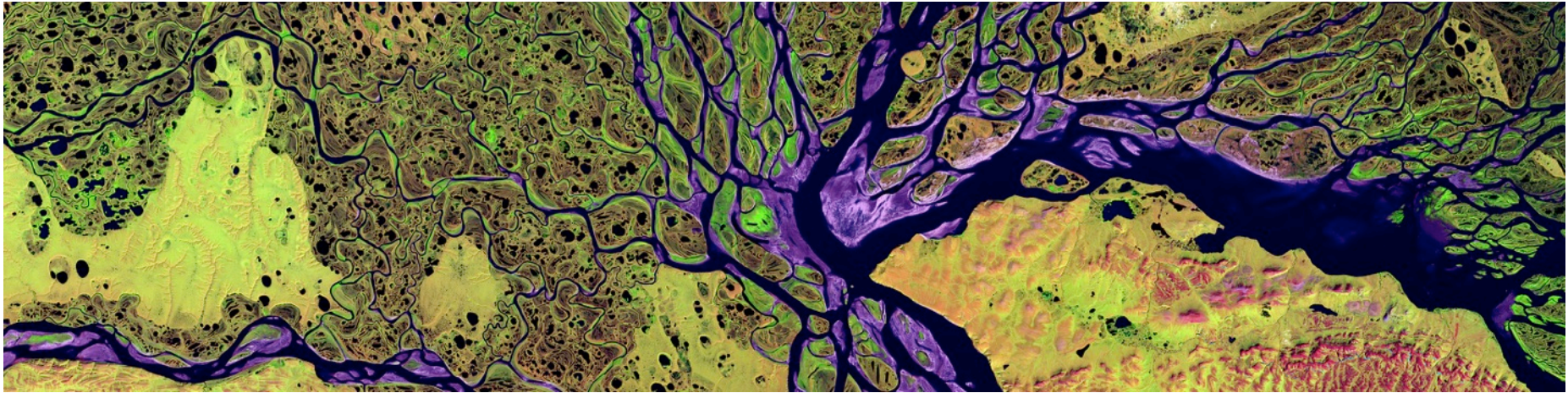


Sources and age of terrigenous organic matter exported from the Lena River watershed, NE Siberia



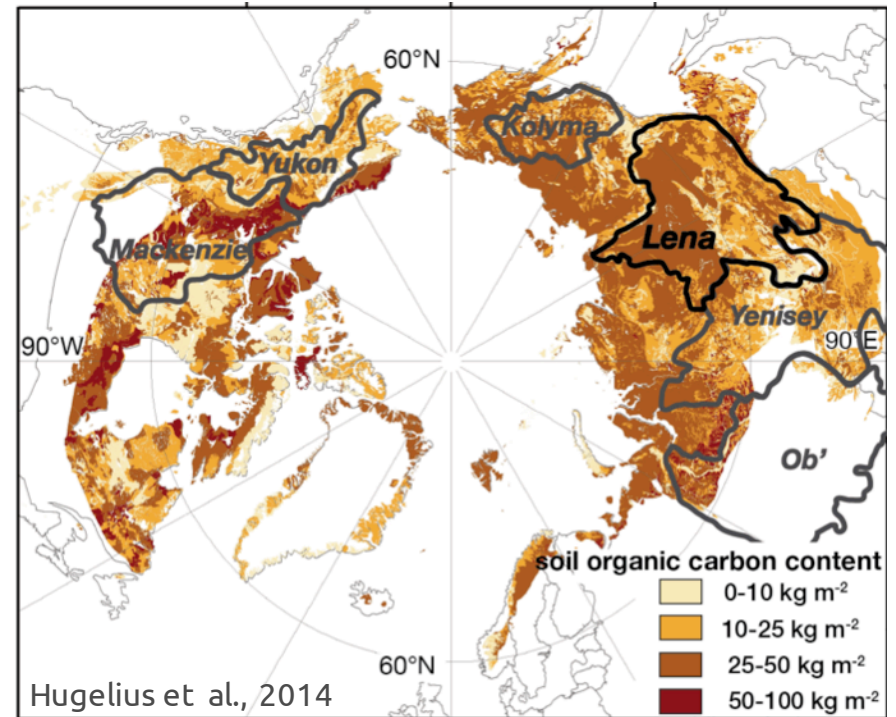
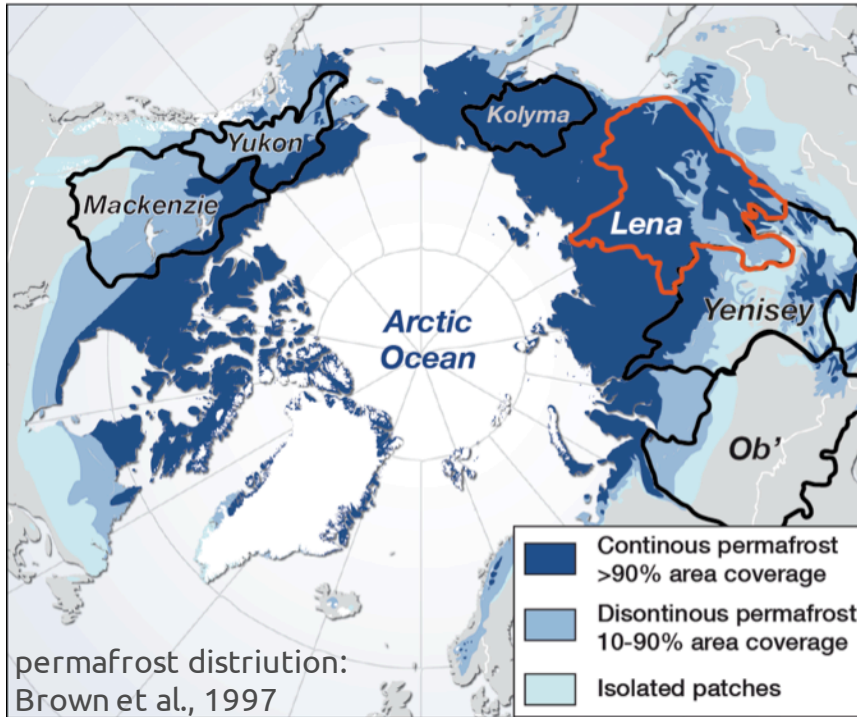
Lena Delta (Landsat 2000, NASA)

Maria Winterfeld^{1,2}, Miguel Goñi³, Janna Just⁴, Jens Hefter²,
Shuwen Sun², Pai Han² & Gesine Mollenhauer^{1,2}

¹Alfred Wegener Institute, Germany; ²University of Bremen, Germany;

³Oregon State University, USA; ⁴MARUM, Germany

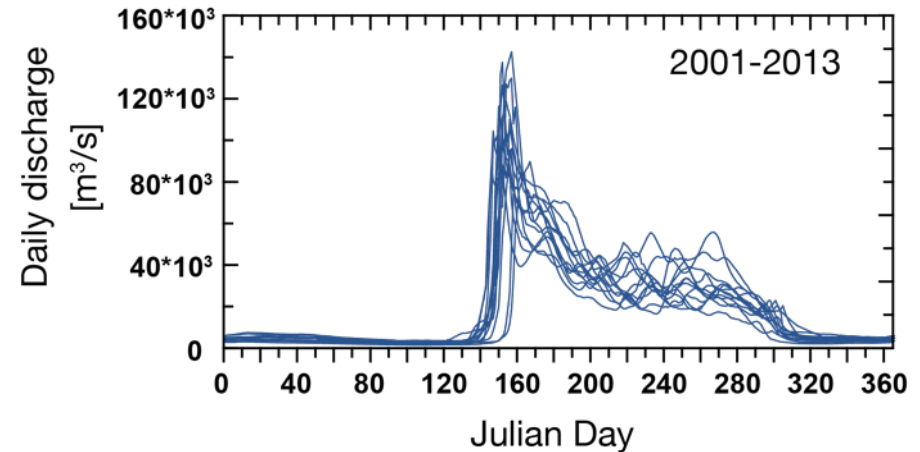
Motivation



Composition of modern exported POM?

Can it serve as baseline for future changes in the catchment?

Lena River catchment



- strong seasonality of discharge
- → spring freshet end of May/early June with ~50% of annual sediment, DOC, and POC export

catchment: $\sim 2.5 \cdot 10^6 \text{ km}^2$

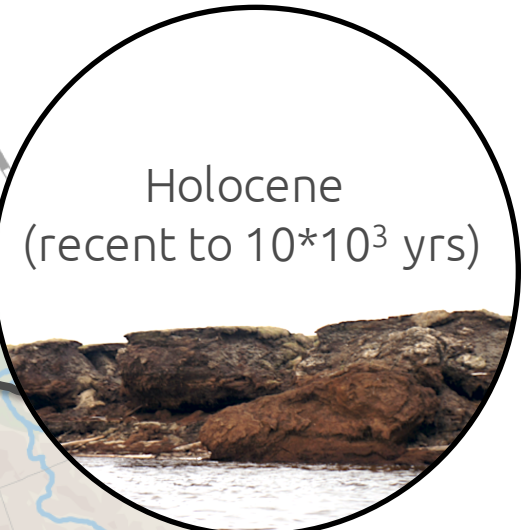
discharge: 588 km^3 (1999-2008)

Sources of POM – Approach

1 Lignin phenols



2 POM ¹⁴C



Holocene
(recent to $10 \cdot 10^3$ yrs)



Late Pleistocene
($10-40 \cdot 10^3$ yrs)



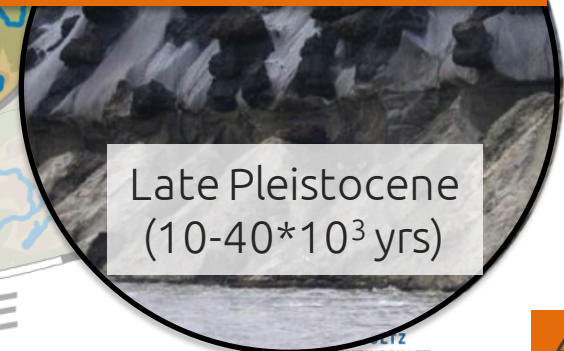
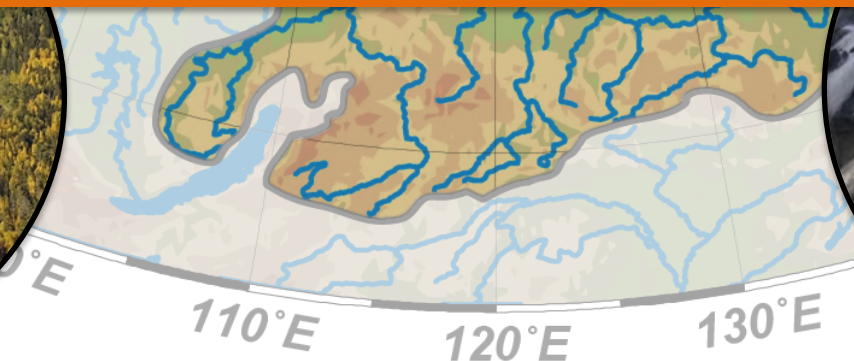
Sources of POM – Approach

1 Lignin phenols

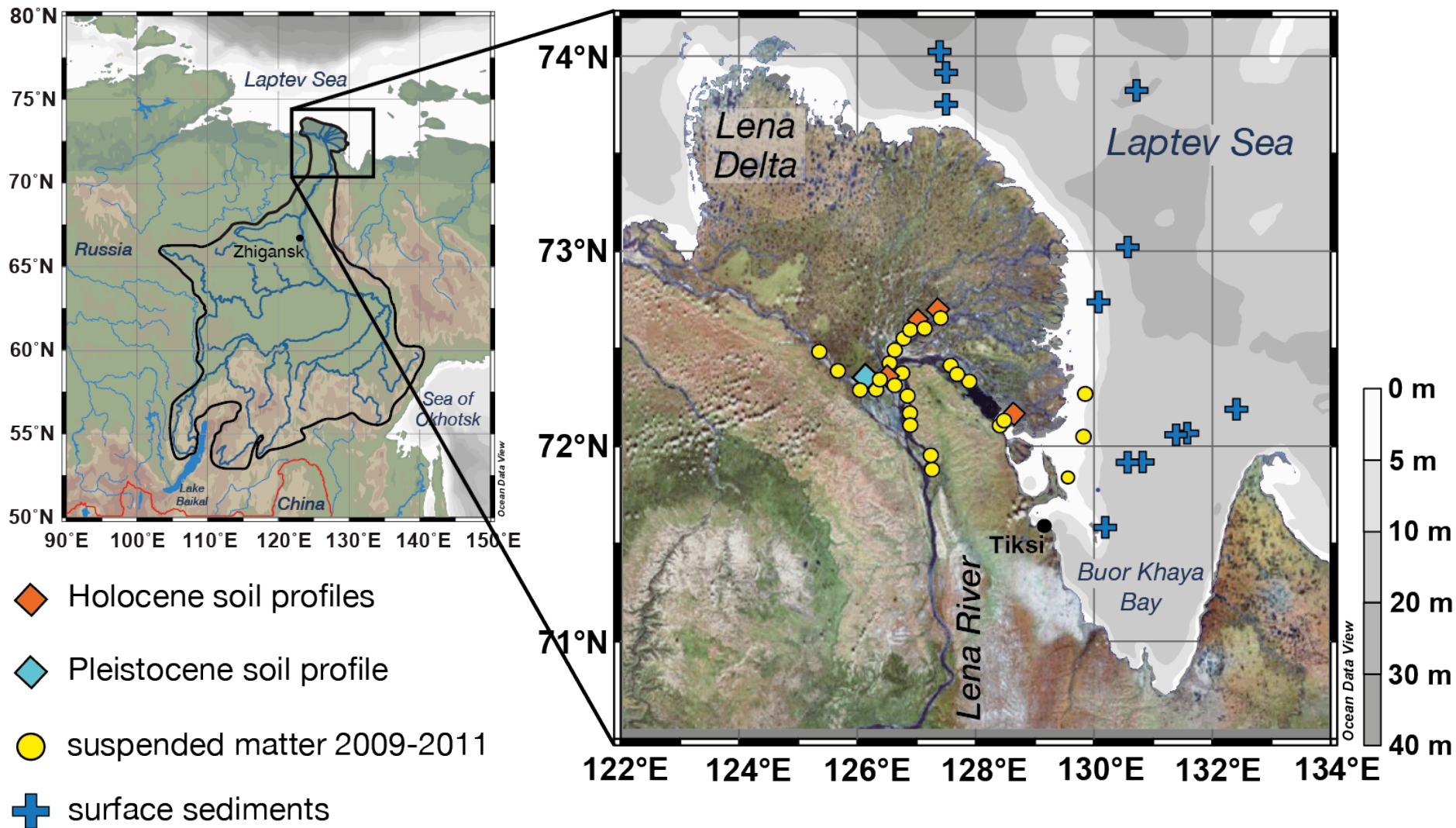
2 POM ^{14}C

How big is the contribution from taiga & tundra in exported POM?

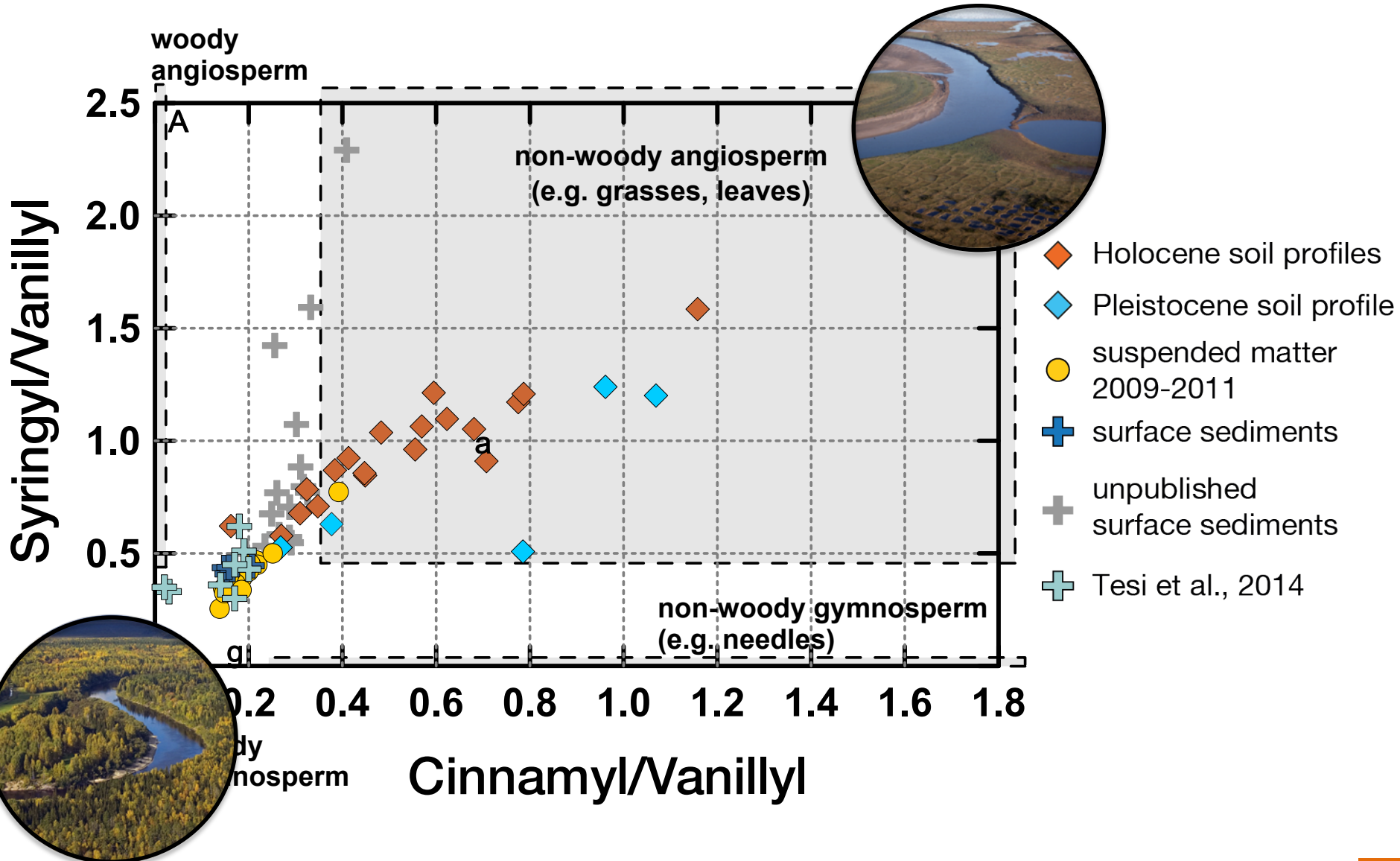
How old is soil-derived POM from the Lena catchment?



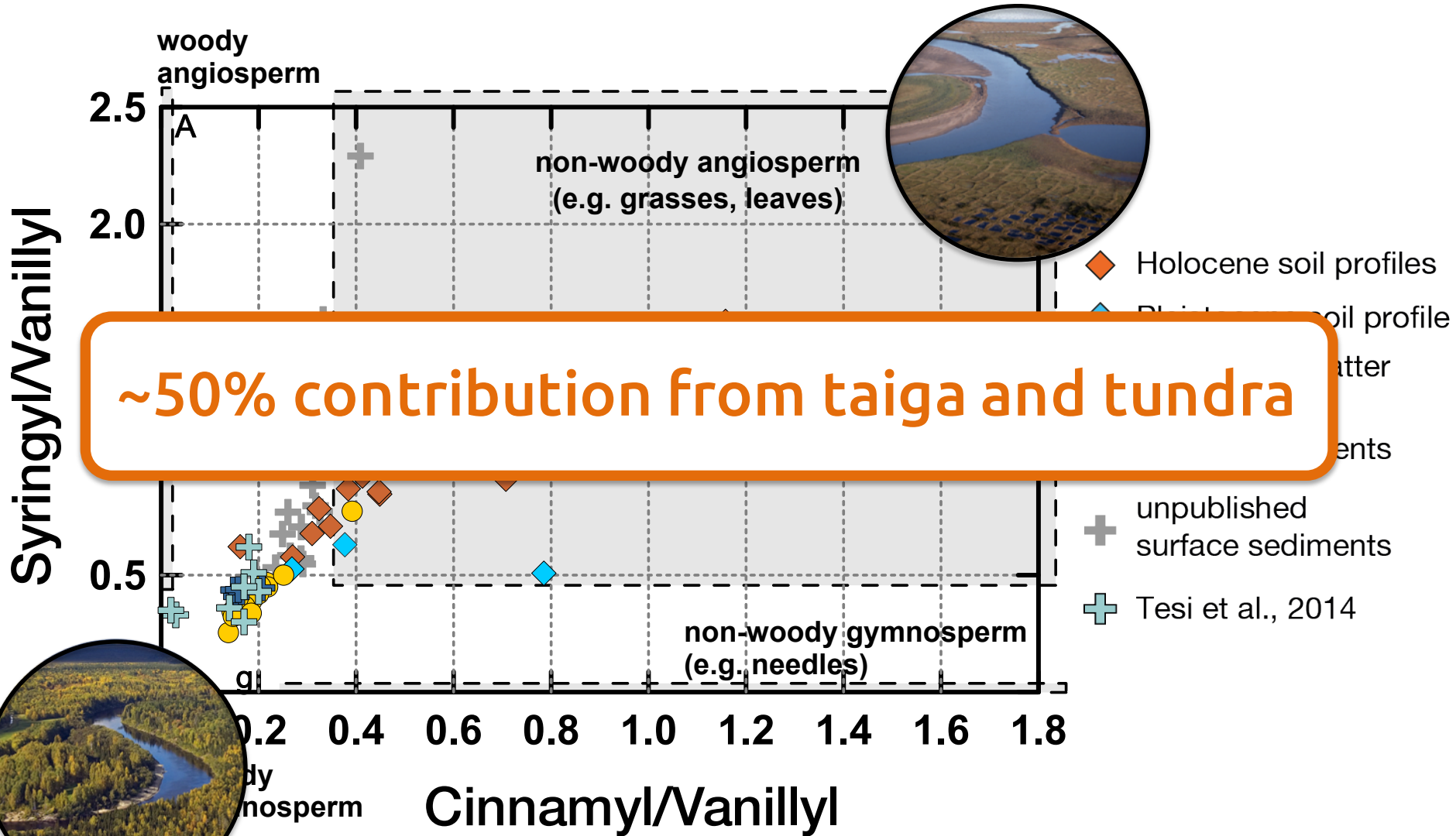
Sampling locations



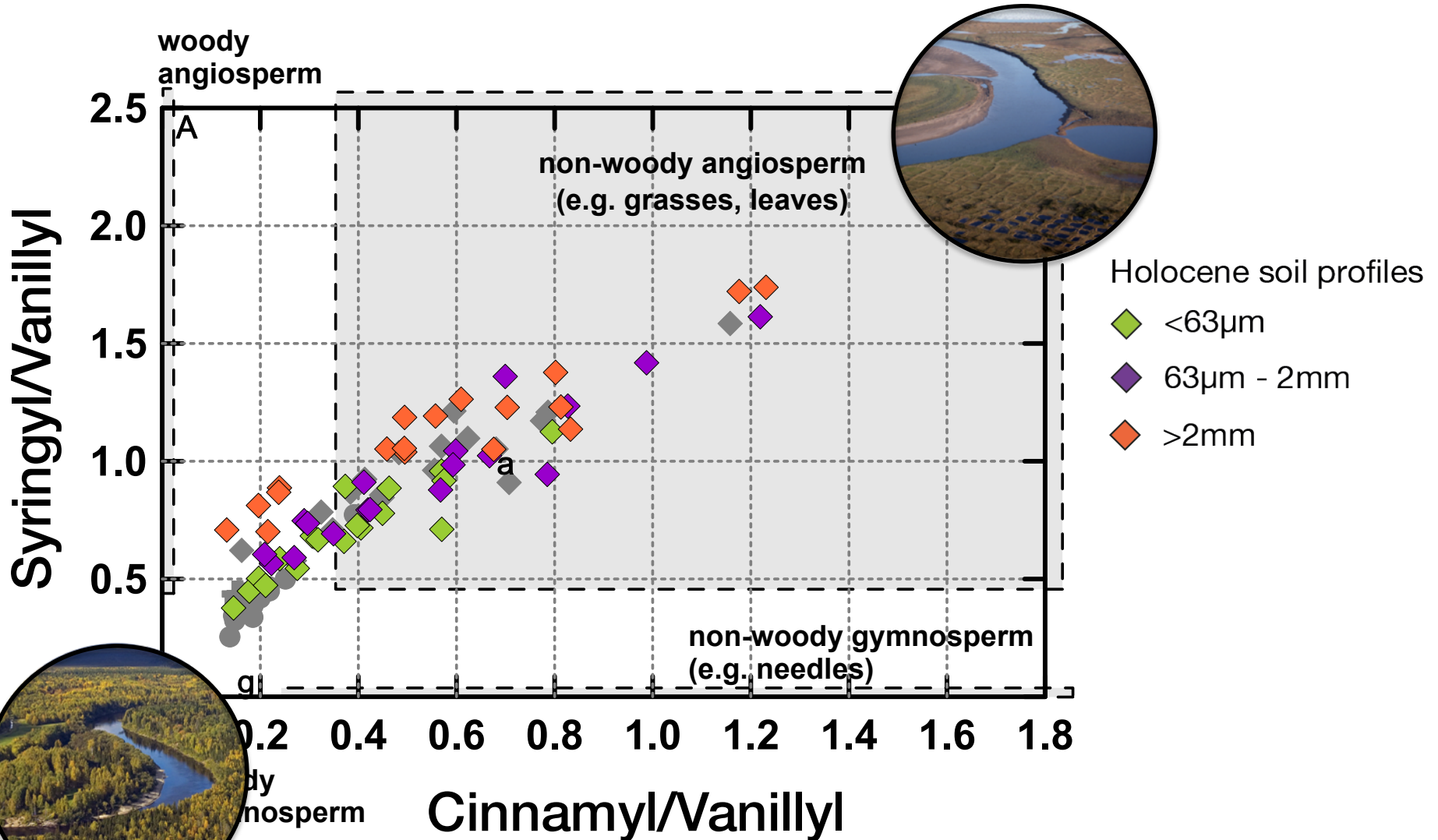
Lignin phenols – sources of POM



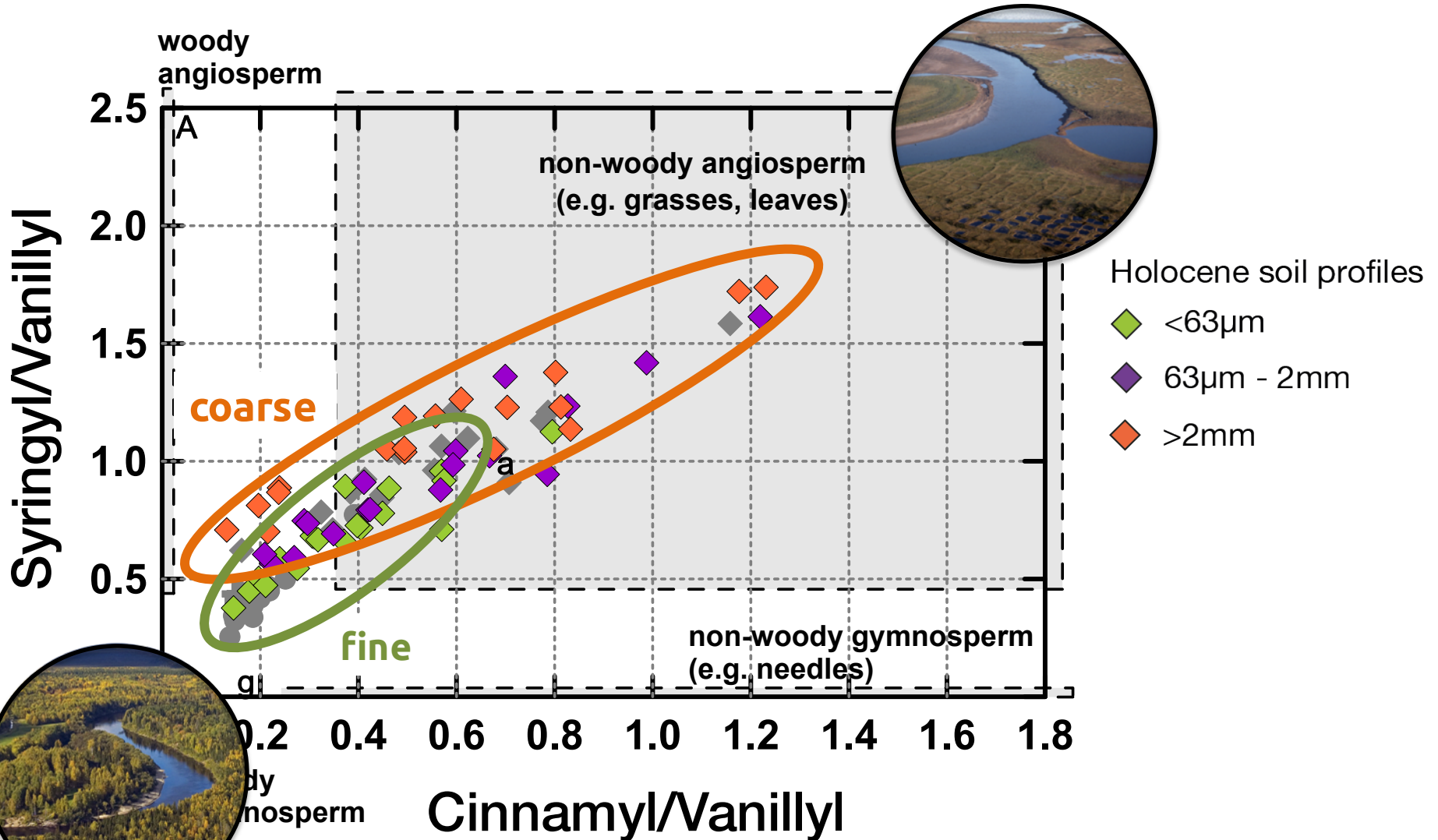
Lignin phenols – sources of POM



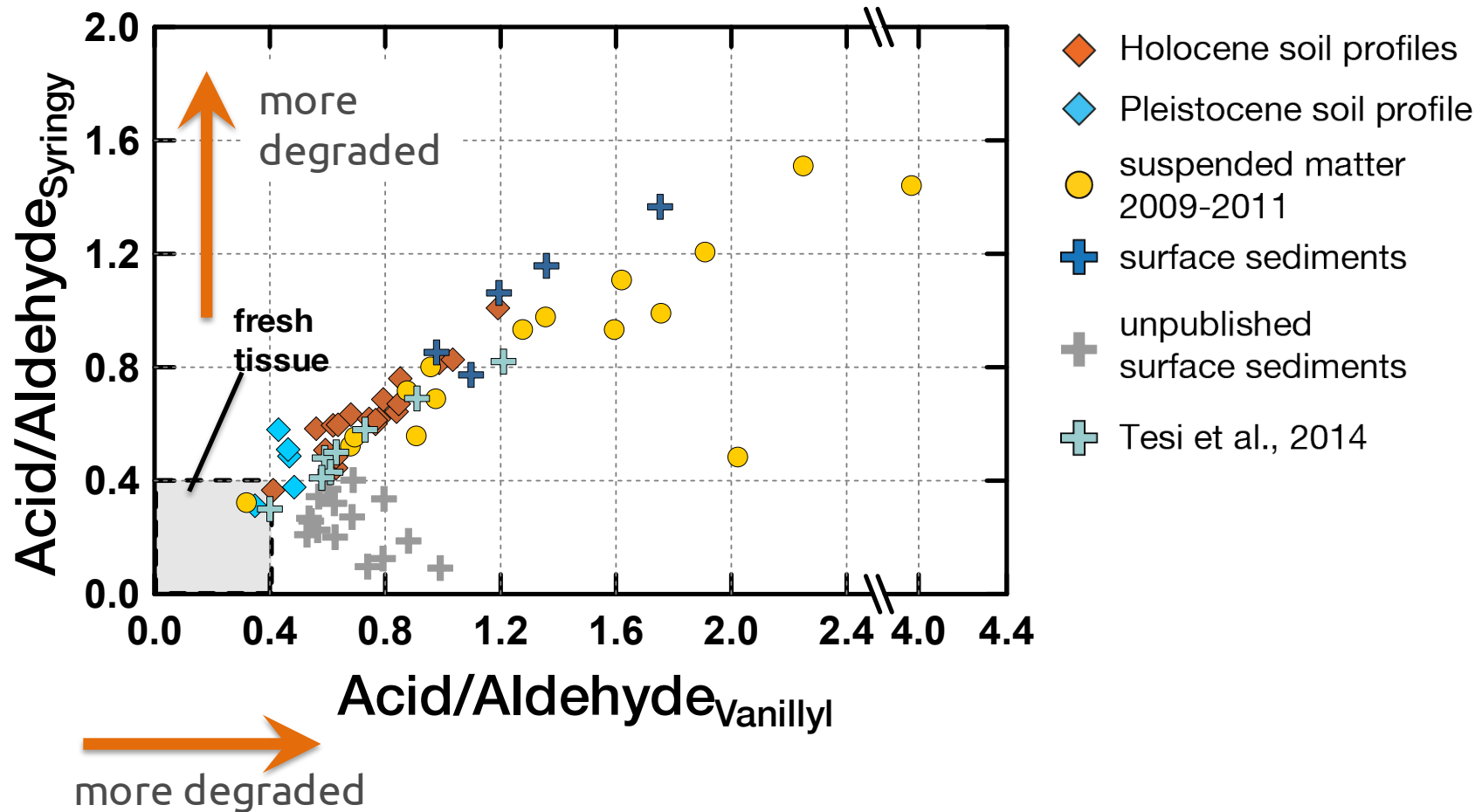
Lignin phenols – sources of POM



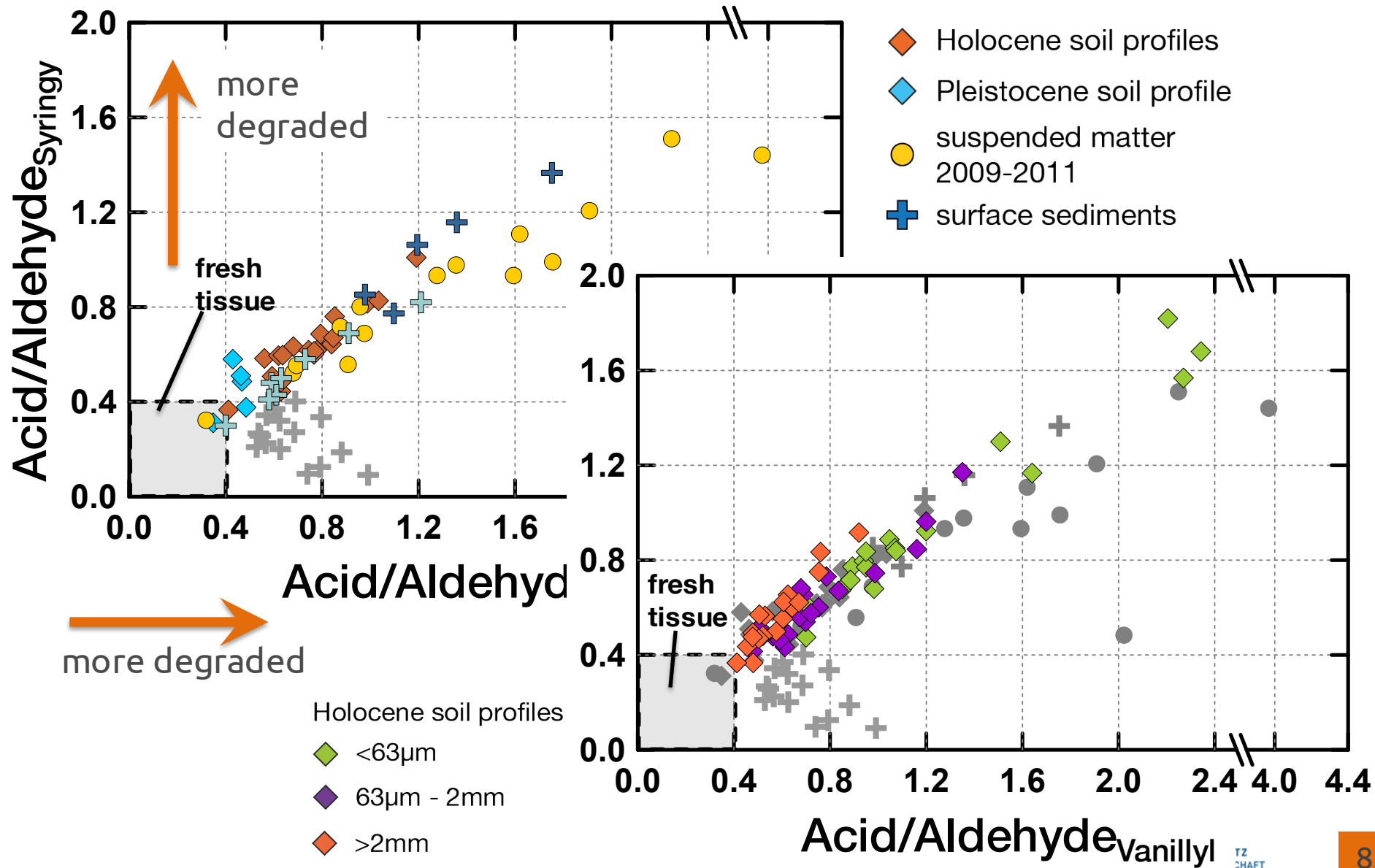
Lignin phenols – sources of POM



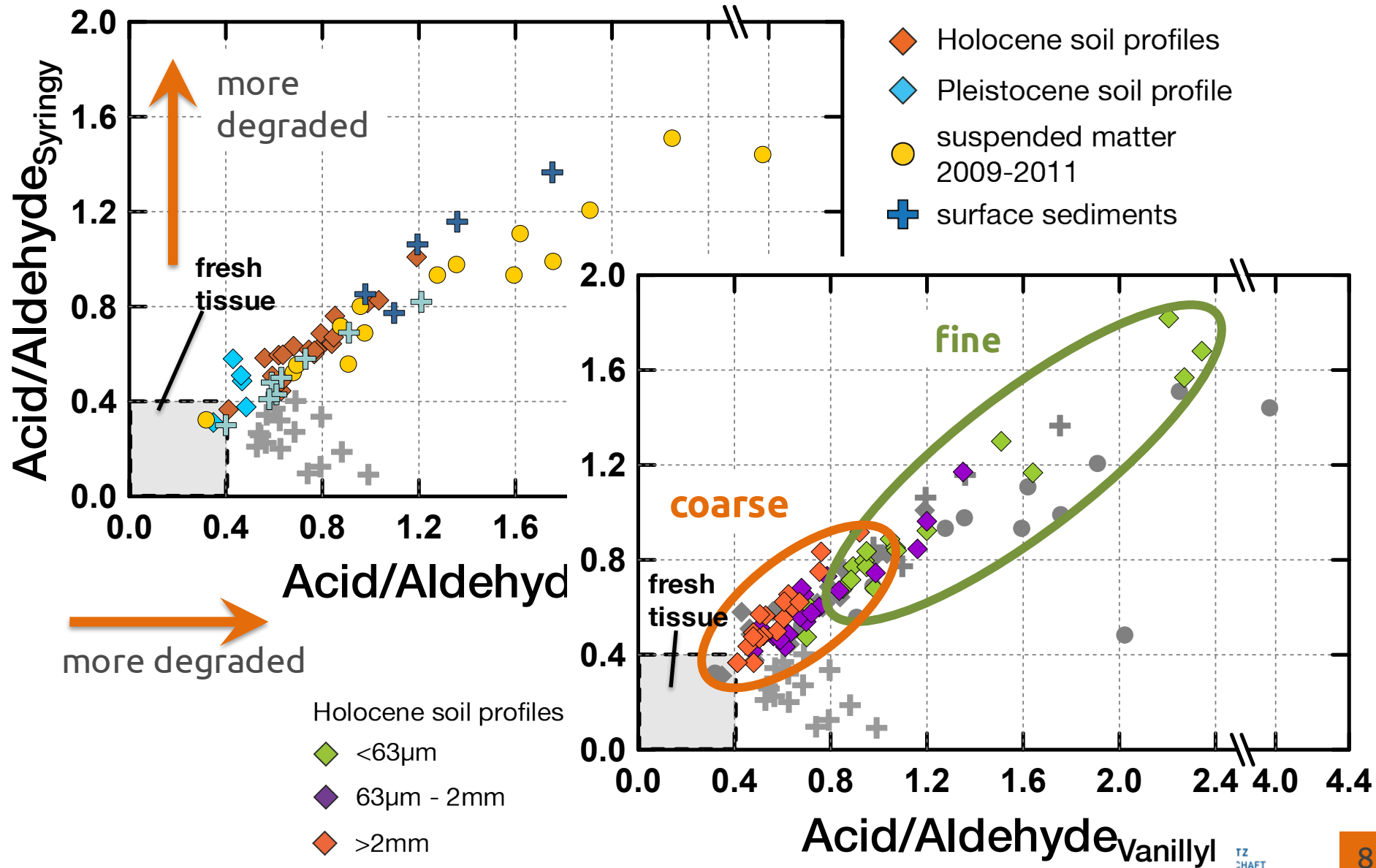
Lignin phenols – degradation



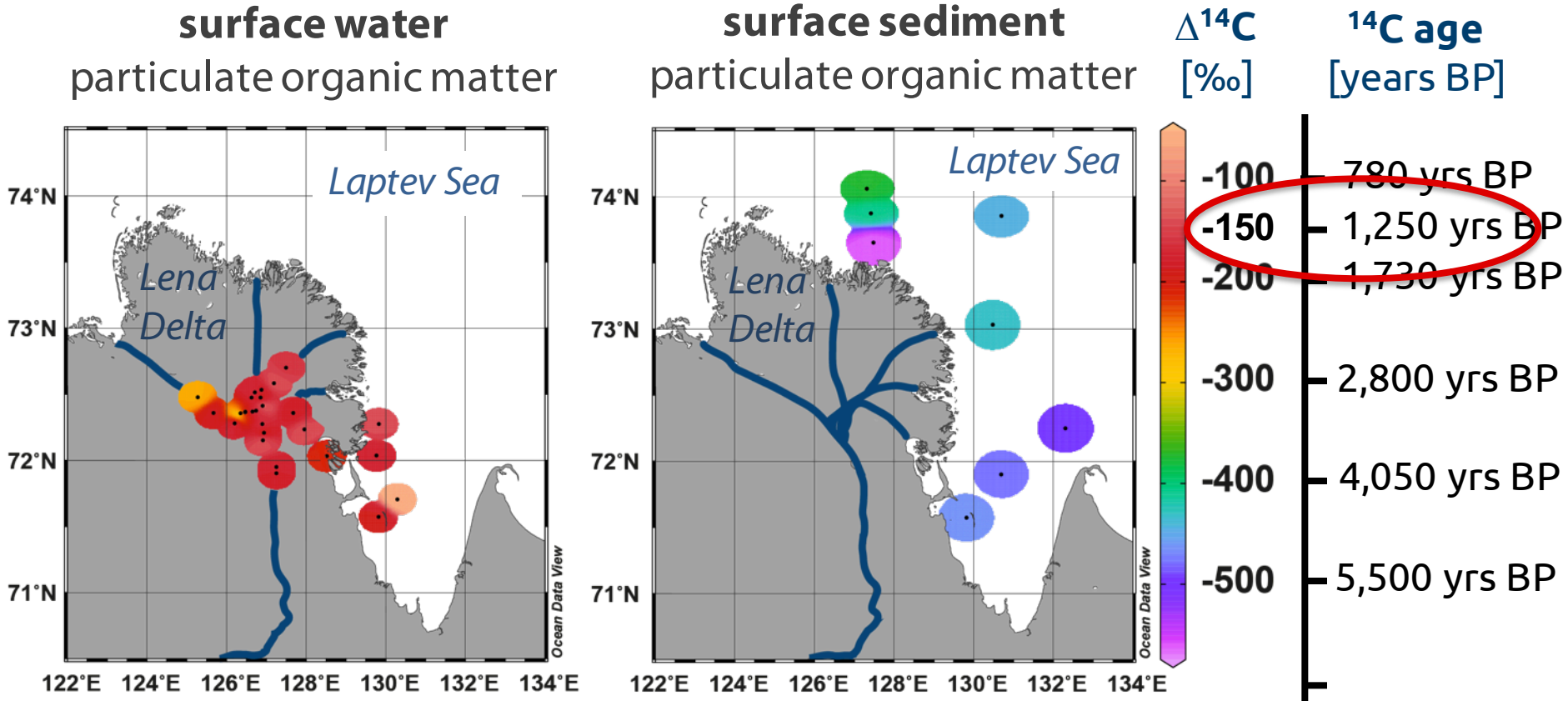
Lignin phenols – degradation



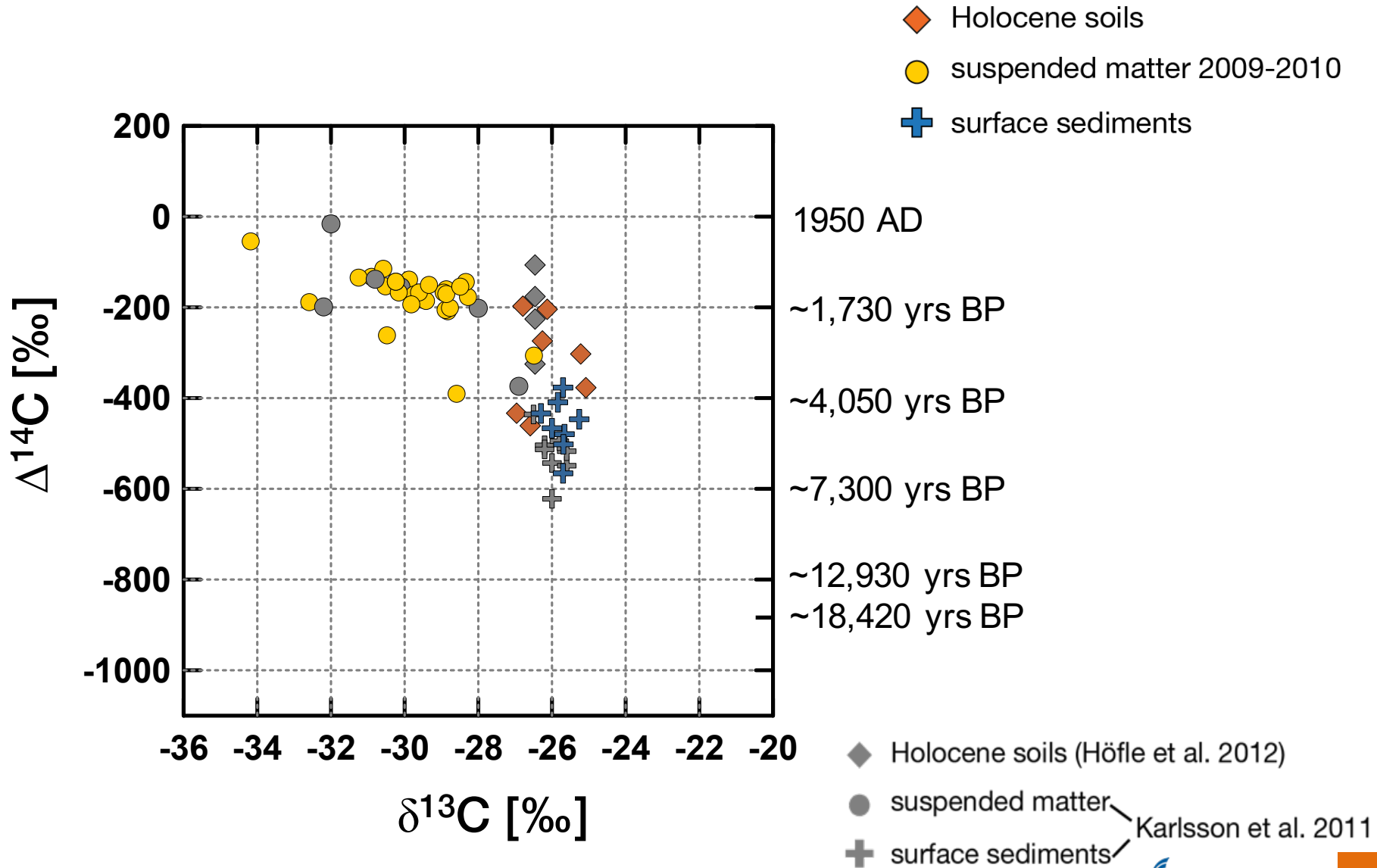
Lignin phenols – degradation



^{14}C age of POM



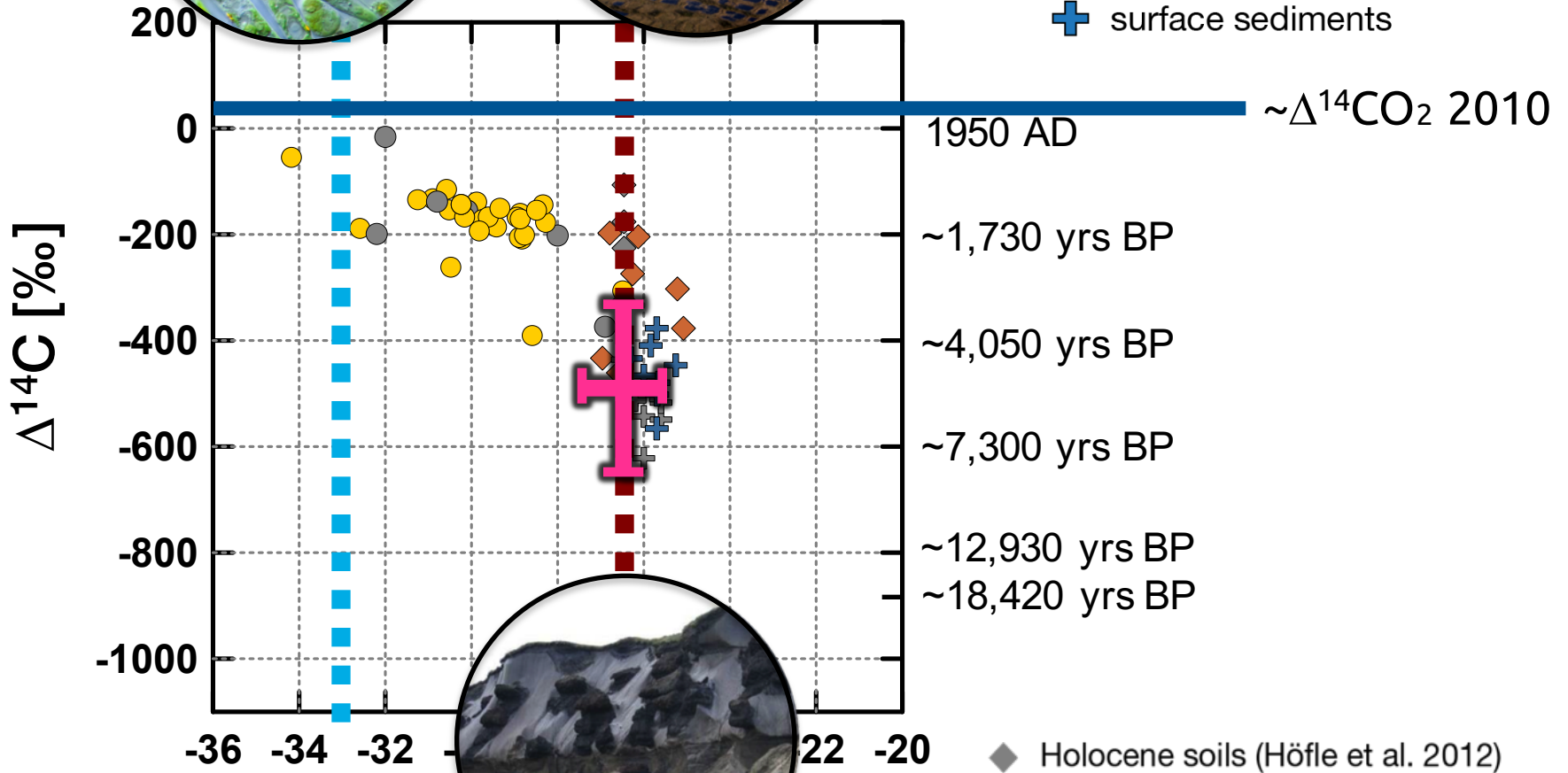
^{14}C age of POM



^{14}C in POM



- ◆ Holocene soils
- suspended matter 2009-2010
- + surface sediments



- ◆ Holocene soils (Höfle et al. 2012)
 - suspended matter
 - + surface sediments
- Karlsson et al. 2011

1 Lignin phenols

- ~50% contribution from taiga and tundra based on bulk data
- POM sources (Holocene vs. Pleistocene) and/or particle size/density influence lignin composition

2 POM ^{14}C

- estimated $\Delta^{14}\text{C}$ of soil derived POM reflects heterogeneity of permafrost soils in the catchment