

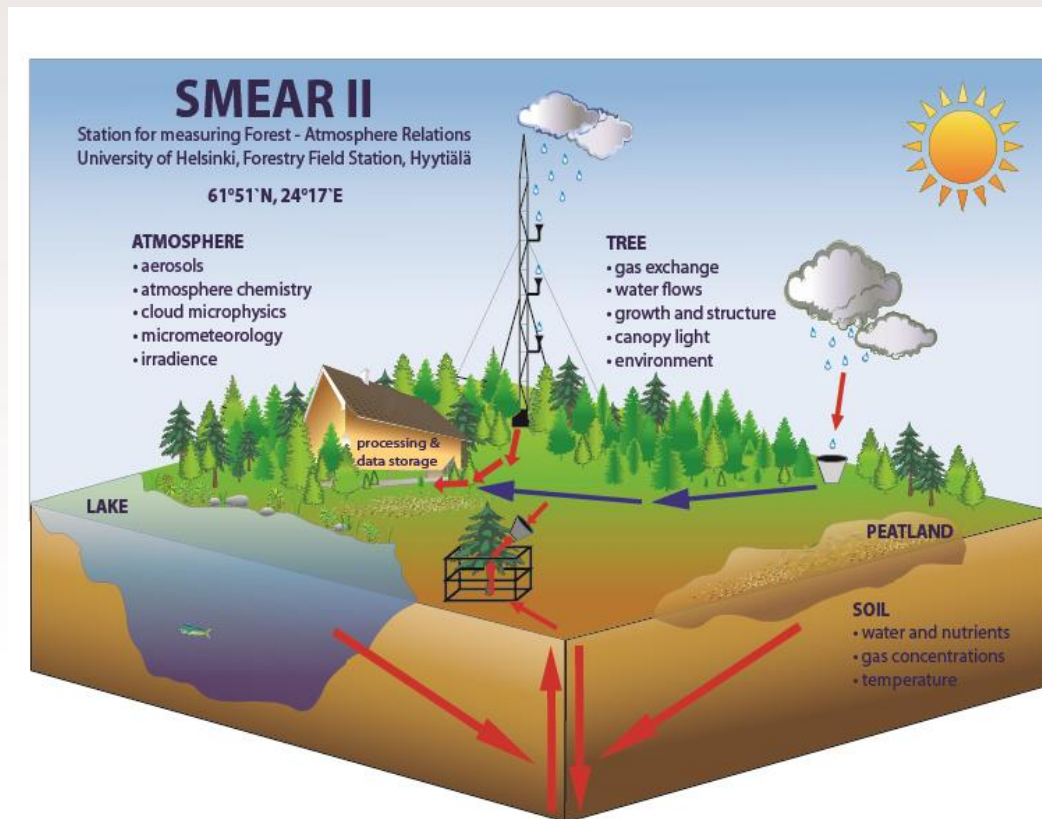
WP11 – PHYSICAL ACCESS TO RIs

ENVRIplus multi-disciplinary test platforms

SMEAR II-Hyytiälä, Univ of Helsinki, Finland

Boreal landscape, rural site: mixed/conifer forest, peatlands and lakes

Co-located activities of ICOS, ACTRIS, ANAEE, eLTER



WP11 – PHYSICAL ACCESS TO RIs

SMEAR II-Hyytiälä

Relevant research area and expertise:

Multidisciplinary

Core expertise: Climate change, ecosystem-atmosphere interactions; GHGs, aerosols, trace gases

Why is the station unique in each RI domain represented?

Continuous and comprehensive atmospheric and ecosystem measurements since 1995, catchment scale studies; advanced instrumentation and data structures (Smart SMEAR)



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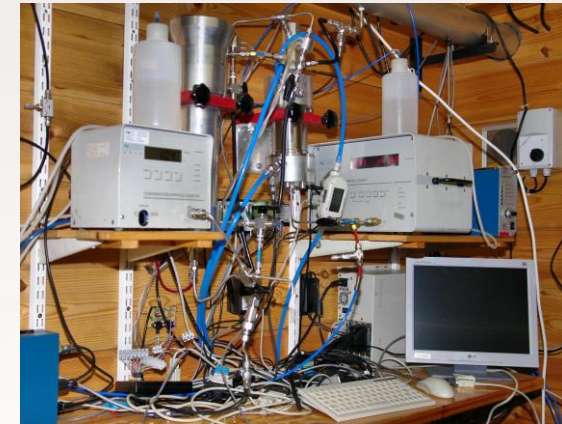
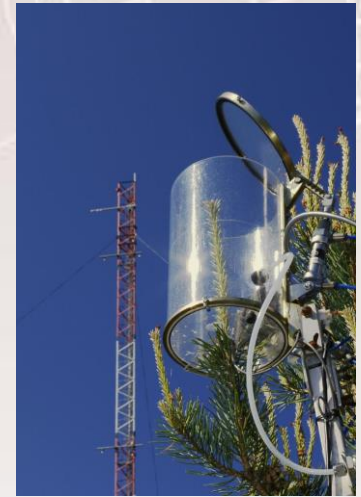
SMEAR II-Hyytiälä

Fully equipped measurement station with atmospheric, ecological and limnological measurements, capable of hosting visitors and visiting instrumentation

FACILITIES: Analytical laboratory, microbalance, instrument development facilities, 127 m instrumented mast (ICOS), 35 m walk-up tower with instrument space (ACTRIS), several towers extending to the top of the canopy (AnaEE/eLTER), eddy covariance measurement platforms in the forest, on nearby lake and in Siikaneva fen area

SCIENTIFIC ASSISTANCE for data interpretation and its connection to 20 year measurement history, technical installation support, instrument maintenance and routine operation

LODGING for 50 (winter) - 100 (summer), cafeteria, 2 saunas and many sports possibilities for recreation (tennis, football, swimming, hiking)



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SMEAR II-Hyytiälä

Past experience in TNA: EUSAAR, ACTRIS, INGOS, EXPEER, IMECC, campaigns e.g. BIOFOR 1-3, BAEC, HUMPPA-COPEC

Expectations from ENVRI+TNA:

- observations on ecosystem activity (e.g. photosynthesis, BSOA formation) from satellite, boundary layer and ground-based measurements, feedbacks to atmospheric processes
- verification and benchmarking of instruments and measurement technologies
- satellite data verification
- new links between domains and measurements - models

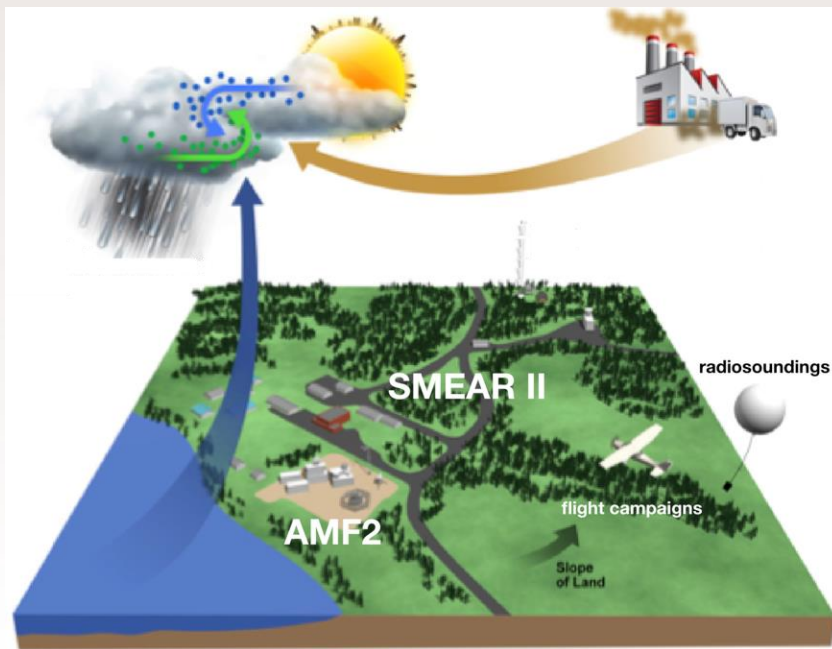


AN EXAMPLE: BIOGENIC AEROSOLS – EFFECTS ON CLOUDS AND CLIMATE (BAECC)

Campaign took place at Hyytiälä, Finland, from 1st Feb to 14th Sep 2014 (~8.5 months)

University of Helsinki, Finland: Research station SMEAR II

U.S. Department of Energy, ARM program: ARM Mobile Facility 2 (AMF2)



SMEAR II

- In-situ observations
- Airborne intensive observation periods
- Atmosphere-biosphere interactions
- Boundary layer height
- Horizontal wind profile
- Cloud base height
- Intensive campaign observations

AMF2

- Cloud observations
- Vertical structure and radiation
- Atmospheric profiling
- Surface meteorology
- In-situ observations

BAECC SNEC

- Snowfall microphysics

Figure courtesy of Nicki Hickmon et al. (ARM)



COMBINATION OF DIFFERENT MEASUREMENT TECHNIQUES

Several remote sensing instruments, which obtained vertical structure of aerosols and clouds, e.g.:

Ka Zenith Radar, 8.6 mm (35 GHz)

High Spectral Resolution Lidar, 523 nm

Microwave radiometer 12.6 mm (23.8 GHz) and 9.5 mm (31.4 GHz)

PollyXT Raman lidar, 355 nm, 532 nm, 1064 nm

Marine W-band Radar, 3.2 mm (95 GHz)

Vaisala Ceilometer, 910 nm

HALO Doppler wind lidar, 1.5 μm

Aircraft measurements

140 flight hours during total of 30 days

spring, summer, and autumn

Radiosoundings

Launches 4 times per day



Photos courtesy of Juho Aalto and Antti Manninen (UHEL)



SURFACE BASED MEASUREMENTS IN BAECC

Intensive observation periods during spring 2014 at SMEAR II

Aerosol size distribution:
vertical and horizontal variability

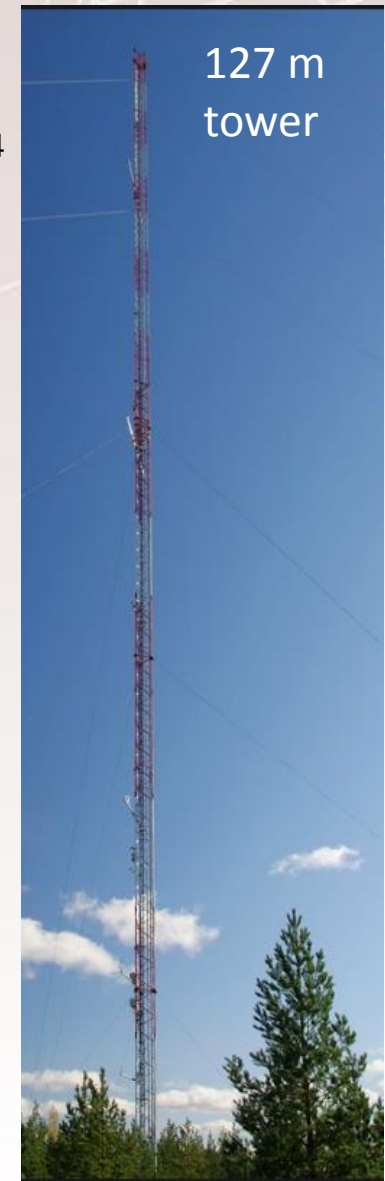
Aerosol chemical composition measurements
HR-AMS, FIGAERO-CIMS, ACSM

BAECC SNEX

Snowfall microphysics: precipitation rate, type, phase, and particle size distribution.

Analysis of fall velocity–dimensional relations.

Derivation of bulk density and mass-dimensional relations.



Photos courtesy of Matti Leskinen, Juho Aalto, and Dmitri Moisseev (UHEL)



Instruments inside of the fence



NASA Particle Imaging Package



Laser snow depth sensor and outside 3-D anemometer



MRR



Outside OTT Pluvio²



WELCOME!



ENVRI WEEK – 16-20 November 2015 – Prague, Czech Republic

