Climate versus human impact on the Lake Atnsjøen ecosystem (sout-eastern Norway) during the last millennium

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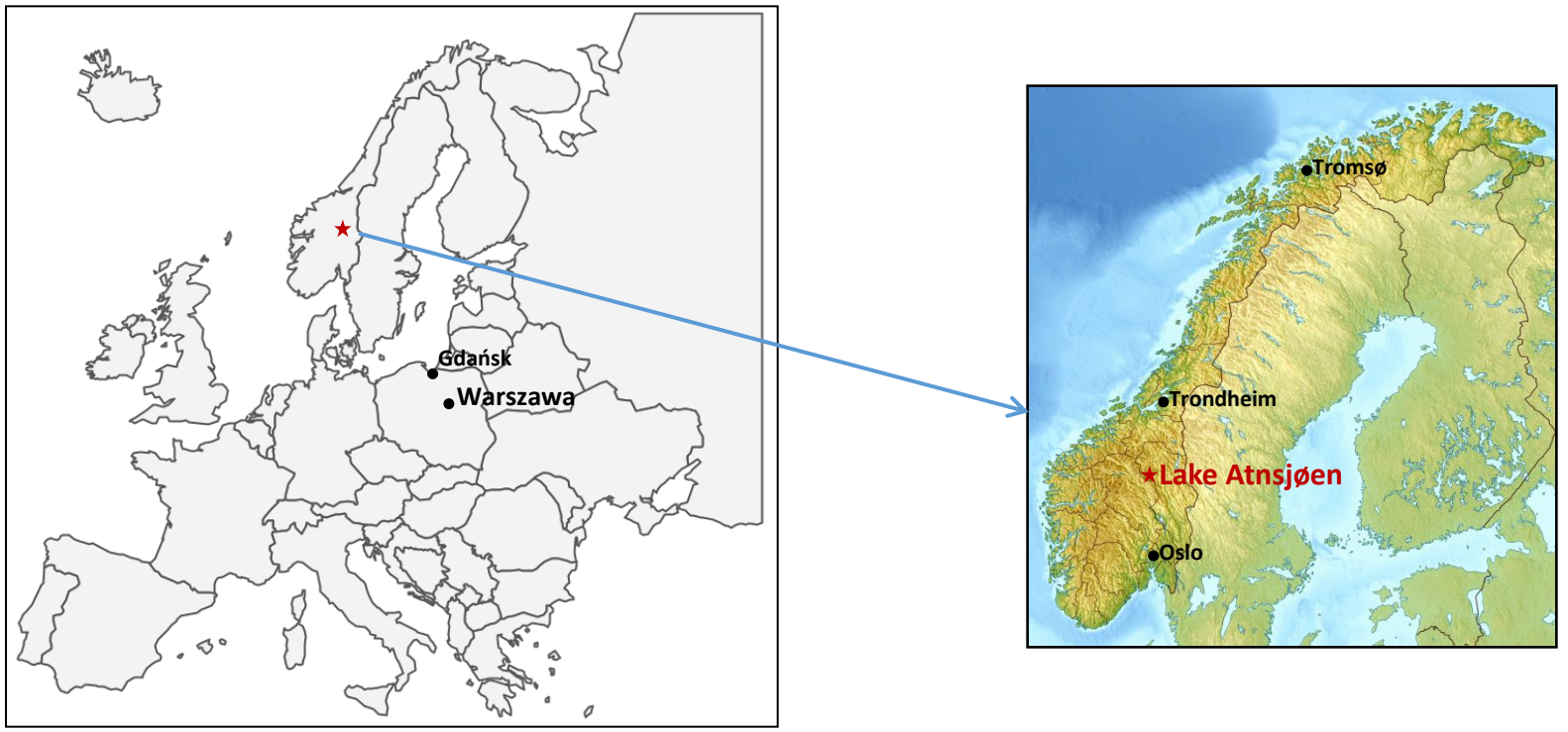
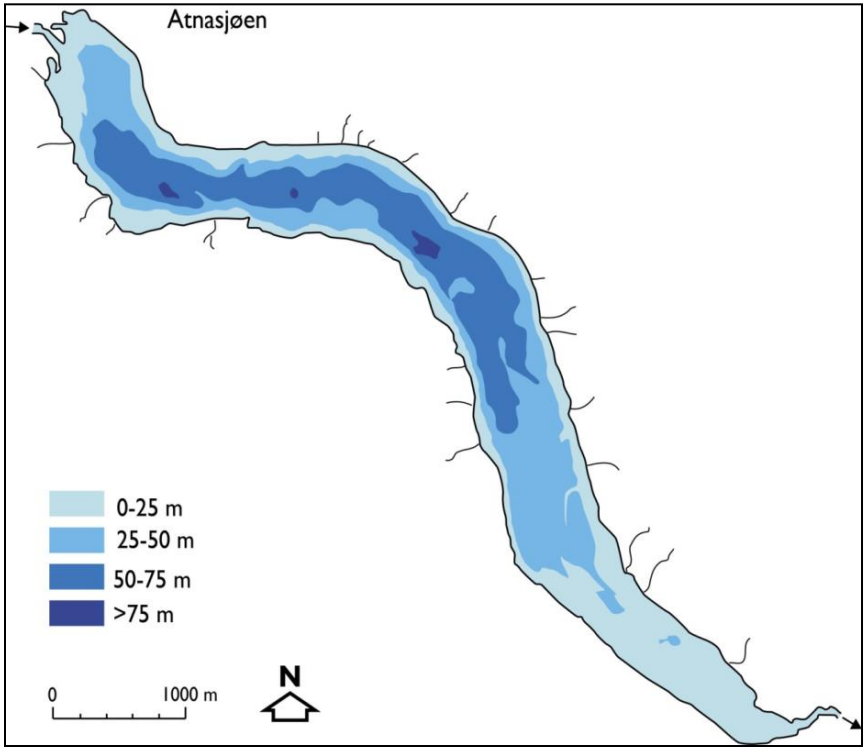
AIM

Using new record we aimed to find out main factor controlling lake environment development during the last Millennium in the region barely changed by human activity.

SITE LOCATION - Lake Atnsjøen



SITE DESCRIPTION



Lake Atnsjøen is a fjord lake has a steep sides and flat bottom.

Altitude:	701 m a.s.l.
Surface area:	4.8 km^2
Mean depth:	35.4 m
Max depth:	80.2 m
Ice cover:	XI-V
Trophy :	oligotrophic

SITE DESCRIPTION

Climate: continental
Precipitation: 555 mm
Mean temp.: 0,7 ºC

Vegetation in the catchment: alpine tundra 85%, Scots Pine at the lake

SITE DESCRIPTION

Geology:

feldspar quartzite (sparagmite), locally large deposits of Quaternary moraine and fluvial materials

CORE

The 34cm long sediment sequence of Lake Atnsjøen was cored in south-eastern part of the lake, from 20m depth by means of a KC-Denmark Kajak-type gravity corer.

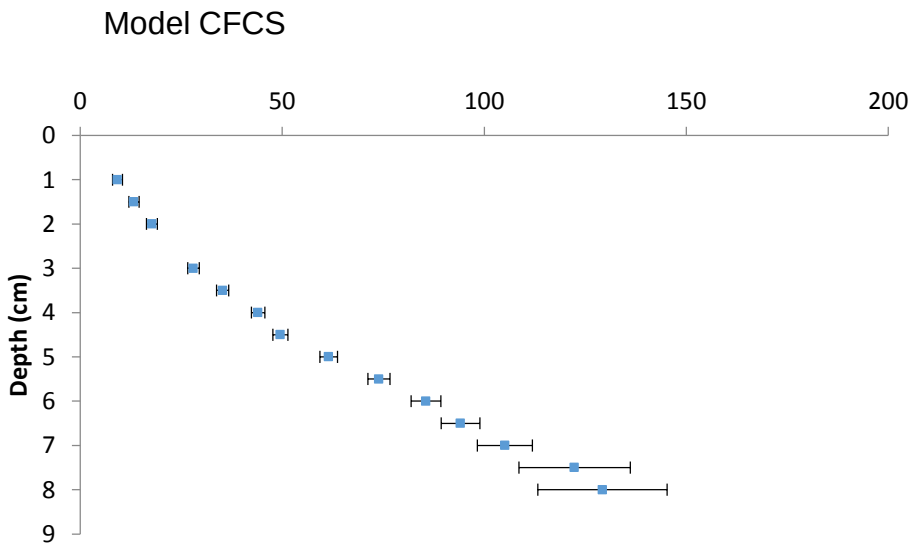
The material was cut in the field into 1cm (0.5 cm for ^{210}Pb) thick slices and sampled for each of the analysis. Samples were than stored the refrigerator until analysis.

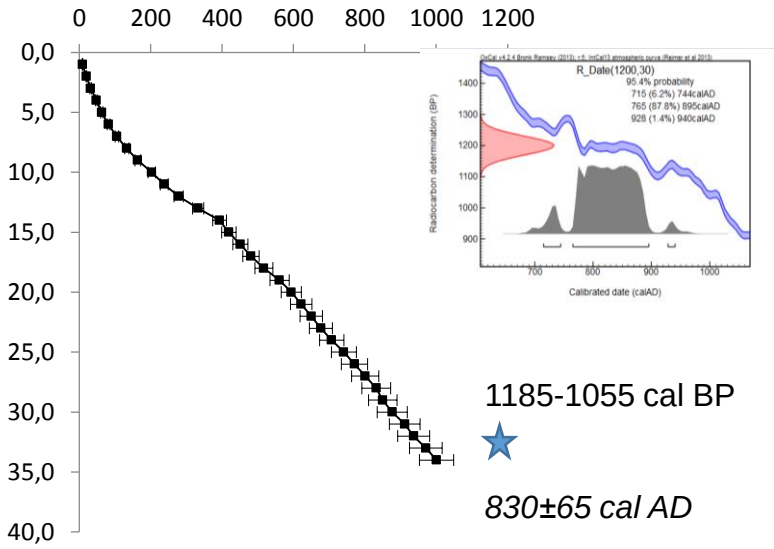
METHODS

^{210}Pb and ^{14}C dating	
Chironomidae	temperature reconstruction
Subfossil Cladocera	lake environment changes
Sediment chemistry	lake environment changes
Pollen	human impact

Plant macrofossil
Diatoms

RESULTS – DATING (^{210}Pb and ^{14}C)

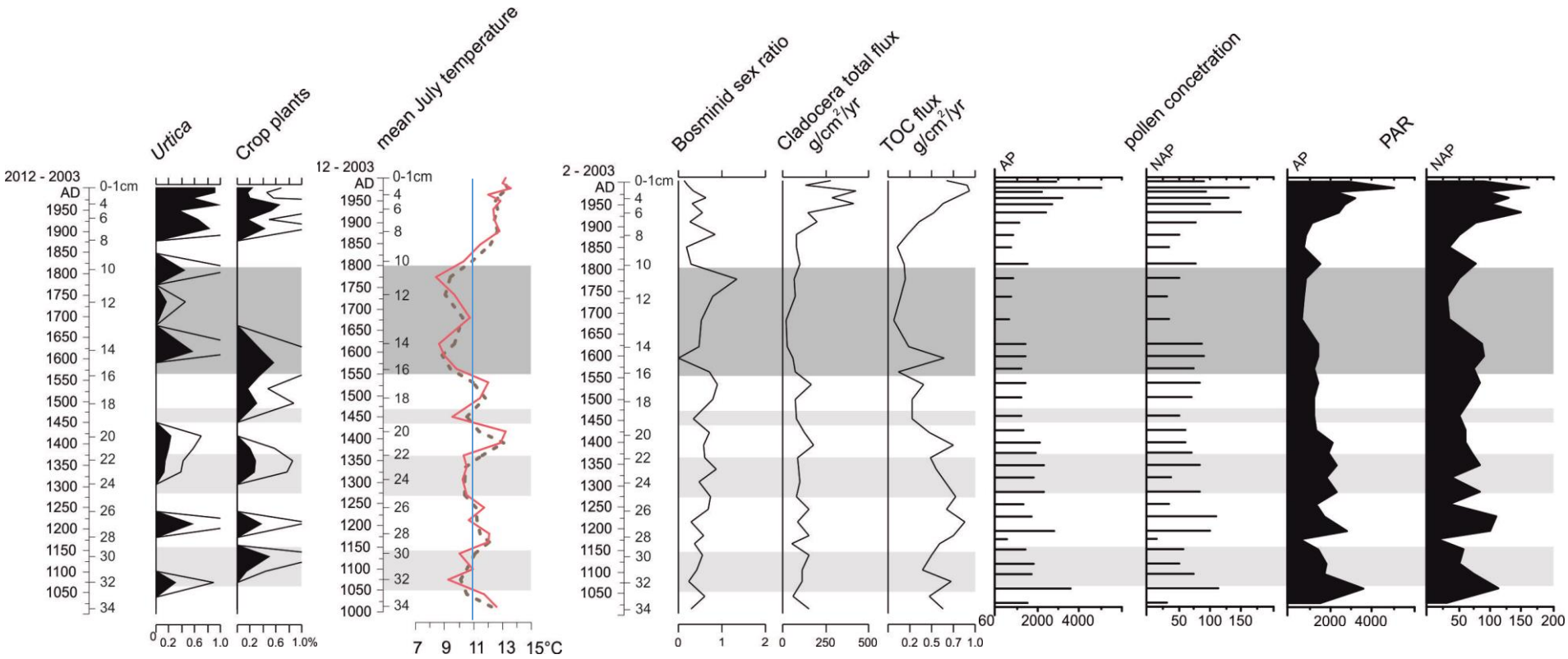




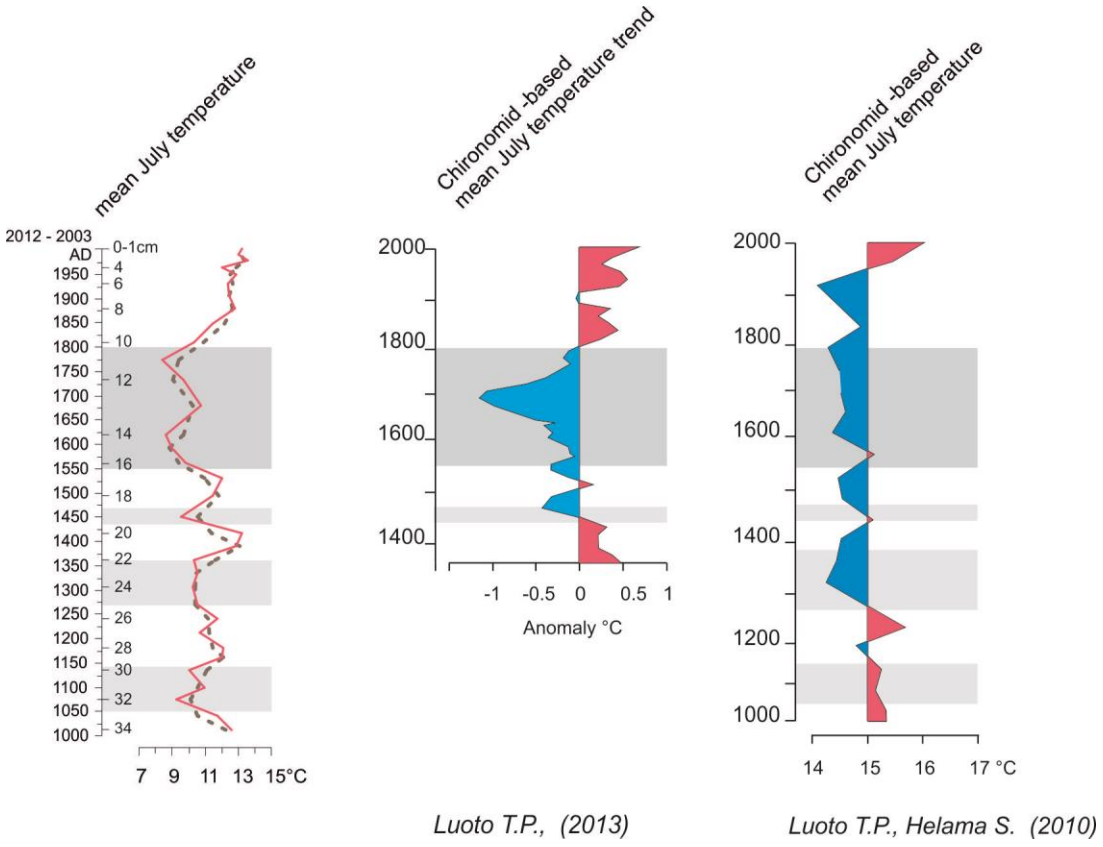
1185-1055 cal BP

830±65 cal AD

RESULTS – TEMPERATURE RECONSTRUCTION



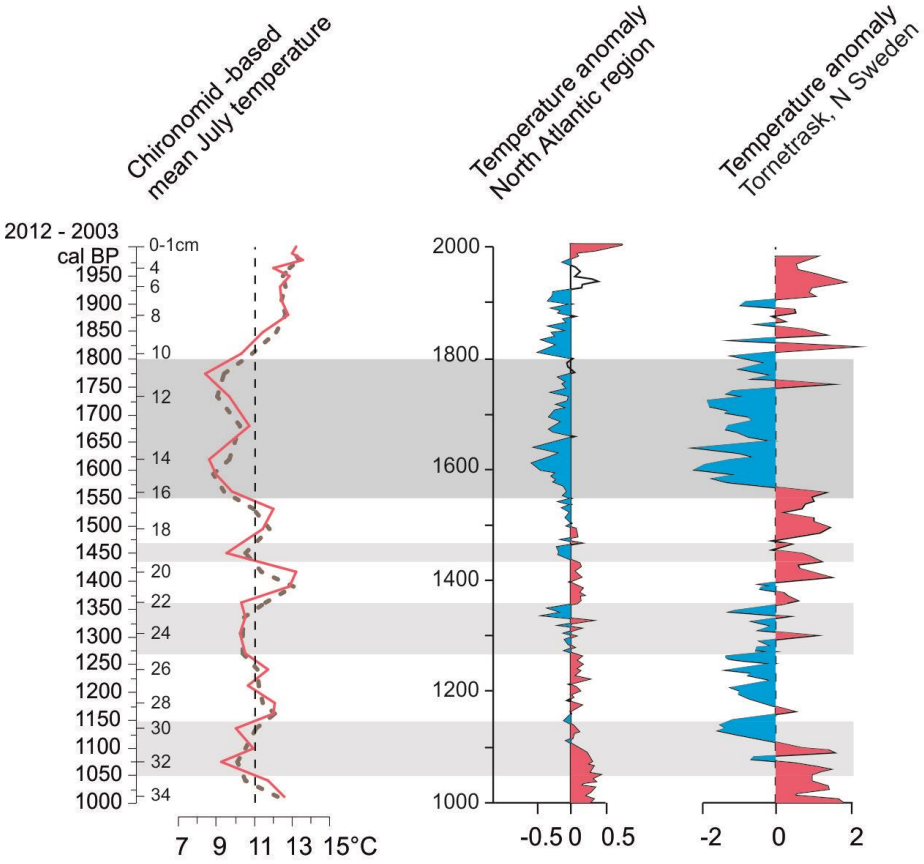
RESULTS – TEMPERATURE IN THE REGION



Luoto T.P., (2013)

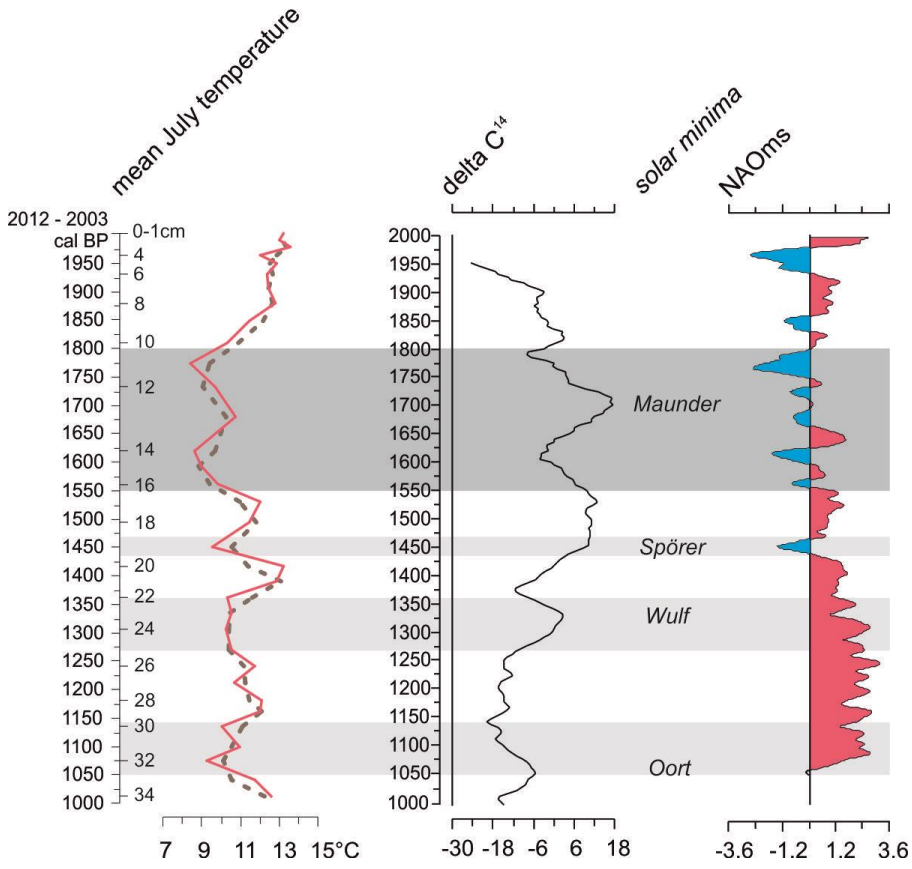
Luoto T.P., Helama S. (2010)

RESULTS – TEMPERATURE RECONSTRUCTION



Mann et al. (2009) *Osborn T. J & Briffa K. (2006)*

RESULTS – TEMPERATURE RECONSTRUCTION



Treuet V. et al., 2009

CONCLUSION

1. Three minor cooling recorded in the period 1000-1550 AD
2. One longer cooling that fall for the colder part of LIA 1550-1800 AD
3. Main coling 1550-1800 reflected well in other regional reconstructions and in the results of all conducted analysis.
4. Human impact was scarce and therefore reconstructed changes are probably due to natural climate fluctuations.