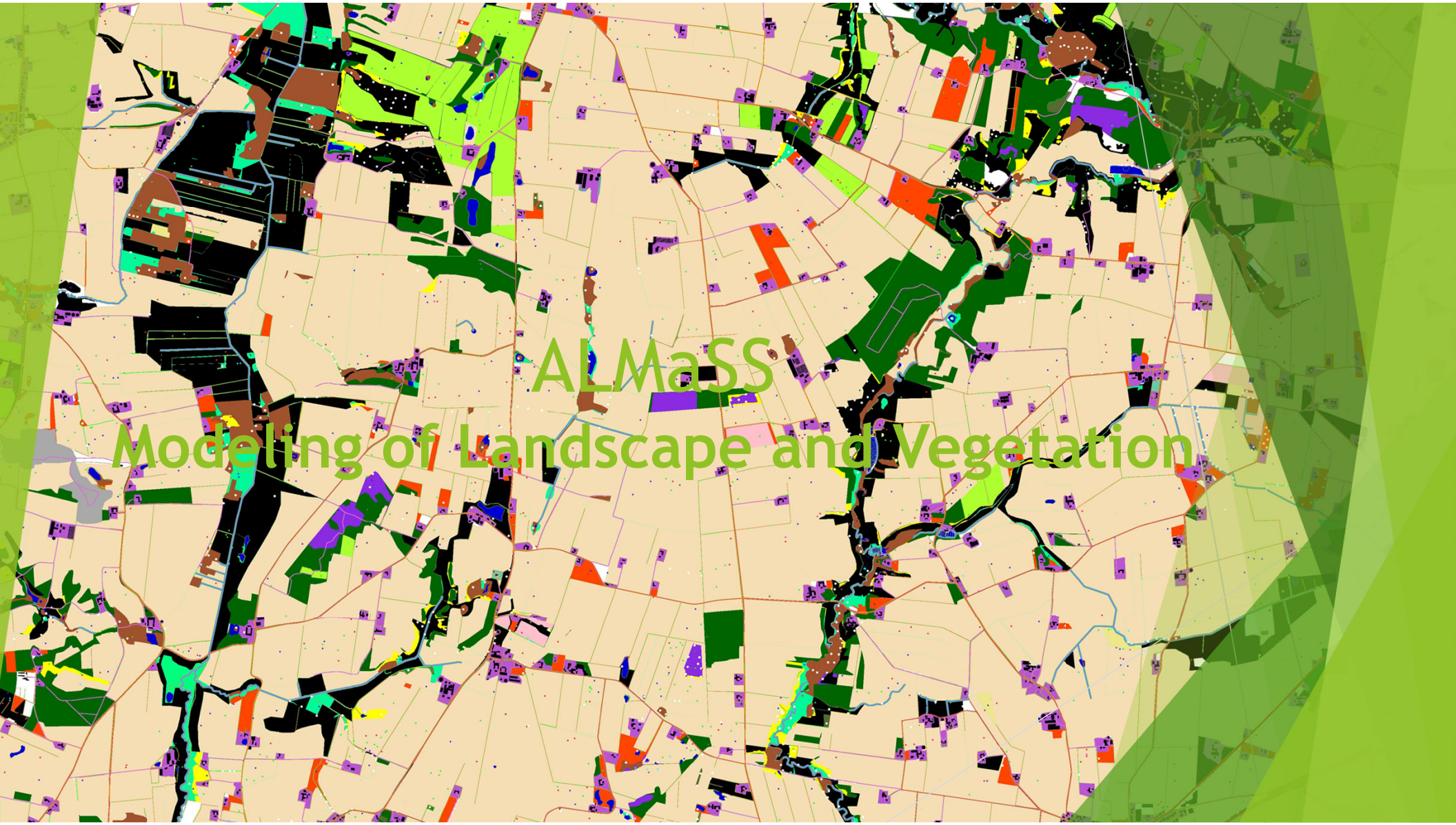

ALMaSS
Modeling of Landscape and Vegetation

ALMaSS Landscape and Vegetation Modelling
Why?

- Dynamic Landscape is the spatial context for the ALMaSS species
  - Properties of the landscape elements e.g. dynamic biomass and pesticide load, together with static attributes such as land cover, determine the fate of the ALMaSS species individuals.
  - Vegetation in particular represents resource for food and cover
  - In an agricultural landscape, farm management practices make a large part of the vegetation highly dynamic.

- Dynamic landscape simulation is becoming an ALMaSS objective on par with species simulation, to answer socio-ecological questions

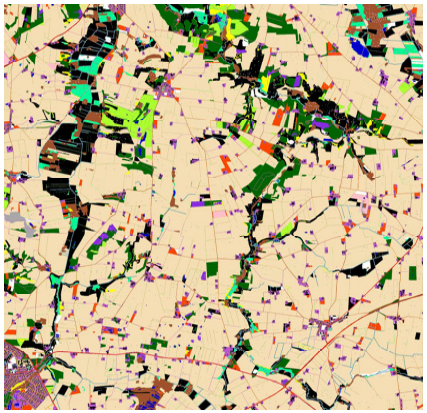
ALMaSS Landscape and Vegetation Modelling
Building a Dynamic Landscape

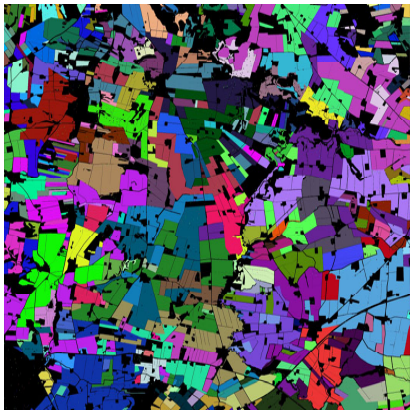
- An ALMaSS dynamic landscape starts as a static landscape model based on country-specific GIS and farming data
- Daily Dynamism is then added through:
  - Weather simulation (based on historical weather data input files)
  - Vegetation growth simulation (e.g. Leaf-Area-Index calculations and customized growth curves for each vegetation type)
  - Farm-type and crop specific management simulation accounting for detailed farm activities (e.g. ploughing, sowing, weeding, fertilization, pesticide application, watering, harvesting) by use of flexible C++ specification classess allowing for complex calendar and field-condition logic

ALMaSS Landscape and Vegetation Modelling

An ALMaSS landscape model is a realistic landscape representation …

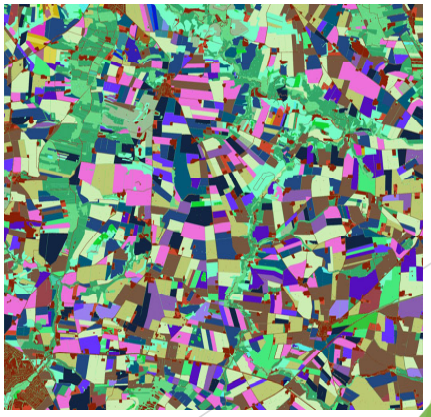
using available GIS data …



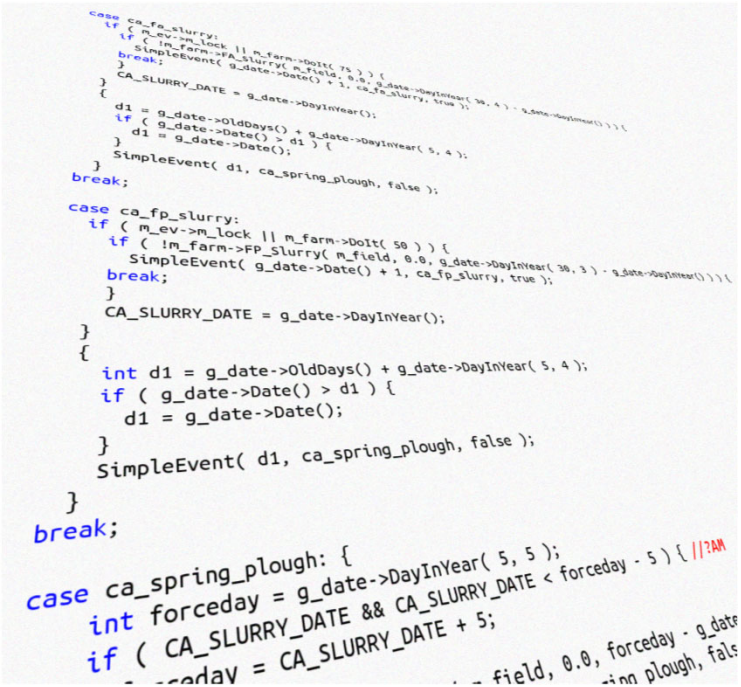


and EU farm subsidies data to associate fields to farms …

giving ALMaSS the means for vegetation growth simulation.



ALMaSS Landscape and Vegetation Modelling
Technological Core



```
case ca_fp_slurry:
  if ( m_ev->m_lock || m_farm->DoIt( 50 ) ) {
    if ( !m_farm->FP_Slurry( m_field, 0.0, g_date->DayInYear( 30, 3 ) - g_date->DayInYear() ) ) {
      SimpleEvent( g_date->Date() + 1, ca_fp_slurry, true );
    break;
    }
    CA_SLURRY_DATE = g_date->DayInYear();
  }
  {
    int d1 = g_date->OldDays() + g_date->DayInYear( 5, 4 );
    if ( g_date->Date() > d1 ) {
      d1 = g_date->Date();
    }
    SimpleEvent( d1, ca_spring_plough, false );
  }
break;

case ca_spring_plough: {
  int forceday = g_date->DayInYear( 5, 5 );
  if ( CA_SLURRY_DATE && CA_SLURRY_DATE < forceday - 5 ) { //?AN
    forceday = CA_SLURRY_DATE + 5;
    ... field, 0.0, forceday - g_date
    ...ing plough, fals
```

A scripted workflow for the production of the ALMaSS landscape input data consisting of Python and ArcGIS raster-vector processing with additional data analysis and manipulation

A fast simulation core engine based on C/C++ that can handle large landscapes and long runs, able to run on servers

A user-friendly GUI suited for smaller ALMaSS run

ALMaSS Landscape and Vegetation Modelling
Contact

- For questions, ideas and further materials on topics of Landscape, Farm and Vegetation Modelling

sess@bios.au.dk

- Thank you for reading !