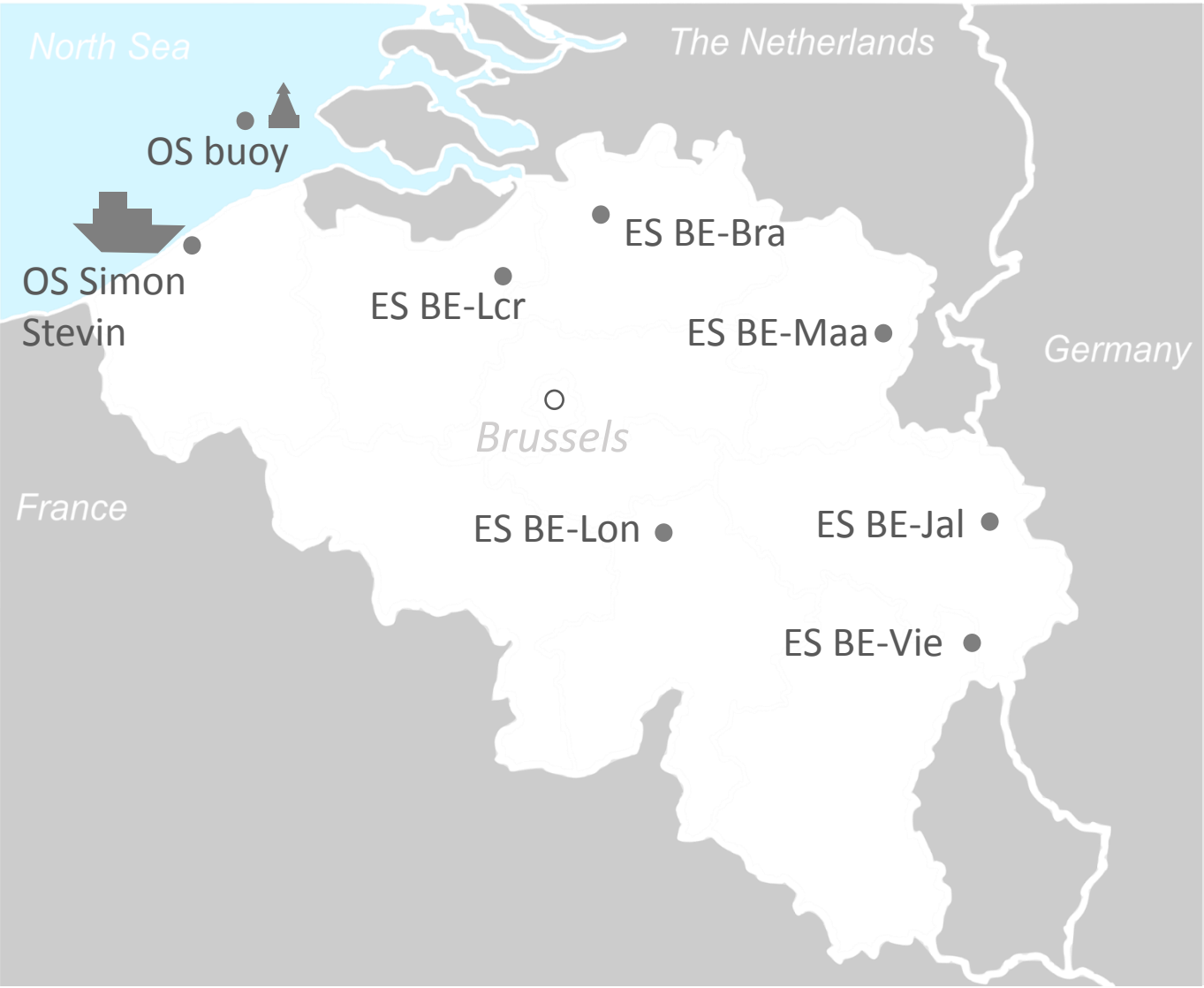
ICOS

INTEGRATED CARBON OBSERVATION SYSTEM

ICOS Belgium:
Ecosystem stations University of Antwerp

Universiteit Antwerpen

8 ICOS Research Stations in Belgium:



OCEANIC STATIONS (OS):

Vlaams Instituut voor de Zee
- Ship Simon Stevin
- Fixed buoy

ECOSYSTEM STATIONS (ES):

Universiteit Antwerpen
- BE-Bra: Brasschaat
- BE-Lcr: Lochristi
- BE-Maa: Maasmechelen

Université de Liège
- BE-Jal: La Robinette
- BE-Lon: Lonzée
- BE-Vie: Vielsalm

3 ICOS Ecosystem Stations in Flanders:

OCEANIC STATIONS (OS):

Vlaams Instituut voor de Zee
Ship Simon Stevin
Fixed buoy

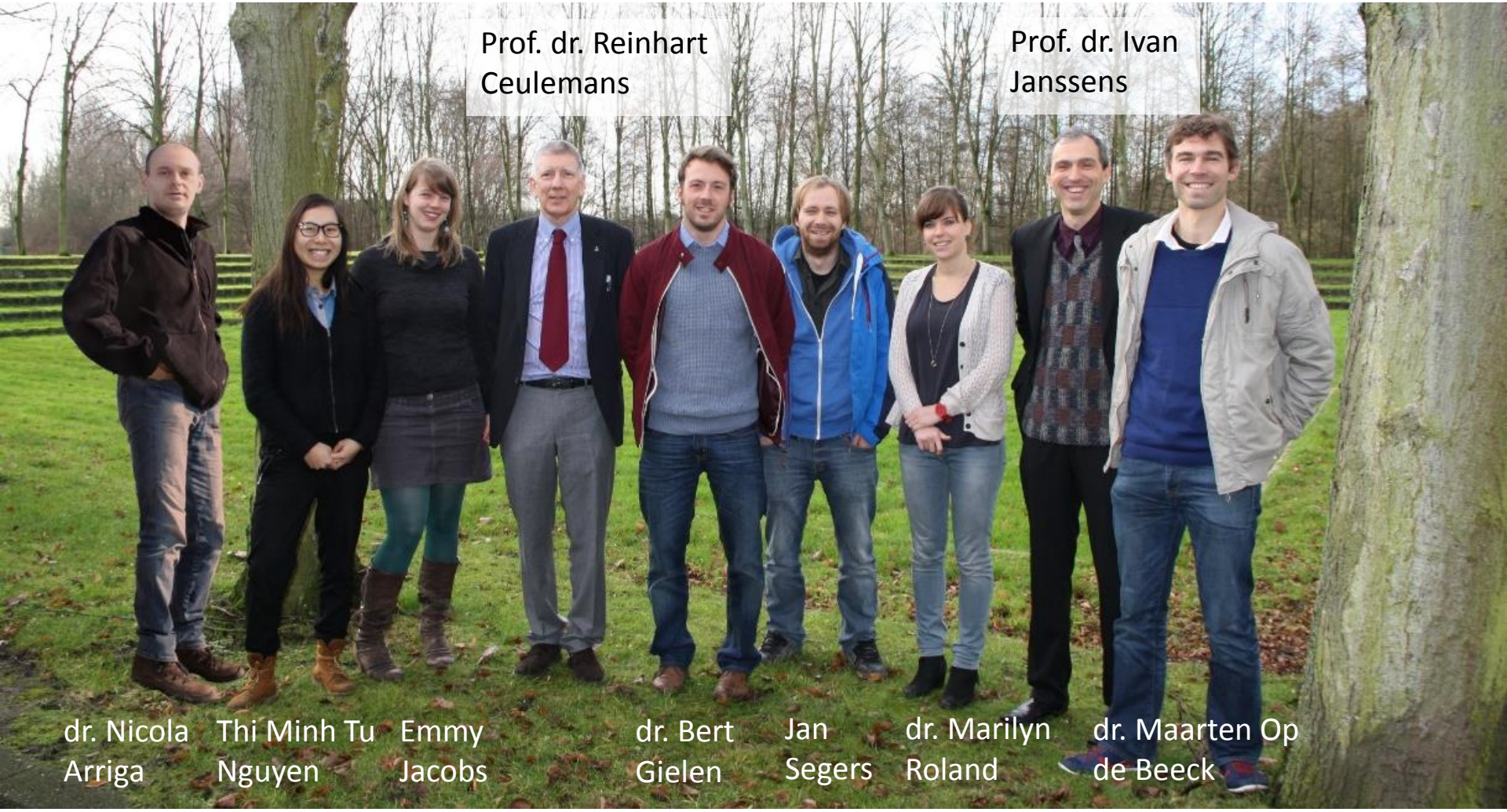
ECOSYSTEM STATIONS (ES):

Universiteit Antwerpen
BE-Bra: Brasschaat
BE-Lcr: Lochristi
BE-Maa: Maasmechelen

Université de Liège
BE-Jal: La Robinette
BE-Lon: Lonzée
BE-Vie: Vielsalm

Team university of Antwerp

Universiteit Antwerpen



ICOS Ecosystem Stations in Flanders:

OCEANIC STATIONS (OS):

Vlaams Instituut voor de Zee
Ship Simon Stevin
Fixed buoy

ECOSYSTEM STATIONS (ES):

Universiteit Antwerpen
BE-Bra: Brasschaat
BE-Lcr: Lochristi
BE-Maa: Maasmechelen

Université de Liège
BE-Jal: La Robinette
BE-Lon: Lonzée
BE-Vie: Vielsalm

1. BRASSCHAAT

Universiteit Antwerpen

inbo Instituut voor Natuur- en Bosonderzoek

SITE CHARACTERISTICS

- ICOS class 1 site
- Scots pine (*Pinus sylvestris*) forest planted in 1929
- Part of 150 ha mixed forest, near urban area
- Tree height 20 - 25 m
- (fierce) Thinning in August 2015
- Poor, sandy soil with patchy clay layer, low pH
- MAT: 9,8°C, MAP: 750 mm
- 40 m high scaffolding tower
- Flux and meteo data since 1997
- Site PI: Ivan Janssens

1. BRASSCHAAT

MEASUREMENTS

- Eddy covariance: CO_2 fluxes at 2 different heights in parallel (historical vs. more realistic footprint)
- Soil respiration chambers: 12 Li-8100 cuvettes for CO_2.
- Air pollution is monitored by INBO (Research Institute for Nature and Forest) since 1995: SO_2 (harbour), NO_x (highway) and O_3
- Forest vitality intensively monitored by INBO since 1995: ICP-Forests level II plot
- Automatic dendrometers

1. BRASSCHAAT

SOME ONGOING RESEARCH…

- Trenching experiment:
  - 4 trenched plots: exlusion of roots to partition autotrophic and heterotrophic soil respiration
  - Started March 2015
  - Collaboration with dr. Liisa Kulmala - University of Helsinki

1. BRASSCHAAT

SOME ONGOING RESEARCH…

- Trenching experiment
- Re-establishing allometric relationships:
  - Coefficients were defined in 2002 on 9 harvested trees
  - To be recalculated for 3 harvested trees
  - Determination of stem biomass / branch biomass / needle biomass

1. BRASSCHAAT

SOME ONGOING RESEARCH…

- Trenching experiment
- Re-establishing allometric relationships
- Comparison of instruments for LAI
  - 1 oak plot and 1 pine plot selected
  - Indirect measurements: DHP, LAI-2200, SunScan ceptometer and Lidar (Riegl TSL – collaboration University of Wageningen (NL))
  - To be compared with direct measurements: destructive sampling needles from pines & litterfall from oaks






ICOS Ecosystem Stations in Flanders:

OCEANIC STATIONS (OS):

Vlaams Instituut voor de Zee
Ship Simon Stevin
Fixed buoy

ECOSYSTEM STATIONS (ES):

Universiteit Antwerpen
BE-Bra: Brasschaat
BE-Lcr: Lochristi
BE-Maa: Maasmechelen

Université de Liège
BE-Jal: La Robinette
BE-Lon: Lonzée
BE-Vie: Vielsalm

2. LOCHRISTI

SITE CHARACTERISTICS

- ICOS class 1 site
- SRC poplar plantation (short rotation coppice)
- 110,000 trees planted in 2010
- Former ERC “POPFULL” (2009-2014)
- Wood for biomass energy
- Flux and meteo data since 2010
- Telescopic mast (fast growing trees!)
- Sandy soil with clay enriched deeper layer
- Former agricultural land
- Site PI: Reinhart Ceulemans

2. LOCHRISTI

SRC CULTURE

- 12 poplar clones (selection, no GMO)
- 8000 trees/ha in double row design
- 11 ha (formerly 14 ha)
- No irrigation, no fertilization
- Harvest every 2-3 years (last 2014)
- Wood chips burned for electricity

2. LOCHRISTI

SRC CULTURE

Results:

- GHG balance: +/-

  CO_2 + (more uptake)

  CH_4/N_2O – (due to former land use)

- Economic balance: -
- Energy balance: +

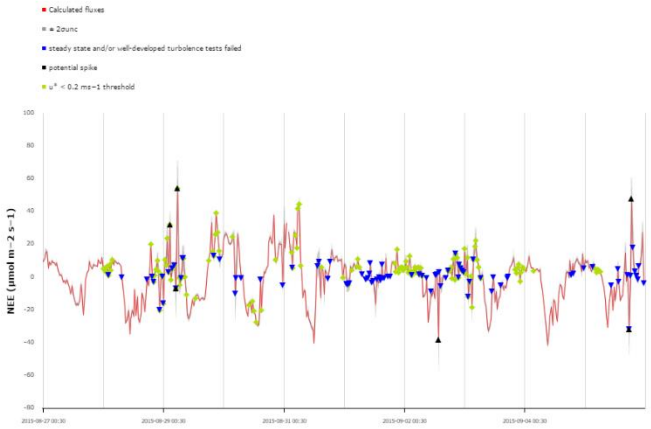
  9x more out than in

  - 1st rotation: 4 t DM ha-2 yr-1
  - 2nd rotation: 12 t DM ha-2 yr-1

2. LOCHRISTI

MEASUREMENTS

- ICOS NRT test site: gaia.agraria.unitus.it/icos/nrt-data
- Eddy covariance: CO_2, CH_4, N_2O
- Soil respiration chambers: 16 Li-8100 cuvettes for CO_2
- Soil profiles installed
- Automatic dendrometers
- VOC's (PTR-TOF-MS)



ICOS Ecosystem Stations in Flanders:

OCEANIC STATIONS (OS):

Vlaams Instituut voor de Zee
- Ship Simon Stevin
- Fixed buoy

ECOSYSTEM STATIONS (ES):

Universiteit Antwerpen
- BE-Bra: Brasschaat
- BE-Lcr: Lochristi
- BE-Maa: Maasmechelen

Université de Liège
- BE-Jal: La Robinette
- BE-Lon: Lonzée
- BE-Vie: Vielsalm

3. MAASMECHELEN

SITE CHARACTERISTICS

- ICOS class 2 site
- Heathland vegetation (eg. *Calluna vulgaris*)
- National Park “Hoge Kempen”
- Poor, dry, sandy soil
- Management on microscale:

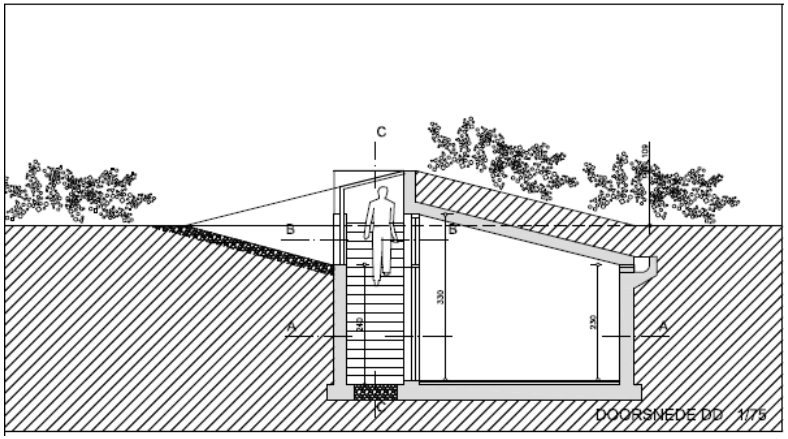
  mowing, ploughing, burning
- Start measurements: foreseen end 2015
- Close coupling to nearby ECOTRON+ (Uhasselt, ANAEE)

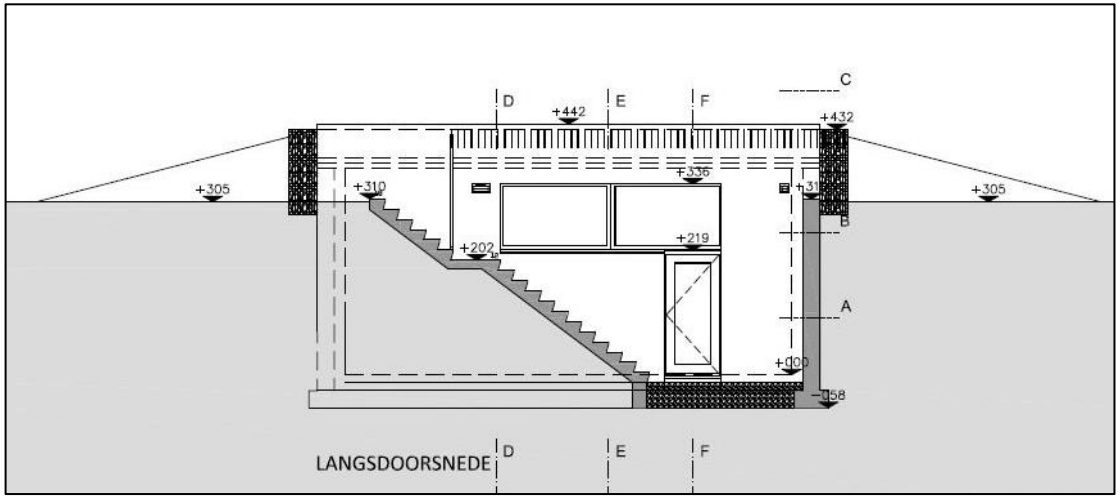
universiteit hasselt

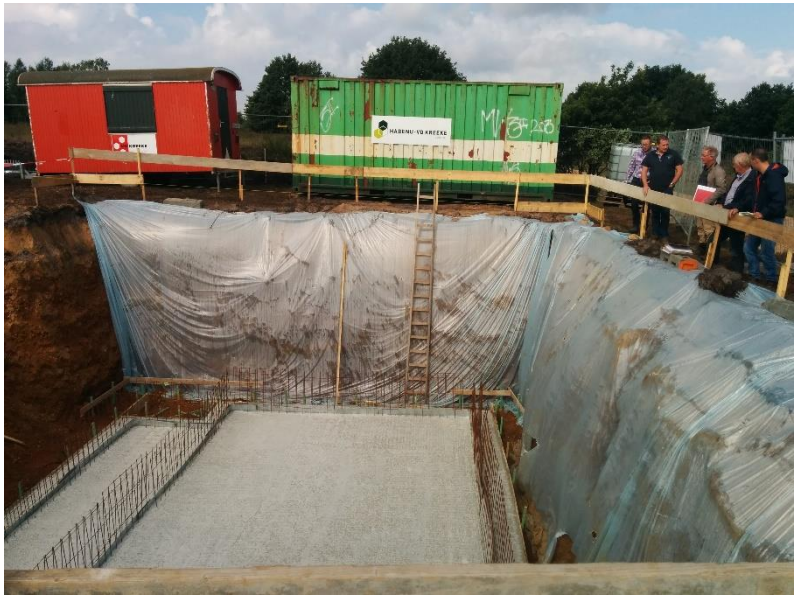
Nationaal Park HOGE KEMPEN in het spoor van de natuur

Agentschap voor Natuur en Bos

3. MAASMECHELEN

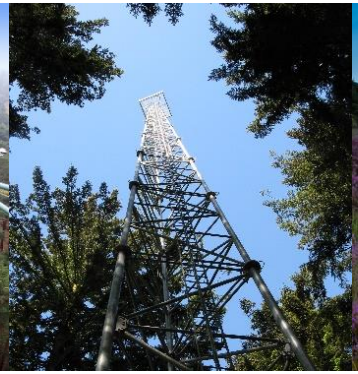






ICOS INTEGRATED CARBON OBSERVATION SYSTEM

www.icos-belgium.be



Universiteit Antwerpen

ESFRI European Strategy Forum on Research Infrastructures

EWI

HERCULES STICHTING