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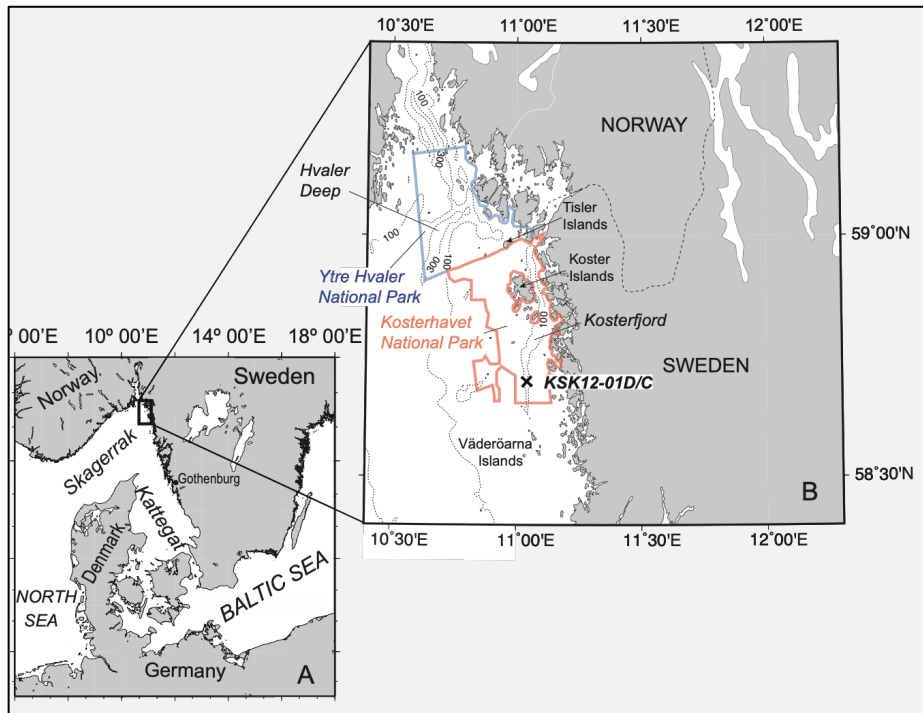
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RECENT ENVIRONMENTAL CHANGE IN A MARINE PROTECTED AREA AS REFLECTED BY SEDIMENT PROXY DATA

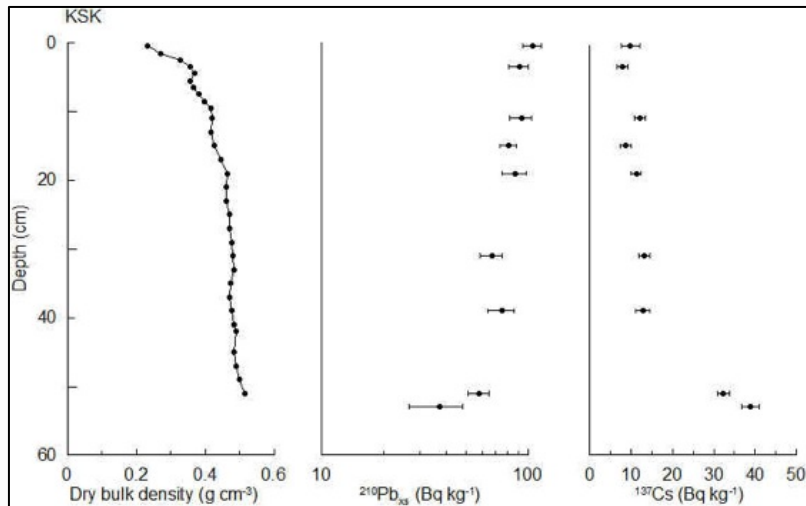
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Study area

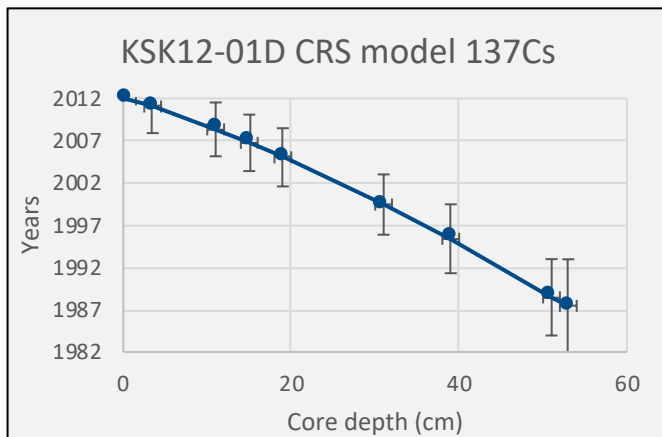


- Koster Trench lies within Koster Fjord Skagerrak, North Sea)
- Kosterhavet National Marine Park (since 2009)
- Aim of this study: to investigate recent environmental changes, which have taken place in the area over the last four decades with help of sediment archives.
- Sediment core KSK12-01D/C
 - Dated by ^{137}Cs and ^{210}Pb
 - Microfossils (dinocysts, selected palynomorphs, & benthic foraminifera)
 - Bulk sediment geochemistry (heavy metals, TOC & C/N)
 - Multivariate statistics

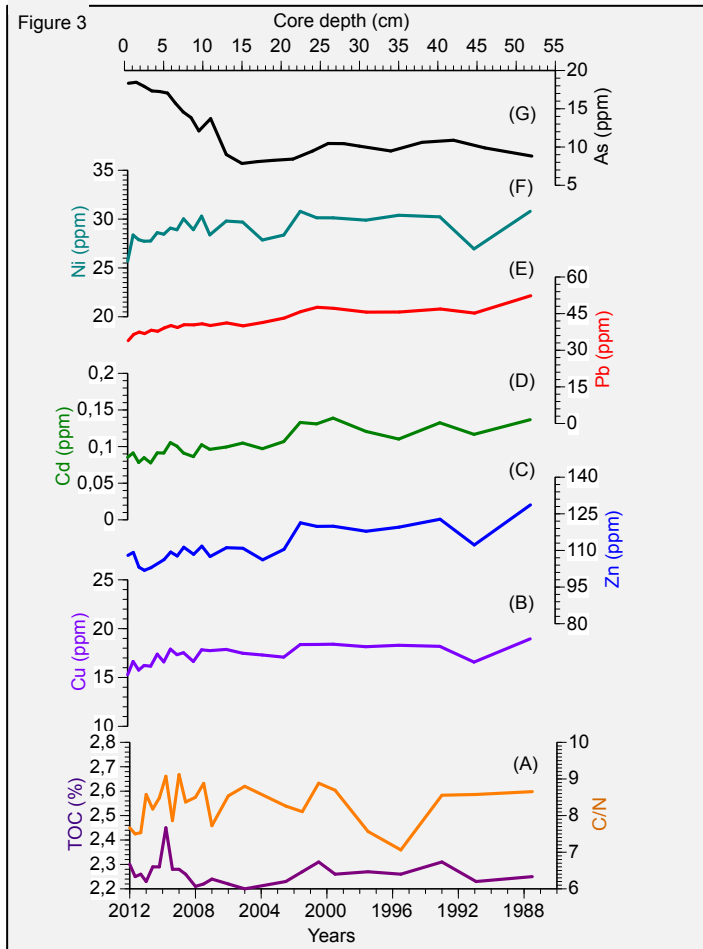


Results: Core chronology

- CRS model
- Core KSK12-01D spans from ~1987 to 2012
- Archives environmental changes for the last 25 years



Results: sediment geochemistry



- TOC range: 2.2-2.5 % d.w.
- C/N range: 7.1 - 9.1
- Heavy metals Cu, Cd, Ni and Zn show insignificant to low pollution levels (SEPA, 2007)
- Pb: mostly intermediate levels
- As: mostly low but increase to intermediate levels since ~2005

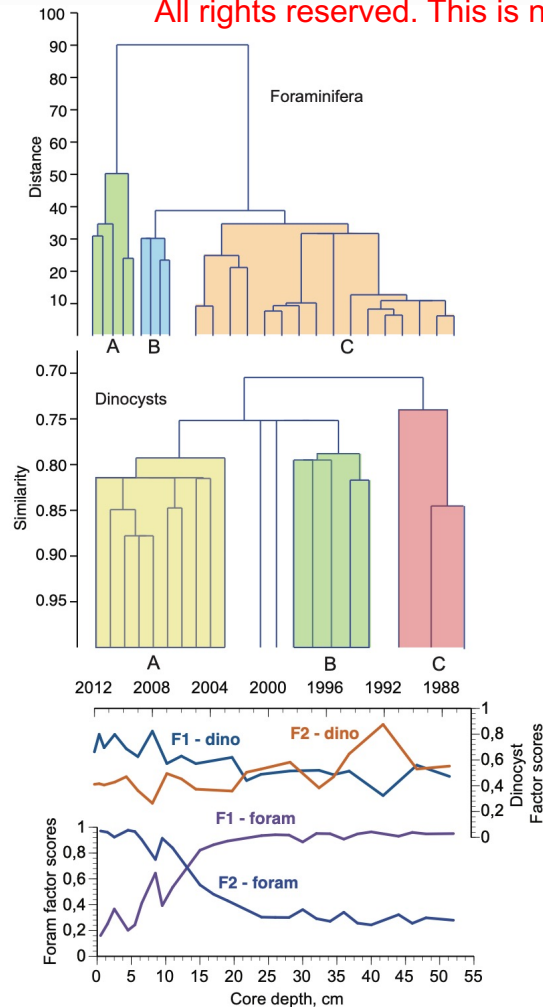
Dinocysts & palynomorphs

- *O. centrocarpum* and *P. dalei* dominate between 1996 and 2002
- *B. baltica* increases since ~ 2005
- *S. ramosus* increases over the last few decades but, together with other *Spiniferites* species, decreases abruptly in the uppermost samples
- *Alexandrium* cysts - a marked increase and peak towards the top of the core

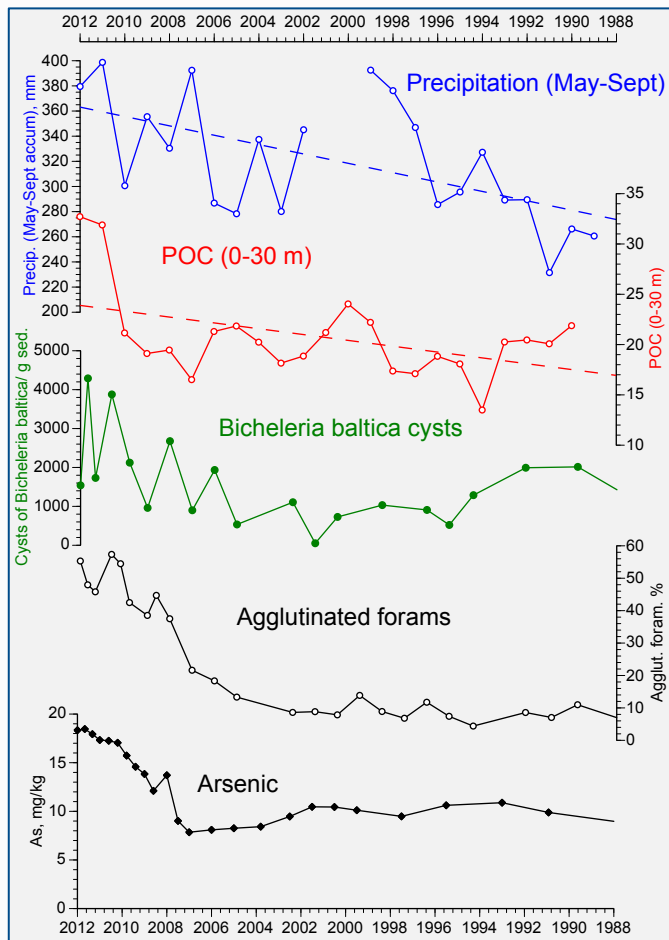
Foraminifera

- Dominant *B. marginata*, *E. vitrea* and *S. fusiformis*, and accessory *C. laevigata*, *C. lobatulus*, *H. balthica* and *N. turgida* (all calcareous species) dominate the record between ~ 1987 and 2006
- Agglutinated *T. earlandi* and *S. fusiformis* are present from 2006 to 2012
- Anl increase of agglutinated foraminifera since 2006

Multivariate statistics



- Foraminifera indicate a major change around 2007
- Dinocysts and palynomorphs indicate several earlier changes in the record: between 1994 and 2002



Discussion and Conclusions

- Local summer precipitation data suggest an increasing trend
- Hydrographic data indicate an increase in Particulate Organic Matter (POC) in surface waters
- These changes are consistent with microfossil data, suggesting increased brackish conditions as a result of freshwater runoff
- A recent increase in sedimentary As, however, still remains to be explained



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THANK YOU!