JÜLICH
FORSCHUNGSZENTRUM

SMAP Validation Activities of the Agrosphere Institute in the Rur Catchment, Germany

François Jonard, Carsten Montzka, Heye Bogena, Sayeh Hasan, and Harry Vereecken

Institute of Bio- and Geosciences - Agrosphere (IBG 3)
Research Centre Jülich, Germany

P.I. Carsten Montzka (c.montzka@fz-juelich.de)

The Rur Catchment and its Test Sites

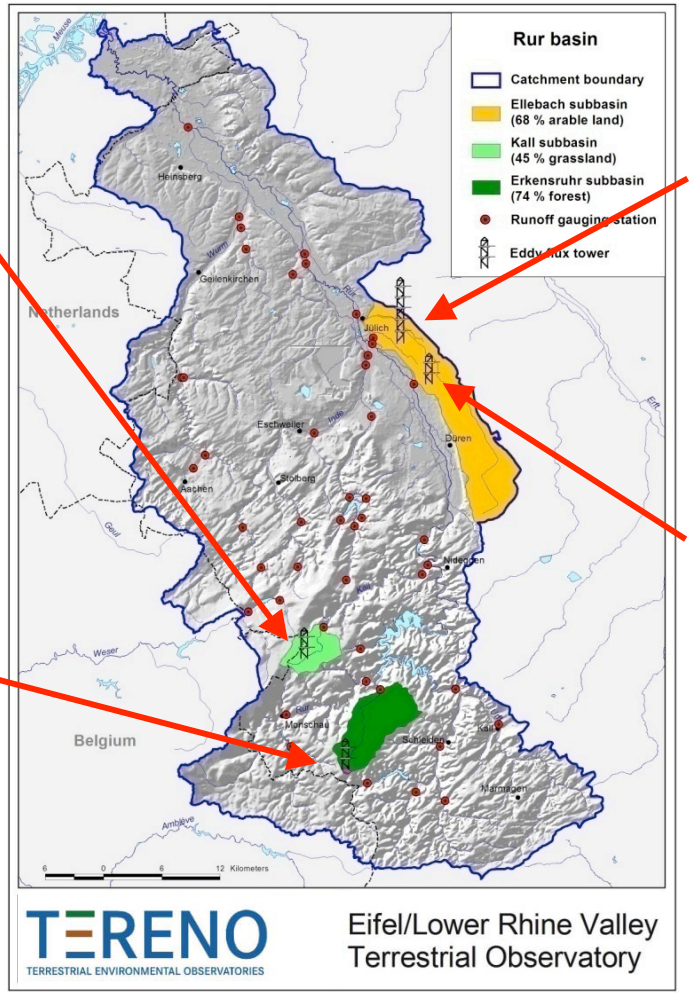
UL: 51°10'13"N, 5°55'50"E - LR: 50°22'38 "N, 7°5'42"E

Grassland Test Site "Rollesbroich" (20 ha)

- Eddy Covariance Station
- Soil Moisture Sensor Network
- Soil Temperature Measurements
- Soil CO_2 Flux Measurements
- Runoff and Solute Monitoring
- Cosmic Ray Probe

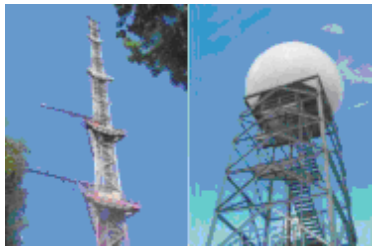
Forest Test Site "Wüstebach" (27 ha)

- Eddy Covariance Station
- Soil Moisture Sensor Network
- Soil Temperature Measurements
- Soil CO_2 Flux Measurements
- Runoff and Solute Monitoring
- Cosmic Ray Probe



Rur is part of the Terrestrial Environmental Observatories (TERENO) network

Meteorological Observatory



- Meteorological Tower
- X-band Doppler Weather Radar

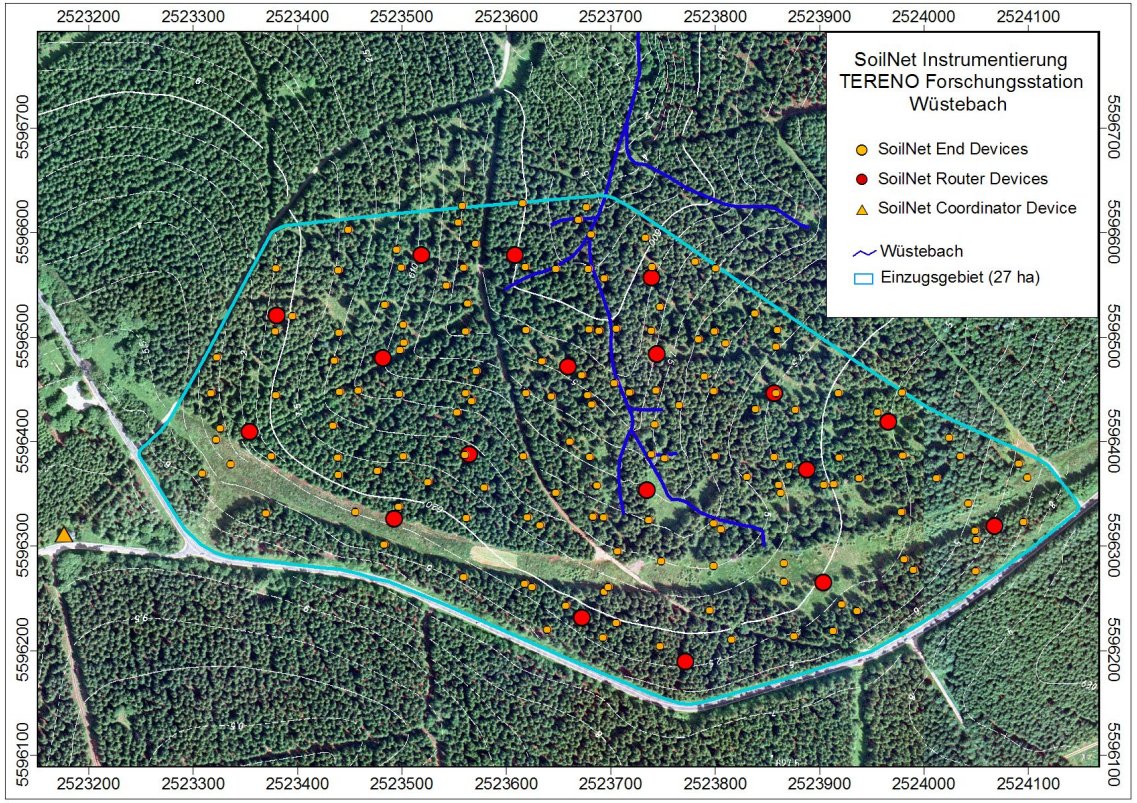
Agricultural Test Site "Selhausen" (34 ha)

- Eddy Covariance Station
- Soil Moisture Measurements
- Soil Temperature Measurements
- Soil CO_2 Flux Measurements
- Remote Sensing (IR, JÜLBARA & ELABARA II radiometers)
- Geophysical Monitoring (GPR)
- Cosmic Ray Probe

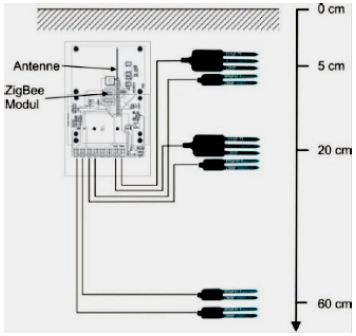
Wireless Soil Moisture Sensor Network - SoilNet

JÜLICH FORSCHUNGSZENTRUM

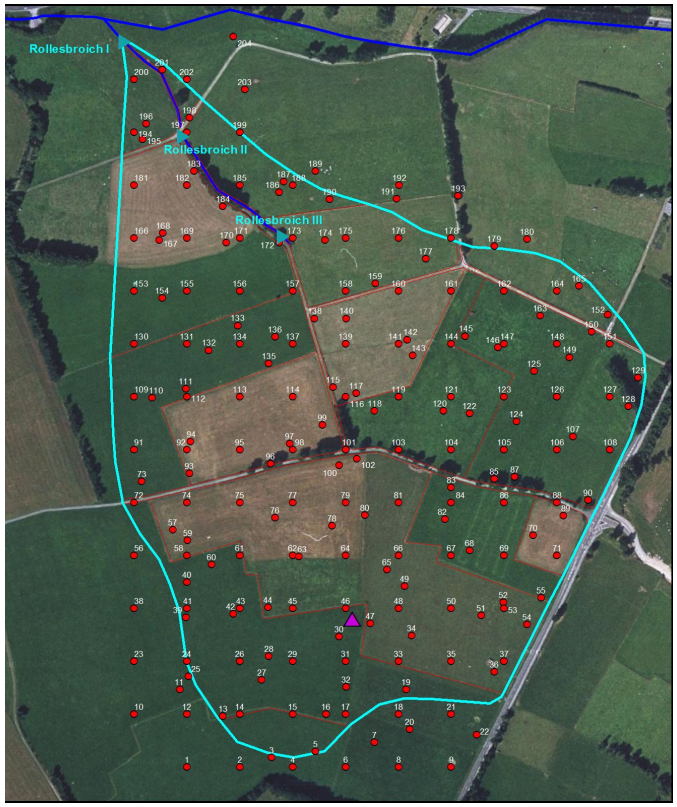
SoilNet Wüstebach



- 900 EC-5/5TE
- 150 locations
- 3 depths
- 2 replications



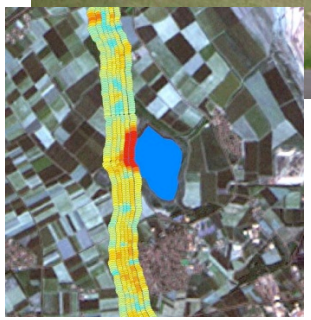
SoilNet Rollesbroich

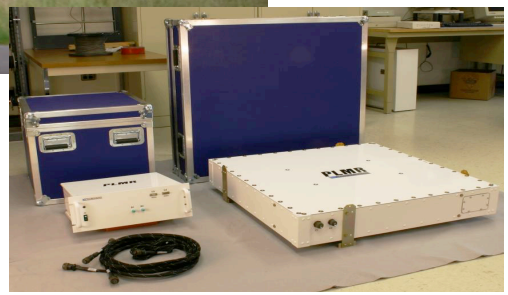


100 0 100 200 m

JÜLICH
FORSCHUNGSZENTRUM

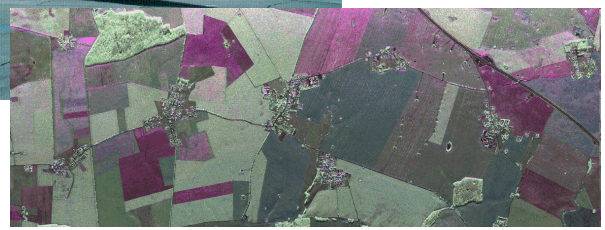
PLMR2





- Polarimetric L-Band Microwave Radiometer (PLMR)
- Frequency band: 1401 – 1425 MHz
- Polarization: H and V
- 50m resolution data at 150m flight altitude
- Incidence angles: +/- 7°, +/-21.5°, +/- 38.5°

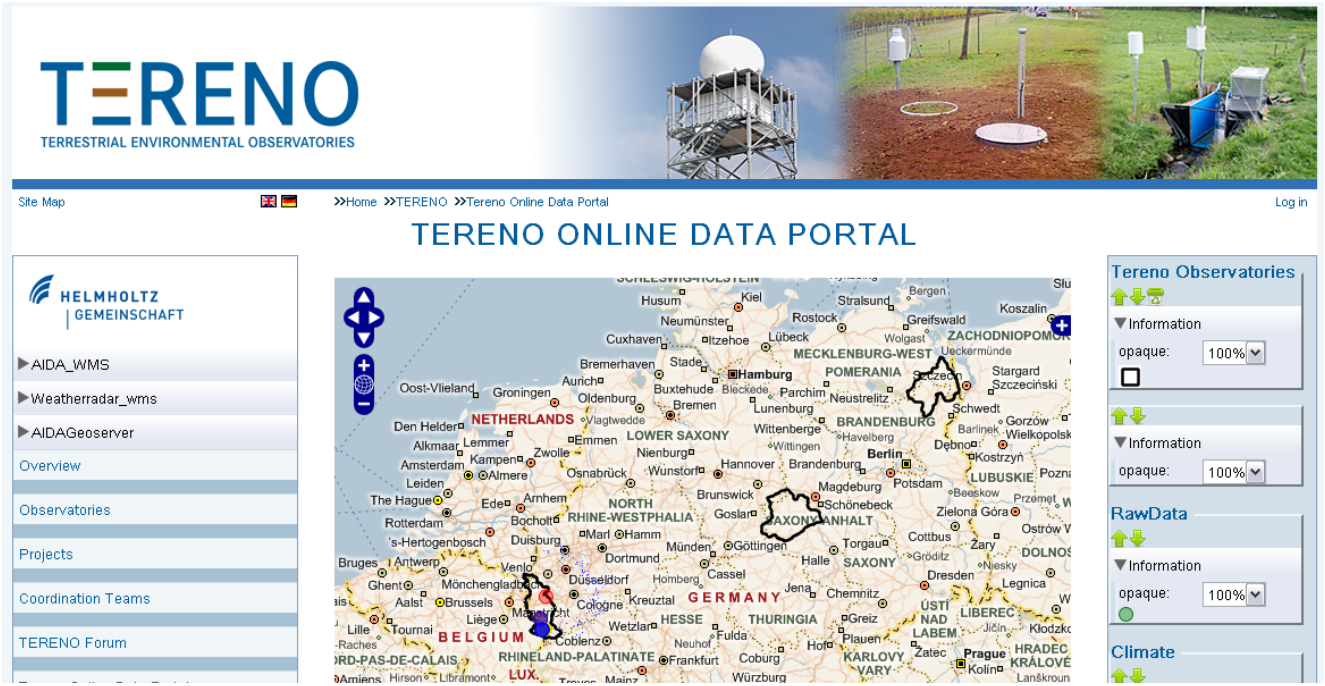
E-/F-SAR (DLR)



- Synthetic Aperture Radar (SAR) system onboard a DLR Dornier DO 228 aircraft
- The sensor is able to operate in 4 frequency bands (X, C, L and P)
- Single (E-SAR) and dual (F-SAR) channel operation
- Scene size: up to 3 x 20 km or 5 x 20 km

⇒ **A joint active and passive microwave sensor platform is under development in cooperation with the German Aerospace Center (DLR)**

TEODOOR



- Public database of observation data (https://teodoor.icg.kfa-juelich.de/)
- Standardized (OGC, …)
- Status: Data service operational, more sensors need to be implemented

Projects of the Agrosphere Institute Within the Rur Catchment

JÜLICH FORSCHUNGSZENTRUM

Ph.D. studies (German Research Foundation)

- François Jonard: Soil moisture retrieval using ground-based active and passive microwave sensors (Jonard *et al.,* IEEE TGRS 2011)
- Sayeh Hasan: Airborne active and passive microwave data fusion for soil moisture retrieval

Projects

- SMOS long term validation and data assimilation for radiative transfer parameter estimation (ESA and BMWi) (Montzka *et al.,* submitted to IEEE TGRS)
- Exchange processes between soil, vegetation and atmospheric boundary layer, multi-scale soil moisture data assimilation (Transregional Collaborative Research Centre 32 / German Research Foundation)
- Terrestrial Environmental Observatories – TERENO: Instrumentation for long term monitoring of environmental variables (Helmholtz Association)