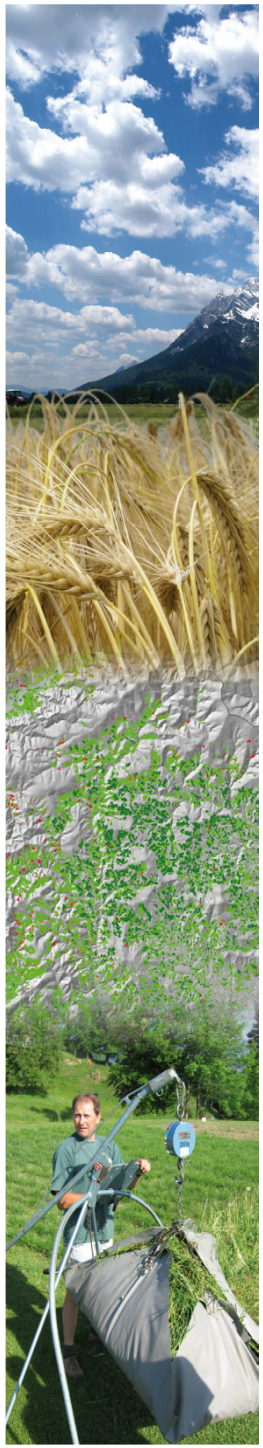


Project Meeting: 17.12.2013, BOKU, Vienna

Spatial Implementation of Drought Monitoring

Vojko Daneu and Andreas Schaumberger

Department Geoinformation
Agricultural Research and Education Centre Raumberg-Gumpenstein

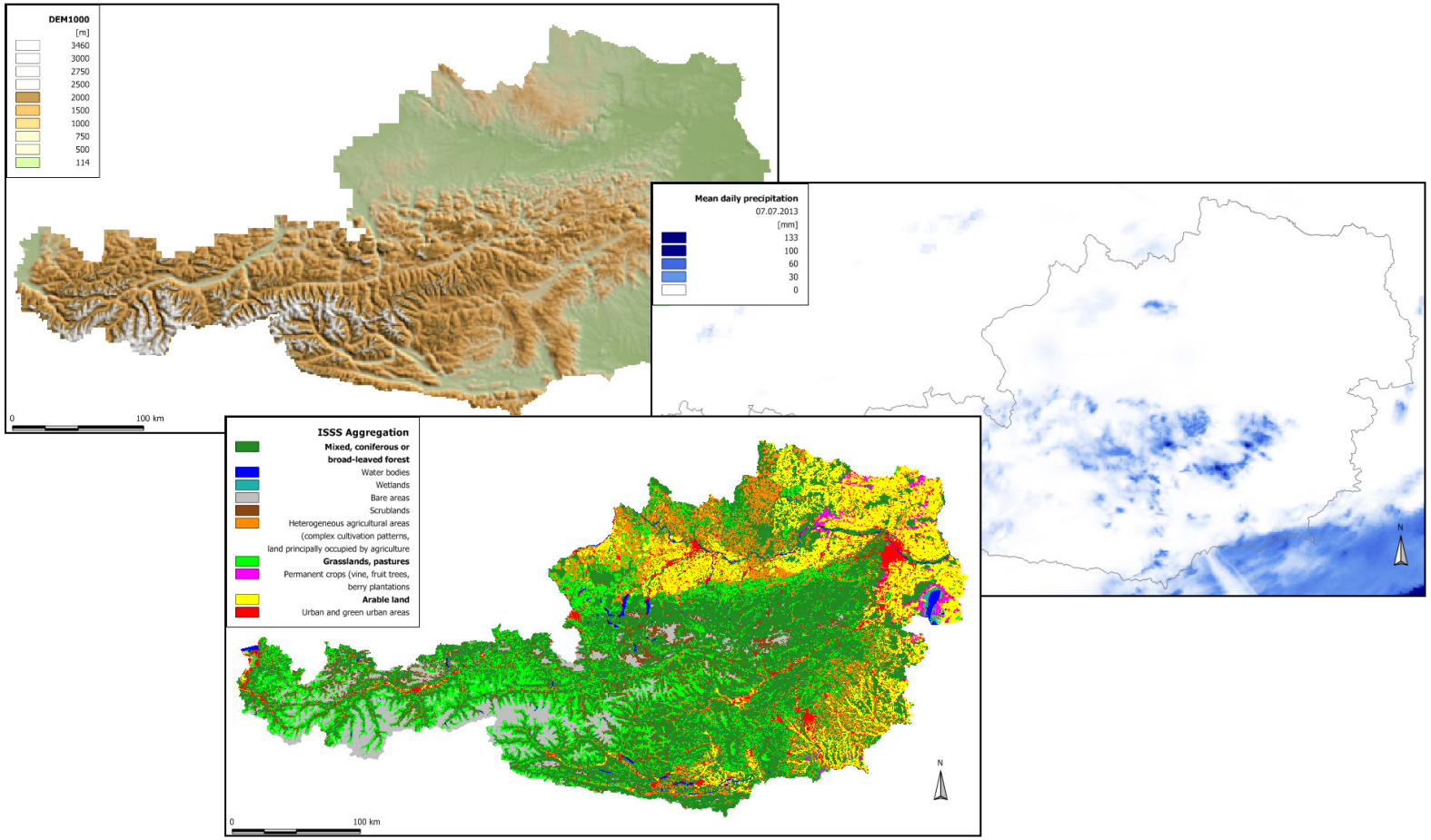
Work Package WP4 – Time Table and Objectives

Kick-off meeting: March 2013

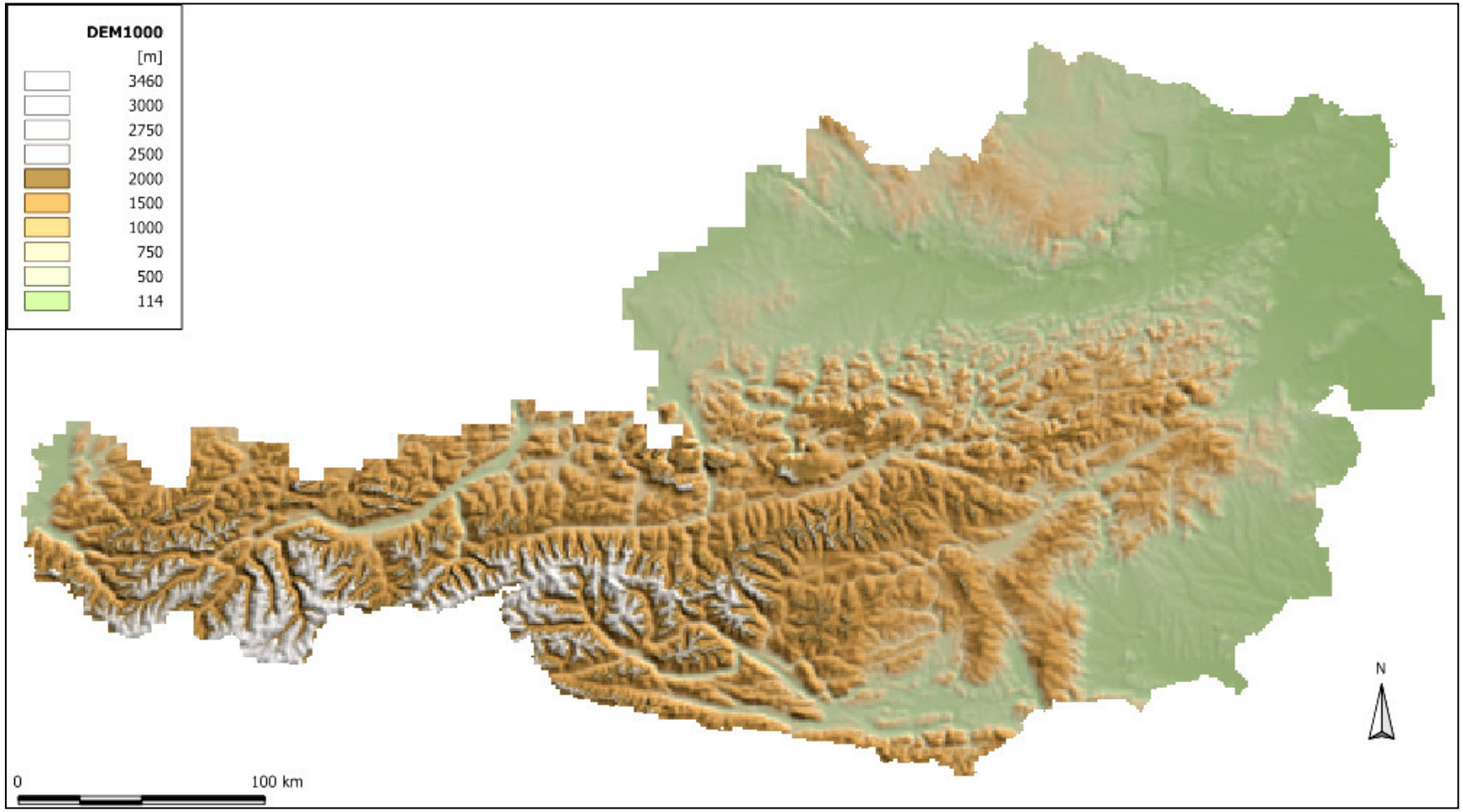
Start / end of WP4: October 2013 / October 2015

- Spatial interpolation of weather data for the period before INCA data are available – format change from ArcGIS to netCDF
- Development of platform independent software that integrates existing models (SpatialGRAM, SoilClim)
- Forecast: Implementation of new developed and/or adapted methods to monitor and forecast agricultural drought for main crops cultivated in Austria
- Web interface to publish our results mainly by maps (delivery of images – netCDF, png, jpg, tiff …)

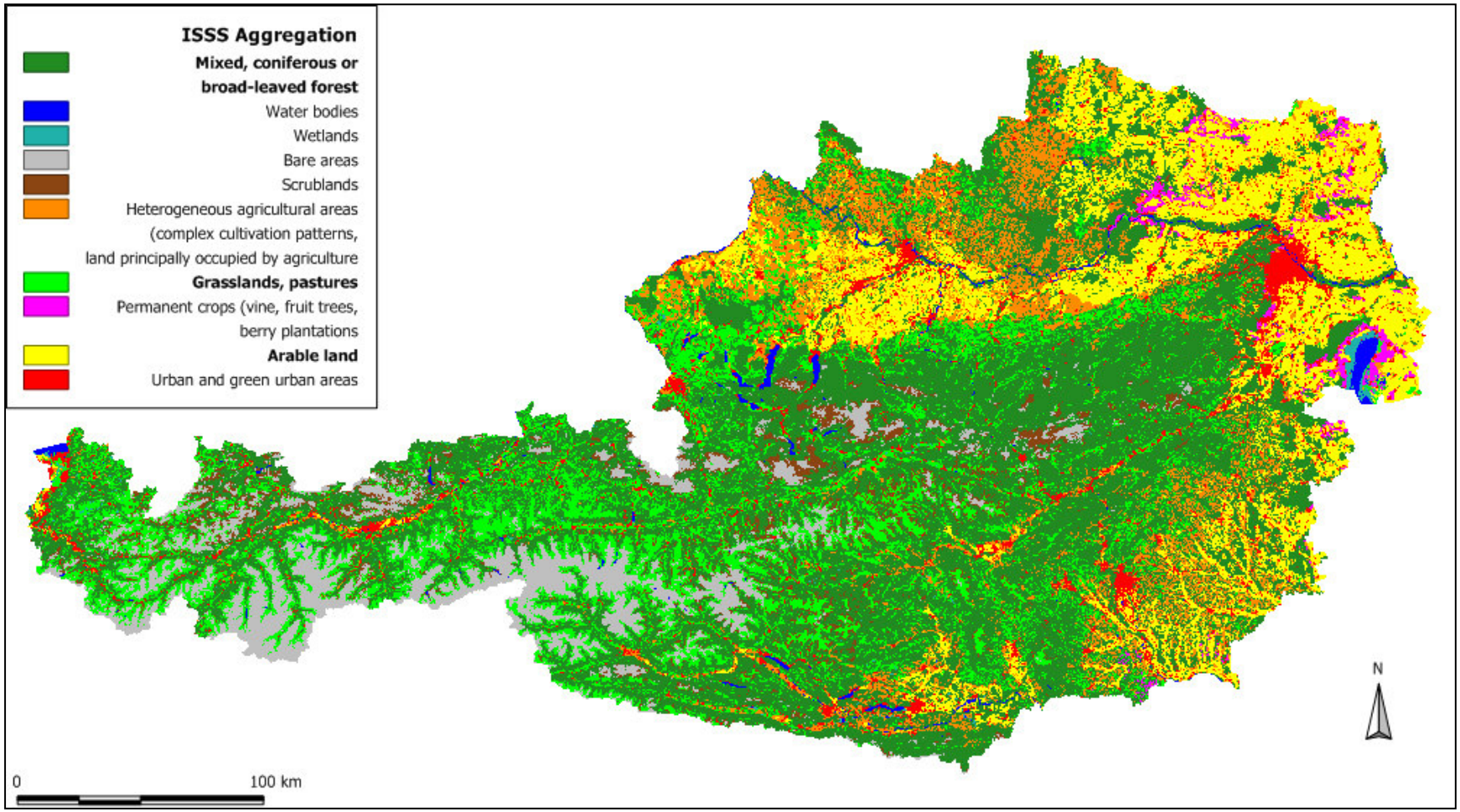
Data for the ADA program



Data Input – Elevation Data DEM



Data Input – Land Use Data CLC 2006 / ISSS / ADA Crops (500 x 500m)

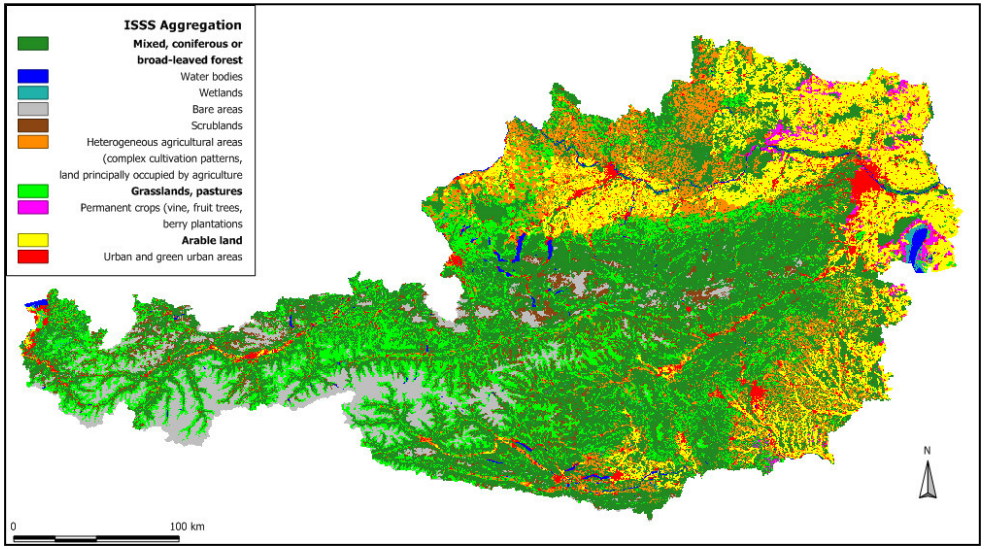


LandCover-Classification from MENDELU University

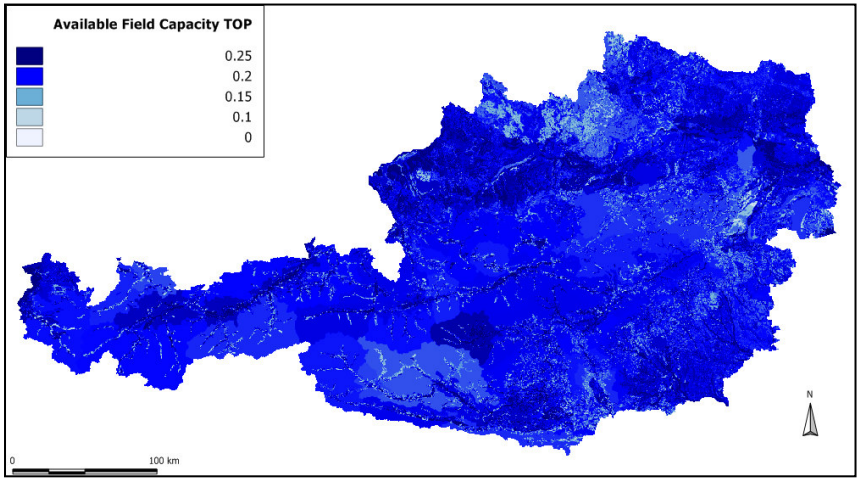
Data Input – Land Use Data CLC 2006 / ISSS / ADA Crops (500 x 500m)

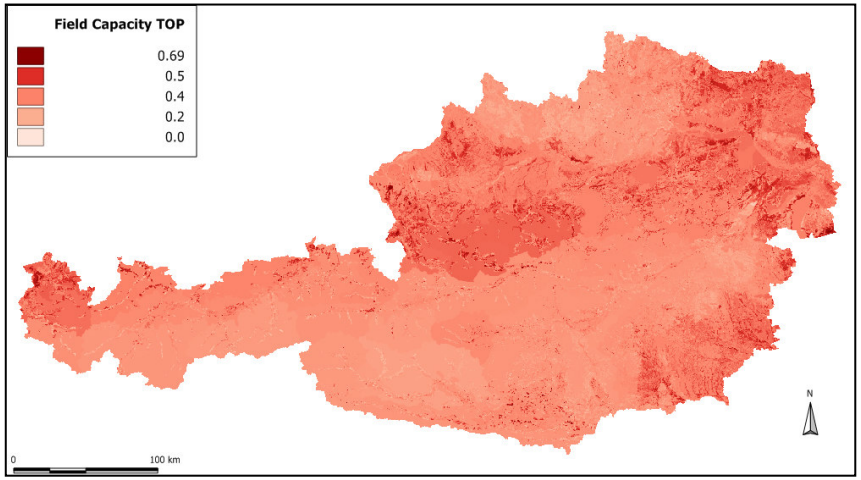
CLC 2006 arable land vs. ADA winter wheat,
ADA spring barley,
ADA spring maize,
ADA sugar beet

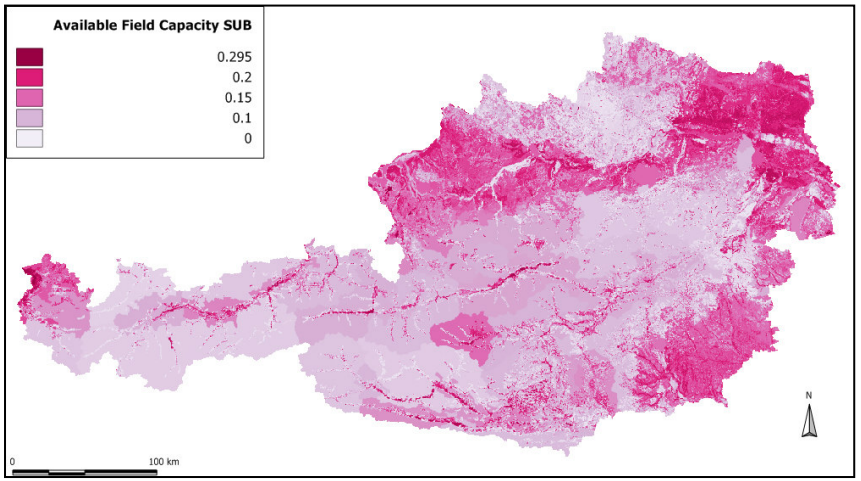
=> Up to 4 scenarios with different ADA crop types (used for the complete arable land area) and 1 scenario with average values

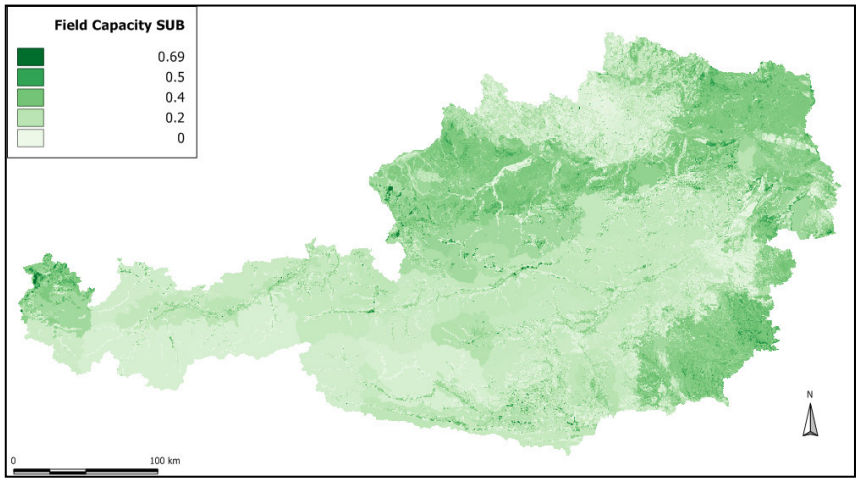


Data Input – Soil Data AFC and FC (500 x 500m)



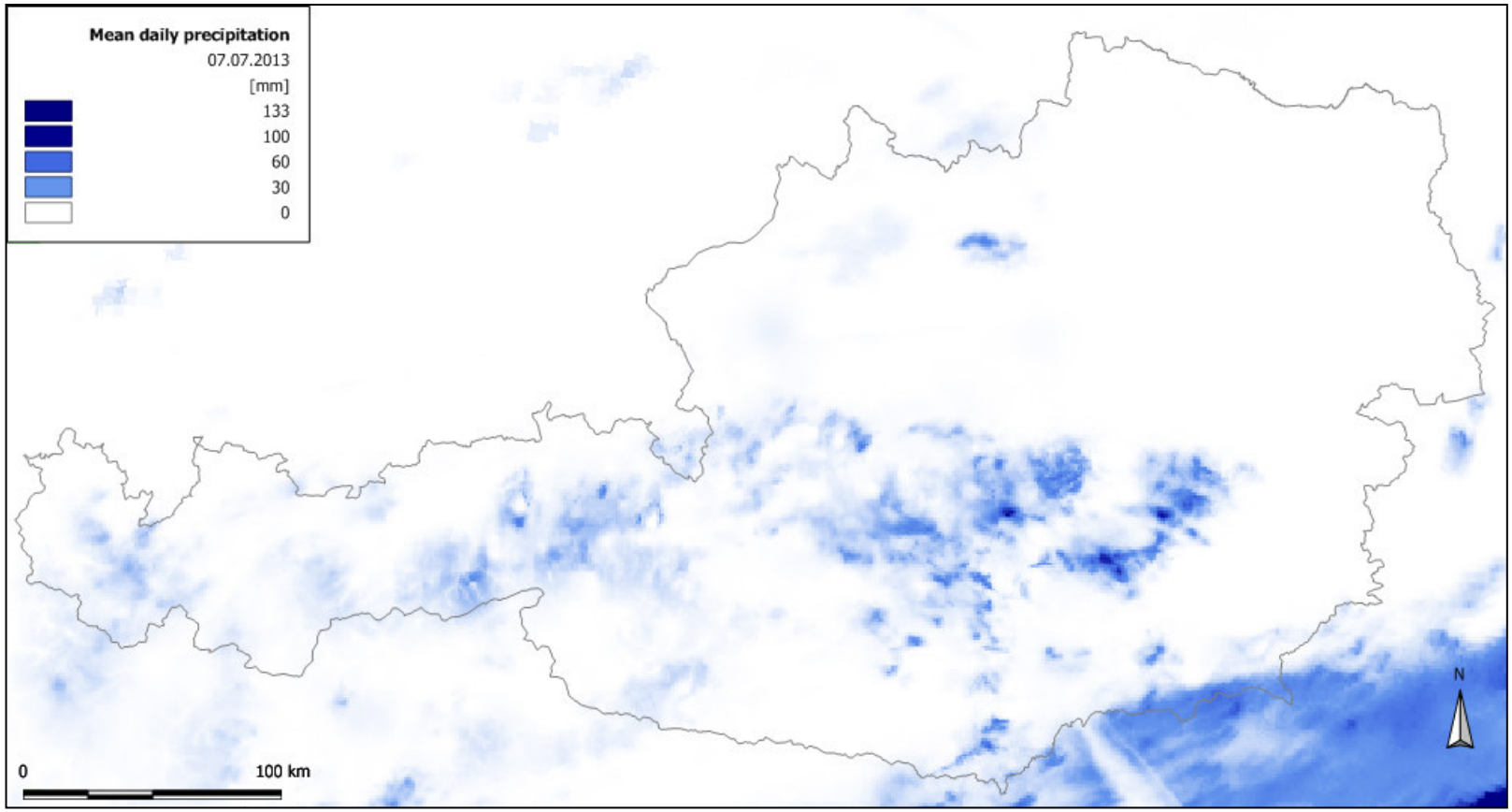






Data Input – Meteorological Data (1000 x 1000m)

Met Data: Temperature - Precipitation – Radiation – Relative humidity - Wind



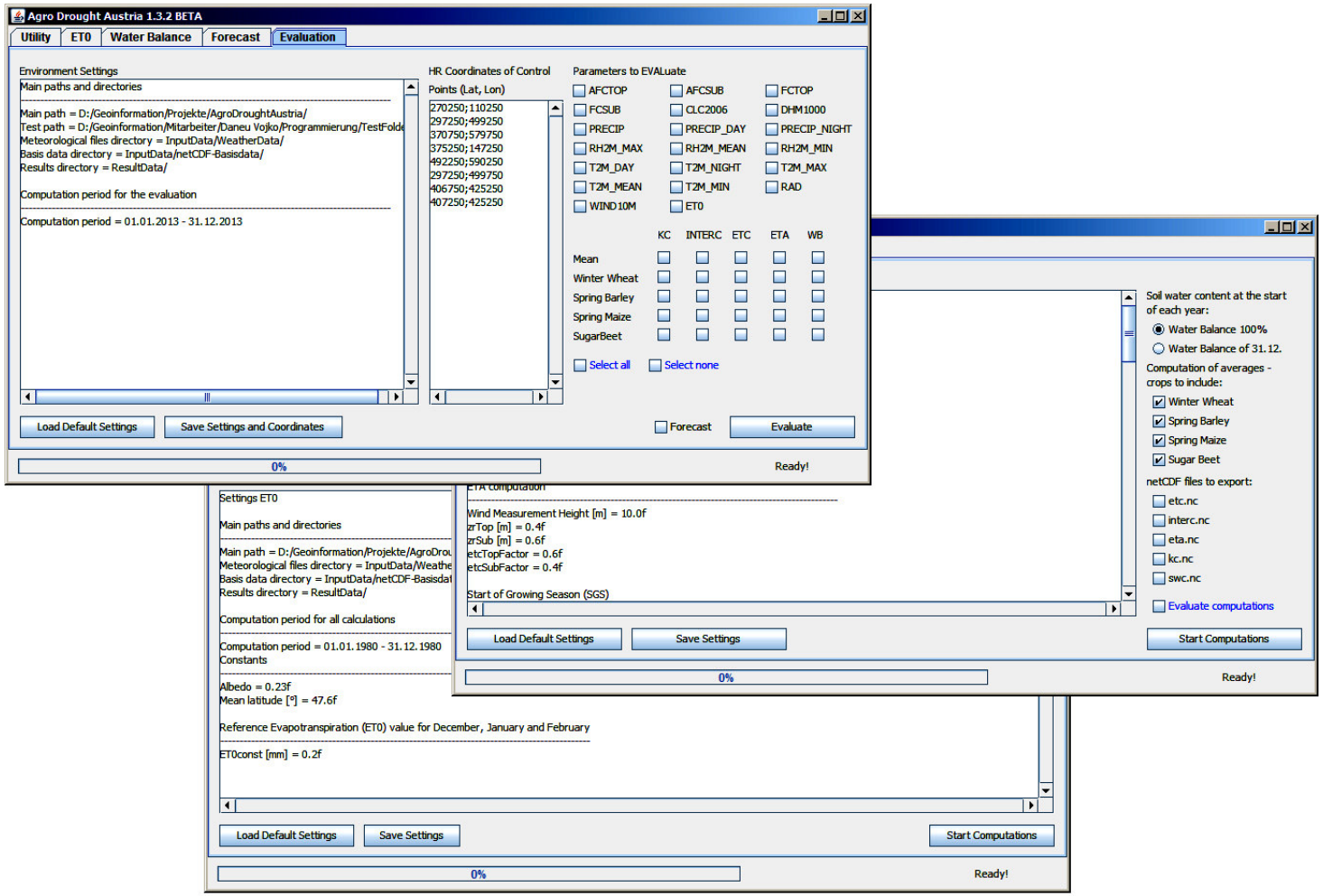
Data Input – Meteorological data (1000 x 1000m)

Met Data: Temperature - Precipitation – Radiation – Relative humidity - Wind

1980 - 2002: Spatial interpolation of weather data for the period before INCA data carried out. ArcGIS -> netCDF missing.

2003 – now (+ 3,10 days forecast): INCA weather data interpolated by ZAMG and supplied

Software – ADA Program



Work Packages ADA Program Overview

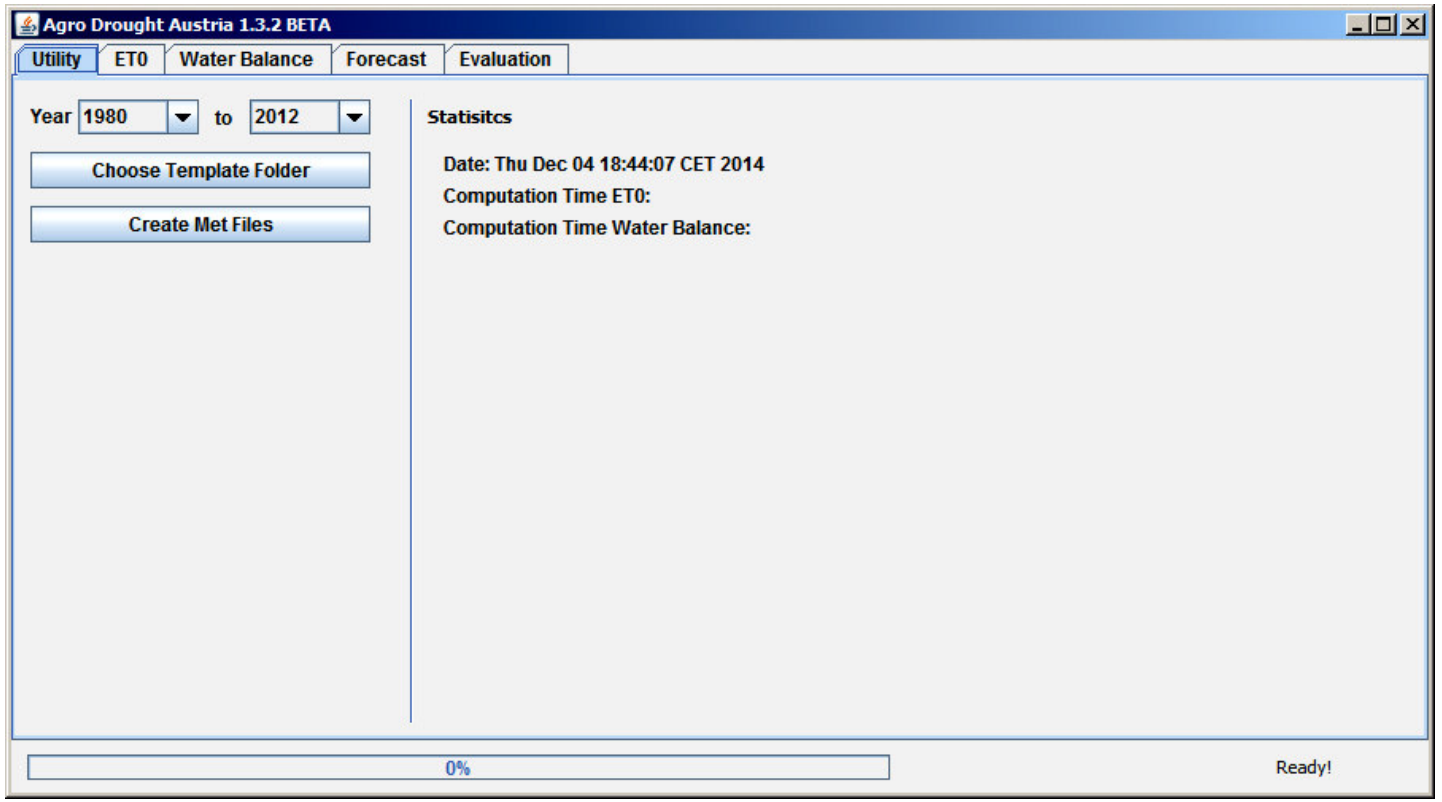
- I/O interface for netCDF data
  - Data format for reading/writing large scientific data files
  - Self describing (reducing the incidence of errors)
  - High performance
- Adapt I/O interface for netCDF data (daily gridded weather parameters) of the ZAMG
- Write graphical user interface
  - Allow data input by the user (environment settings)
  - Allow selection of various computation szenarios (SWC at the start of the year, „variable crops“, data export)
- Continue translate methods (ET0, SWC) from c# into Java (SpatialGRAM)
- Translate and include methods (ET0, SWC, FC) from Delphi into Java (SoilClim)

Work Packages ADA Program Overview

- Testing and debugging
- Development of automated procedure for computation, I/O and distribution of results (netCDF, PNG) on the web server
- Final Testing and debugging

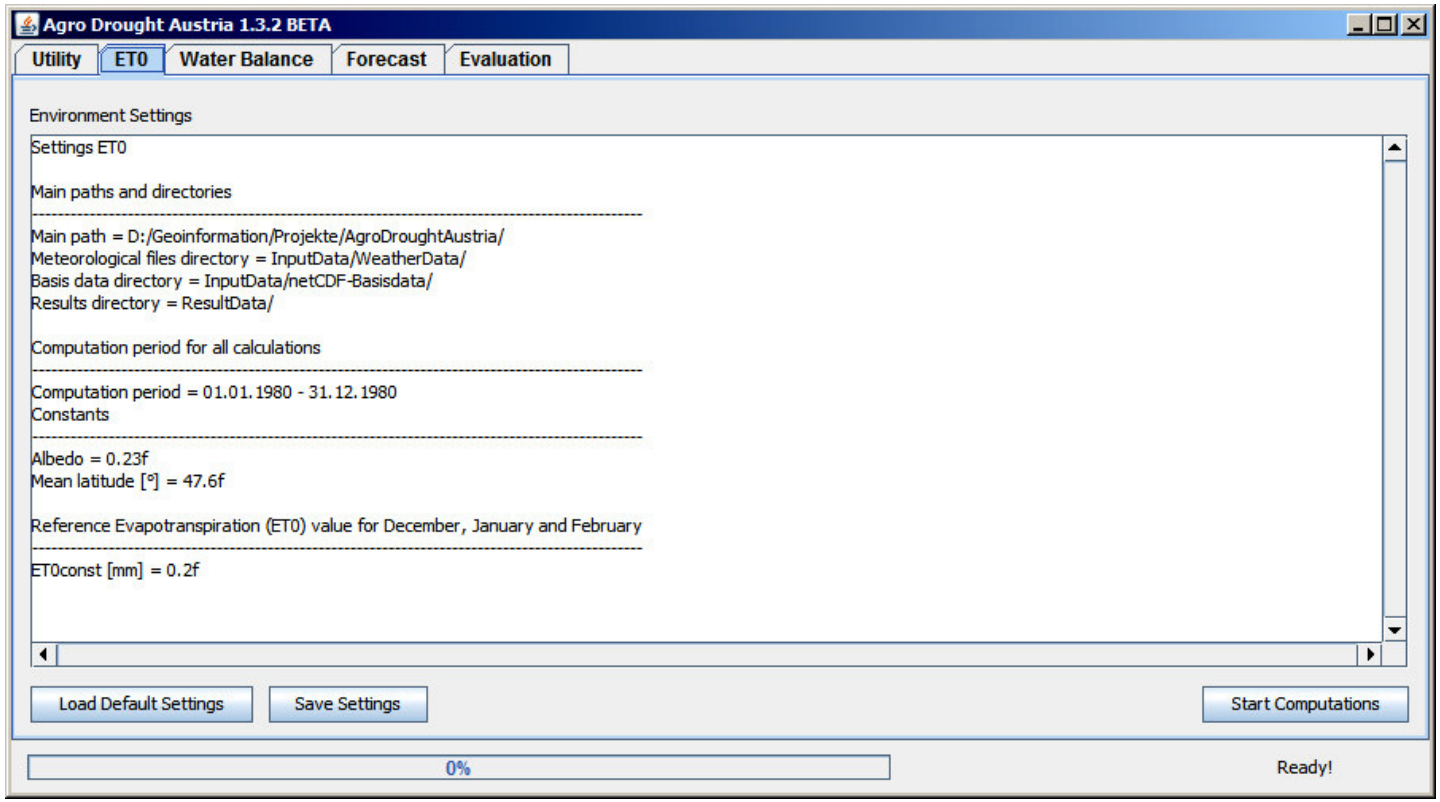
ADA Program – Tab Utility

- Dummy file creation
- Computation time summary
- and whatever is of interest



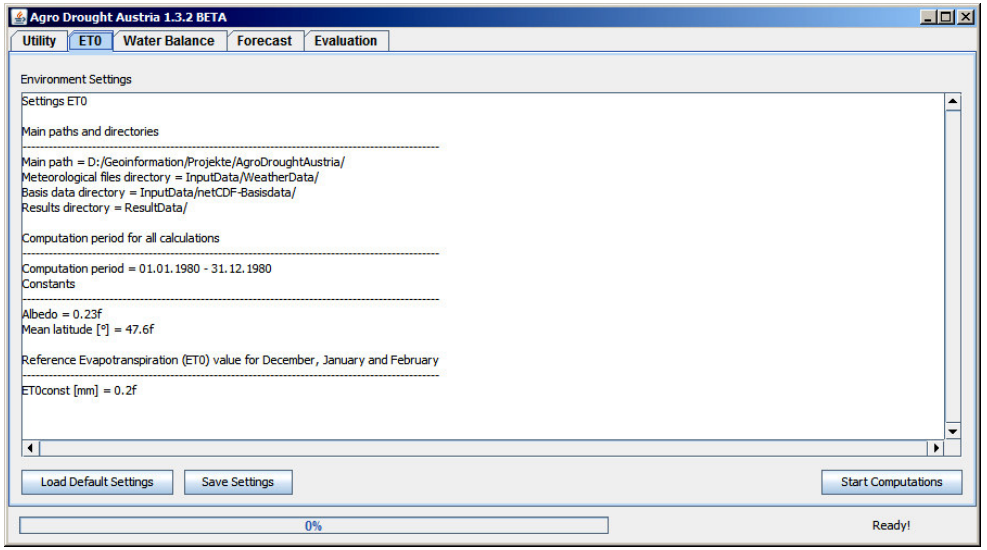
ADA Program – Tab ET0

- Environment Settings
- Load Default Settings, Save Settings
- Compute ET0



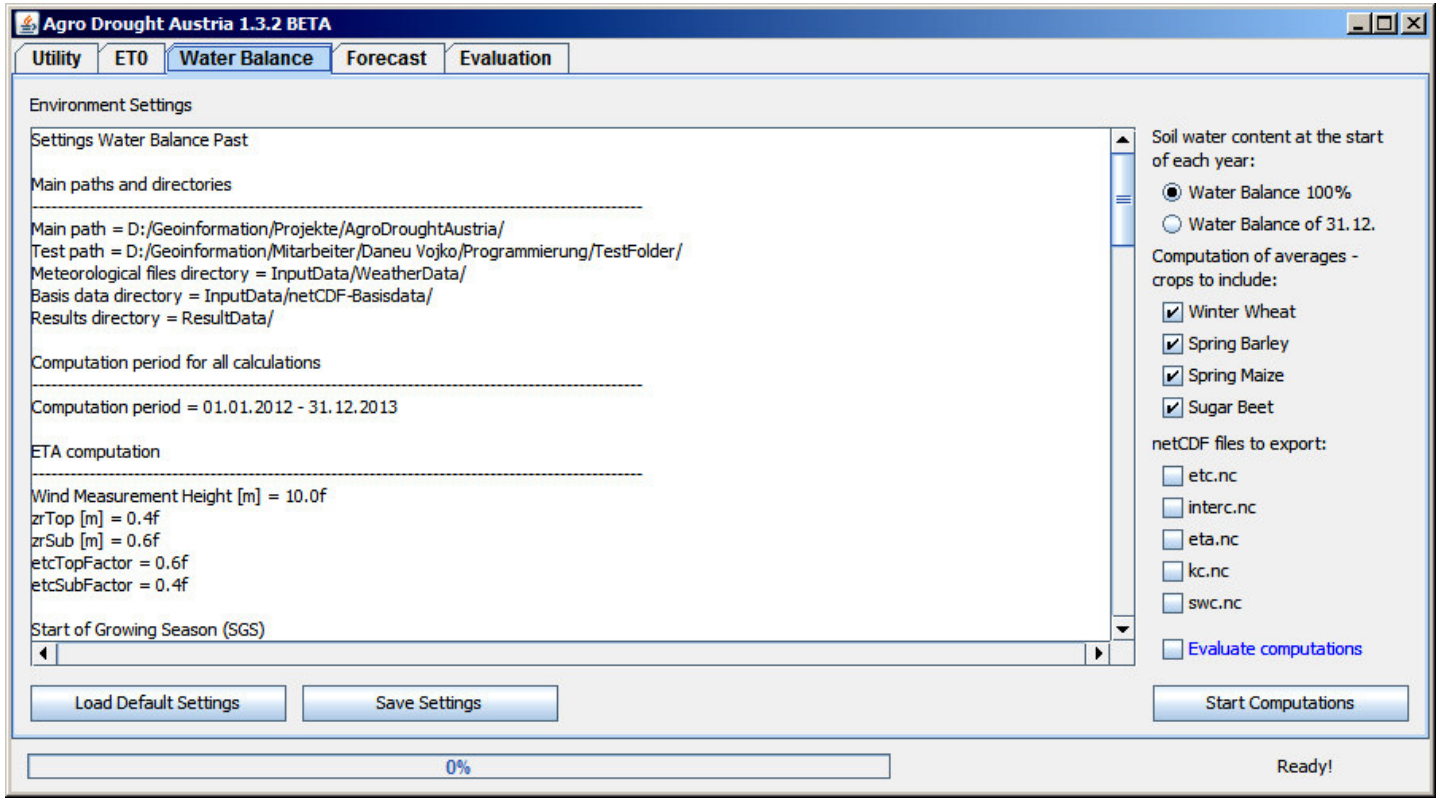
ADA Program – ET0 Computation

- Computation of ET0 for all past years from 1980 - 2014
- Methodology: FAO Penman-Monteith method
- Export as netCDF files
- Compute only once



ADA Program – Tab Water Balance (no forecast)

- Environment Settings
- Load Default Settings, Save Settings, Selections
- Compute KC, ETC, Interception, ETA, SWC



ADA Program – Water Balance Computation

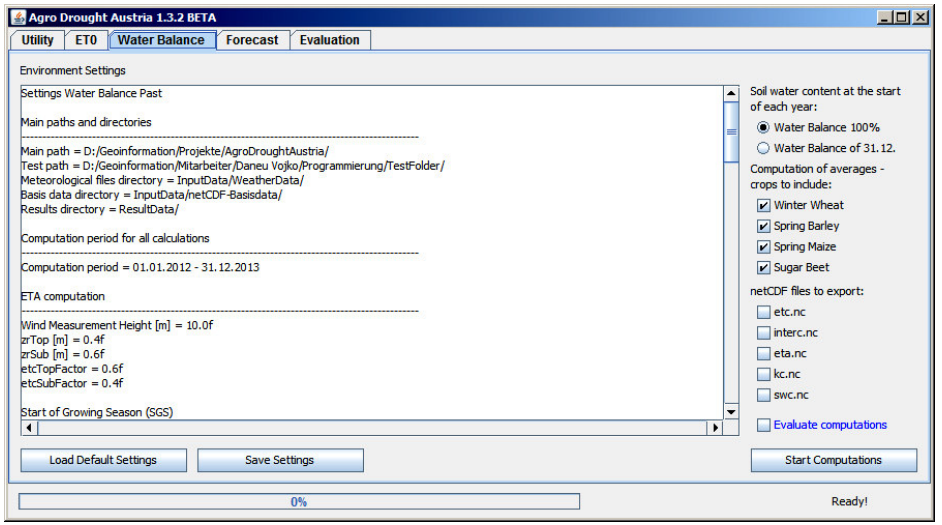
- KC, ETC, Interception, ETA, SWC for all past years (max. from 1980 – 2014) for the top and sub soil using „past“ met data

- Selection: Root zone depletion value
  Dr = 0 or Dr = Dr (31.12) => export Dr as netCDF files

- Selection: “variable crops” (wWheat, sBarley, sMaize, sugBeet) - select at least one!

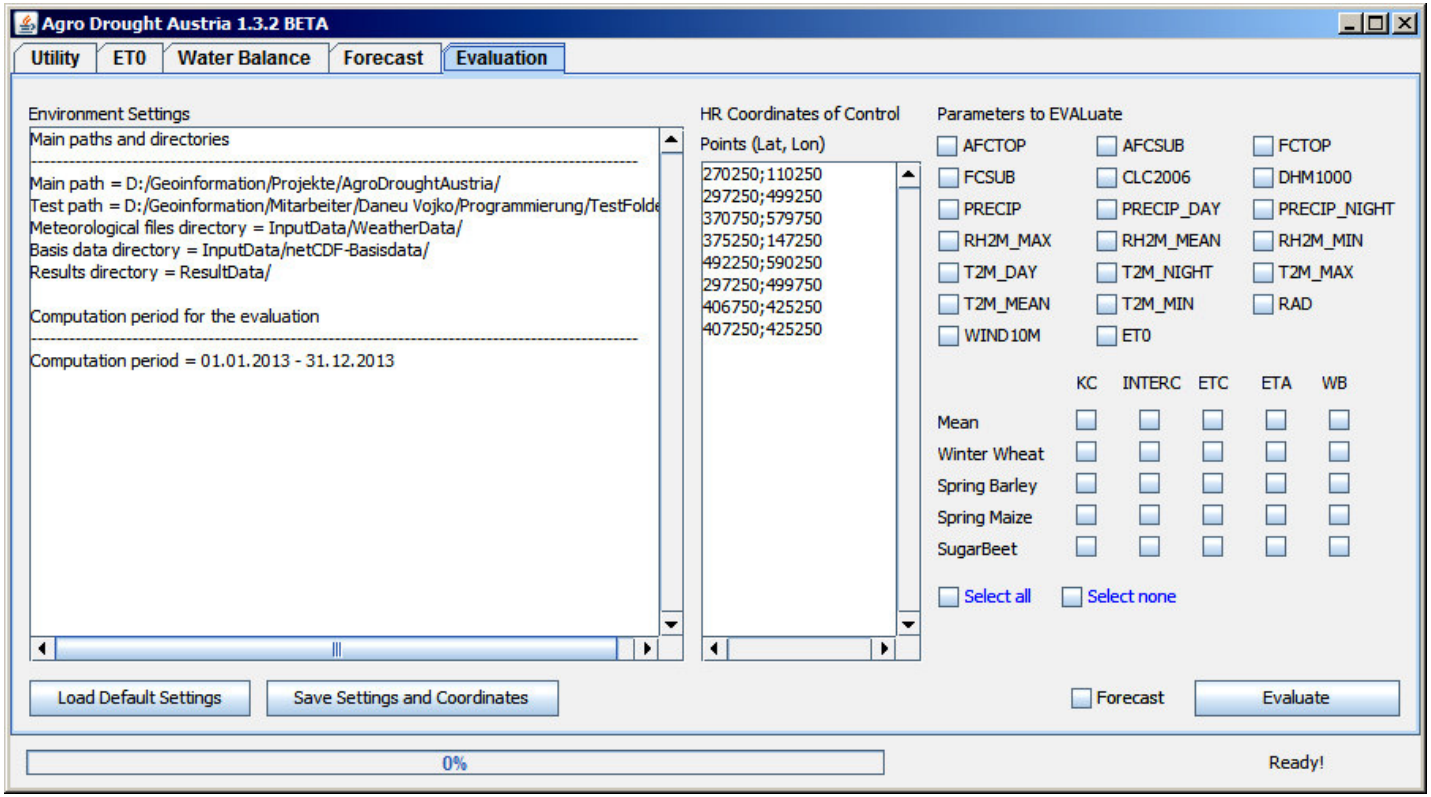
- Selection: export KC, ETC, Interception, ETA, SWC as netCDF files

- Selection: evaluate on the fly



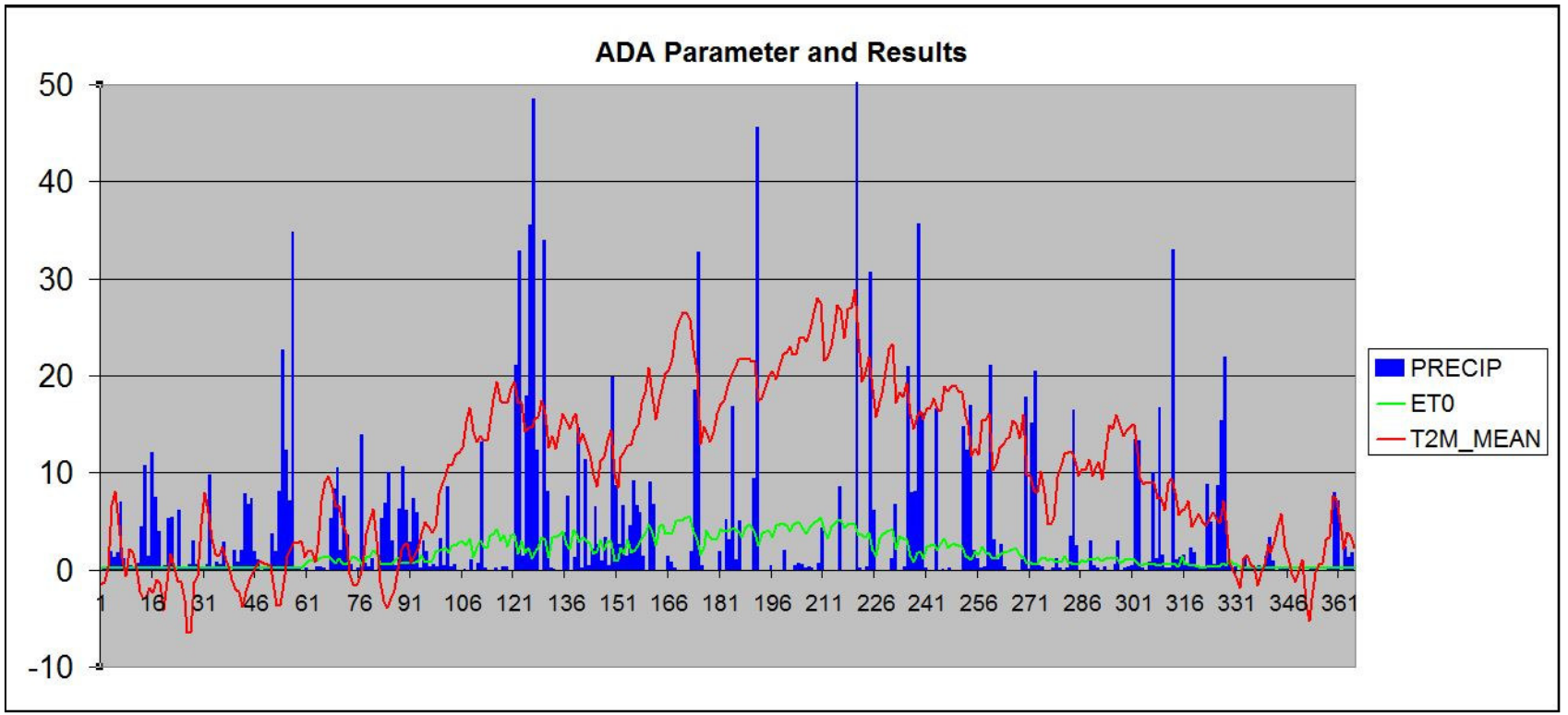
ADA Program – Tab Evaluation

- Environment Settings, CP Settings
- Load Default Settings, Save Settings, Selections
- Evaluate



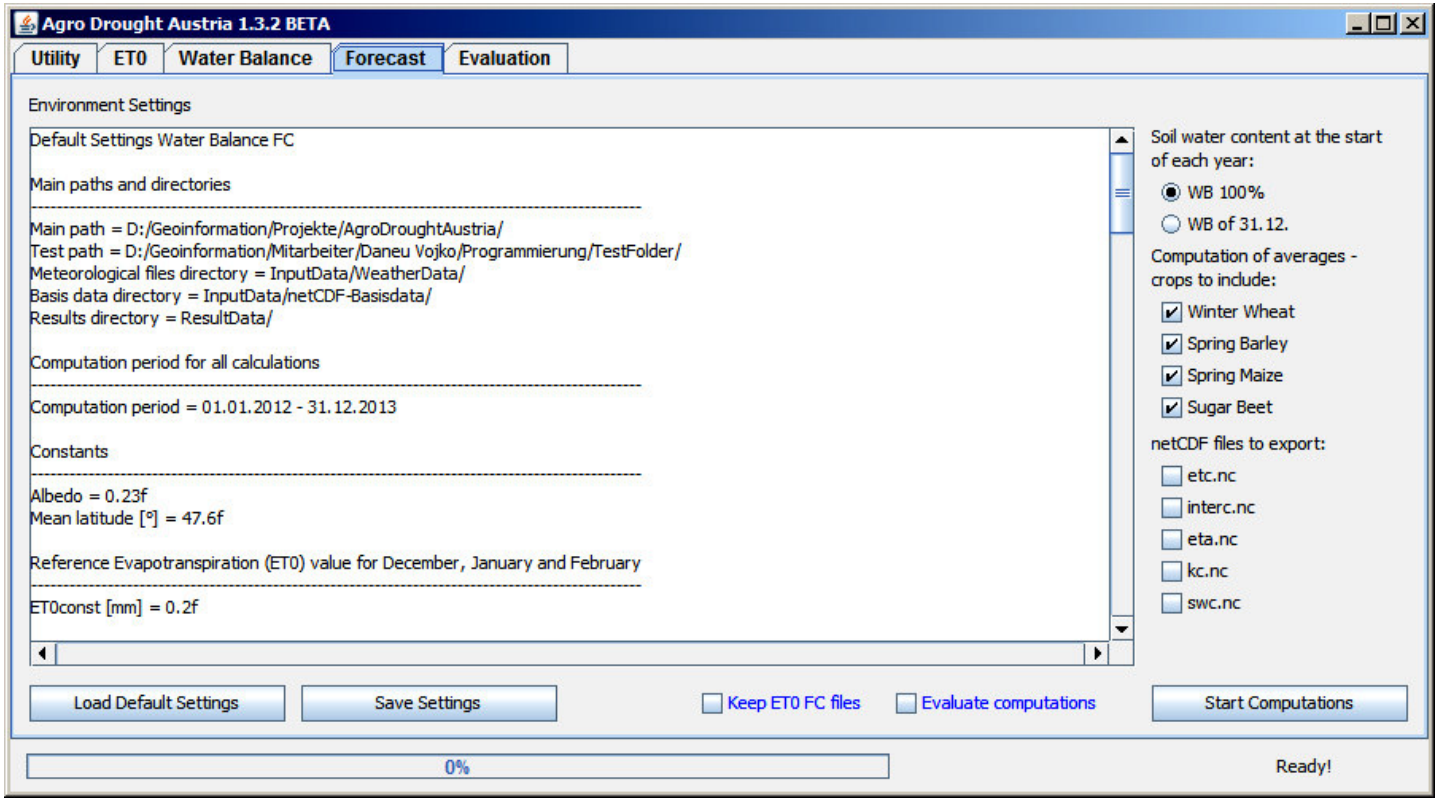
ADA Program – Tab Evaluation

- Evaluation of various parameters and computation results at selected control points



ADA Program – Tab Water Balance Forecast

- Environment Settings
- Load Default Settings, Save Settings, Selections
- Compute KC, ETC, Interception, ETA, SWC, **FC**



ADA Program – Water Balance Forecast Computation

- KC, ETC, Interception, ETA, SWC for 2015 (using met data of 1980 – 2014 and forecast data) for the top and sub soil

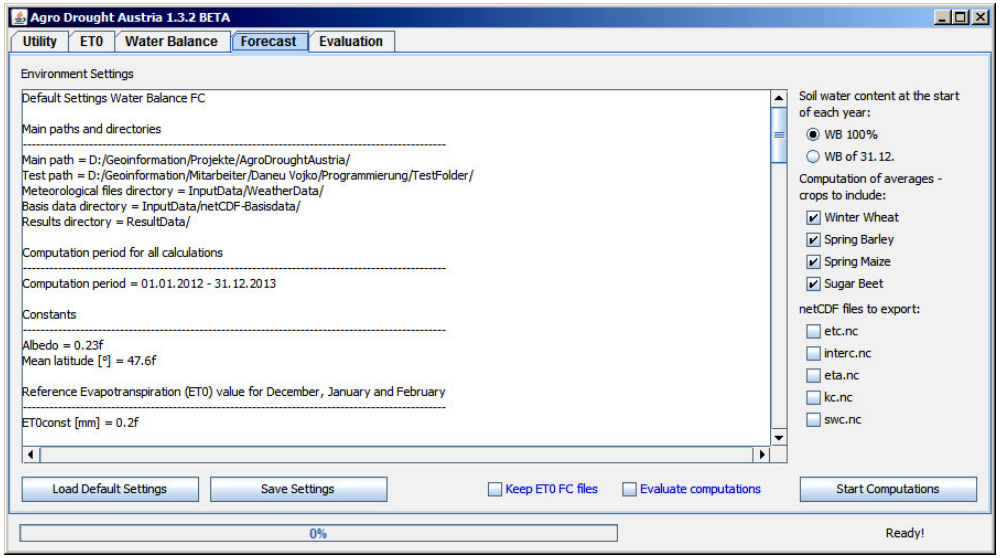
- Selection: Root zone depletion value

  Dr = 0 or Dr = Dr (31.12) => load Dr from netCDF files

- Selection: “variable crops”

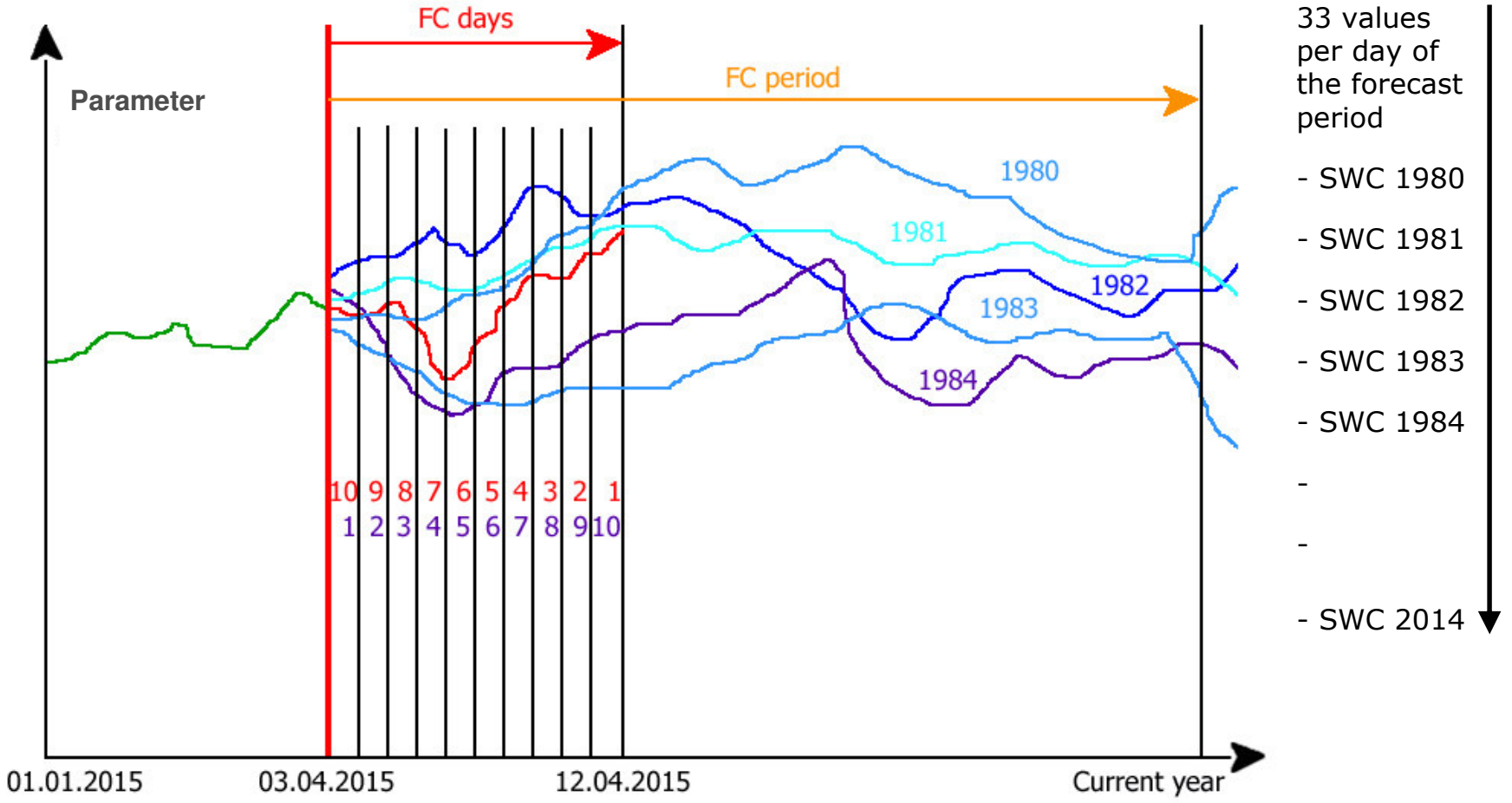
- Selection: export KC, ETC, Interception, ETA, SWC as netCDF files

- Selection: evaluate on the fly



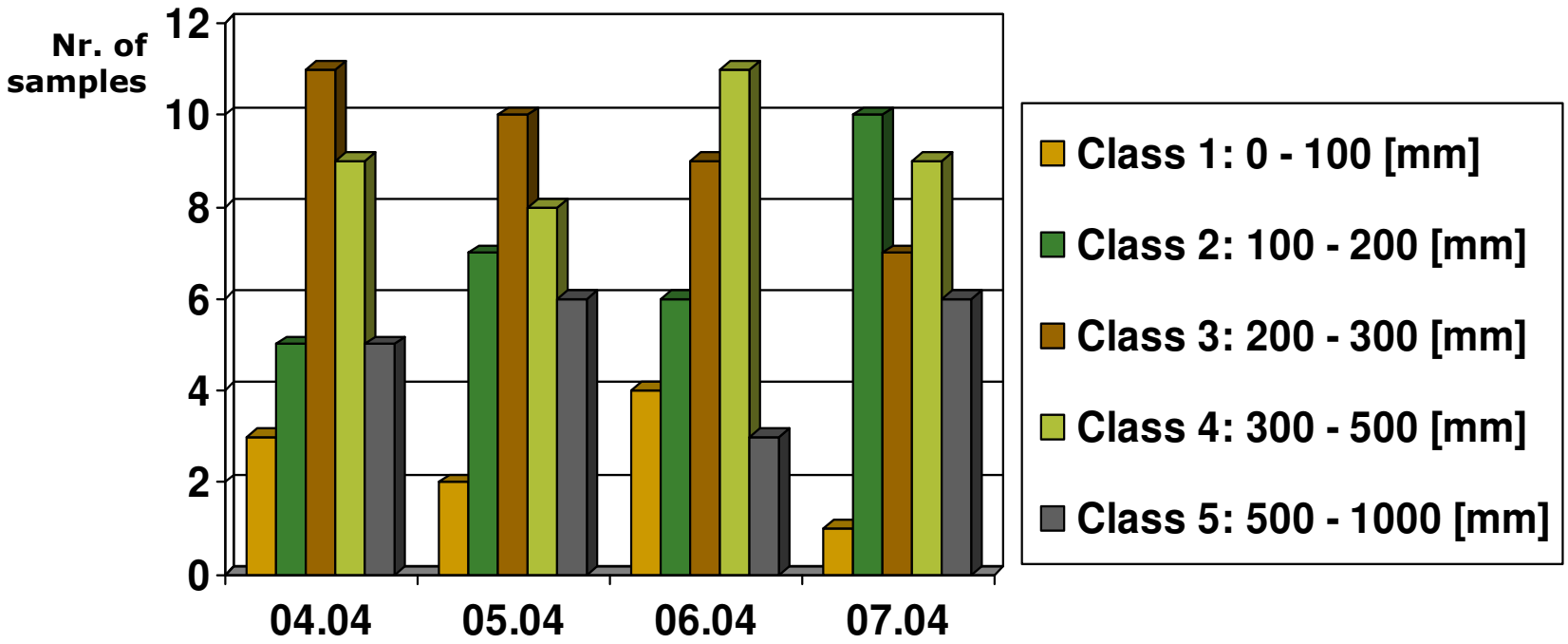
ADA Program – Water Balance Forecast Computation

- Forecast using weighted meteorological data



ADA Program – Water Balance Forecast Computation

- Classify 33 SWC values for each day of the fc period



- export results as multidimensional netCDF files (for each day of the forecast period and for each „variable" crop

ADA Program / Source Data – Next steps

- Translate SoilClim‘s forecast methods (ET0, SWC, FC) from Delphi into Java and include the code or parts of it into the ADA program – MARCH 2015
- Thorough testing and debugging – MARCH 2015
- Development of automated procedure for I/O, computation and distribution of results (netCDF, PNG) on the web server – JUL 2015
- Final Testing, debugging and adaptations – SEPT 2015
- Format change of spatially interpolated weather data from ArcGIS to netCDF – JAN 2015

Questions that have to be answered

Heterogeneous agricultural areas -> arable land, grass or ignore?