

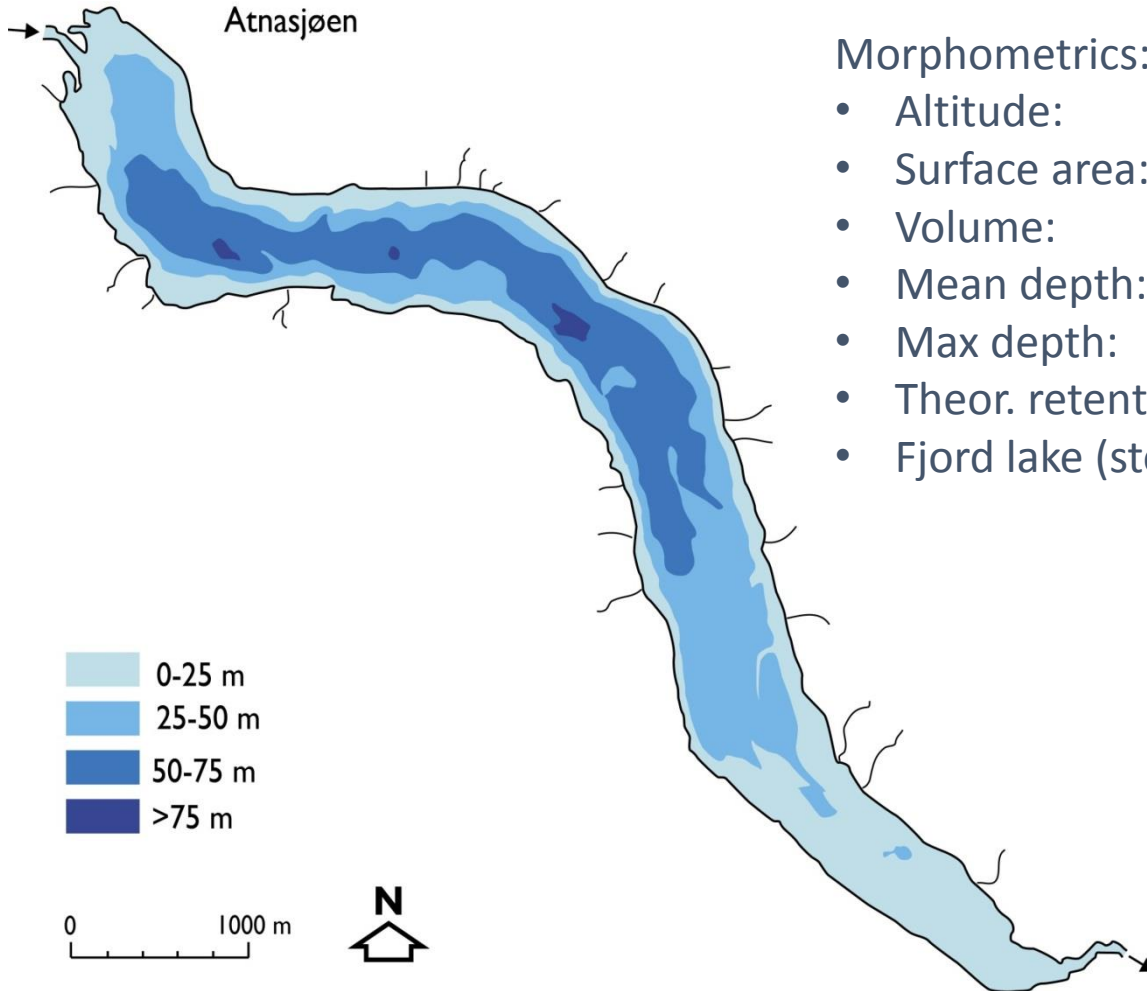
Joint research on the Lake Atnsjøen ecosystem changes – *natural environment of the lake*

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Sustainable Development of the Lake Ecosystem”*

Introduction to Lake Atnsjøen



Morphometrics:

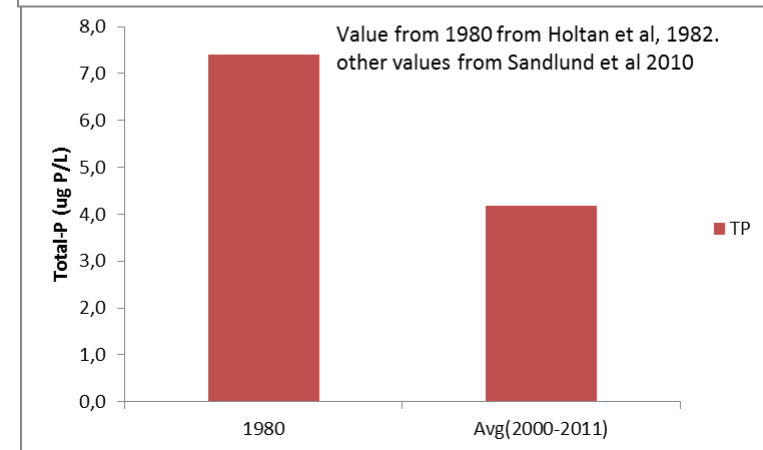
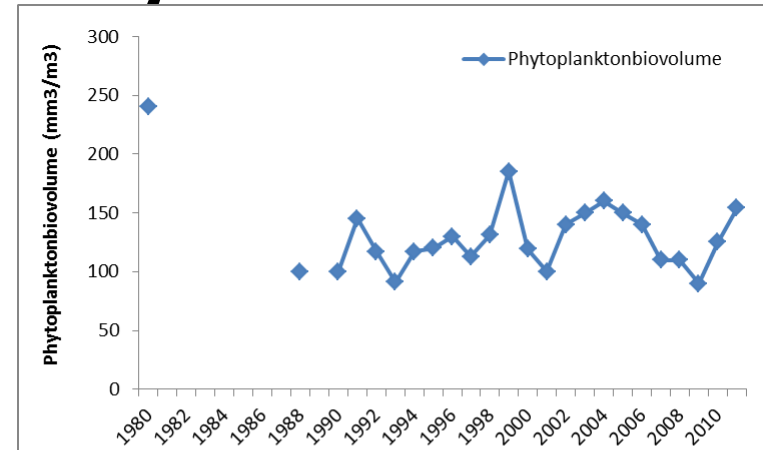
- Altitude: 701 m a.s.l.
- Surface area: 4.8 km²
- Volume: 169 x 10⁶ m³
- Mean depth: 35.4 m
- Max depth: 80.2 m
- Theor. retention time: 0.5 yr
- Fjord lake (steep sides and flat bottom)



Lake Atnsjøen – water quality

Total-P	~ 4 µg/l
Total-N	~ 140 µg/l
pH	~ 6.4
Ca	~ 0.8 mg/l
TOC	~ 1.4 mg/l

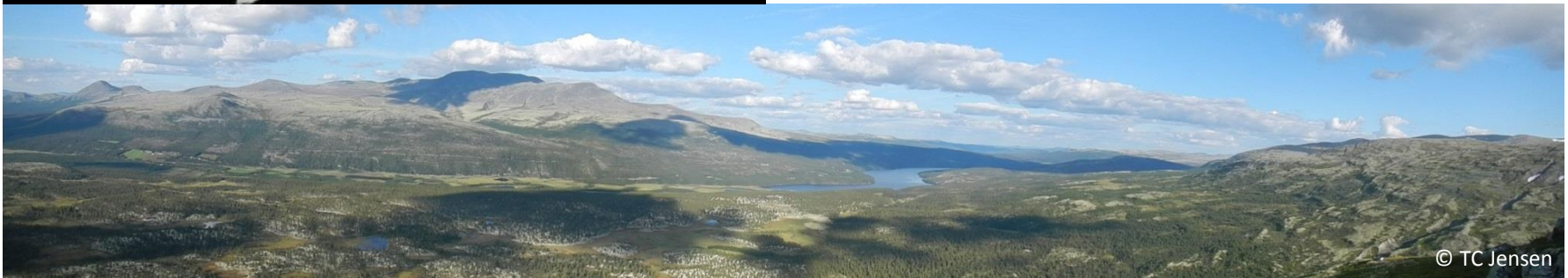
- Weak increasing trend for pH
- Productivity of the lake might have decreased from 1980 onwards, as indicated by phytoplankton biomass and TP concentration.



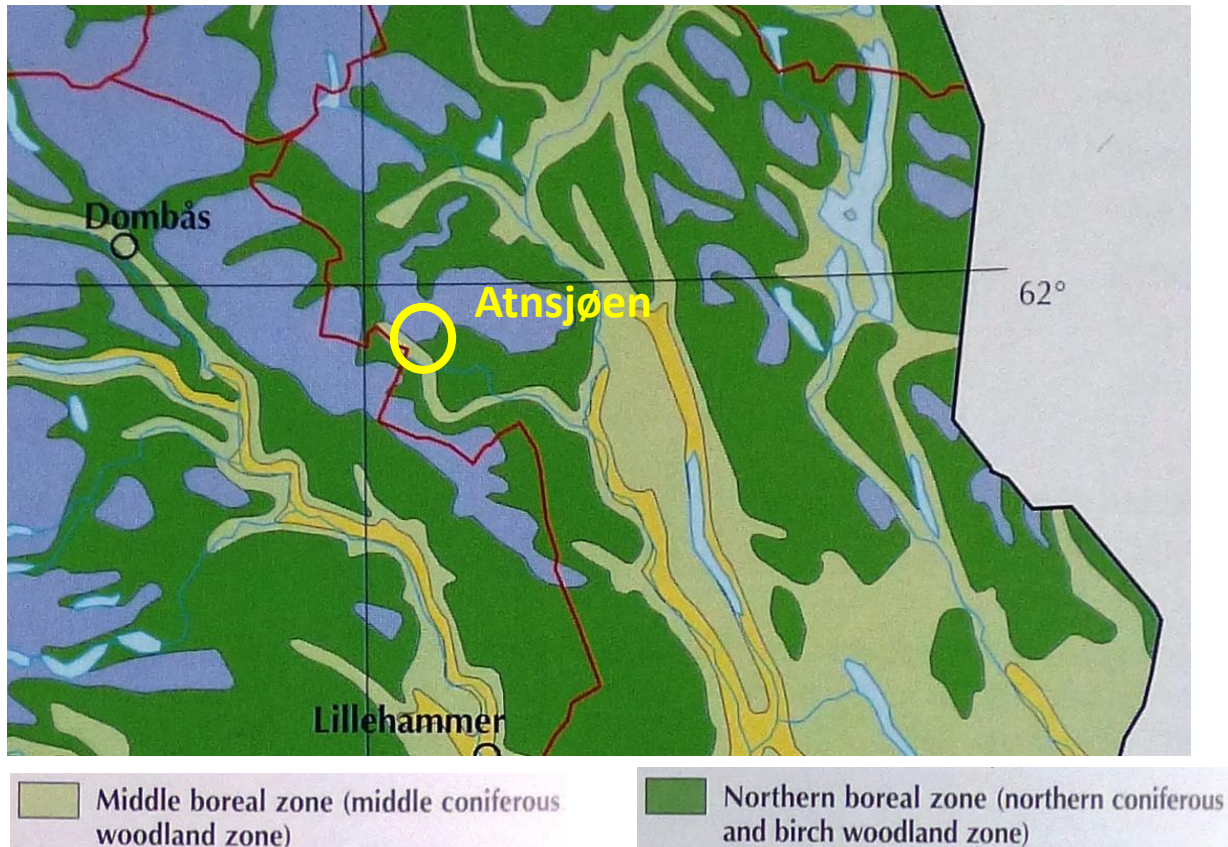
Lake Atna catchment



- Catchment area: 457 km²
- Geology: feldspar quartzite (sparagmite), locally large deposits of Quaternary moraine and fluvial materials
- Vegetation: alpine tundra (85%), some Scots Pine
- Continental climate
- No glaciers in the catchment
- Ice covered late November - late May
- Little human impact
- Some forestry in the area
- Large part of the catchment in the Rondane National Park

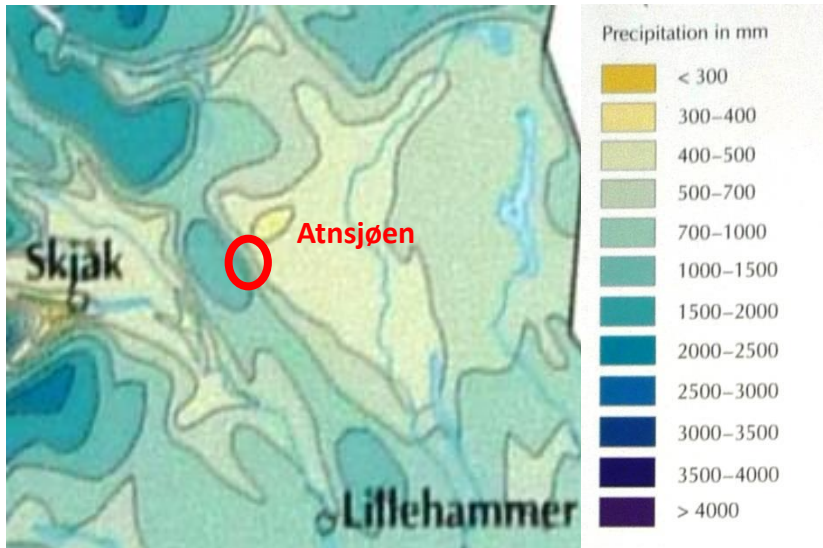


Vegetation zones in Lake Atnsjøen region



Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

Precipitation in Lake Atnsjøen region



Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

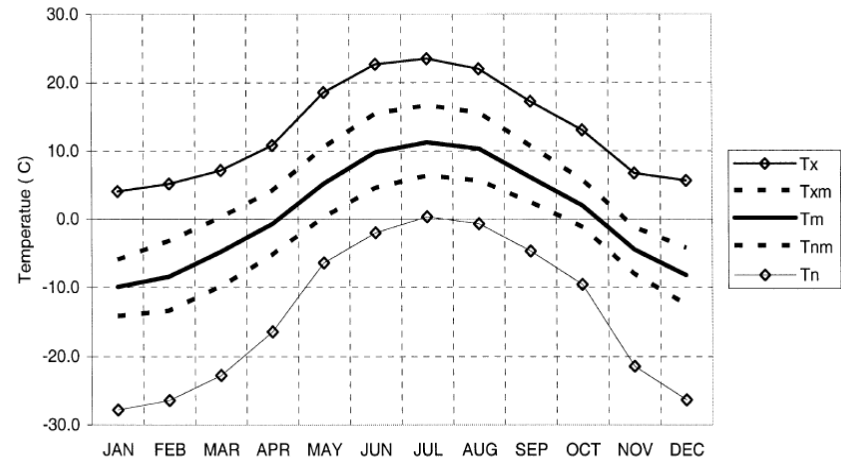
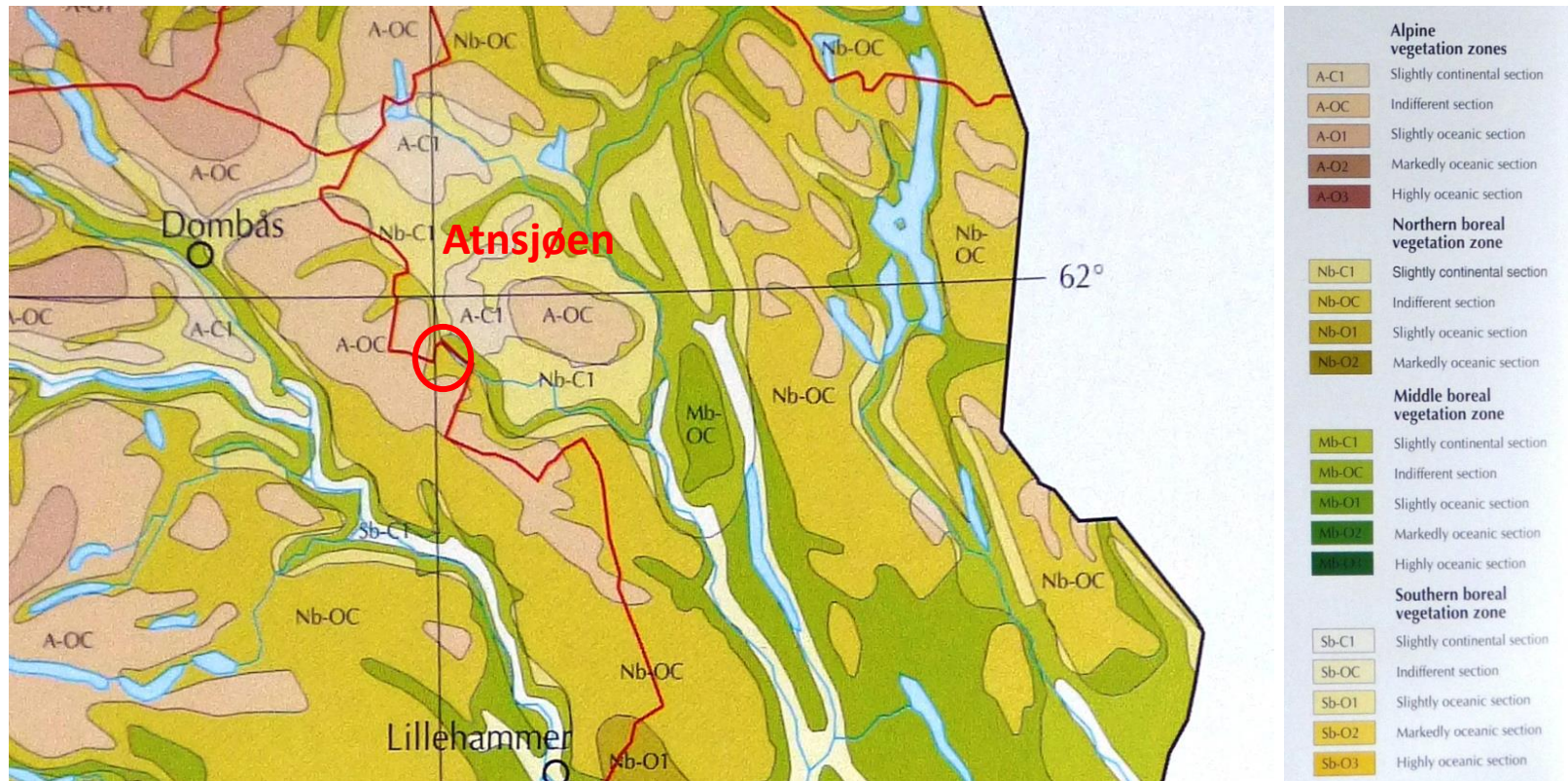


Figure 2. Monthly standard normals (1961–1990) of mean temperature (Tm), daily maximum temperature (Txm), daily minimum temperature (Tnm), monthly maximum temperature (Tx) and monthly minimum temperature (Tn), at the weather station Sørneset.

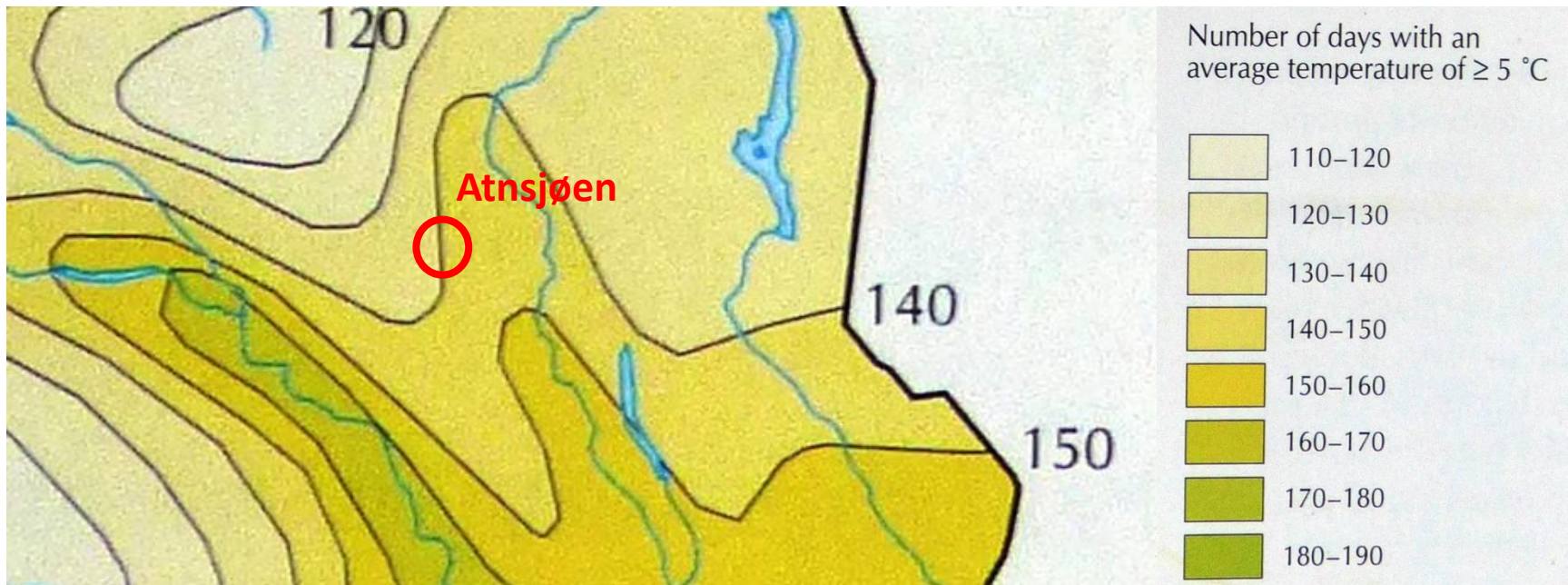
From Nordli et al. 2007

Vegetation ecological regions near Lake Atnsjøen



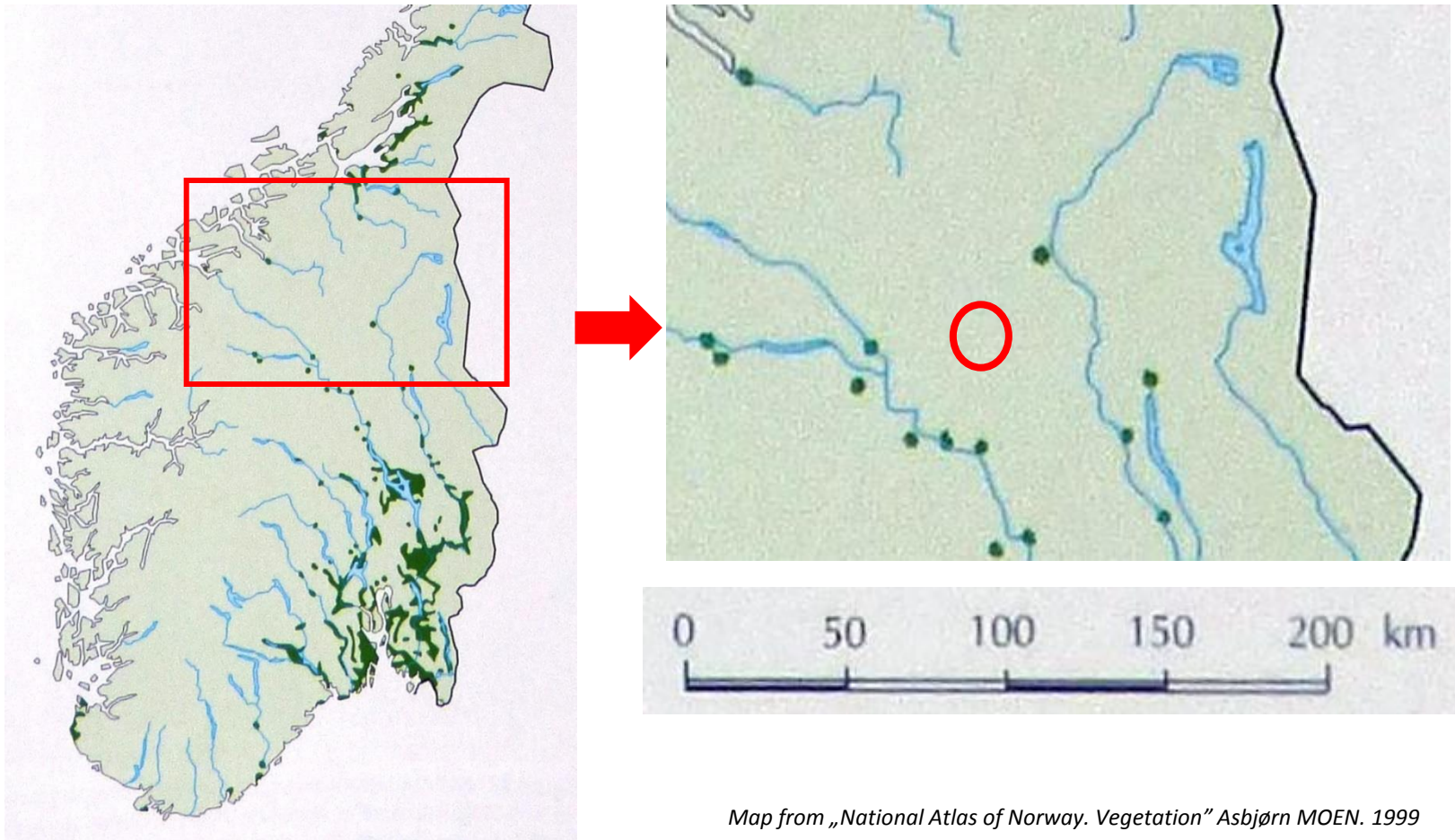
Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

Length of growing season in Lake Atnsjøen region



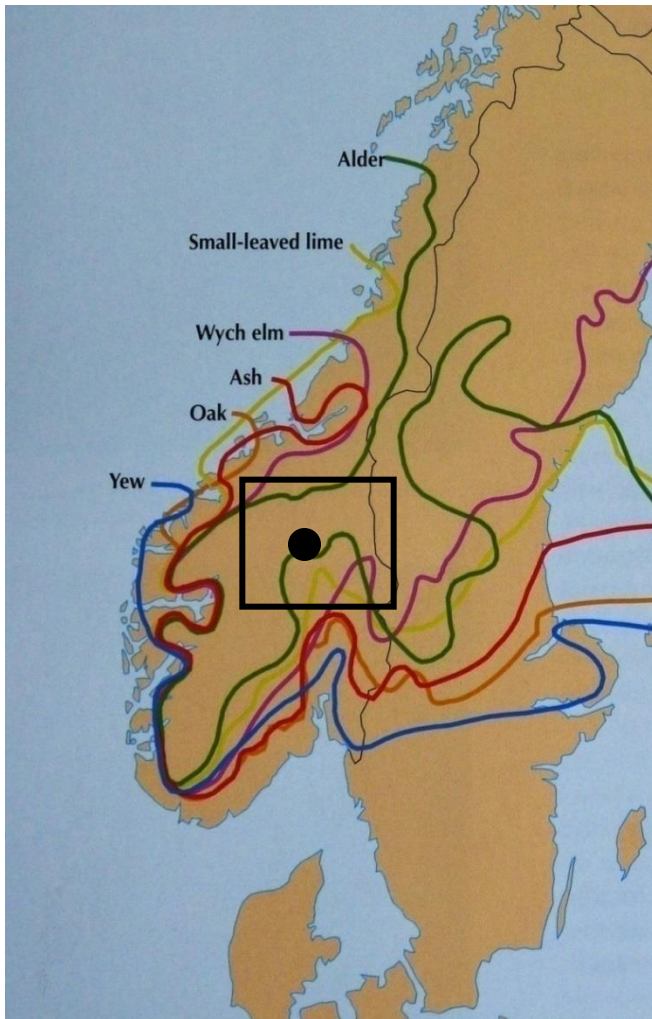
Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

Cereal-growing district in Norway



Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

Northern limits of broad-leaved deciduous trees in Norway and Lake Atnsjøen region



Map from „National Atlas of Norway. Vegetation” Asbjørn MOEN. 1999

Monitoring in Lake Atnsjøen

Monitoring in the lake cover measurements of: temperature, water chemistry, phytoplankton, zooplankton, macroinvertebrates and fish.

Two monitoring programmes:

- Aim of the first is to trace long term natural and anthropogenic induced ecological changes in a lake ecosystem
- Aim of the second programme is to document the ecological effects in freshwaters due to acid deposition, and record improvements due to reduced sulfur emissions in Europe

Lake Atnsjøen – human activity in the catchment

- After the Black death in 1349 population in Norway (also the area around lake Atnsjøen) was drastically reduced (~by 50 %)
- New settlements (farms: Nasset and Strømbu) after the Black death in Lake Atnsjøen catchment dates from 1750'ies (farm at the outlet from 1690).
- Mining activities: (copper) in the neighbour municipality from around 1750; iron from peatlands in the catchment during several periods
- Fishing activity in the lake started in medieval times
- Sawmill at the outlet was built in 1750, dam (floating of timber) strated from 1810 (current dam from 1917)
- First cabins in the catchment developed in late 1960'ies (north of the lake)
- Forestry in the area has increased over the last 30 years.

