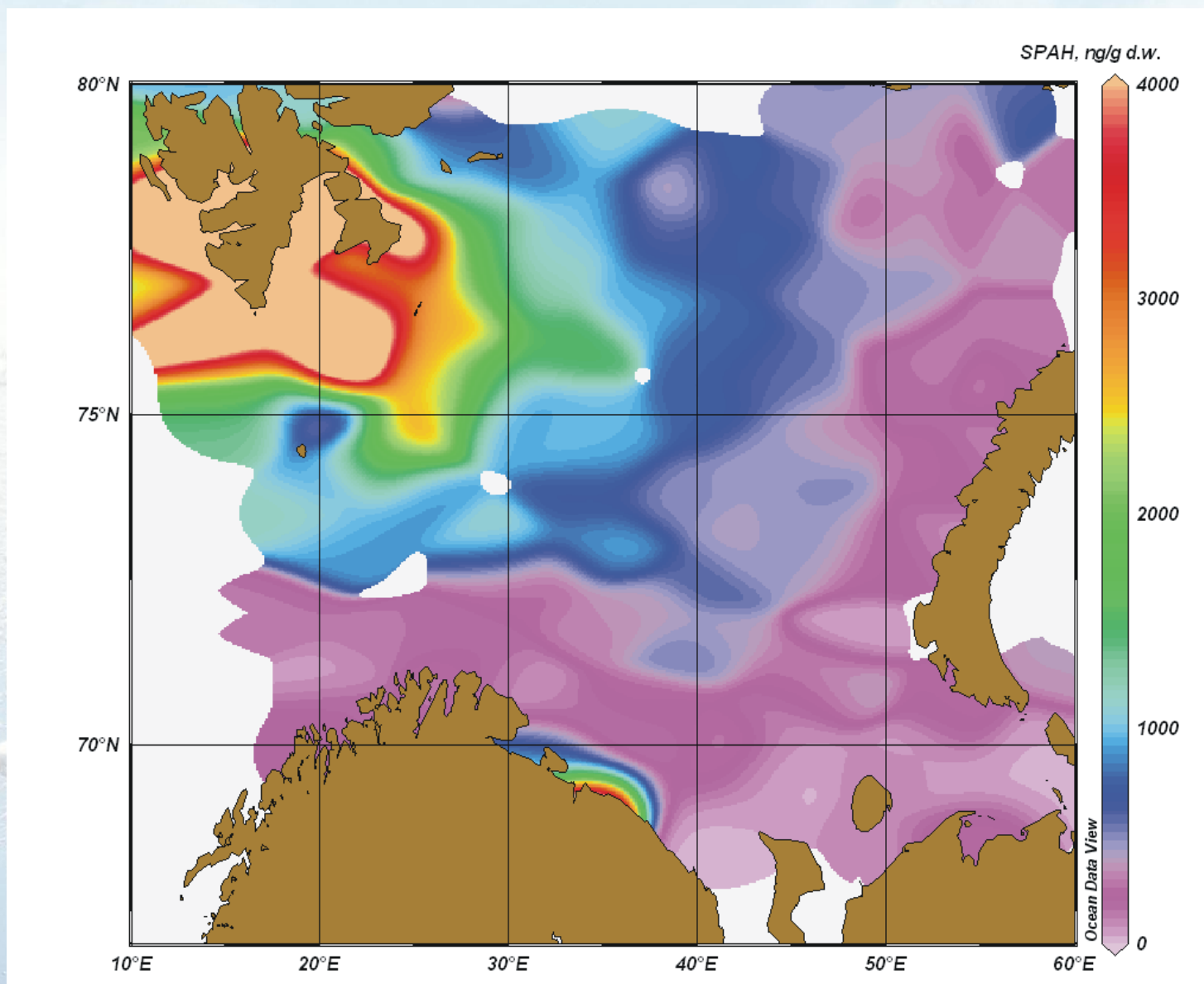
Sustainable development in the Arctic

Oil and gas

Social and economical development,
national and regional
Challenges within environment,
biological resources and technology
The dynamic permafrost

In cooperation with the Arctic
Monitoring and Assessment
Programme, AMAP

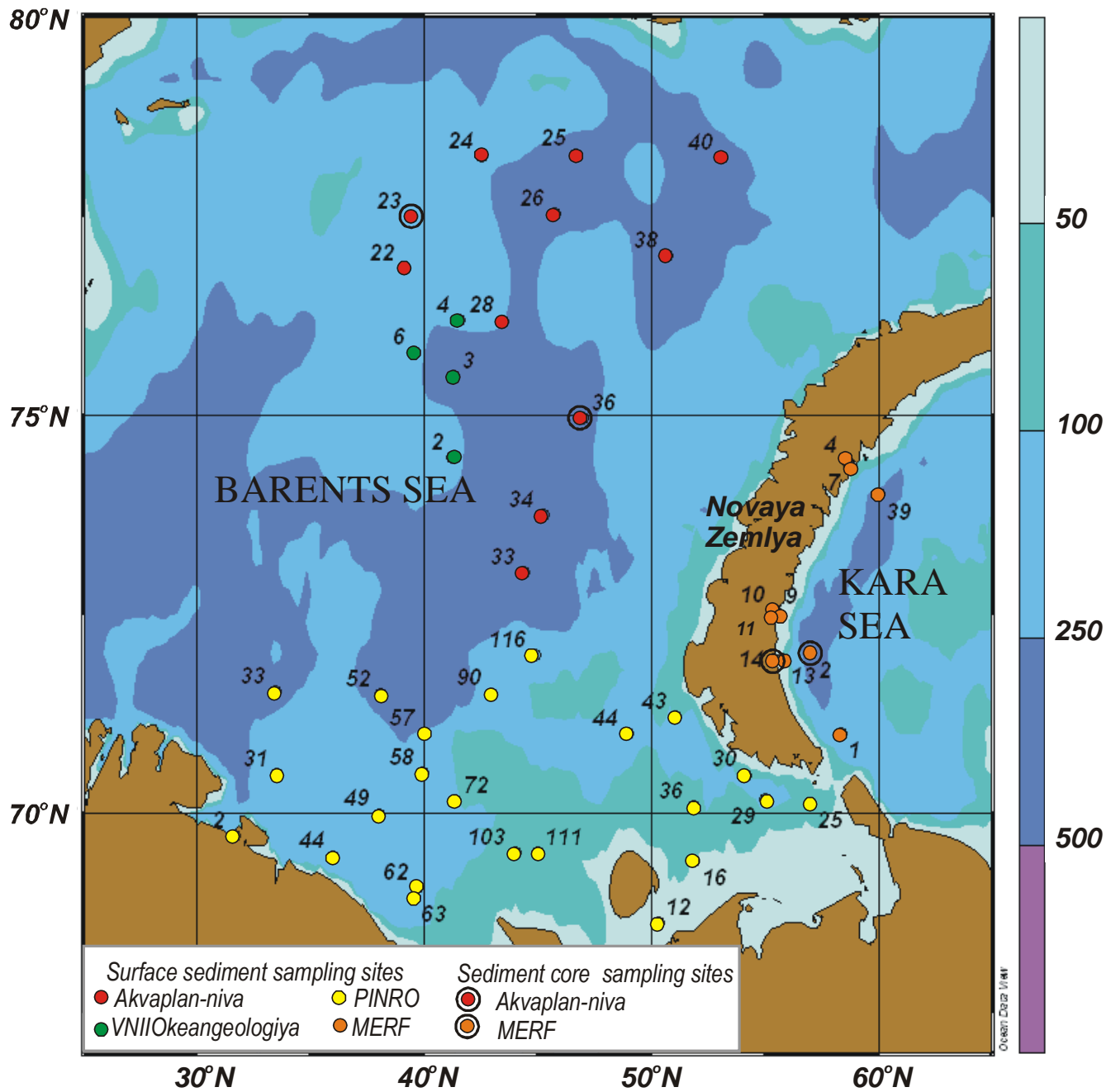
Arctic 
Frontiers



ΣPAH (ng/g dry weight) in surface bottom sediments from the Barents Sea in 1991-1998. (Dahle et al., 2006)

Oil hydrocarbons and PAH in the Barents Sea sediments

- Aim:
- study current PAH levels in the bottom sediments from the Barents and Kara Seas,
- identify temporal trends by comparing the results with previous data



Sampling sites during 2003-2004

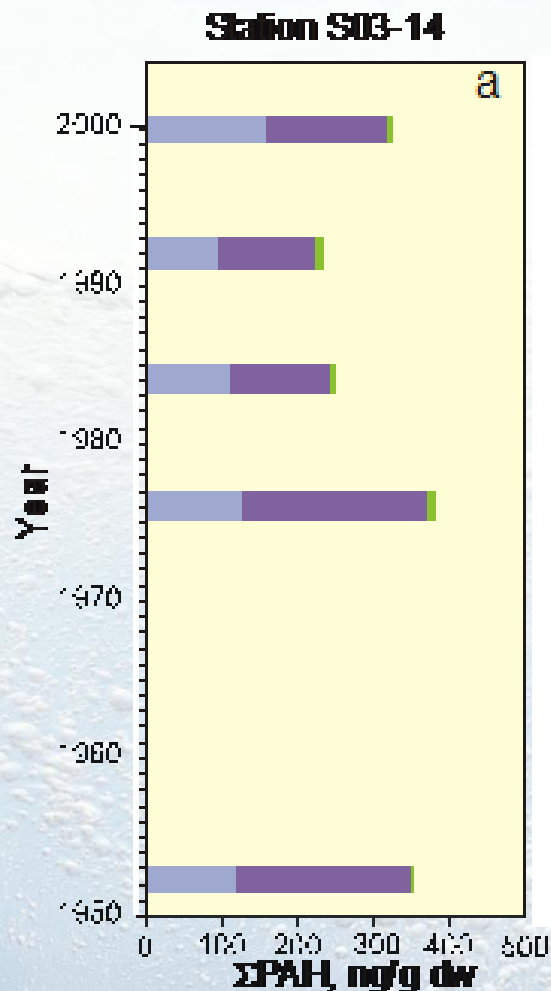
Results, sedimentation rates

Table 1. Results of CIC-model dating

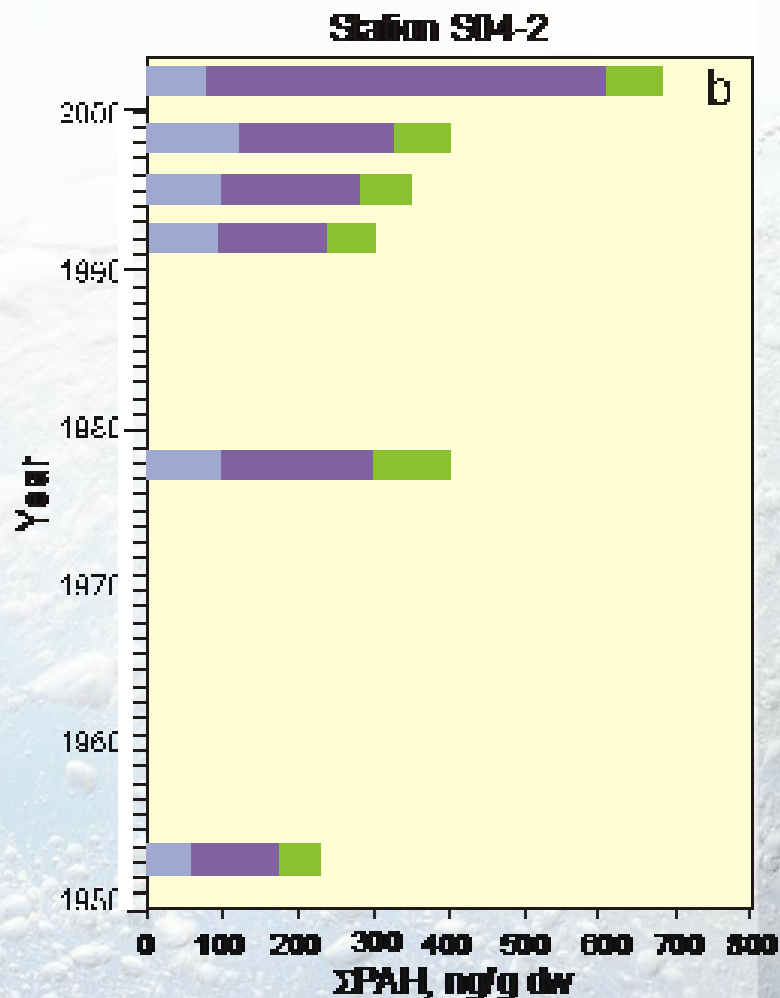
Area	Station number	Depth, m	Sedimentation rate, mm/yr	R ² value
Inner Abrosimova Bay	S03-14	35	2.5	0.9339
Novaya Zemlya Trough	S04-02	335	3.9	0.8137
NE Barents Sea	BB-23	217	0.3	0.9356
NE Barents Sea	BB-36	243	1.2	0.9370

Time trend of PAHs in sediments

NZ, Abrosimova Bay (35 m)



Kara Sea trough, south (335 m)

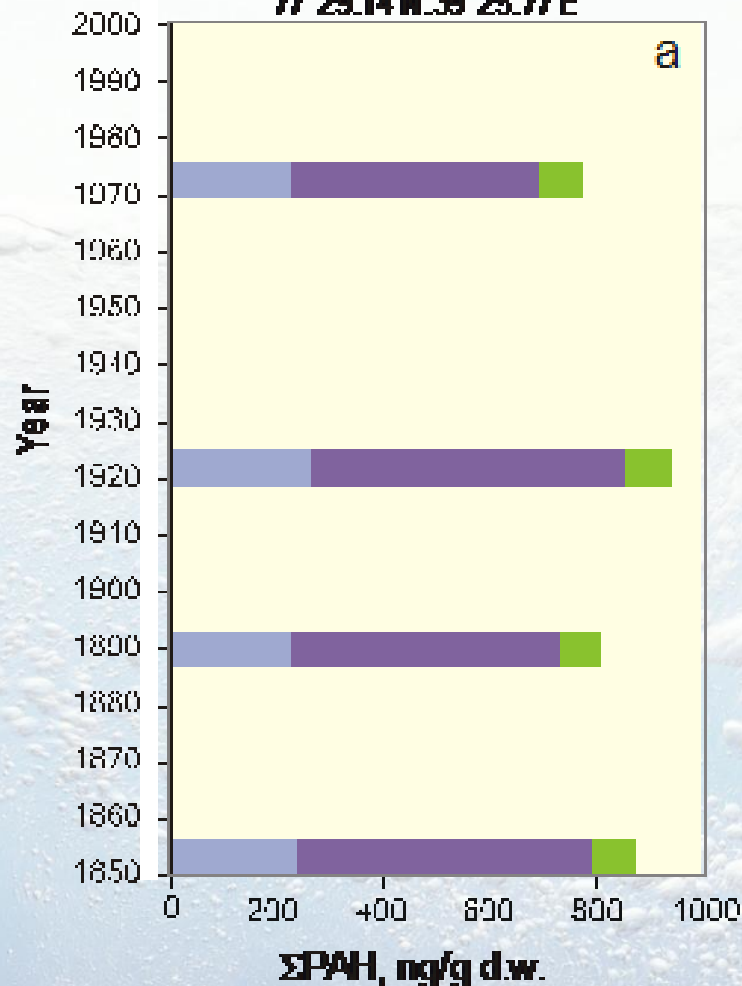


ΣPyro PAH ΣNPD Perylene

Time trend of PAHs in sediments, north eastern Barents Sea

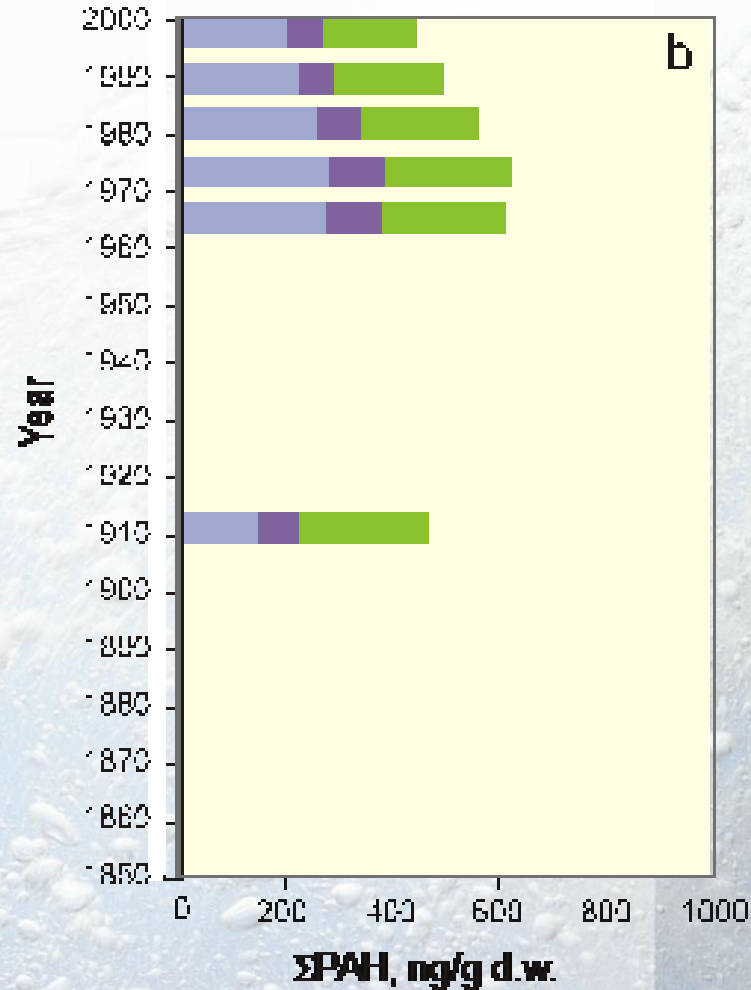
217 m

Station BB-23
77°29.14'N:39°25.77'E

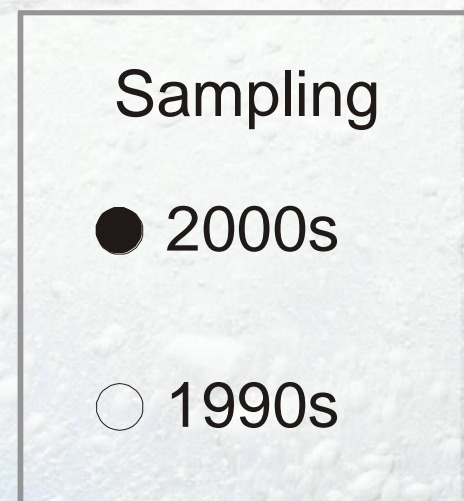
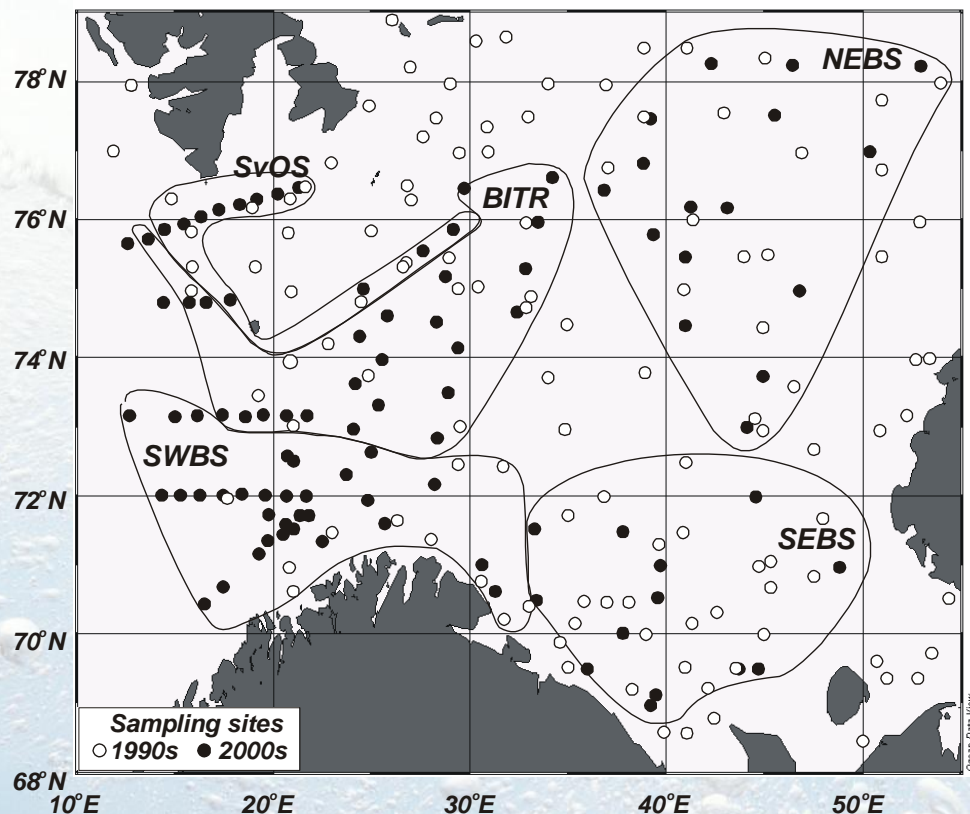


243 m

Station BB-36
74°58.00'N:46°59.80'E



Clustering of bottom sediment sites based on the sampling in 2000s (110 stations)



SvOS = Svalbard offshore area; BITR=Bear Island Trough, NEBS=north-eastern part of the Barents Sea, SWBS=south-western part of the Barents Sea; SEBS=south-eastern part of the Barents Sea

PAHs in Barents Sea sediments, development 1990s to 2000s

PAH parameters	Svalbard offshore		Bear Island Trough		SW Barents Sea		SE Barents Sea		NE Barents Sea	
	2000s	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s	1990s
	N=13	N=9	N=23	N=14	N=39	N=11	N=14	N=21	N=17	N=17
¹ ΣPAH	4383	3735	1324	1130	178	129	319	169	689	575
² ΣPyrPAH	780	598	365	341	88	81	207	96	242	260
³ NPD	3466	3048	851	691	67	32	88	37	291	184
FFPI	73	73	59	54	34	21	24	20	38	28
⁴ FLT/202	0.525	0.510	0.539	0.562	0.543	0.567	0.763	0.642	0.520	0.572
⁵ IND/276	0.235	0.227	0.403	0.323	0.531	0.585	0.650	0.553	0.450	0.484

Geometric mean of PAH concentrations (ng/g d.w.), Fossil Fuel Pollution Index (FFPI, %) and PAH molecular mass ratios N=number of samples.

Overall results

- Barents Sea
 - High levels in Svalbard waters, stable (natural erosion of coal rich rocks)
 - Low levels in north eastern Barents Sea, stable
 - Low levels in south western Barents Sea, stable
 - Low to medium levels in south eastern Barents Sea, increasing (pyrogenic and petrogenic)
- Kara Sea and Novaya Zemlya
 - Low levels, but increasing in southern parts (petrogenic)