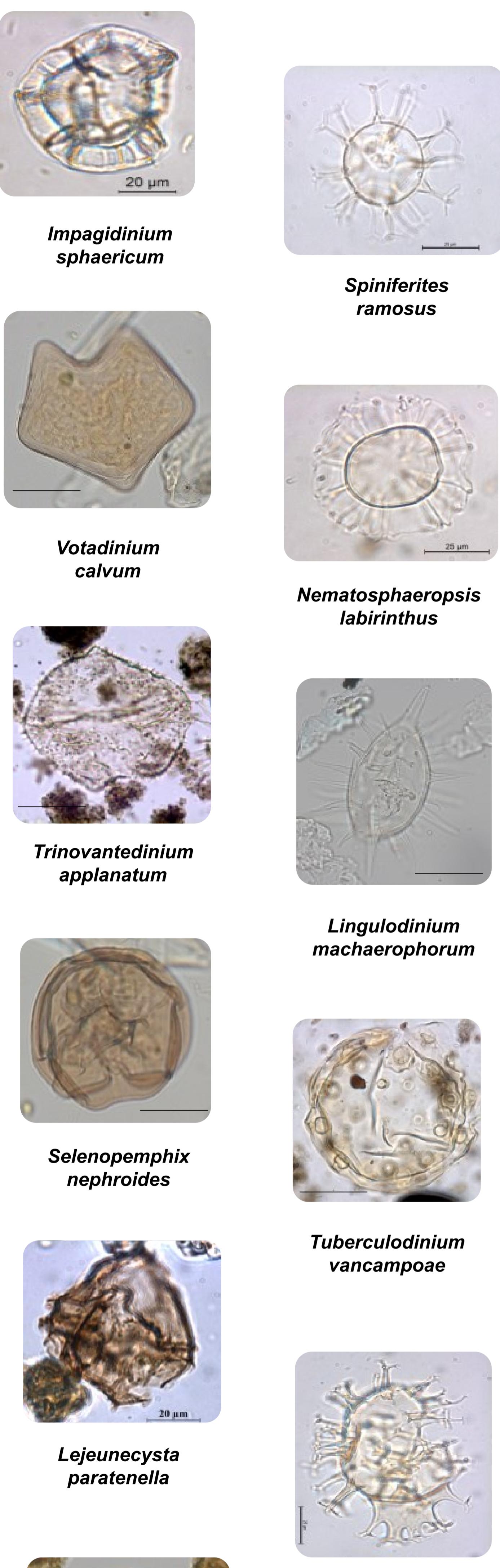


Last ca 2850 yr history of the Java Sea environment reconstructed based on marine palynomorphs



Introduction

A dinocyst-based reconstruction of the late Holocene marine environment between ca 2850 and 990 cal yr BP in the Java Sea coastal waters off SE Kalimantan, Indonesia, supported by biogeochemical data.

This work is the first of this kind for the Java Sea and will potentially contribute to the overall knowledge of the marine environment history of Indonesia.

Study area

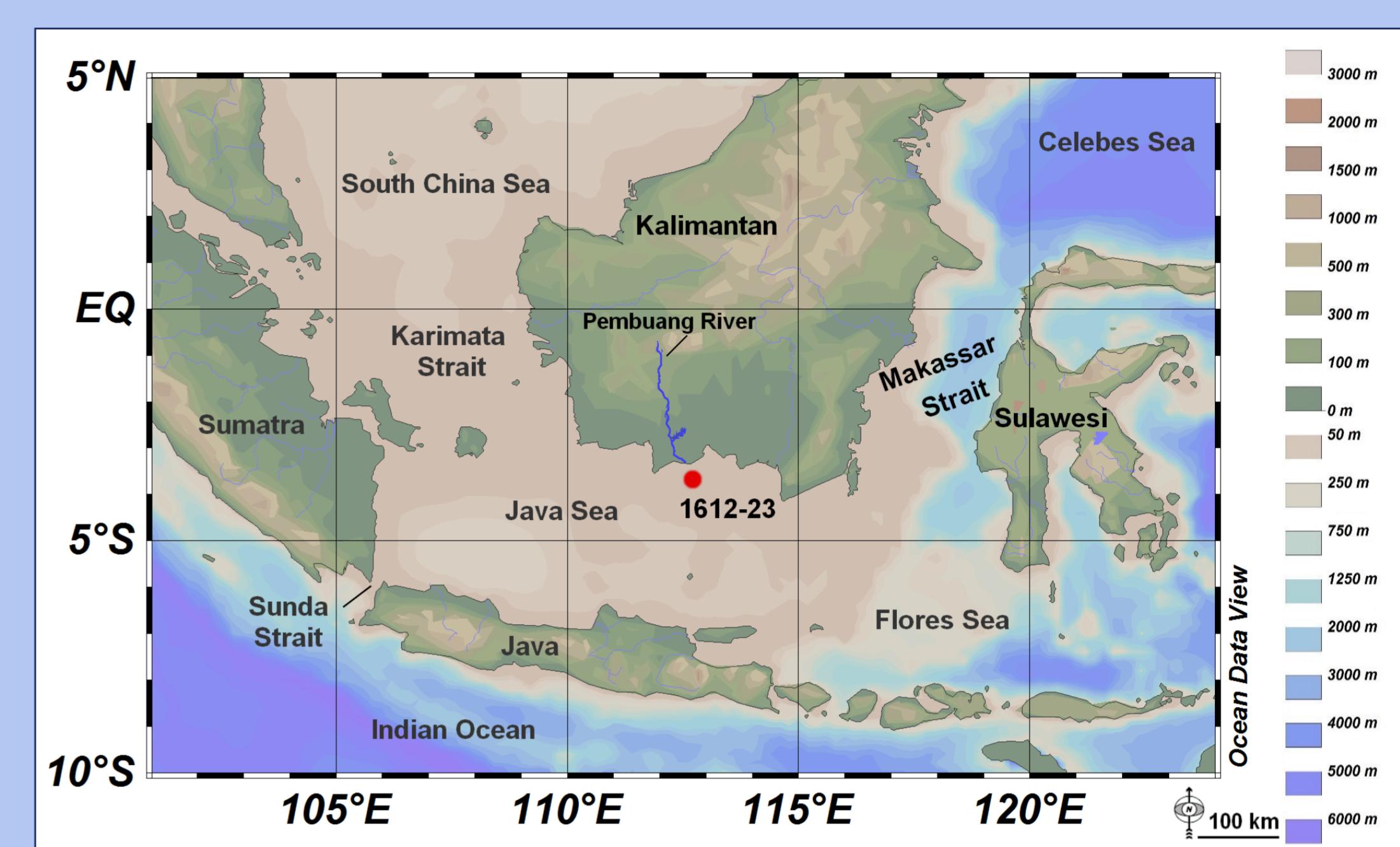


Fig. 1. Study area with main water depths, land orography (delivered from the World Ocean Atlas, 2009) and a position of the study site (marked with a dot). The map was created using the Ocean Data View software (Schlitzer, 2014).

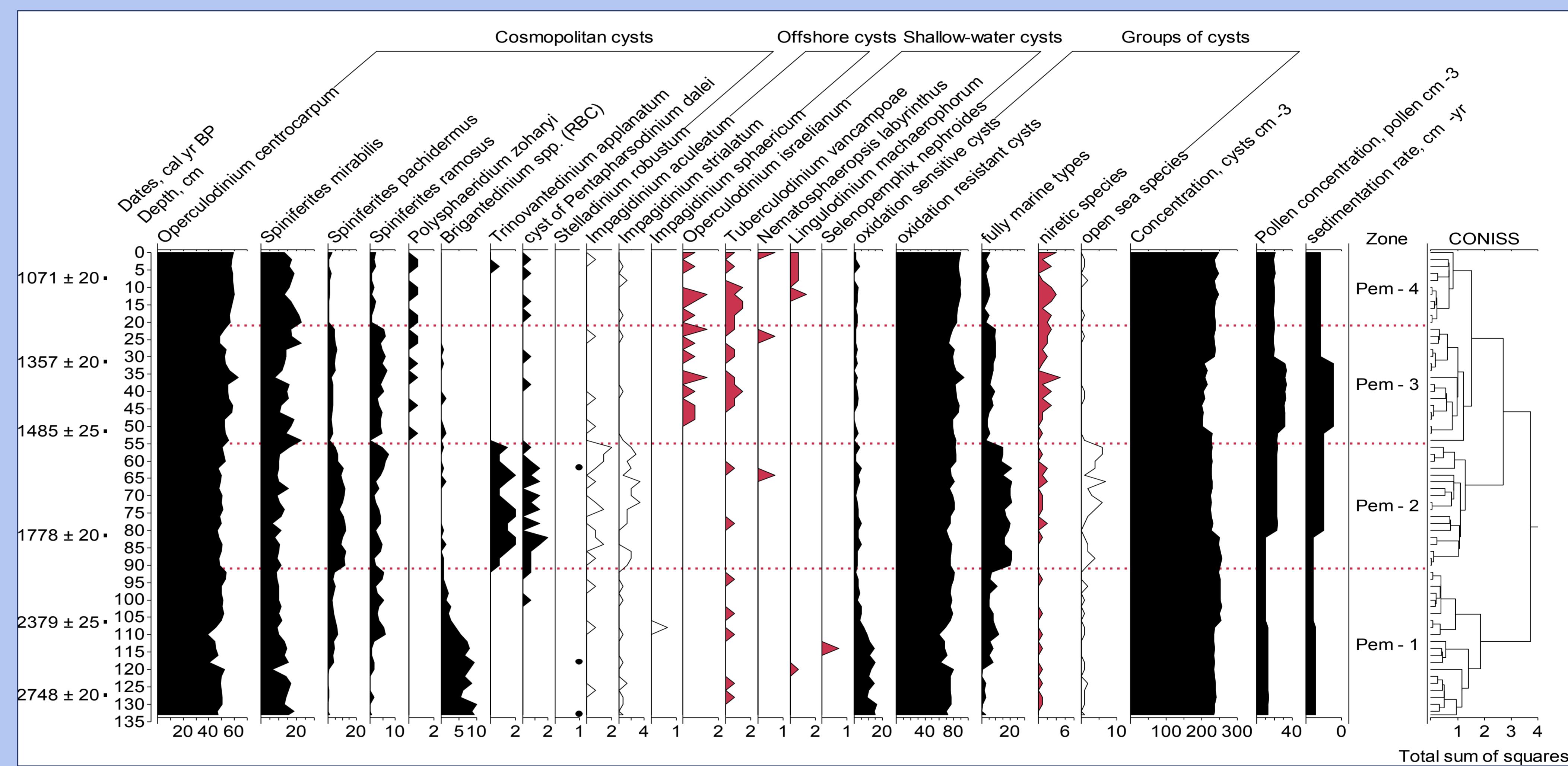


Fig. 2. Organic-walled dinocyst diagram showing relative abundances of the individual dinotypes, sums of cosmopolitan, open sea and neritic dinotypes, phototrophic and heterotrophic species, dry bulk concentrations of dinocysts, pollen and fern spores, sedimentation rates and a CONISS cluster-diagram based on total sum of squares. Presence of cyst types contributing to the dinocyst total sum less than 2% on average depicted as black dots.

Conclusion

- Open shelf with stable conditions (Pem-1)
- After 2480 cal yr BP, ventilation of waters intensified (Pem-2)
- Typical offshore dinocyst association was replaced by a coastal-water one between ca 2040 and 1530 cal yr BP that is most likely attributed to El Niño-induced seasonal differences between dry and wet periods of the year (Pem-3).
- After 1530 cal yr BP (Pem-4), a more pronounced influence of the Pembuang River was indicated

Contact:

Anastasia Poliakova¹,
Karin A.F. Zonneveld^{2,3},
Hermann Behling¹

¹ -Georg-August-University,
Göttingen, Germany;

² -University of Bremen;

³ -Center for Marine
Environmental Sciences
(MARUM), Bremen, Germany.

Web: <https://www.uni-goettingen.de/en/349304.html>
Phone: +49-(0) 551 39-7873;
Email: anastasia.poliakova@biologie.uni-goettingen.de

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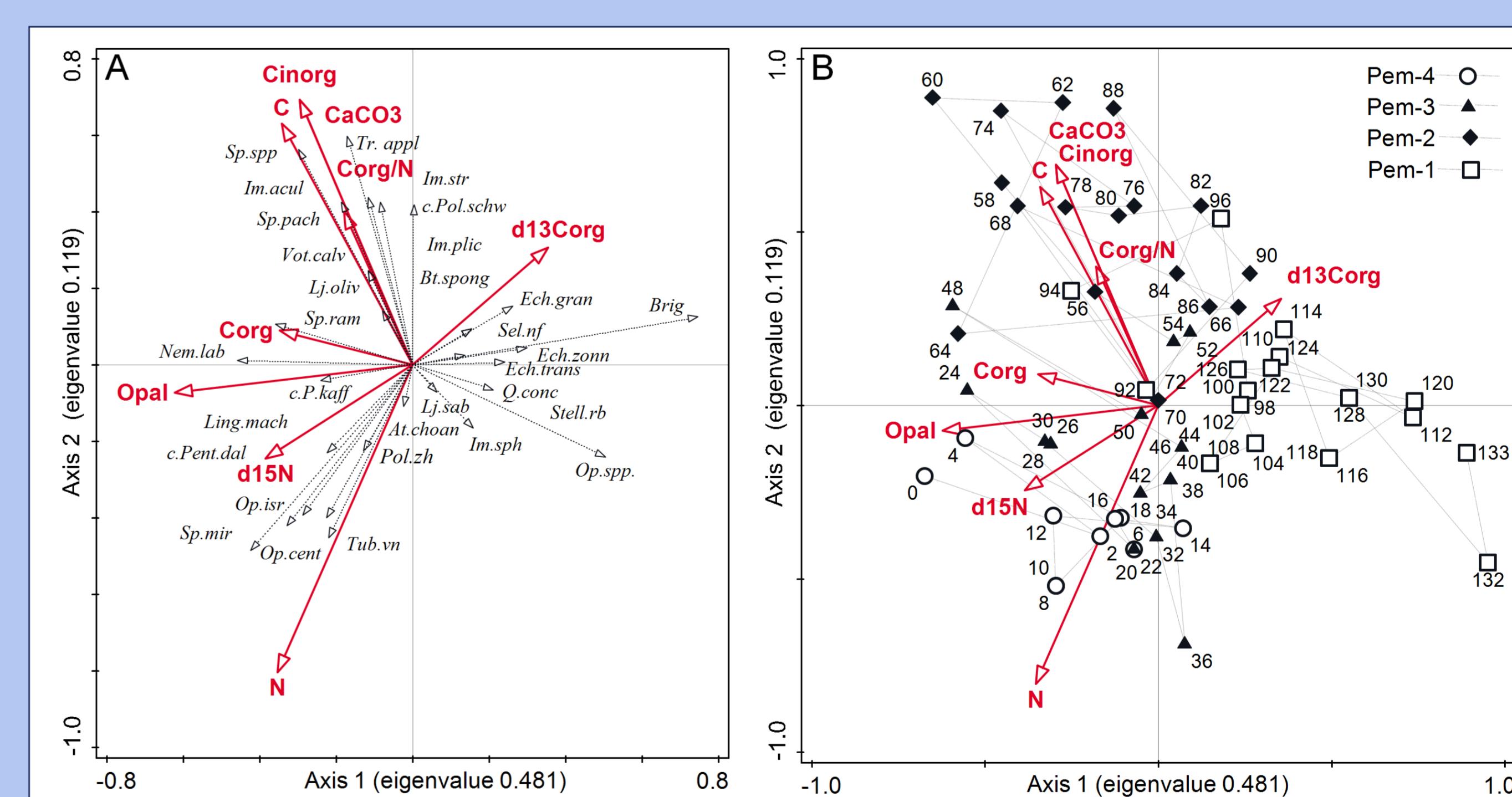


Fig. 5. Results of RDA analysis illustrating dinotypes in relation to biogeochemical environmental variables. Biogeochemical parameters are abbreviated as indicated in text. Dinoflagellate cyst types are indicated as following: At.choan - *Ataxodonium choane*, Brig - *Brigantedinium spp.* (RBC), Bt.spong - *Bitectatodinium spongium*, c.P.kaff - Cyst of *Polykrikos kofoidii*, c.Pent.dal - cyst of *Pentapharsodinium dalei*, c.P.schw - cyst of *Polykrikos schwarzii*, Ech.gran - *Echinidinium granullatum*, Ech.trans - *Echinidinium transparentum*, Ech.zonn - *Echinidinium zonneveldii*, Im.str - *Impagidinium striatum*, Im.acul - *Impagidinium aculeatum*, Im.plc - *Impagidinium plicatum*, In.sph - *Impagidinium sphaericum*, Ling.mach - *Lingulodinium machaerophorum*, Lj.oliv - *Lejeune cysta oliva*, Lj.sab - *Lejeune cysta sabrina*, Nem.lab - *Nematospaeropsis labyrinthus*, Op.cent - *Operculodinium centrocarpum*, Op.izr - *Operculodinium israelianum*, Op.spp - *Operculodinium spp.*, Pol.zh - *Polysphaeridium zoharyi*, Q.conc - *Quinquecuspis concreta*, Sel.np - *Selenopemphix nephroides*, Sel.rb - *Stelladinium robustum*, Sp.mir - *Spiniferites mirabilis*, Sp.pach - *Spiniferites pachidermus*, Sp.ram - *Spiniferites ramosus*, Sp.spp - *Spiniferites spp.*, Tr.appl - *Trinovantedinium appланatum*, Tub.vn - *Tuberculodinium vancampoaе*, Vot.calv - *Votadinium calvum*.