Landscape dynamics in Denmark through 2000 years – a multidisciplinary study

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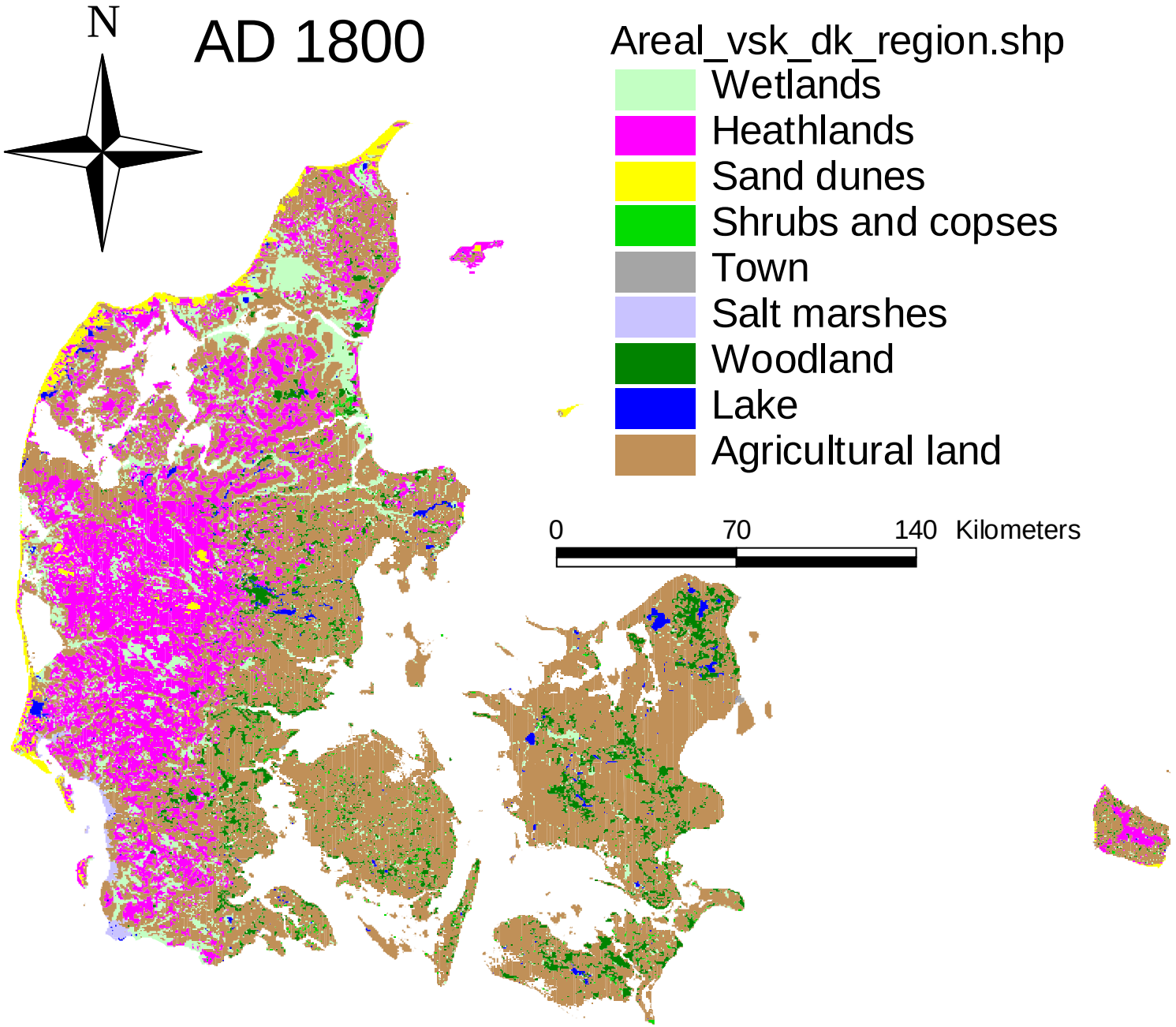
Store Økssø, Himmerland, Danmark

Why study long-term landscape dynamics?

- Modern landscapes harbour: production, biodiversity, cultural history…
- Modern landscape management requires a holistic approach incorporating all these elements
- Better understanding of the historical trajectories of landscapes is a prerequisite for successful management of all the elements of the modern landscapes

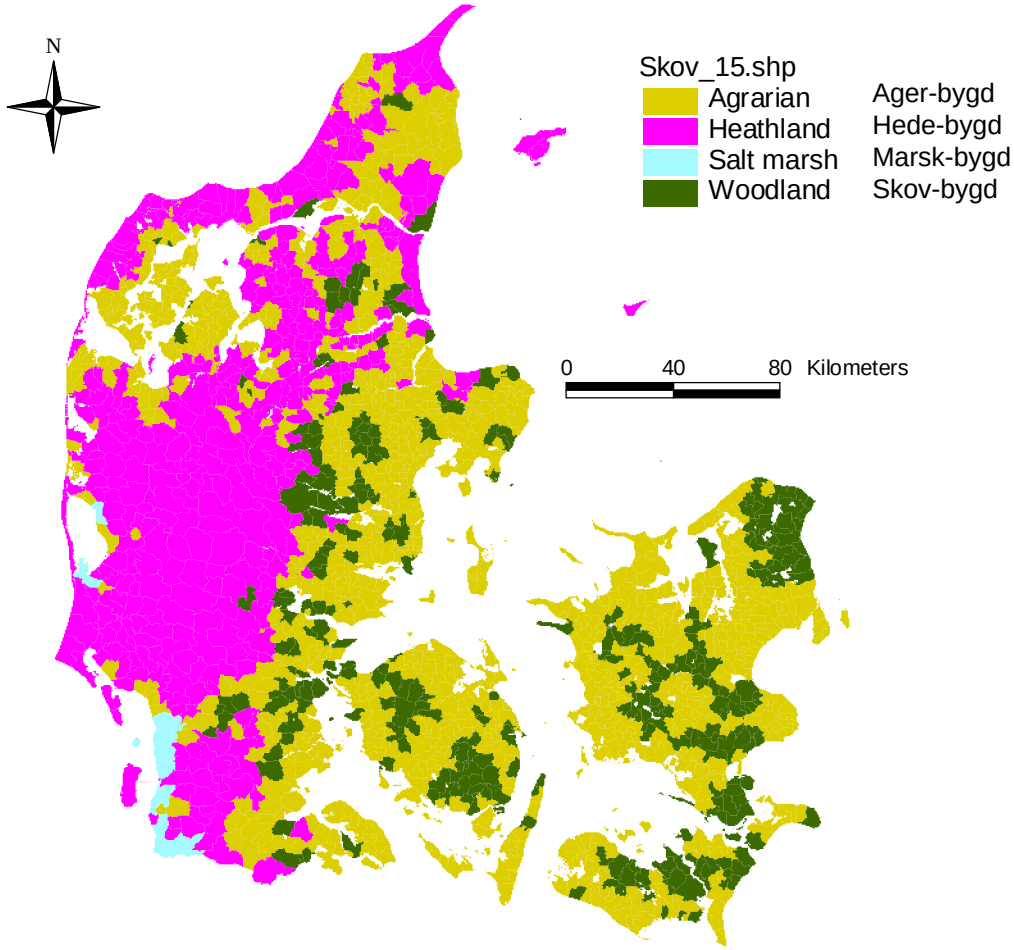
How to study long-term landscape dynamics?

- Multidisciplinarity
- Use common objects – carefully selected landscape types that all sub-projects focus on
- Use identical scale for all sub-projects
- 9 udvalgte områder – 3 fra hver hovedbygdetype (søoplande). National relevans.
- Hovedvægt på langtidsudvikling, kontinuerlig landskabsudvikling fra 0 – 2000



The mapping made by the Danish Royal Society of Sciences and Letters in the late 18th century is the earliest reliable from Denmark

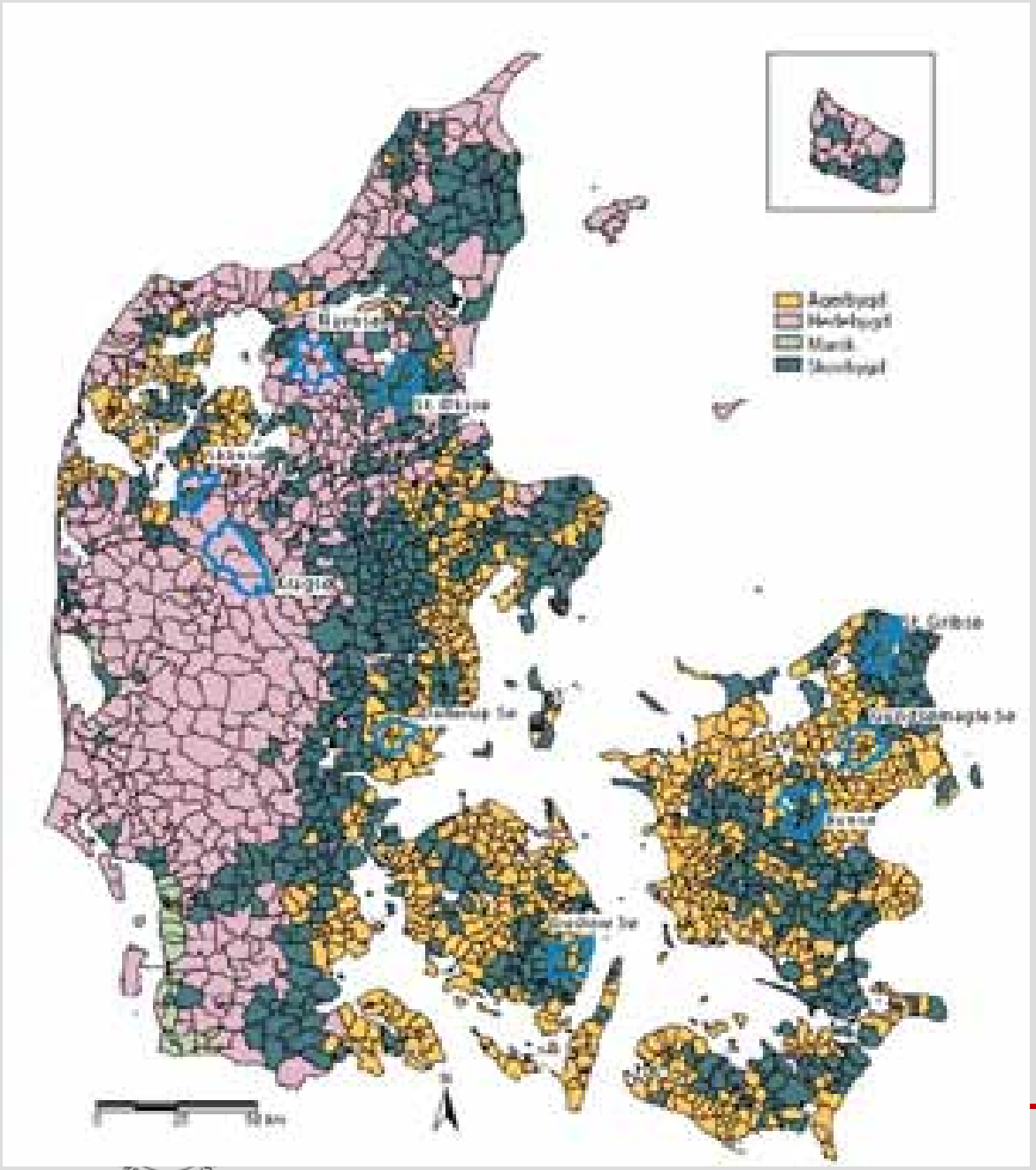
Project inspiration: the historical cultural landscape



Cultural geography classification of Danish landscapes around 1800 (modified from Møller & Porsmose 1997). Each unit reflects the dominant economy of the area which was closely associated with dominant landscape ressources.

Some aims of the Danish AGRAR 2000 project

- What was the origin and the historical development of the traditional cultural landscape pattern?
- How has the traditional pattern developed (disintegrated?) through the last 200 years?
- What were the rates of landscape changes through the last 2000 years?



AGRAR 2000 study areas are the catchments of nine lakes, three in each of the dominant landscape types of the 1800-landscape. From each lake a pollen record covering at least the last few millenia exists.

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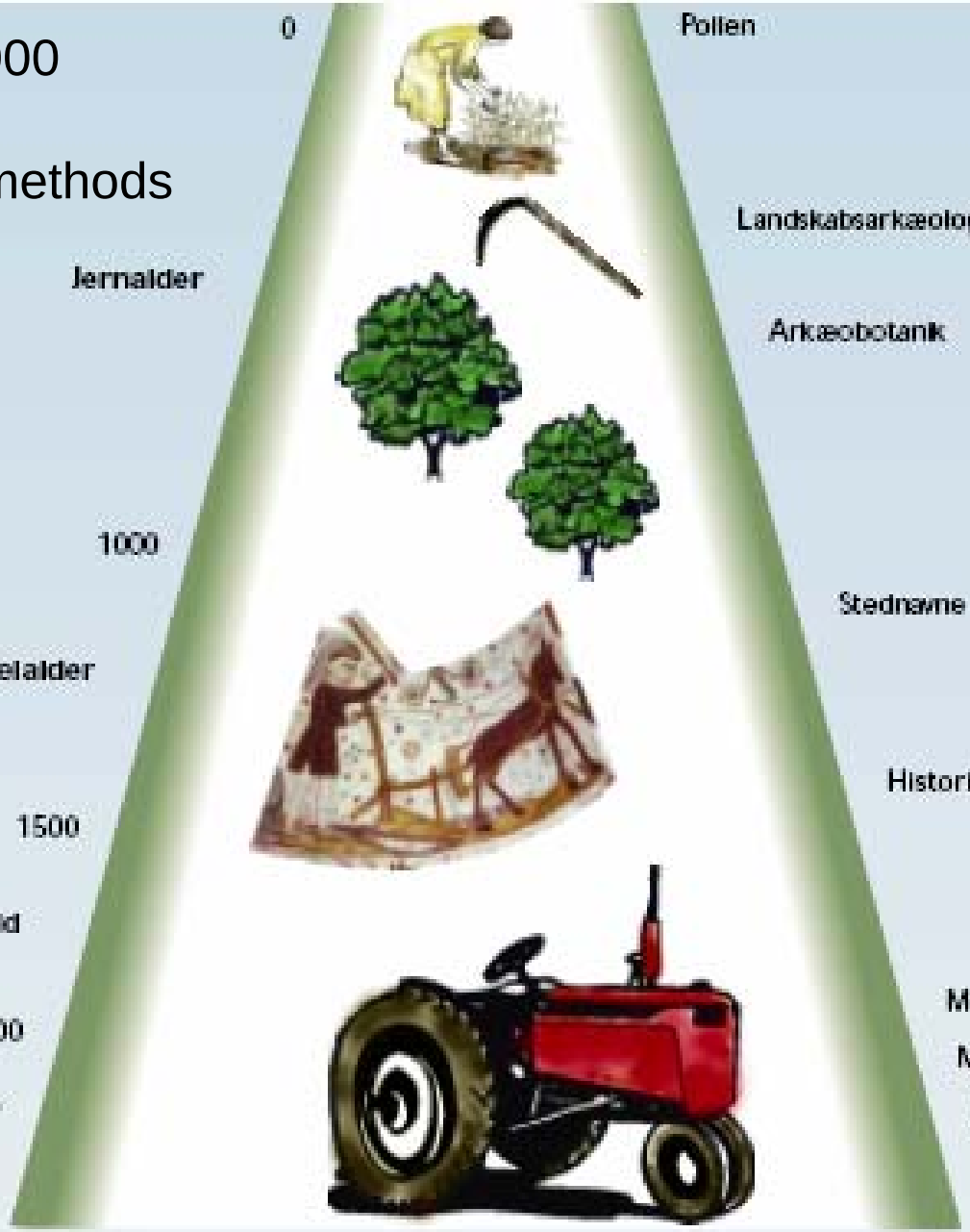
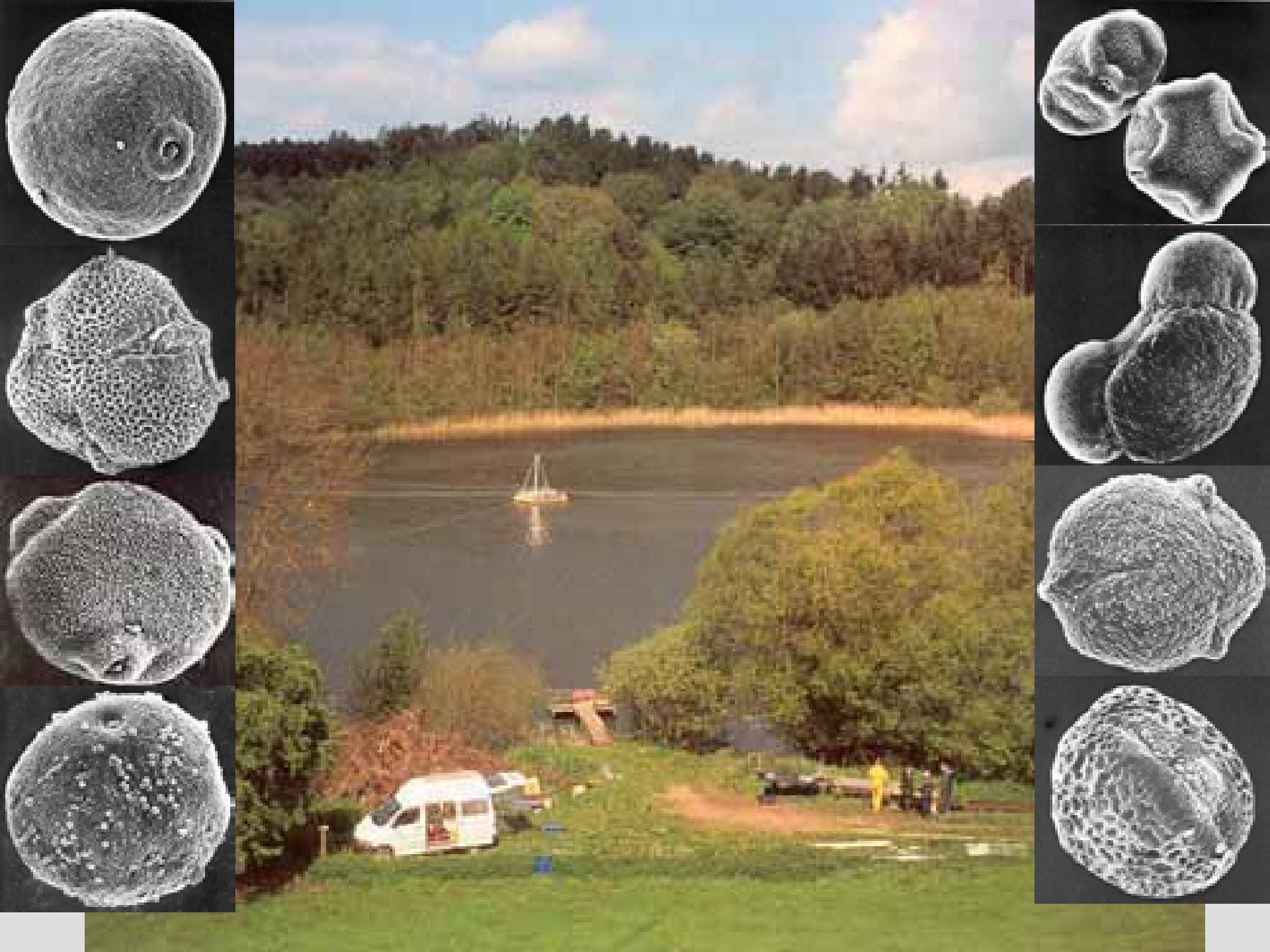
AGRAR 2000

Time and methods

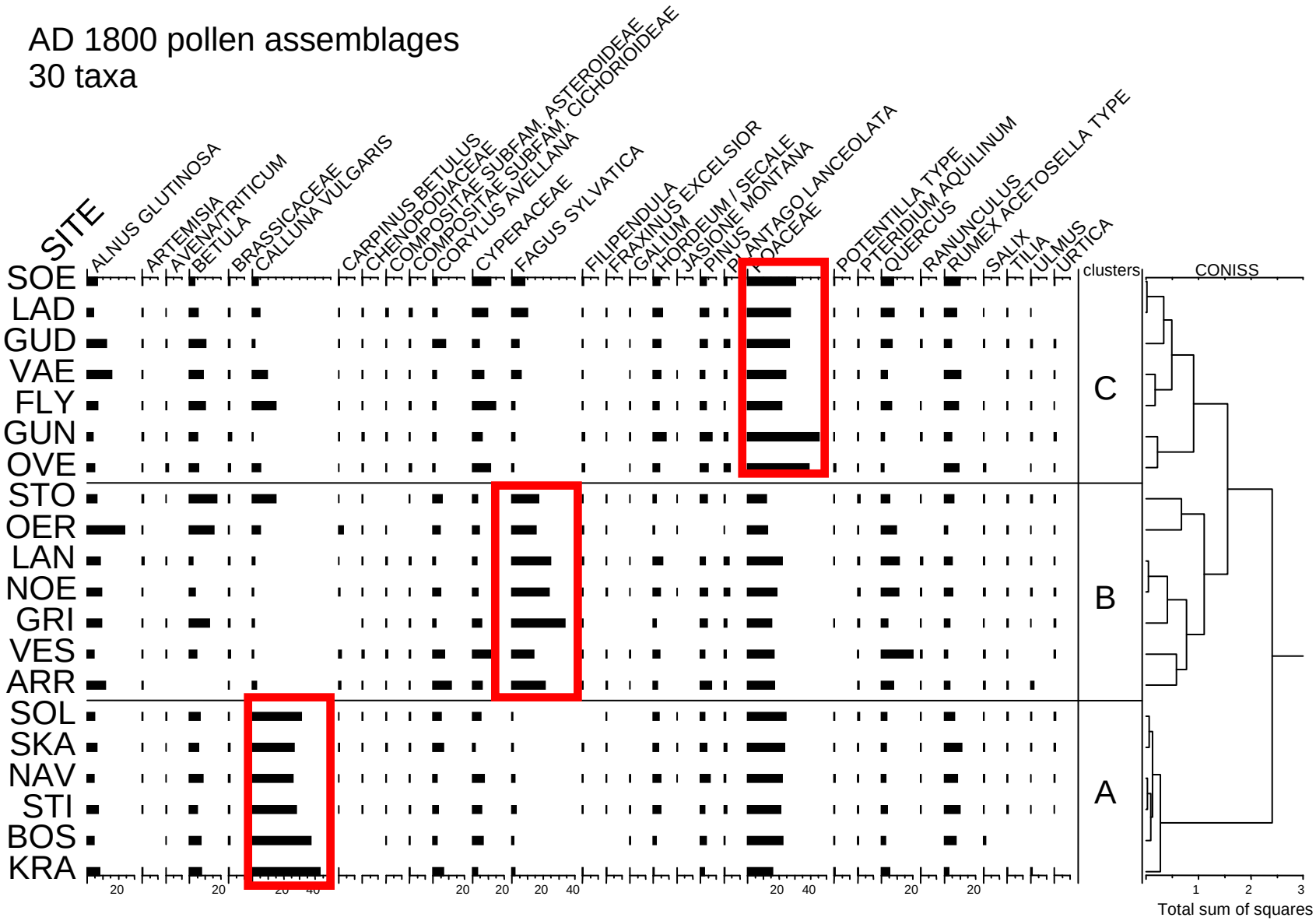


Sub-projects of AGRAR 2000

- Long-term quantitative estimation of vegetation cover (pollen, modelling, GIS).
- Land-use during Iron Age and the Medieval period (tools, field systems, settlement patterns).
- Iron Age and Medieval crops and cultivation systems (plant macrofossils).
- Farming and agricultural economy ca. 1000 until ca. 1850 (archival studies).
- Habitats in the agrarian landscape 1800–2000 (historical maps, GIS).
- Production landscapes and macro-nutrient households 1900-2000 (agricultural statistics).

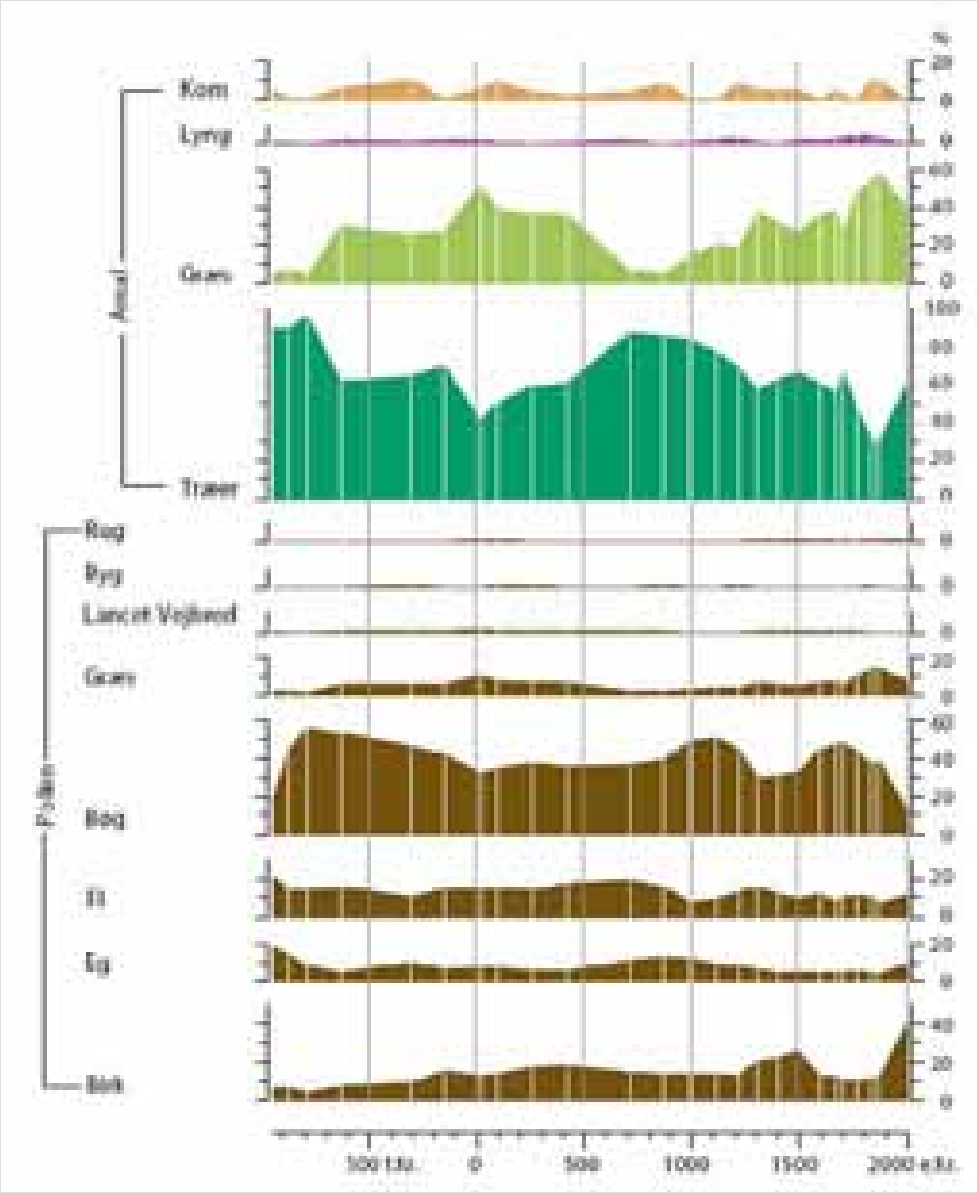


AD 1800 pollen assemblages
30 taxa



Pollen data clearly reflect the landscape type
(heathland, woodland or agricultural)

Odgaard & Rasmussen 2000



Vegetational development through the last 3000 years in a typical **woodland landscape**

*Rekonstruktion af areal af korn, lyng, græs og træer gennem de sidste ca. 3 årtusinder i en radius af 1800 m omkring **Store Gribsø**. Rekonstruktionen bygger på indholdet af pollen i søens aflejringer. Nogle vigtige pollentypers hyppighed er også vist i figuren. Pollenanalyse: Tina Løvberg.*

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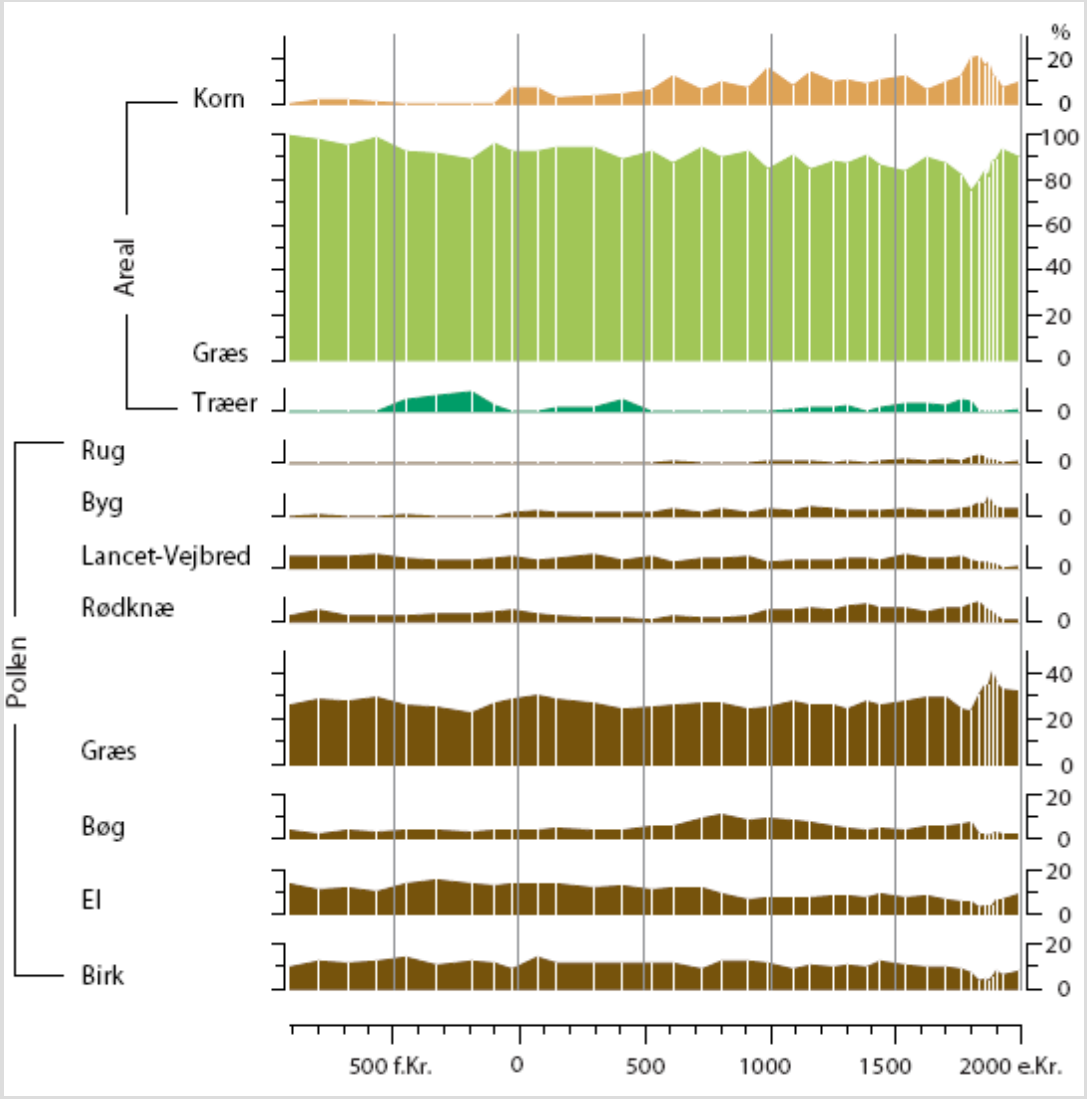

Vegetational development through the last 3000 years in a typical **agrarian landscape**

*Rekonstruktion af areal af korn, lyng, græs og træer gennem de sidste ca. 3 årtusinder i en radius af 1800 m omkring **Gundsømagle Sø**. Rekonstruktionen bygger på indholdet af pollen i søens aflejringer. Nogle vigtige pollentypers hyppighed er også vist i figuren. Pollenanalyse: Peter Rasmussen.*

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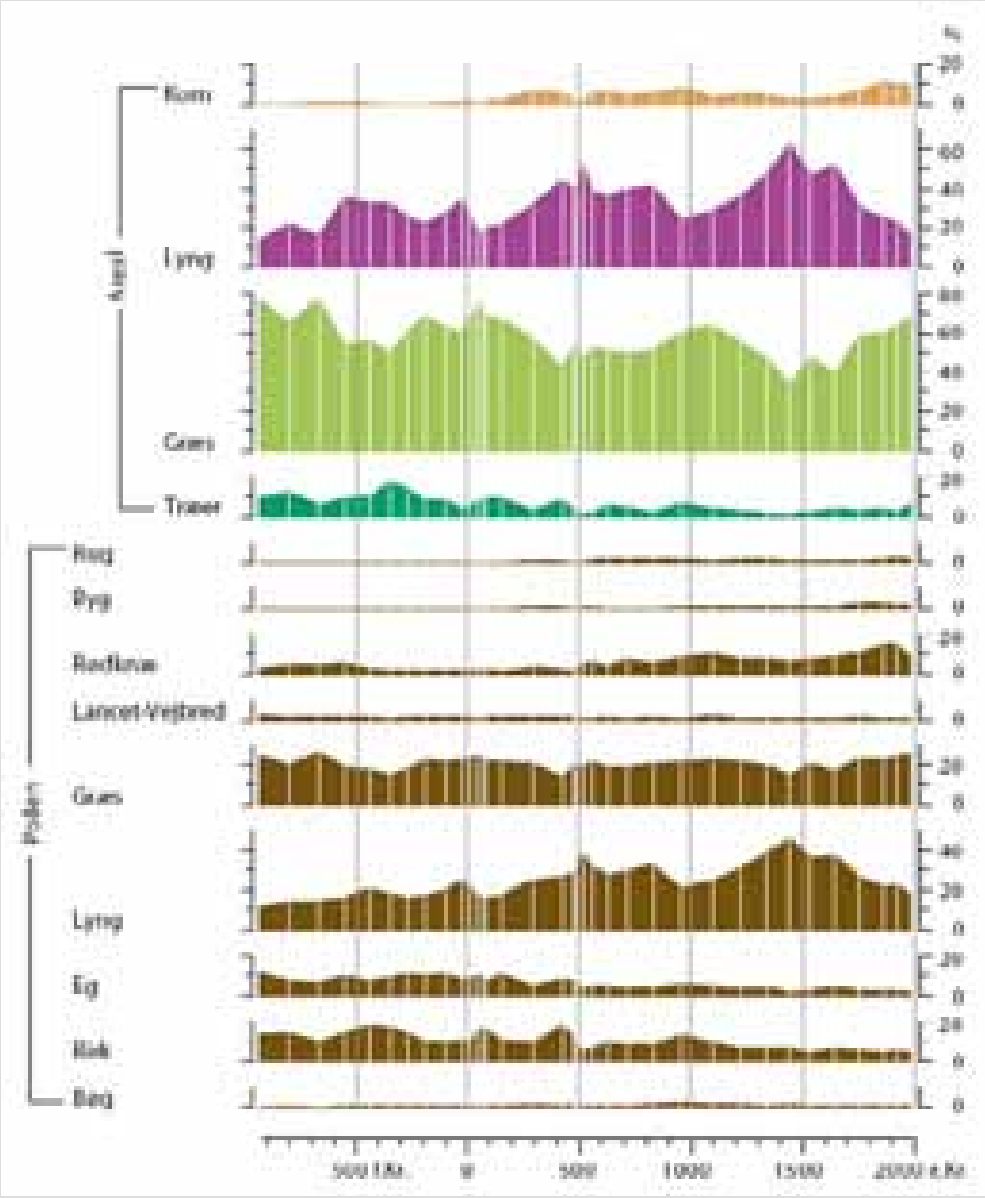

Vegetational development through the last 3000 years in a typical **heathland landscape**

*Rekonstruktion af areal af korn, lyng, græs og træer gennem de sidste ca. 3 årtusinder i en radius af 1800 m omkring **Skaansø**. Rekonstruktionen bygger på indholdet af pollen i søens aflejringer. Nogle vigtige pollentypers hyppighed er også vist i figuren. Pollenanalyse: Bent Odgaard.*

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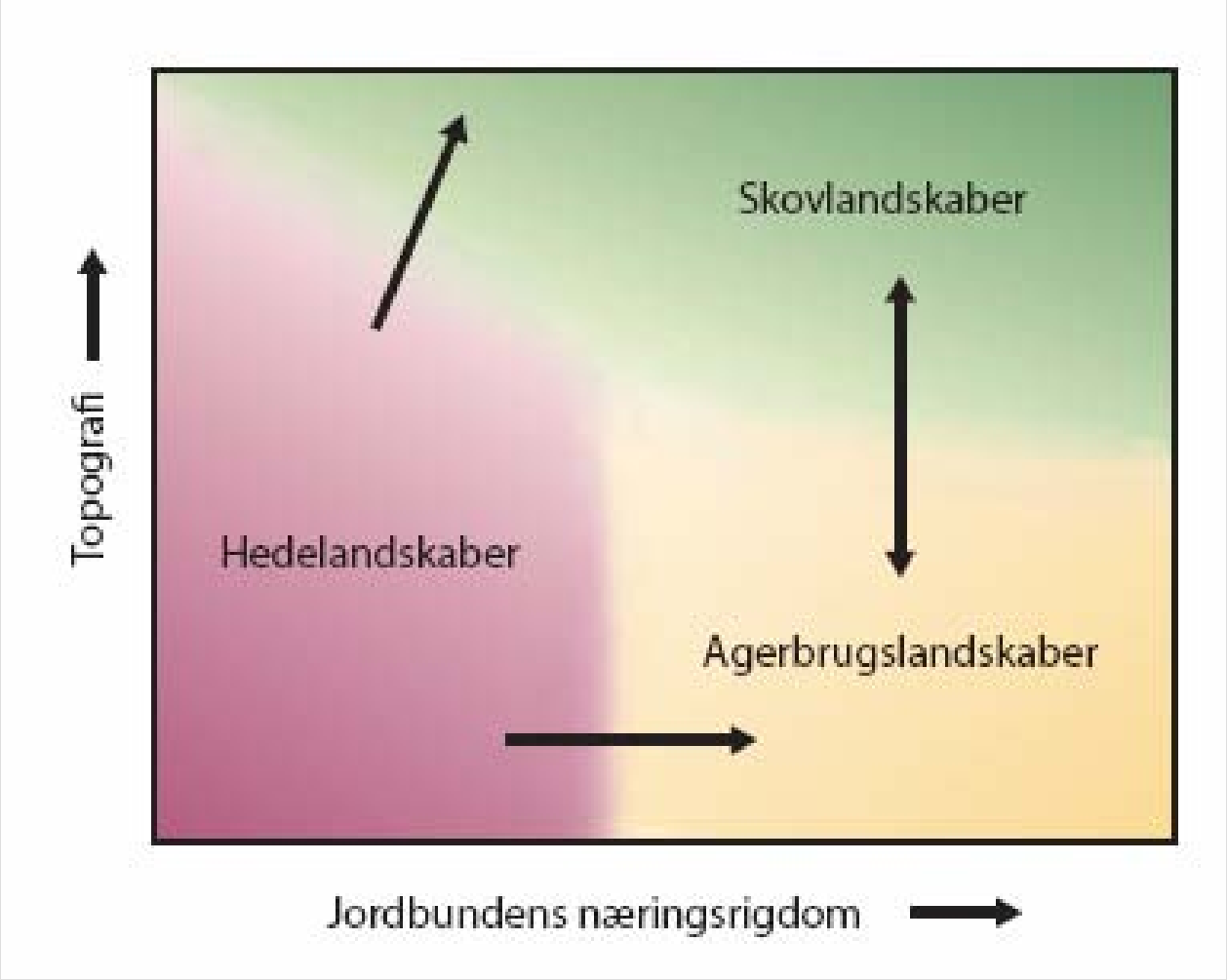
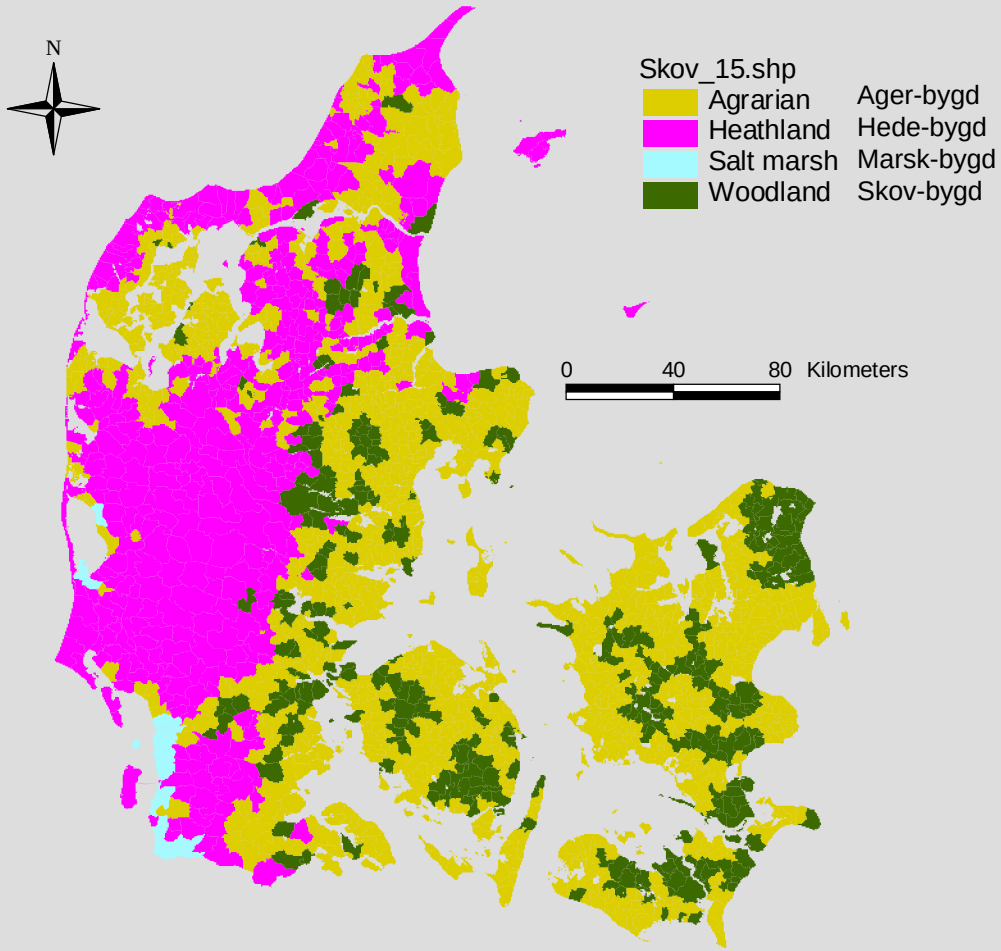


Schematic model of the relations of the three main landscape types to soil nutrients and topographical variation through the period 0 – 1800 in Denmark. The arrows indicate the direction of dynamics through the period.

Main results from pollen data

- Ancient woodlands are mostly found in hilly landscape unsuitable for arable farming
- This characteristic pattern of woodland distribution was founded already by 1000 BC
- Heathland landscape origins are even older
- Ecotones of the woodland landscapes were buffers for agricultural dynamics

Fate of landscape units after 1800 ?



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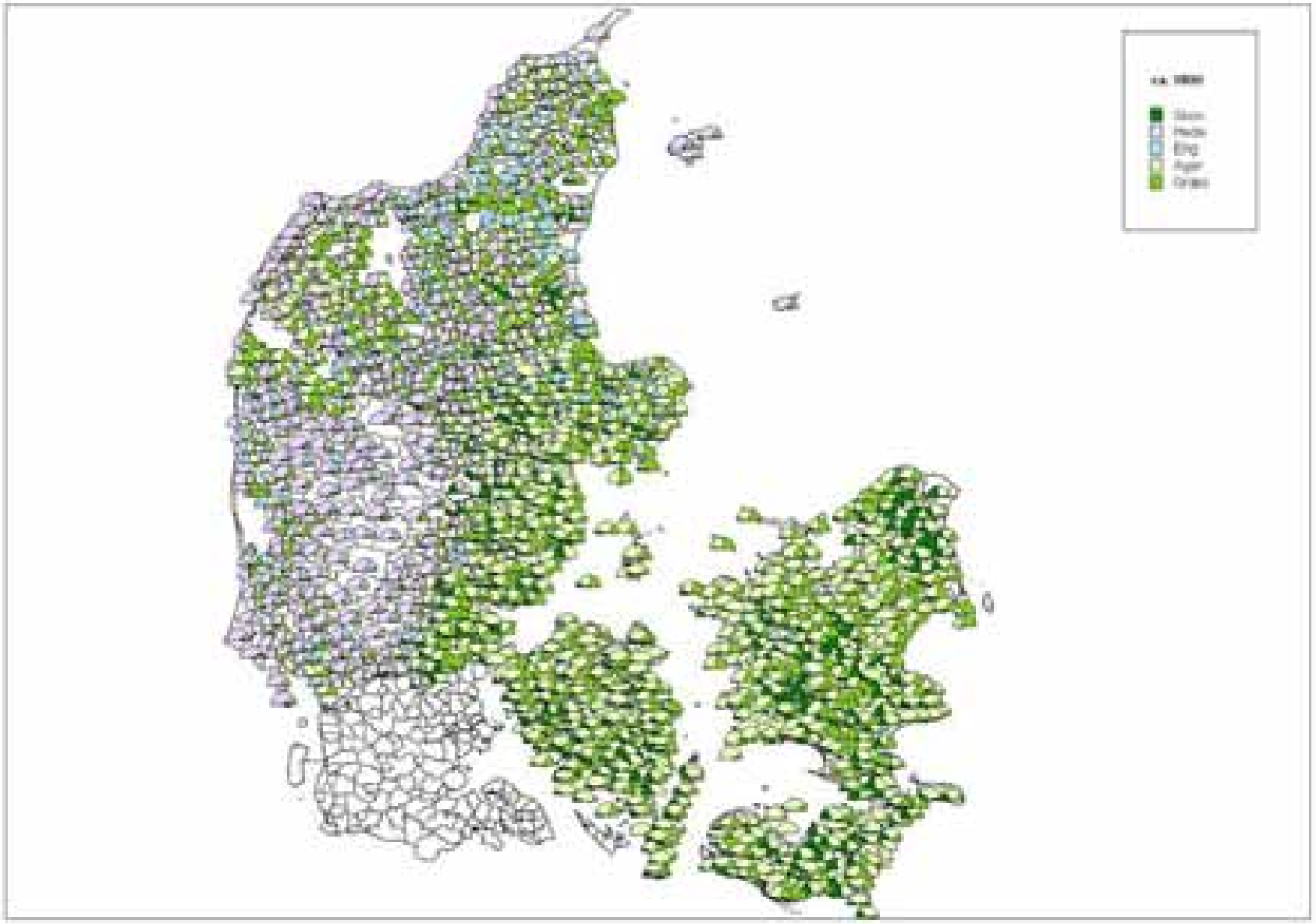
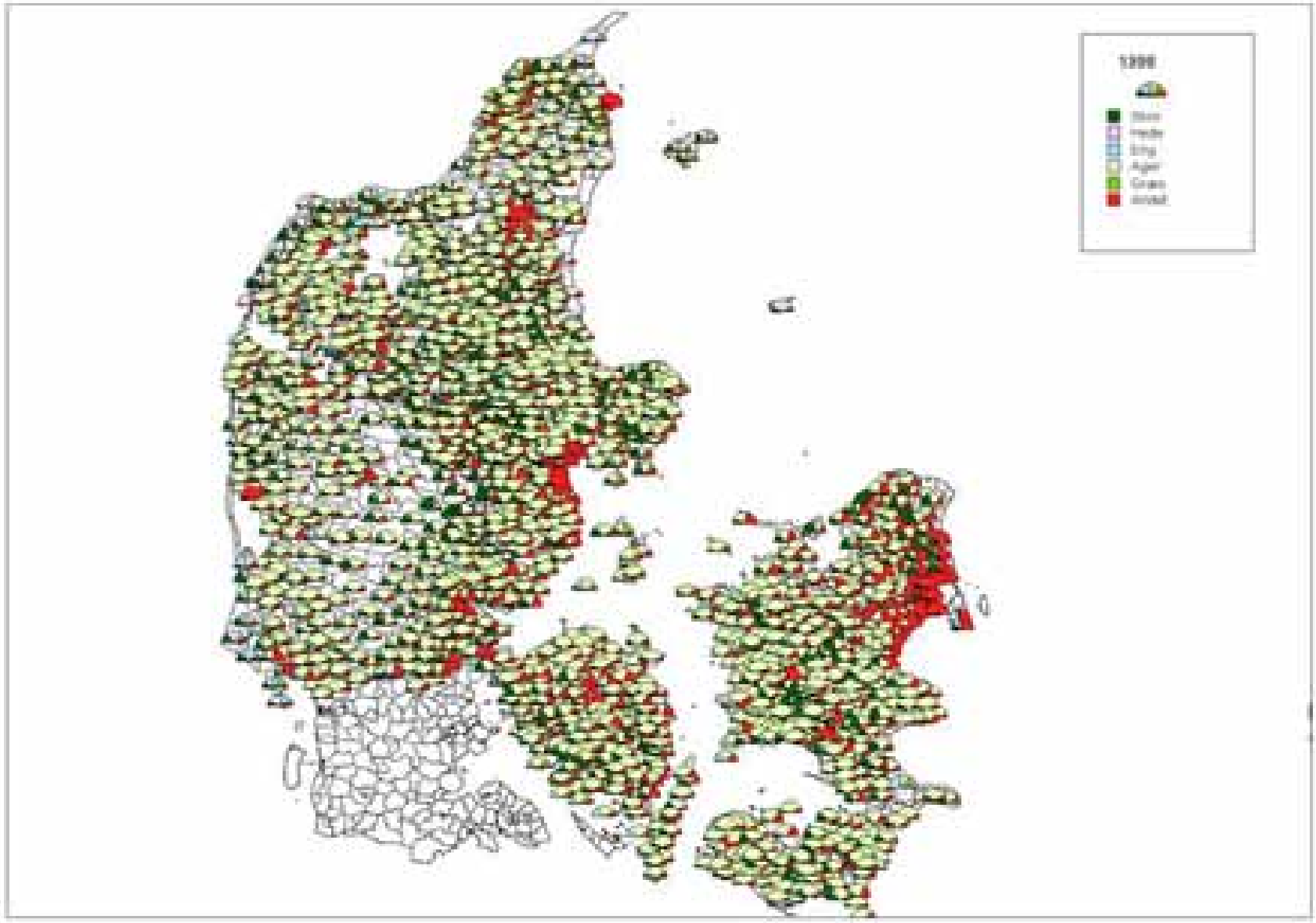
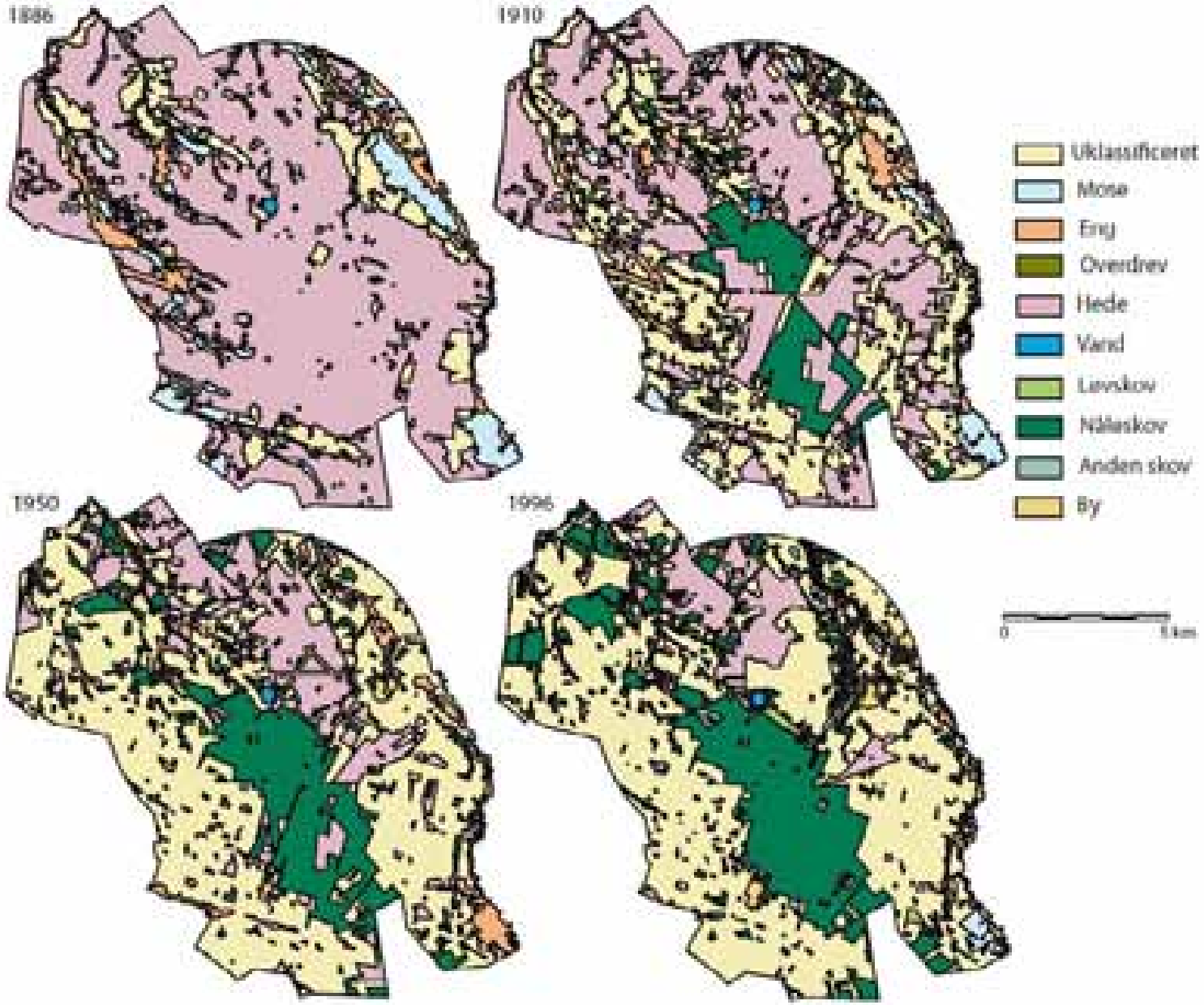
Arealfordeling år 1800



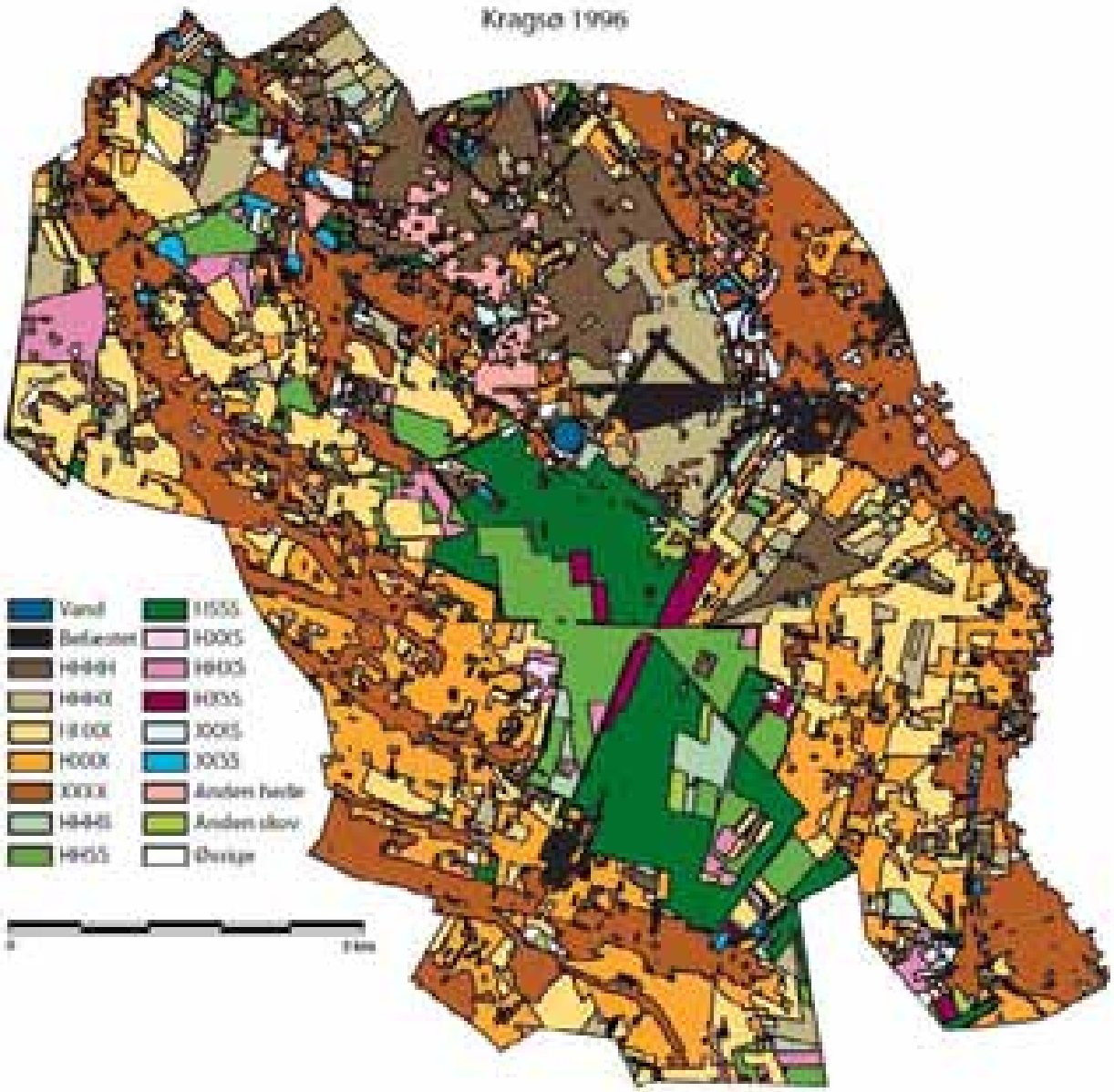
Arealfordeling år 1881

Arealfordeling år 1998

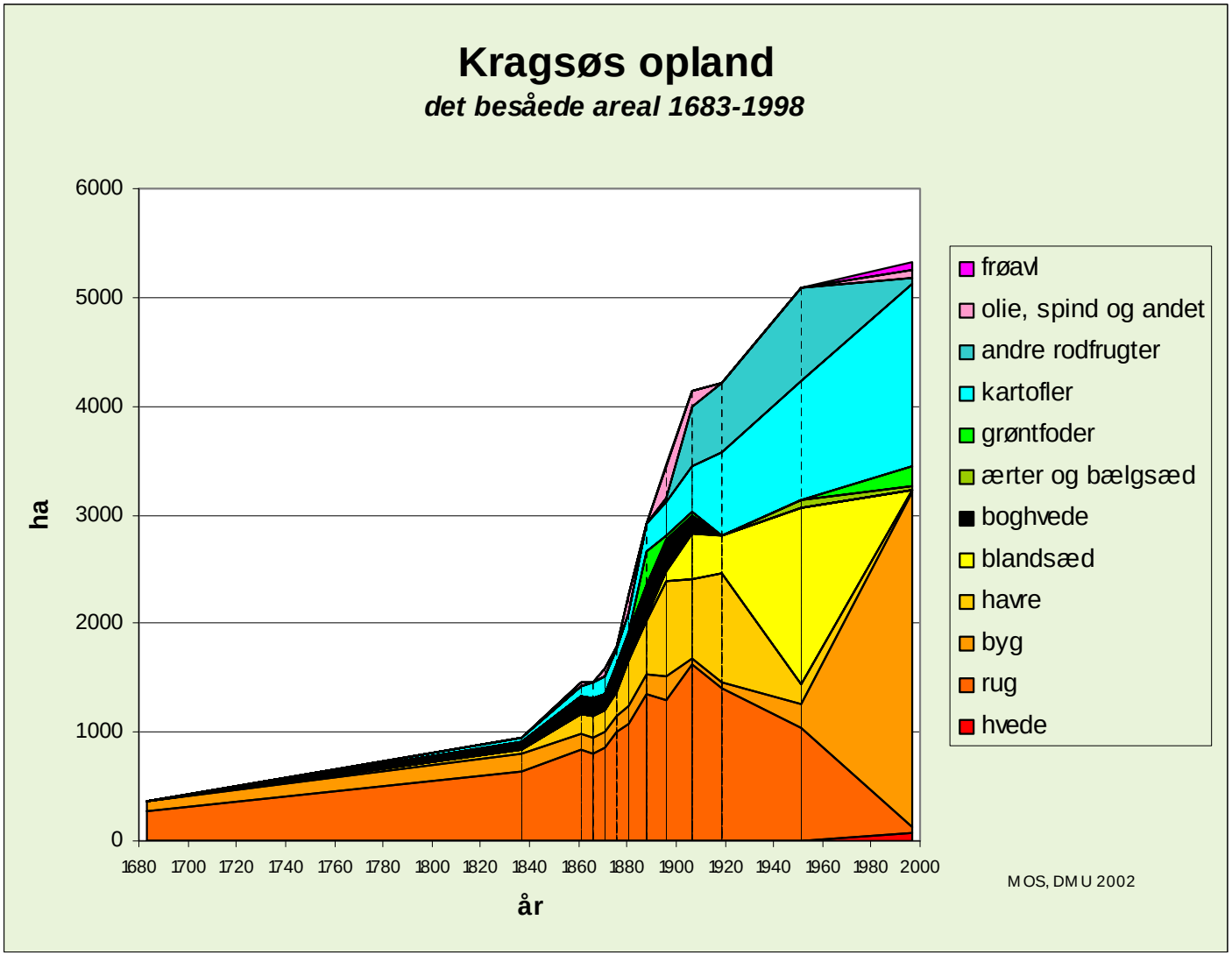




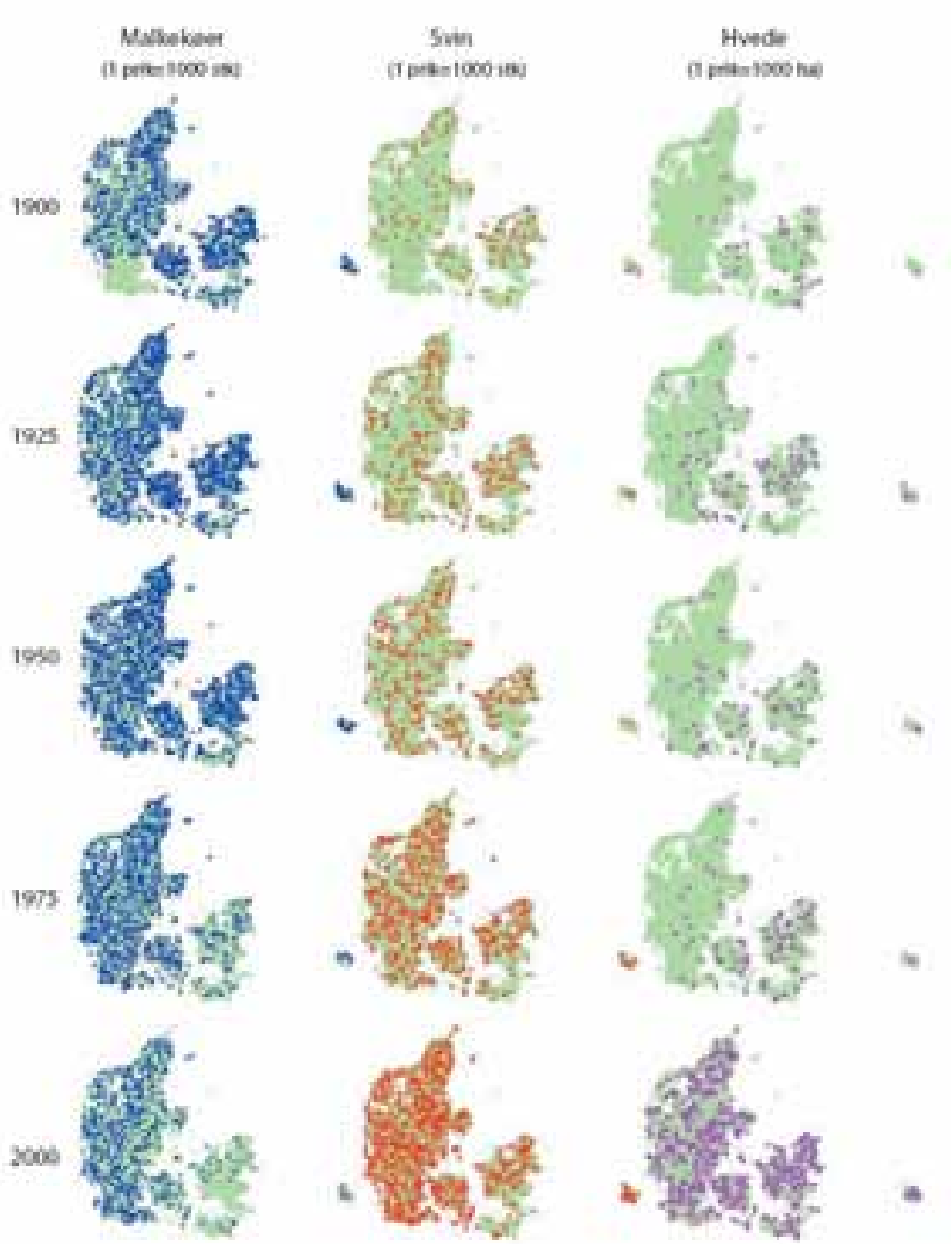
Changes in dominant vegetation units of a heathland type landscape between 1886 and 1996



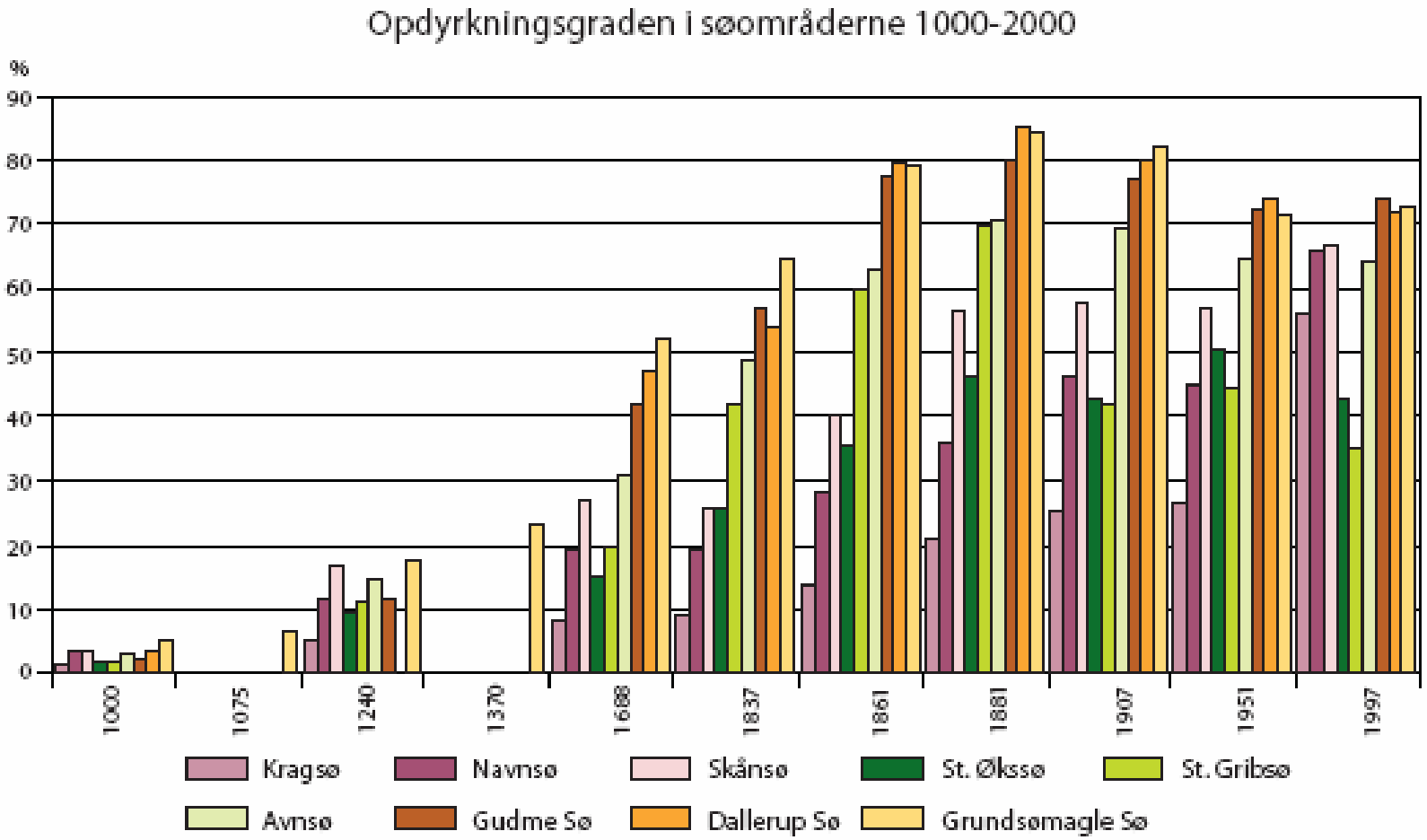
Dynamics of landscape patches of a heathland type landscape between 1886 and 1996. Relatively few patches have remained stable during the 110 years.



The development since AD 1683 in agricultural area occupied by crops in the catchment of lake Kragsø, Denmark (Morten Stenak)



Development in dairy cows, pigs and wheat cultivation during the 20th century



Percentage of area cultivated in the nine study areas through the period 1000 – 2000.

Mennesket har ændret på det danske landskab gennem årtusinder. Så selvom vores landskab præges af moderne udvikling, er der mange strukturer, der peger langsynte tilbage. Et eksempel er de gamle landsbyers placering, som har eksisteret omtrent 3000 år tilbage i tiden. Denne bog følger 9 udvalgte danske landskabers historie gennem de sidste 2 årtusinder, og for første gang kan der sættes tal på, hvor meget skov, hede og opdyrket areal, der var gennem denne periode. Vi følger også det traditionelle kulturlandskabs opblomstring efter 1800 og ser på, hvad disse ændringer har betydet for årsringene i landskabet. Tidslinjen er således trukket nøje bestemt fra jernaldertidens ard-plejede og voldkronede marker i digevoldinger til vor tids storlandbrug med støtteordninger og økologiske tendenser. Bogen er skrevet af 15 forskere, som har samarbejdet i det tværvidenskabelige projekt ACRAR 2000.

DANSKE LANDBRUGSLANDSKABER GENNEM 2000 ÅR

Fra digevoldinger til støtteordninger

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