First quantitative constraints on the Pliensbachian-Toarcian warming in polar regions

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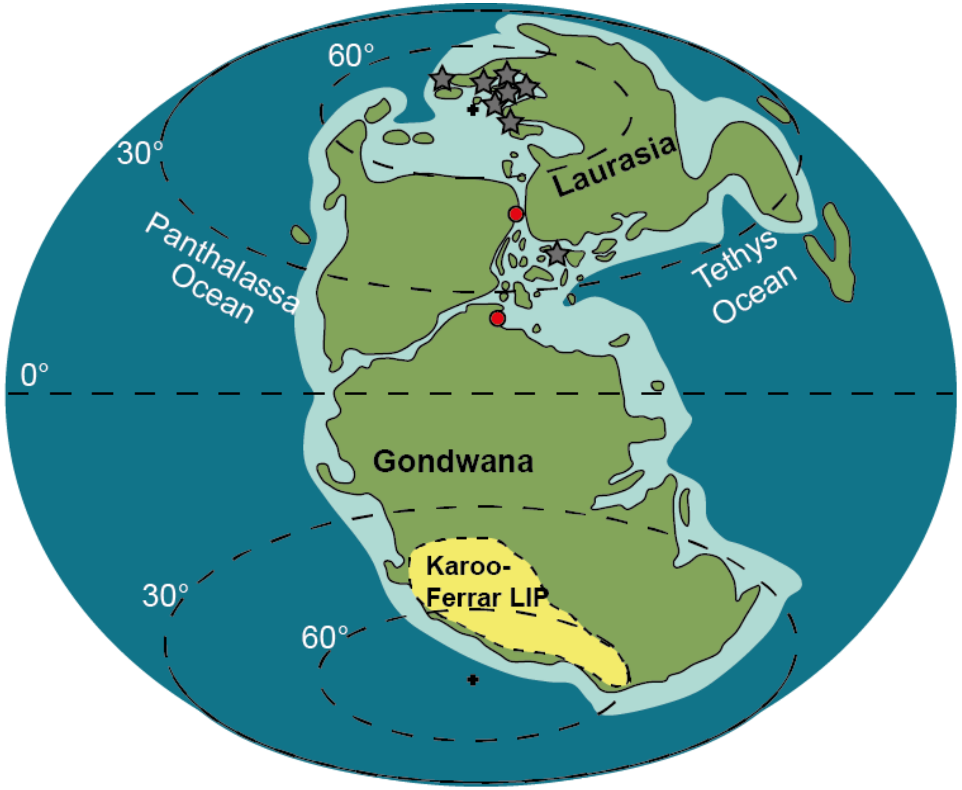
Photography not allowed

The Pliensbachian-Toarcian warming

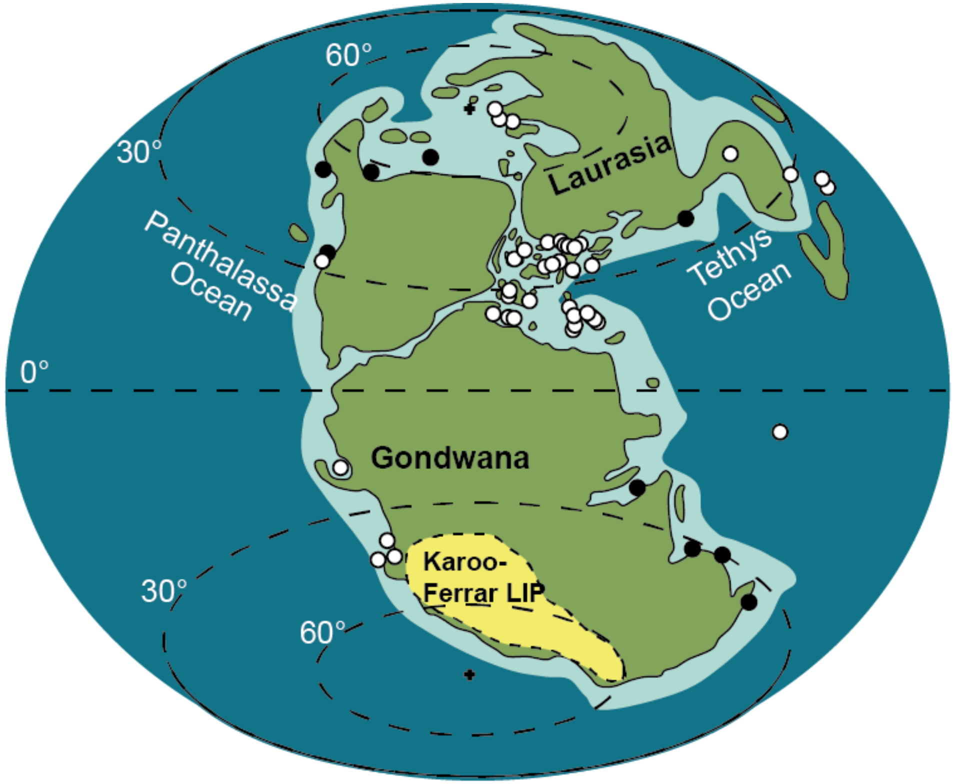
Late Pliensbachian cryosphere?



☆ Upper Pliensbachian glendonite (Rogov et al., 2021)

● Evidence for major eustastic changes (Krencker et al., 2019)

Early Toarcian hyperthermal event

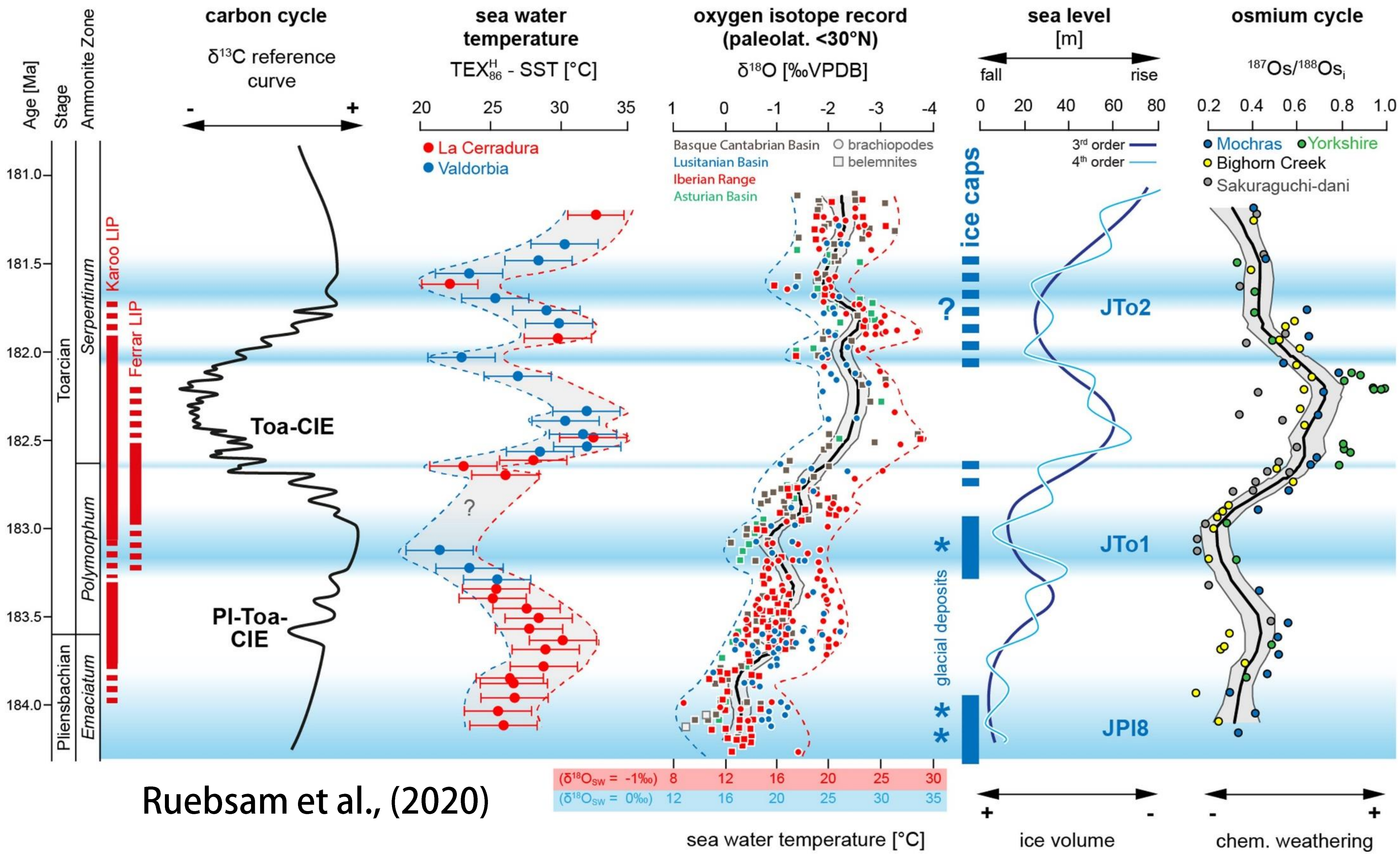


○ CIE records (according to Remirez and Algeo, 2020)

● Organic rich facies (according to Them et al., 2017)

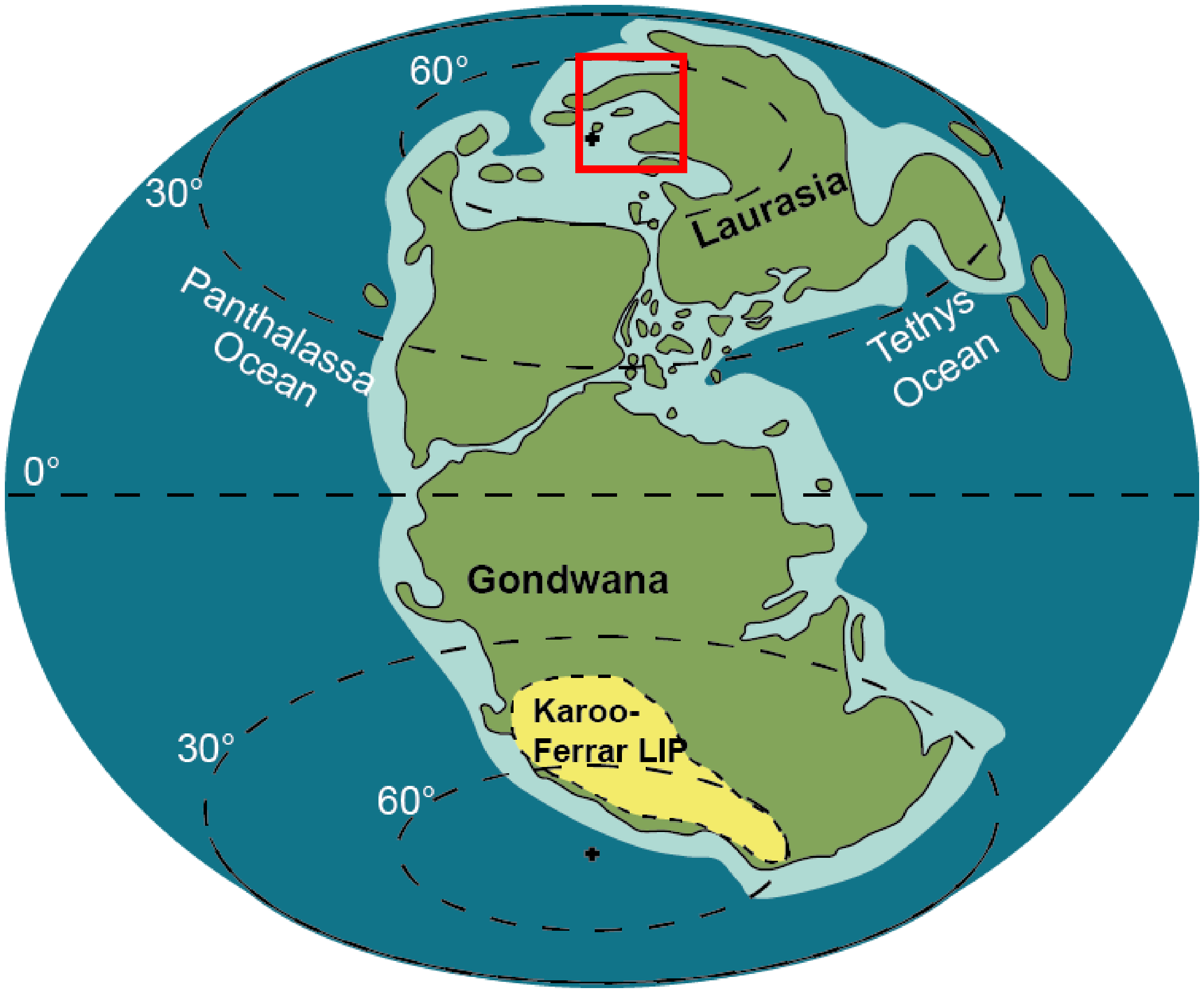
Pliensbachian-Toarcian paleogeographic map, modified from Dera et al. (2009)

Low latitude geochemical records

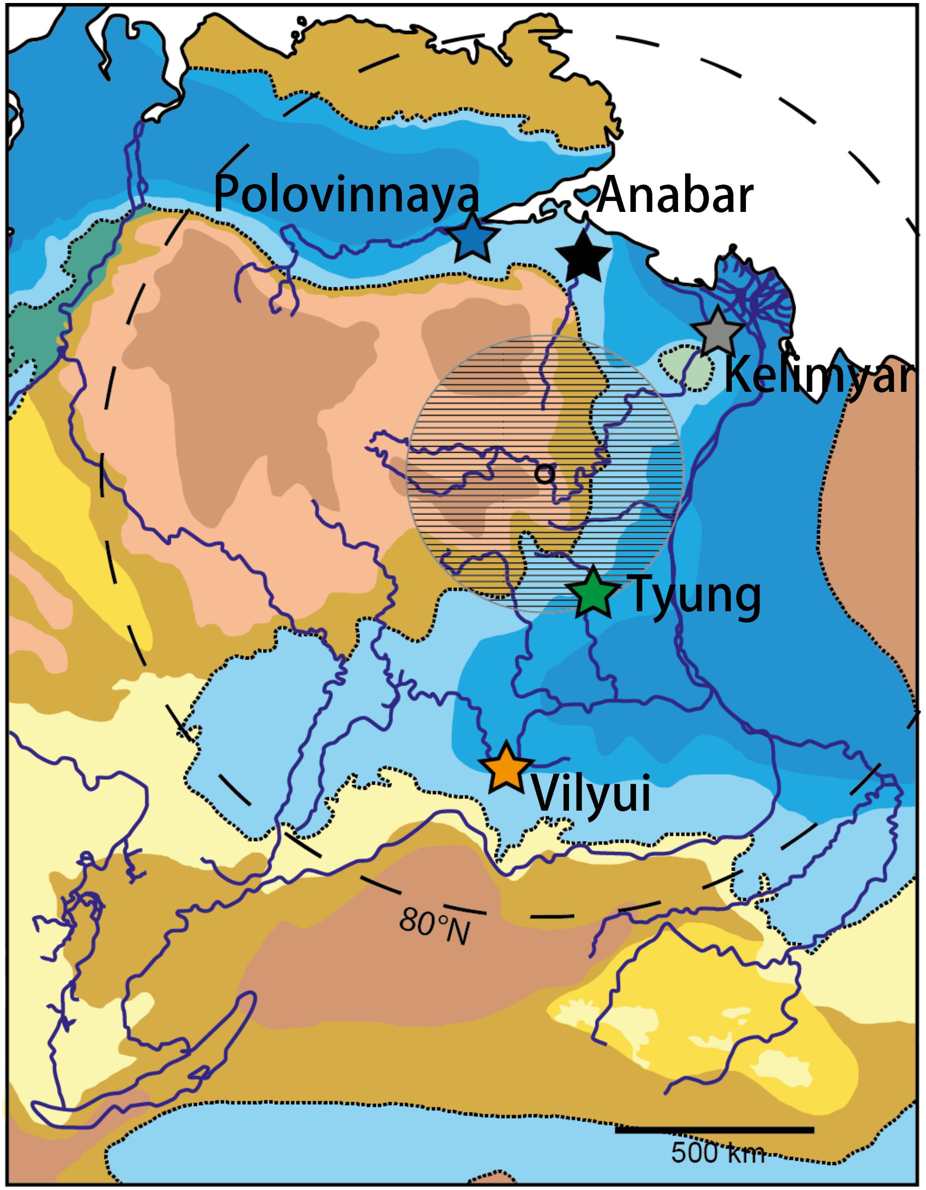


Ruebsam et al., (2020)

Building a polar record

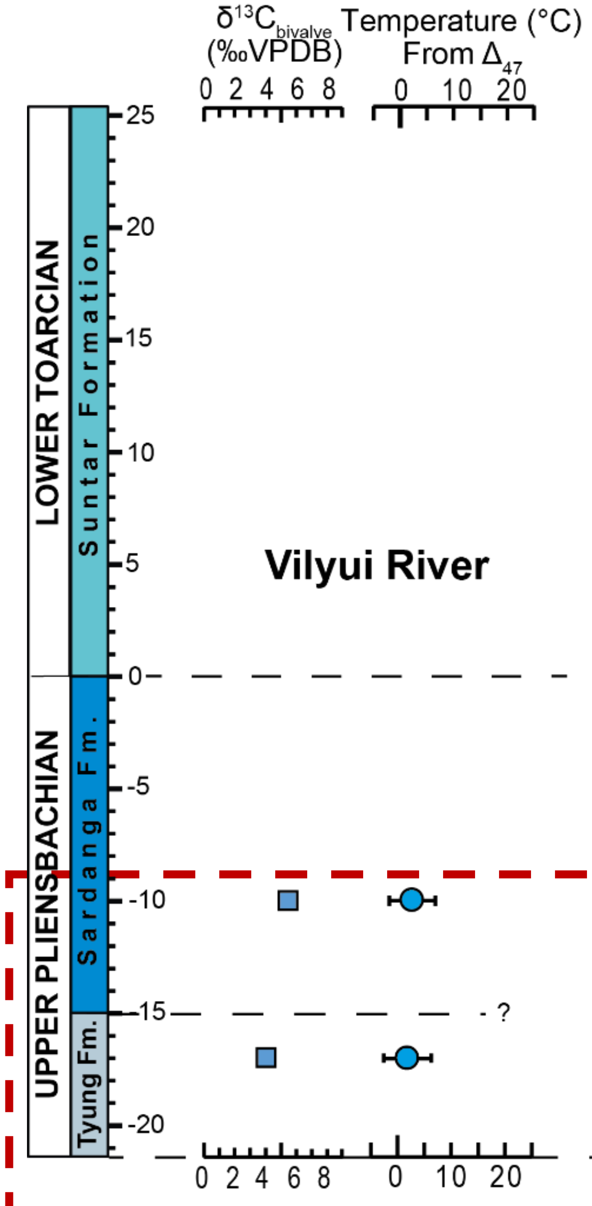


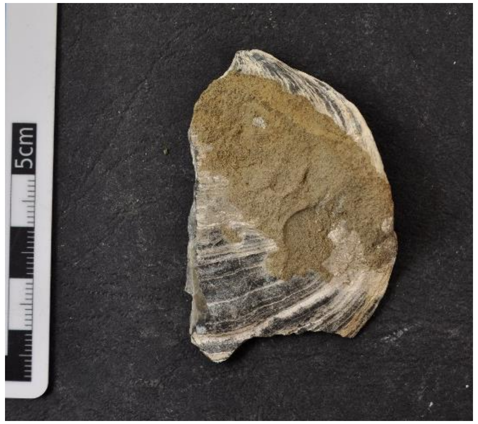
Pliensbachian-Toarcian paleogeographic map, modified from Dera et al. (2009)



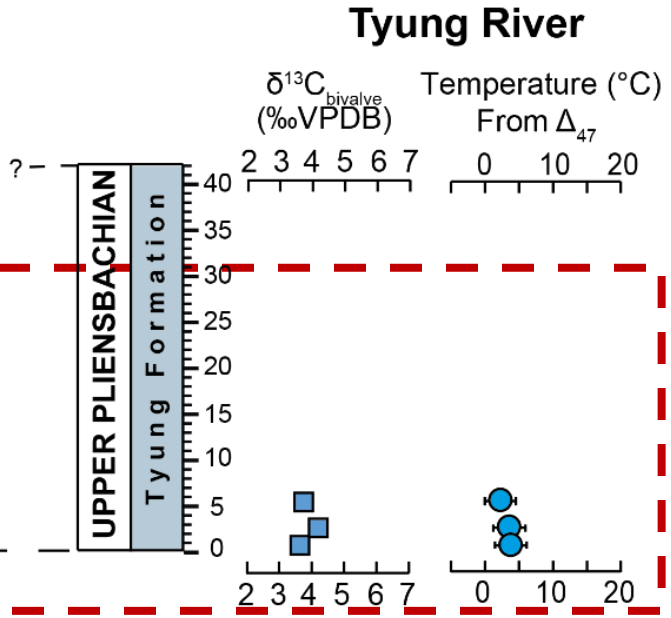
Early Toarcian paleogeography of eastern Siberia (Modified from Zverkov et al., 2021)

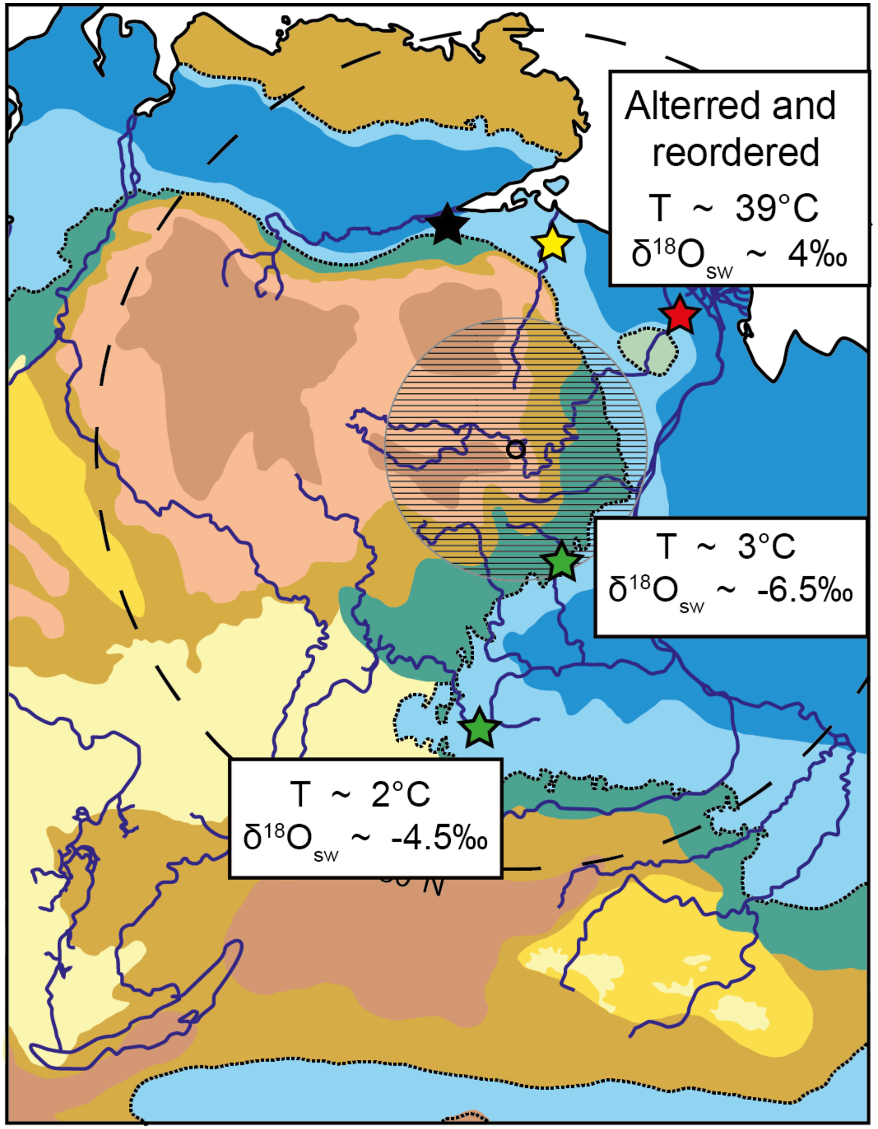
Late Pliensbachian, *Harpax* calcite



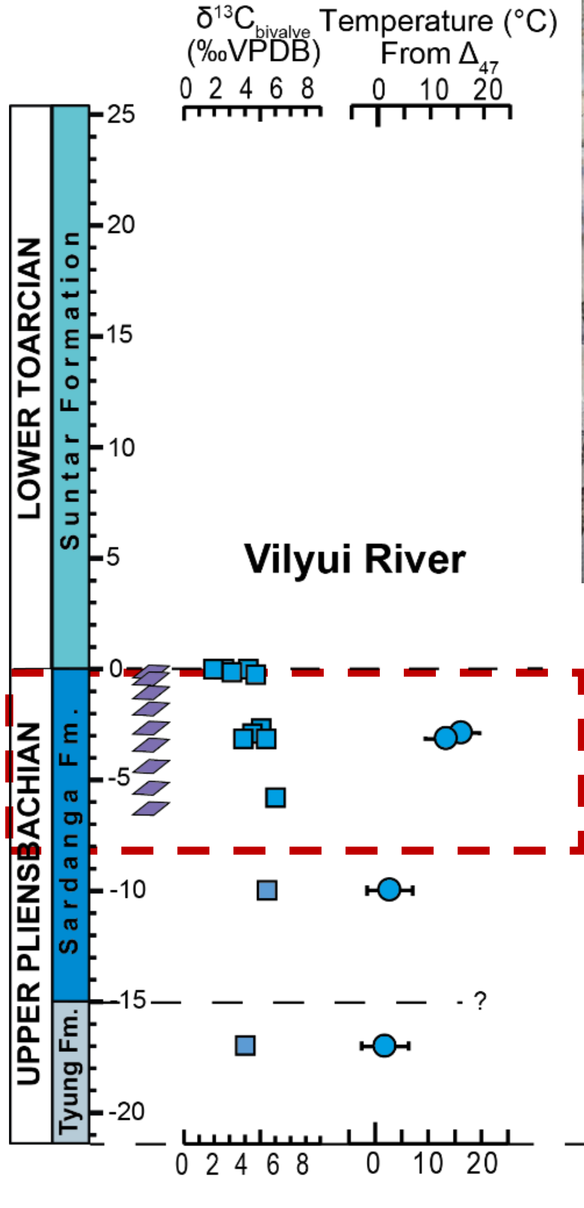


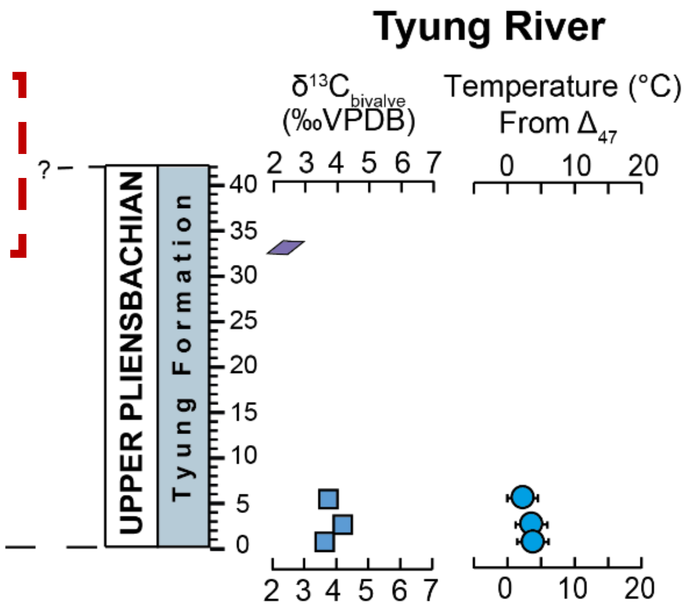
Harpax laevigatus
(Tyung River, Upper Pliensbachian)

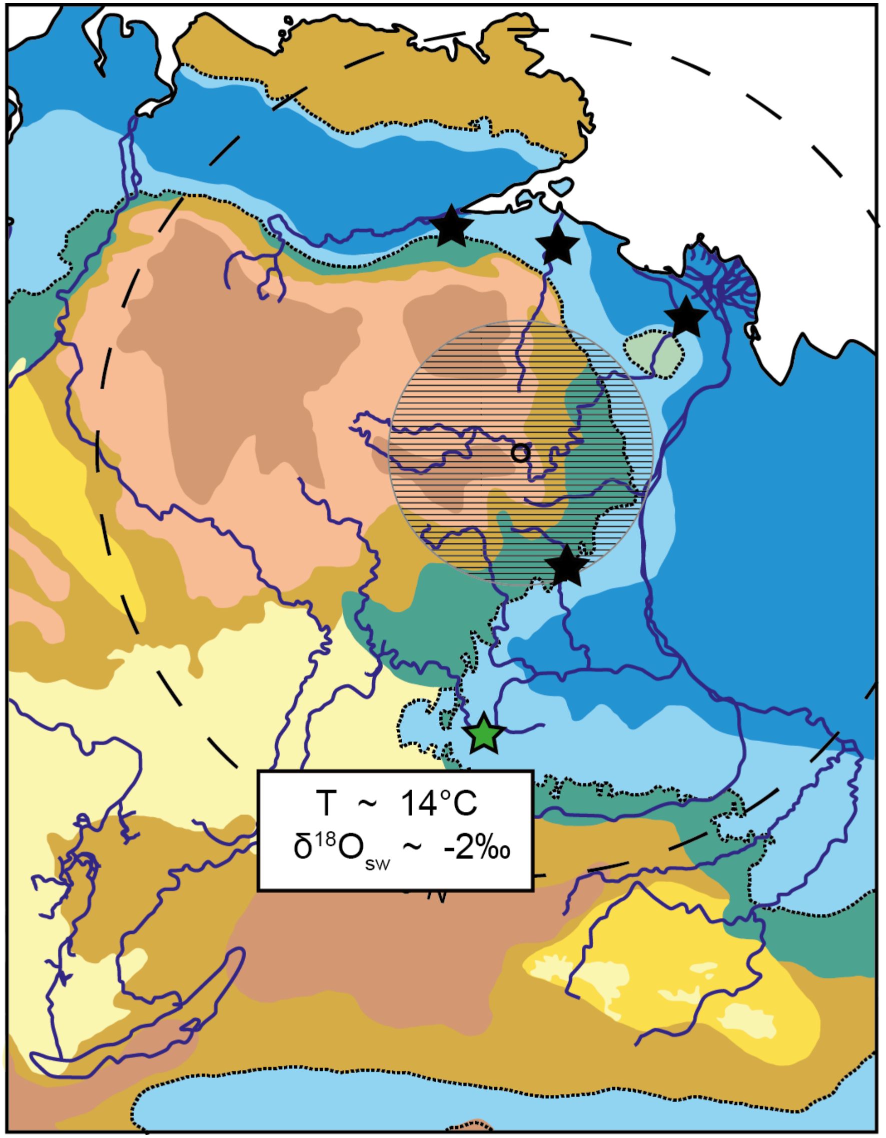




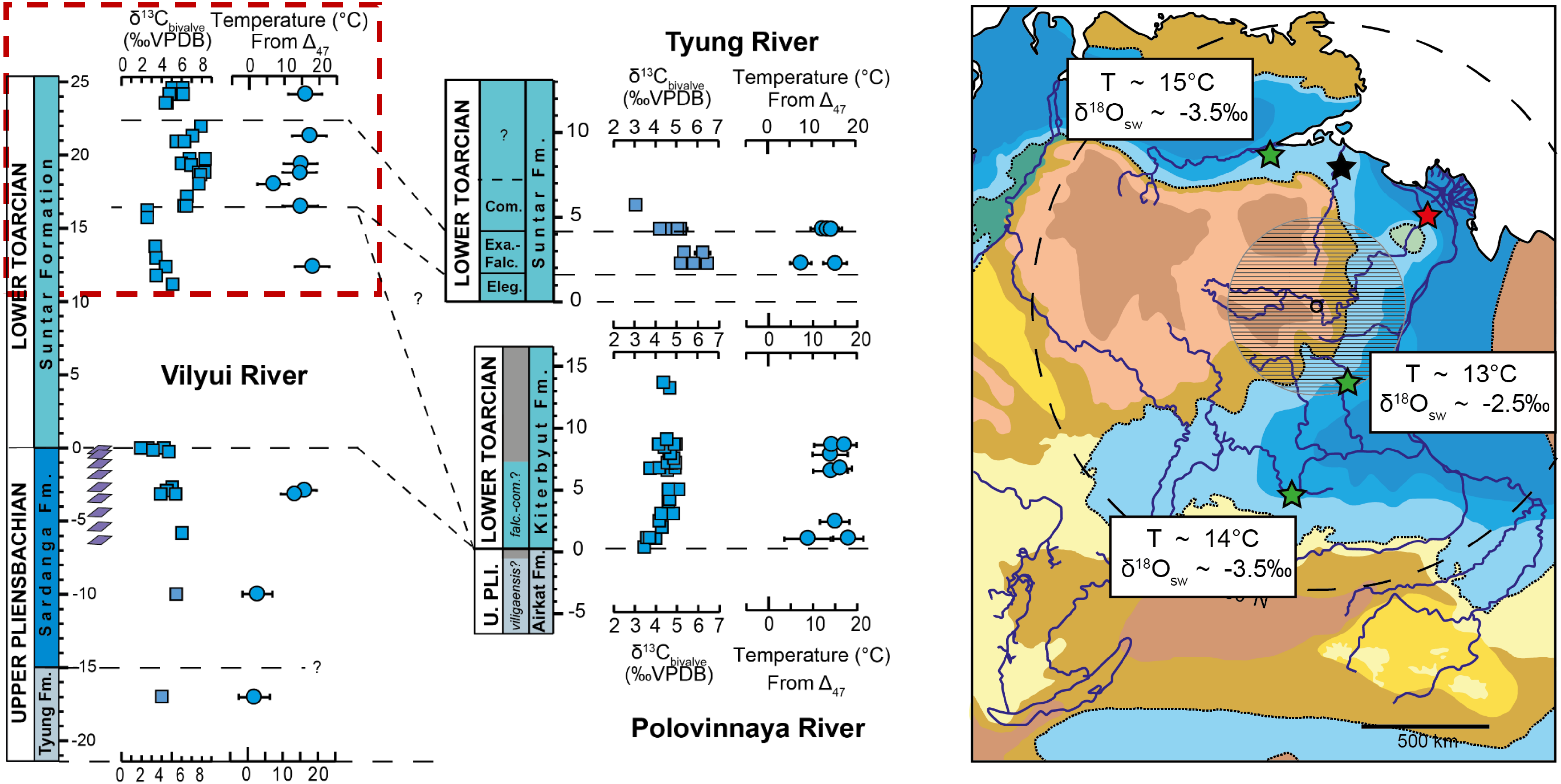
Latest Pliensbachian, glendonite interval



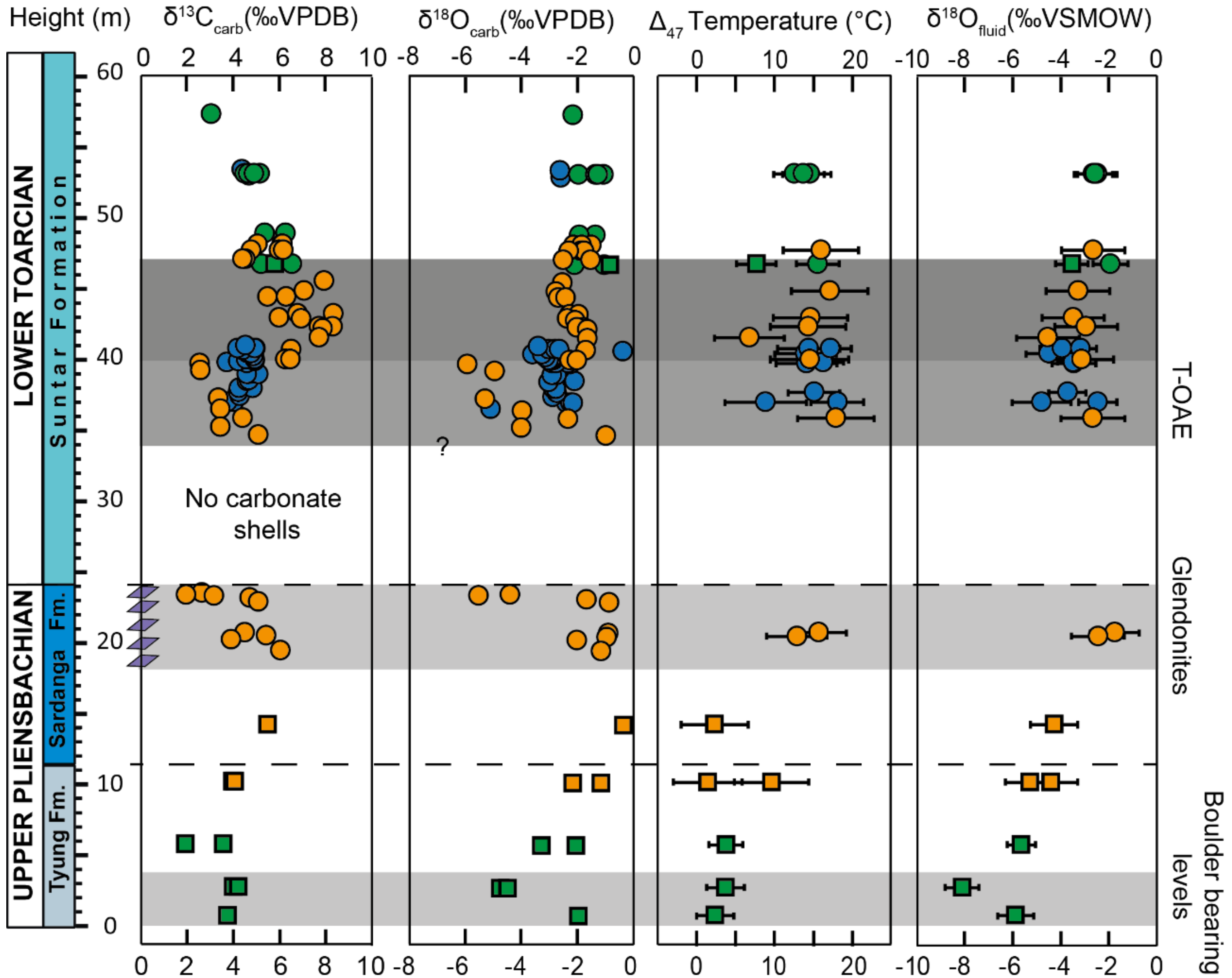


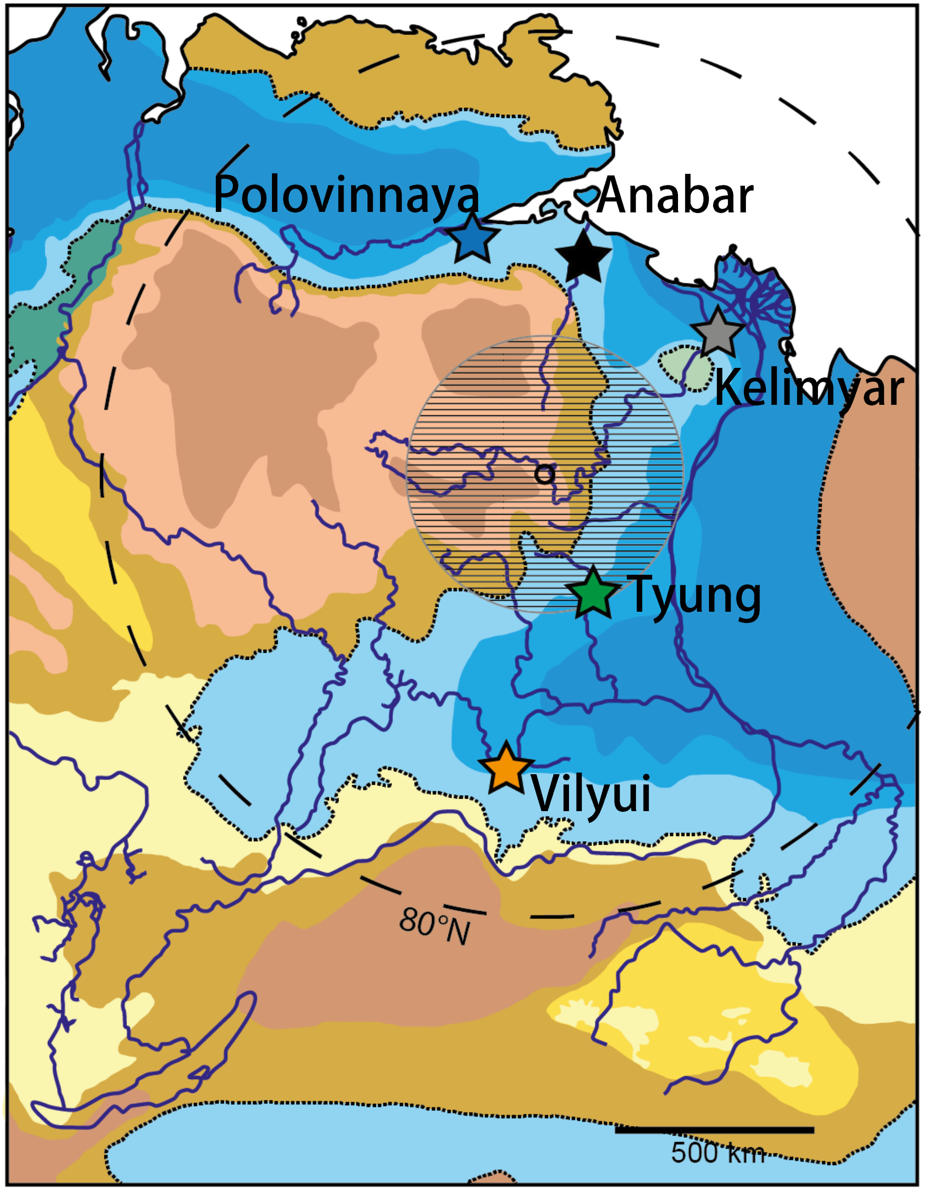


Jenkyns Event (T-OAE), aragonite bivalves

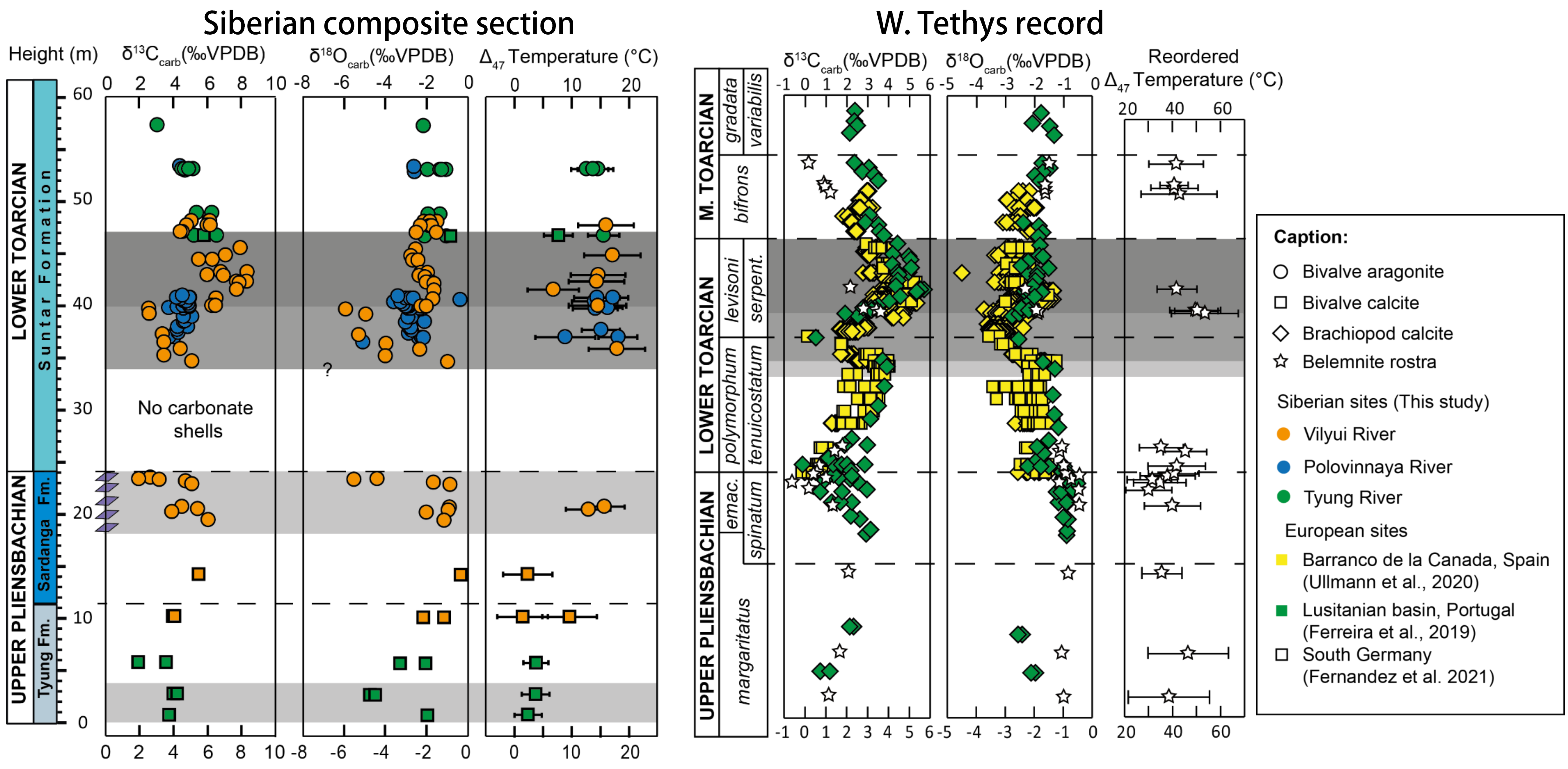


Composite Siberian record





Comparison with the western Tethys



Take home message

Near freezing temperatures (0 to 5°C) recorded in U. Pliensbachian *Harpax* shells.

Warm polar temperatures (7 to 18°C) recorded from aragonite shells from the Latest Pliensbachian glendonite-bearing strata and throughout the Jenkyns event.

Regional depletion in ^{18}O relative to the hypothetic global ocean during the Jenkyns event

Polar warming between 12 and 5°C between Late Pliensbachian and Early Toarcian, 5-7°C at low latitudes

Uncertainties in temperatures linked to both seasonal biases and preservation of the aragonite shell Δ_{47}.

Coming data (belemnite and organic geochemistry) should help to address these issues and refine the age model.

References

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