Estonian University of Life Sciences- overview , research and educational activity

Steffen M. Noe, 11.4.2024

Eesti Maaülikool
Estonian University of Life Sciences

SMEAR Estonia

www.emu.ee

Eesti Maaülikool

Estonian University of Life Sciences

UFPR

UNIVERSIDADE FEDERAL DO PARANÁ

SMEAR estonia

TARTU OBSERVATORY

space research centre

TARTU ÜLIKOOL

1632

UNIVERSITAS TARTUENSIS

EESTI KESKKONNA-OBSERVATOORIUM

ERA-PLANET

GlobalSMEAR

Pan Eurasian Experiment

PEEX

iCUPE

ACTRiS

AnaEE

Analysis and Experimentation on Ecosystems

SA Järvselja

Õppe- ja Katsemetskond

ICOS

INTEGRATED CARBON OBSERVATION SYSTEM

eLTER

KIK

ENVIRONMENTAL INVESTMENT CENTRE

Euroopa Liit

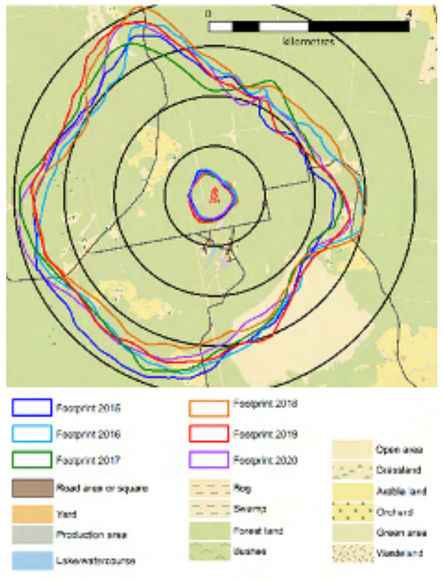
Euroopa Regionaalarengu Fond

Eesti tuleviku heaks

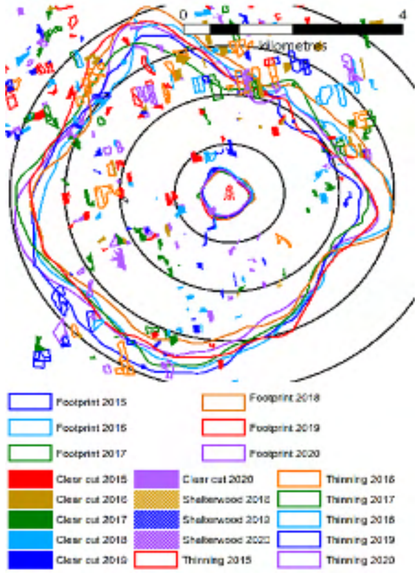

SMEAR
stonia

Spatially explicit time-series of changes in forest ecosystems

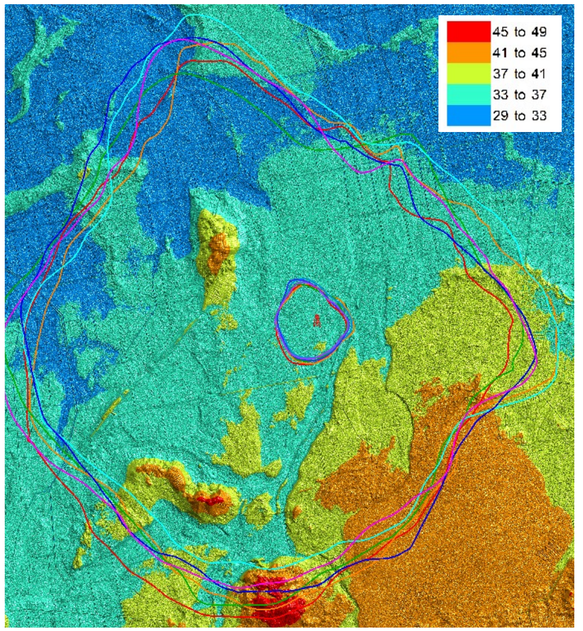
Footprint area: natural change ~1.5-5%, human induced change ~2-2.5% per year



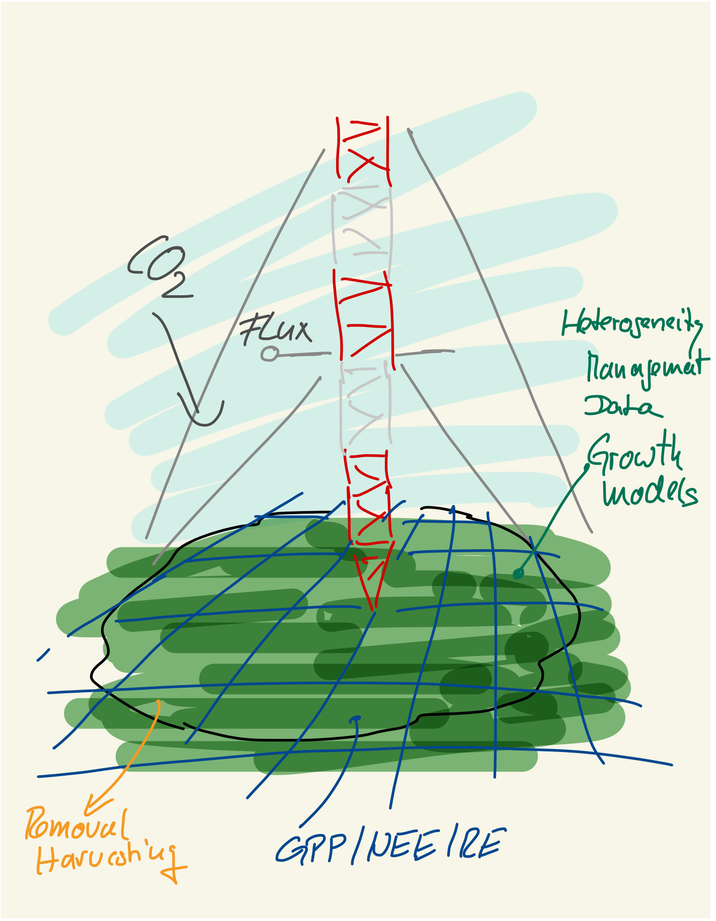
Six years of changes in the 70 and 30 meter footprint of the SMEAR Estonia station determined by wind speed and wind direction.



Six years of changes in the 70 and 30 meter footprint of the SMEAR Estonia station determined by forest management activities



Tree heigh map of the footprint area given by airborne Lidar data. These can be used to modulate the footprint calculation and to verify modelled changes in height growth in a 4 year interval.

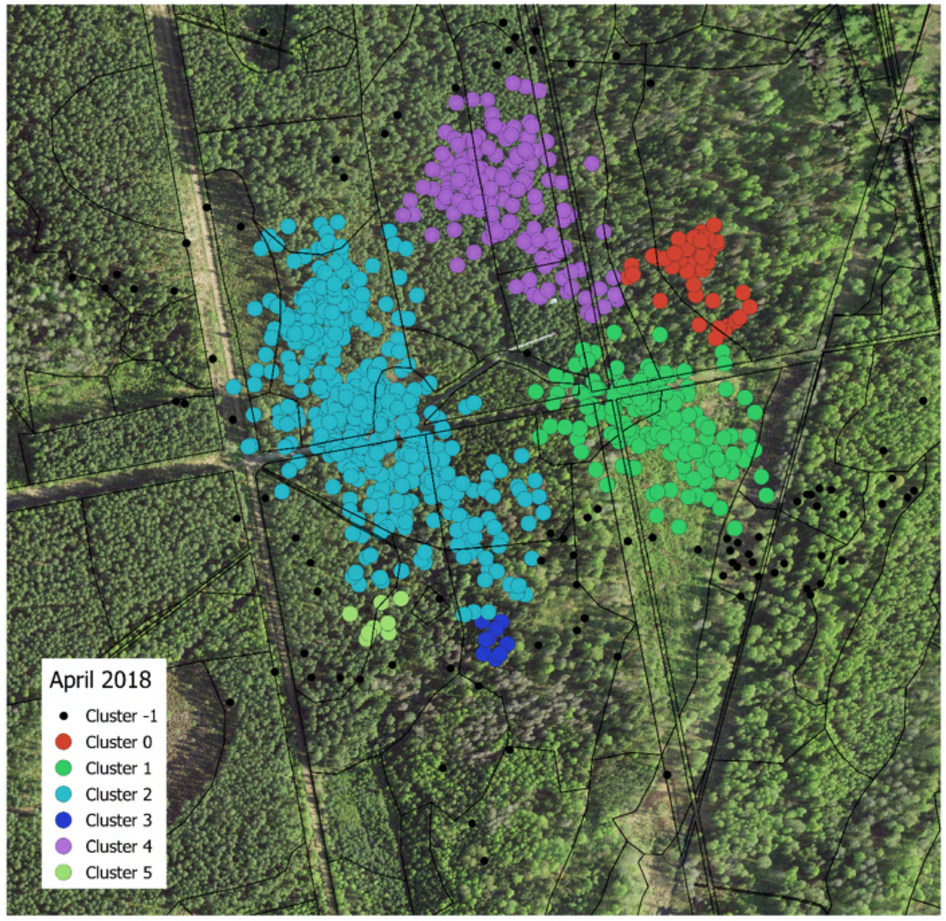


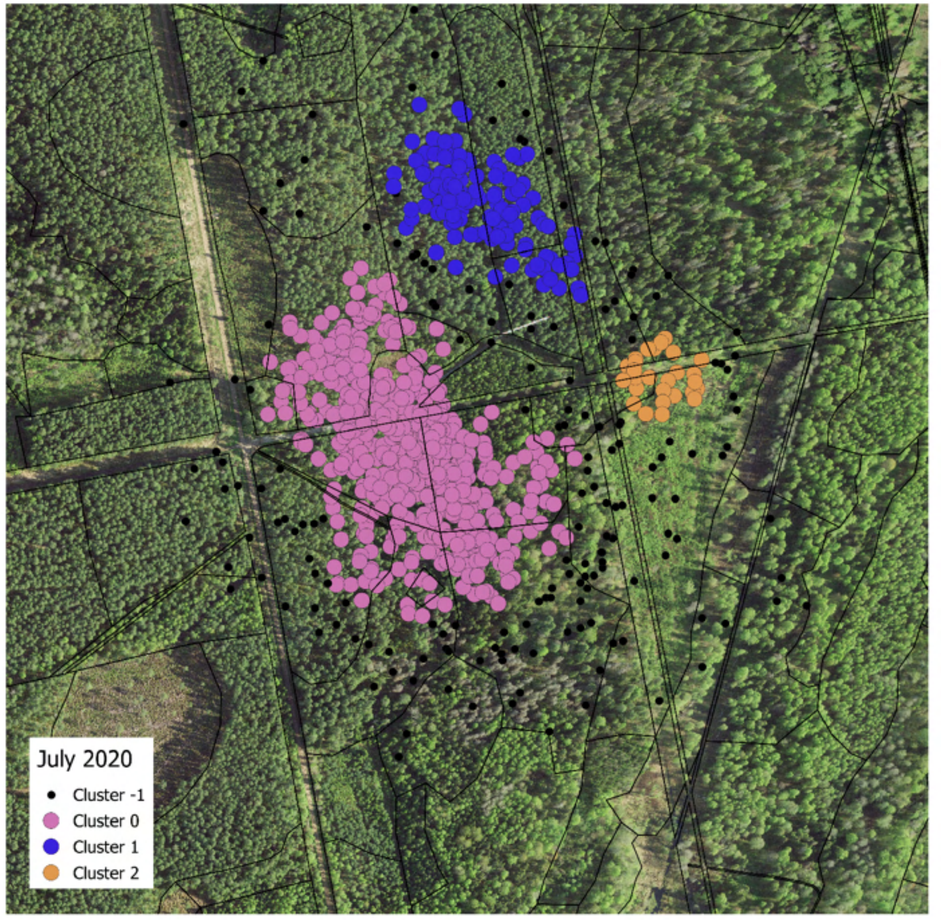
Joonas Kollo, Allar Padari

Machine learning cluster detection of area of max. CO2 flux in the footprint

Density-based spatial clustering of applications with noise (DBSCAN, HDBSCAN)

Utilising unsupervised learning to find the areas of maximal contribution to EC in the footprint



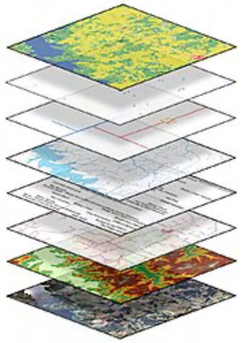


Anuj Thapa Magar, Allar Padari, Alisa Krasnova

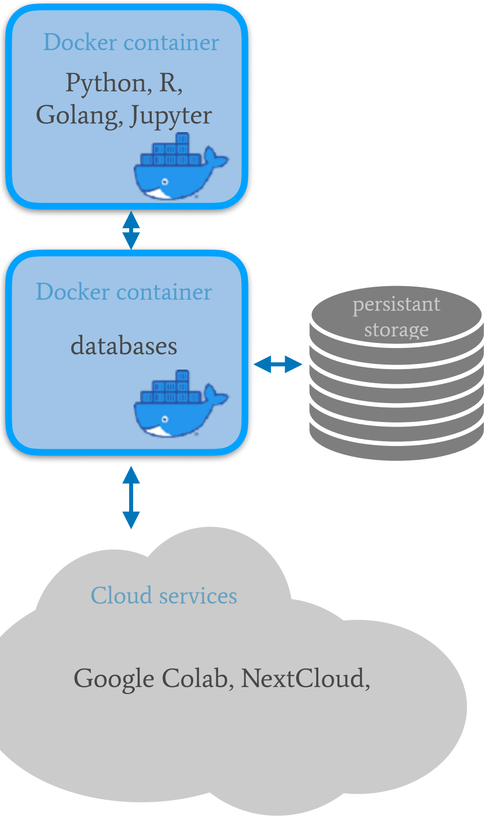
Workflow from mutliple data sources towards gridded results

Benefits, the neural network can be easily automatised as microservice, no manual parameter estimations

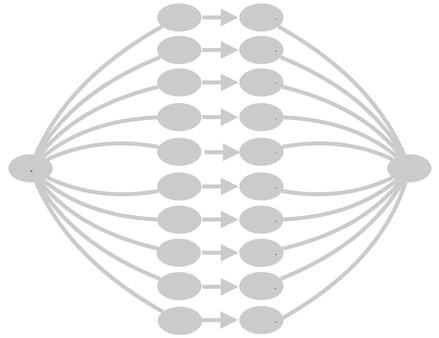
Eddy covariance, meteo, atmospheric data

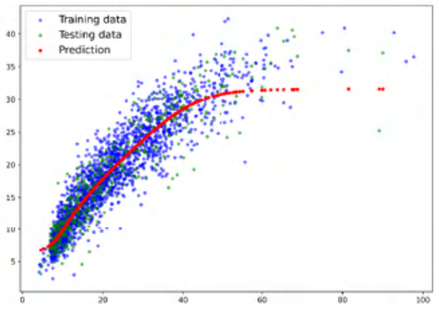


GIS data, land cover, forest management

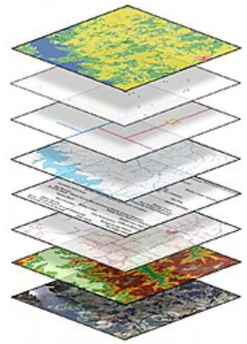


Compiling the data





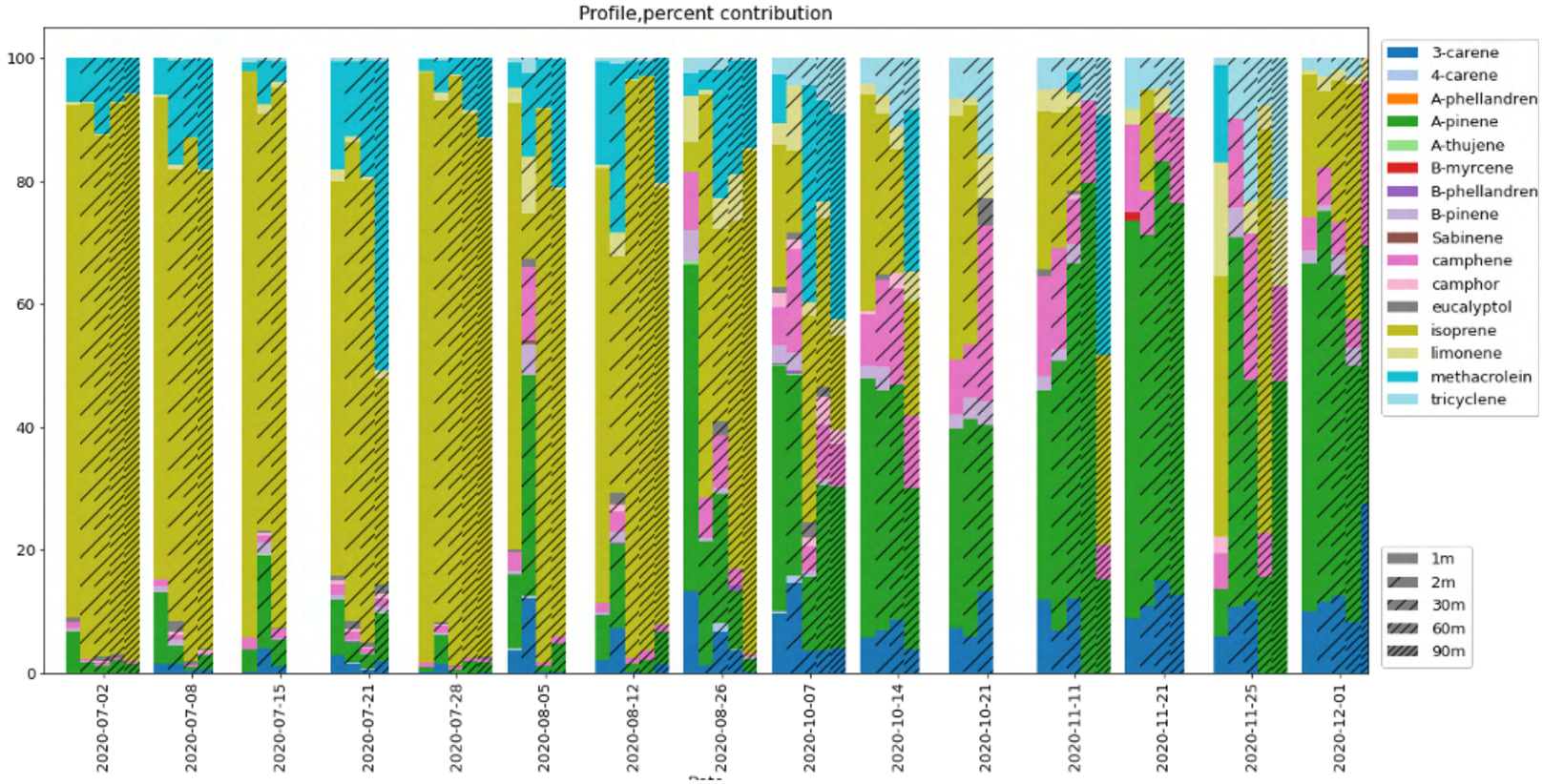
ML/AI layer



Mapping to the grid

Drone BVOC measurements

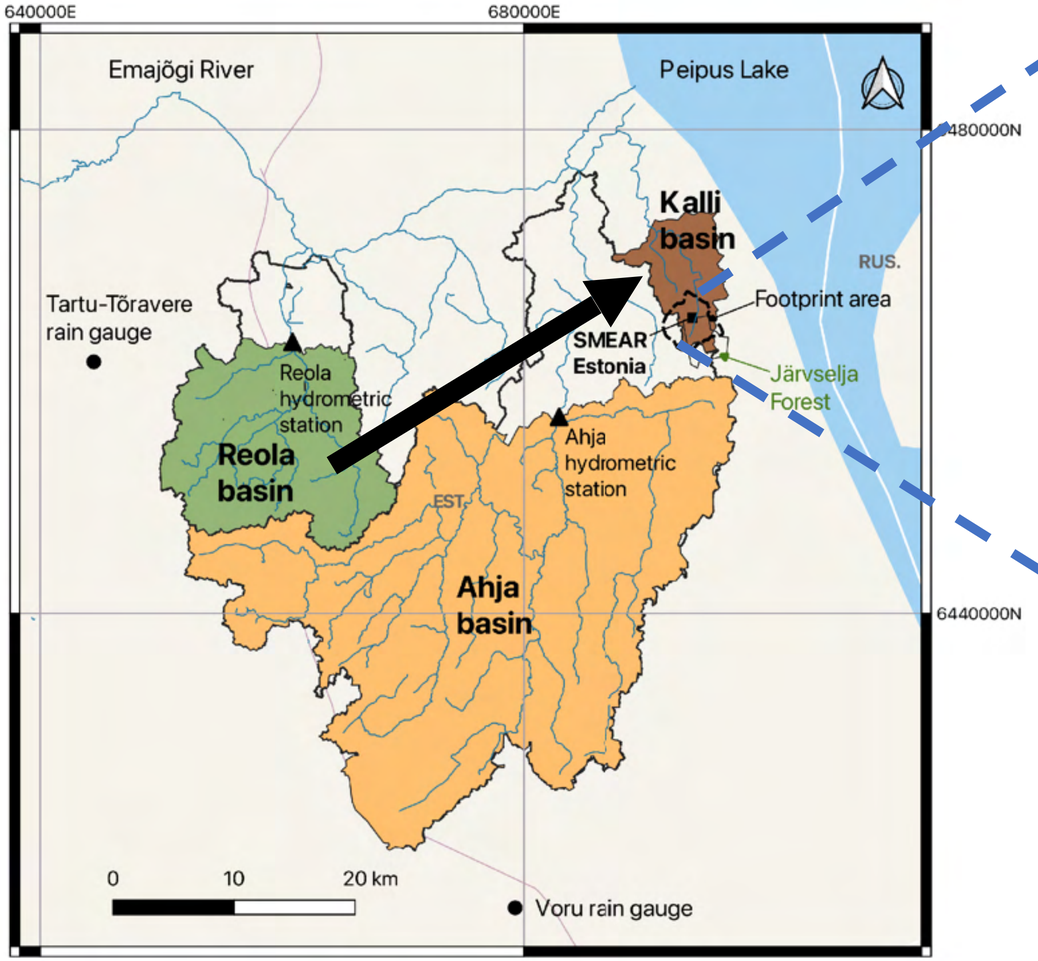
From summer to autumn we see a change from isoprene to monoterpene chemistry

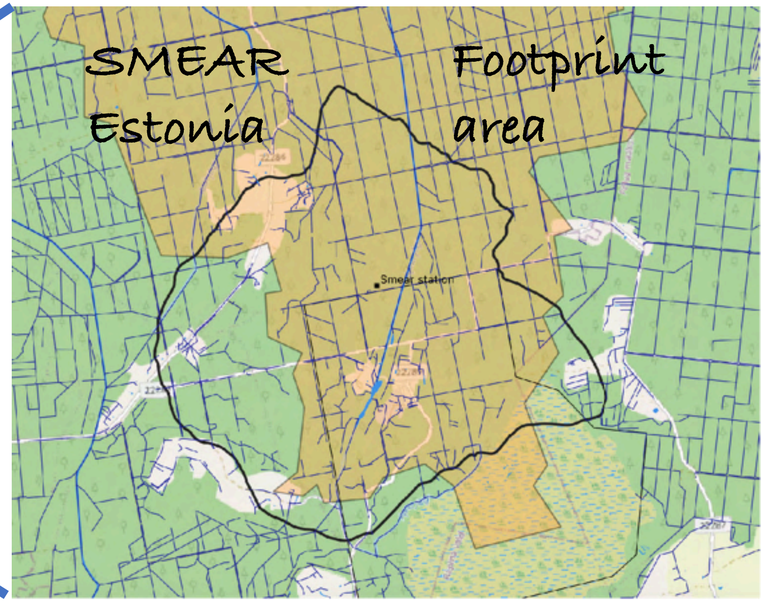


Dmitrii Krasnov, Beate Noe

Modelling the hydrology at the SMEAR Estonia station

Combining in-situ data (SMEAR Estonia, Estonian weather service) and satellite data (NASA, NOAA)



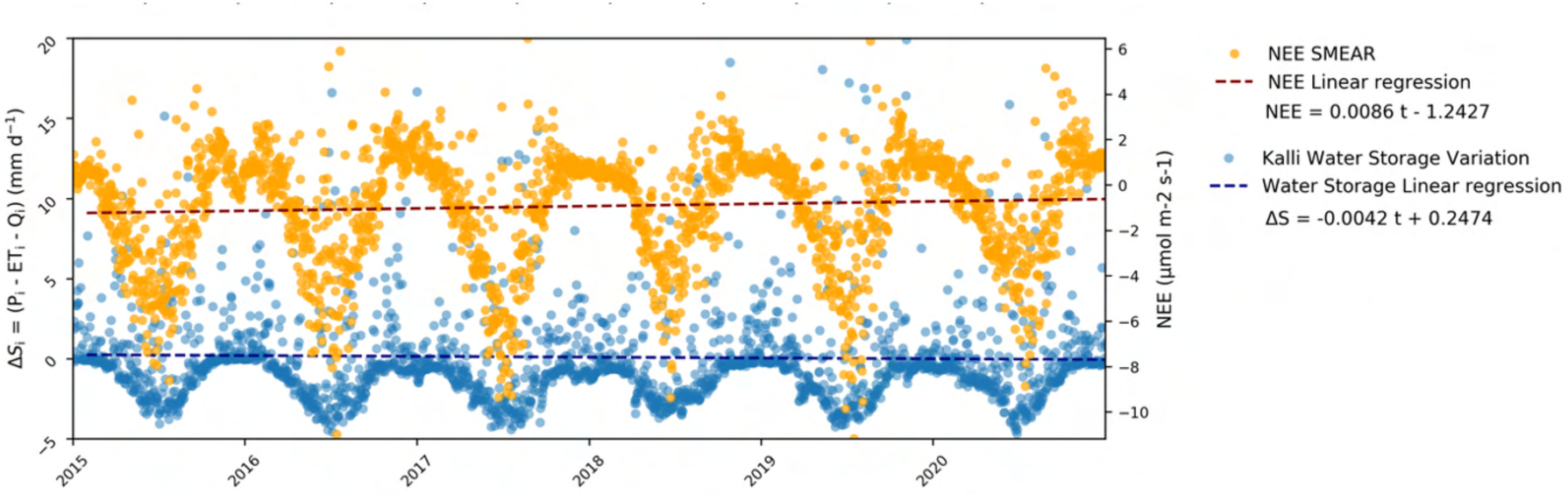


Upper Kalli Watershed, Järvselja Forest

Emilio Graciliano Ferreira Mercuri, Toomas Tamm, Steffen Manfred Noe; Forestry Studies, 78, 72-90

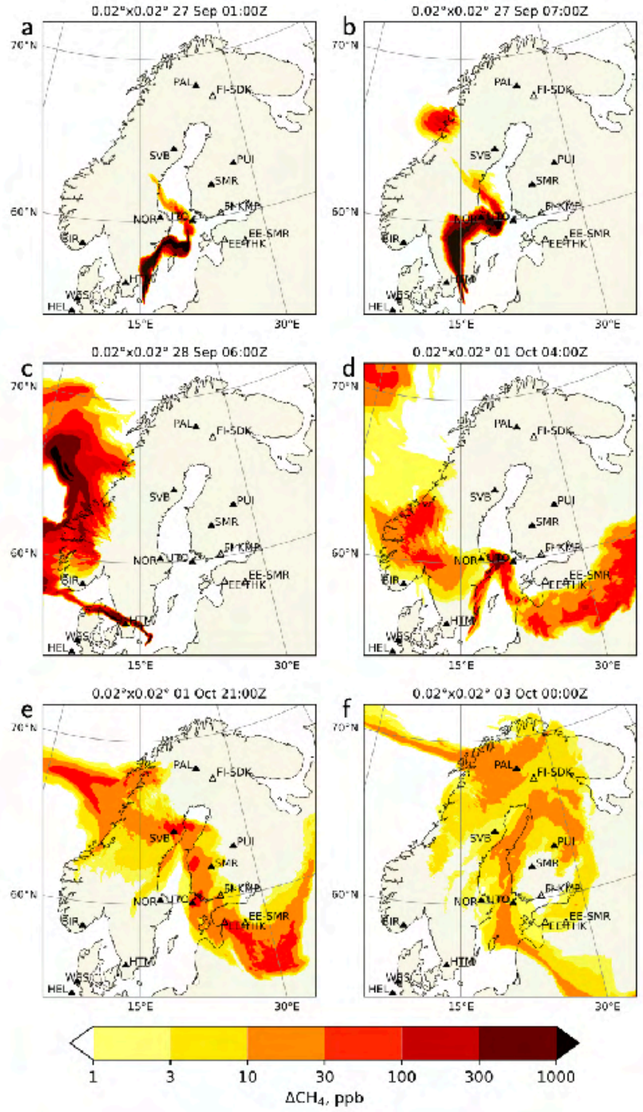
Are there links between NEE and the water storage?

- From the hydrological modelling results we see a slight negative correlation in the storage, i.e. the system's water turnover increases, less is stored
- With less water in the system the NEE is shifting towards more positive numbers, i.e. there is less carbon uptake capacity



Nordstream CH4 signatures measured at SMEAR Estonia

SILAM model estimations

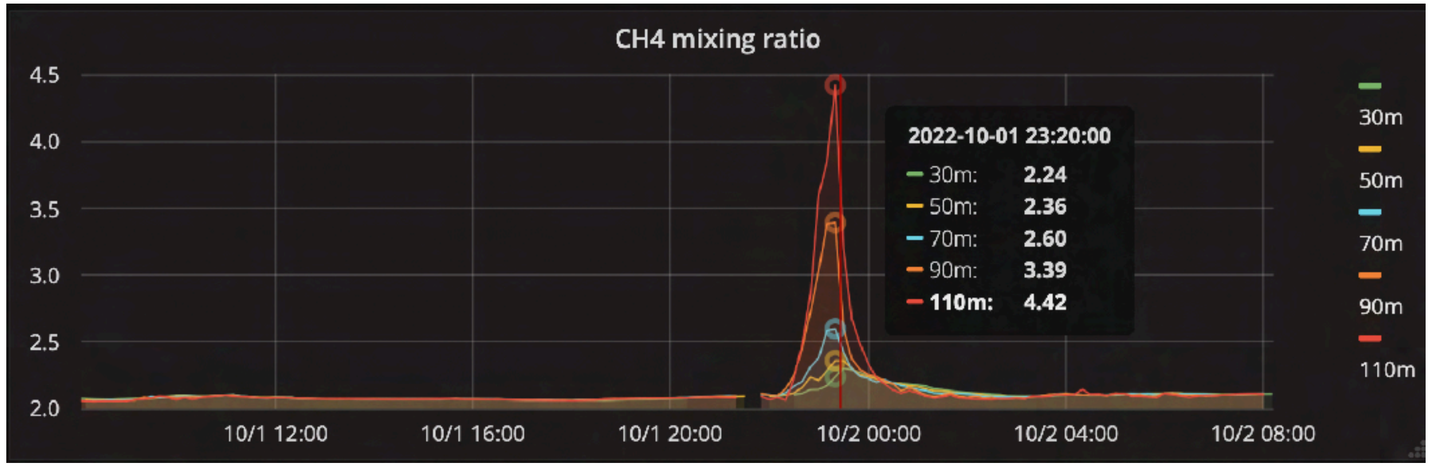


https://doi.org/10.5194/egusphere-2023-732
Preprint. Discussion started: 15 September 2023

EGUsphere Preprint repository

A bottom-up emission estimate for the 2022 Nord Stream gas leak: derivation, simulations and evaluation

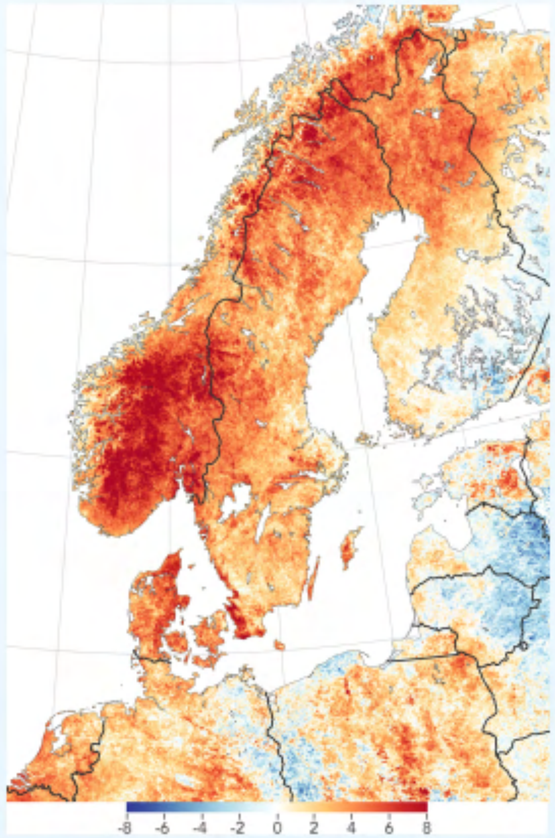
Rostislav Kouznetsov[1], Risto Hänninen[1], Andreas Uppstu[1], Evgeny Kadantsev[1], Yalda Fatahi[1], Marje Prank[1], Dmitrii Kouznetsov[2], Steffen Noe[3], Heikki Junninen[4], and Mikhail Sofiev[1]



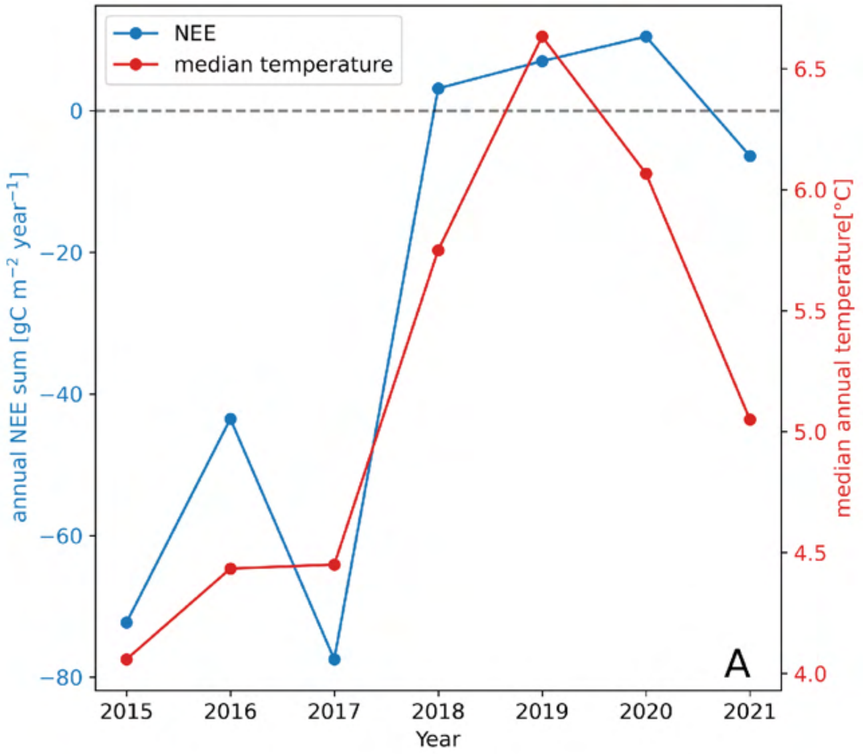
online measured CH4 plume over SMEAR Estonia

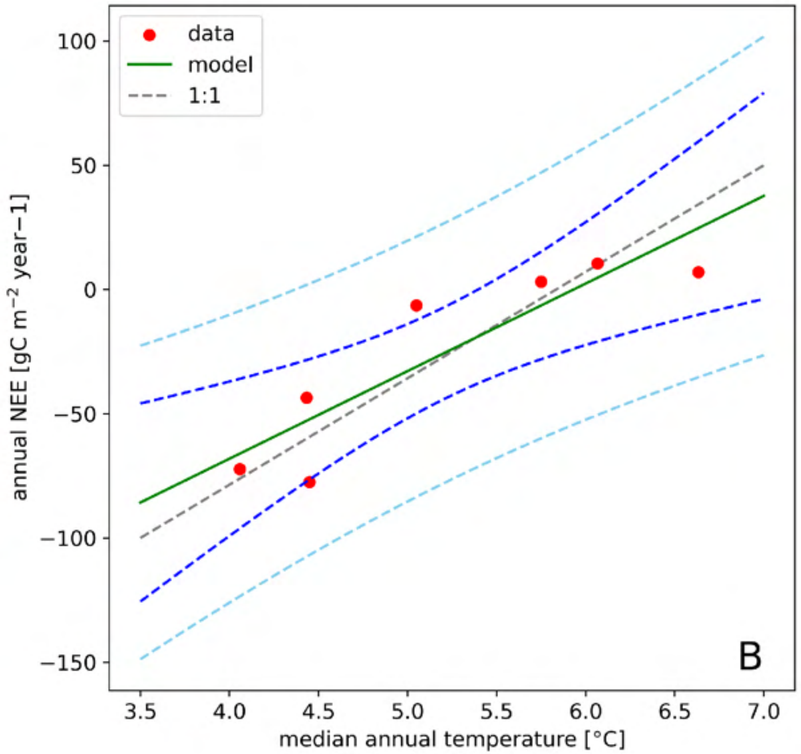
Temperature driven source/sink dynamic and stress legacy effect

7 years of data from SMEAR Estonia, 2018 heatwave event in northern Europe



Land surface temperature anomaly in July 2018 compared to 2000-2015 mean.
Picture by NASA Earth Observatory





OLS Regression Results

Dep. Variable:	NEE	R-squared:	0.793
Model:	OLS	Adj. R-squared:	0.752
Method:	Least Squares	F-statistic:	19.17
Date:	Mon, 15 May 2023	Prob (F-statistic):	0.00717
Time:	22:04:54	Log-Likelihood:	-29.377
No. Observations:	7	AIC:	62.75
Df Residuals:	5	BIC:	62.65
Df Model:	1		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-209.1335	42.538	-4.916	0.004	-318.482	-99.785
Temperature	35.2594	8.053	4.378	0.007	14.557	55.961

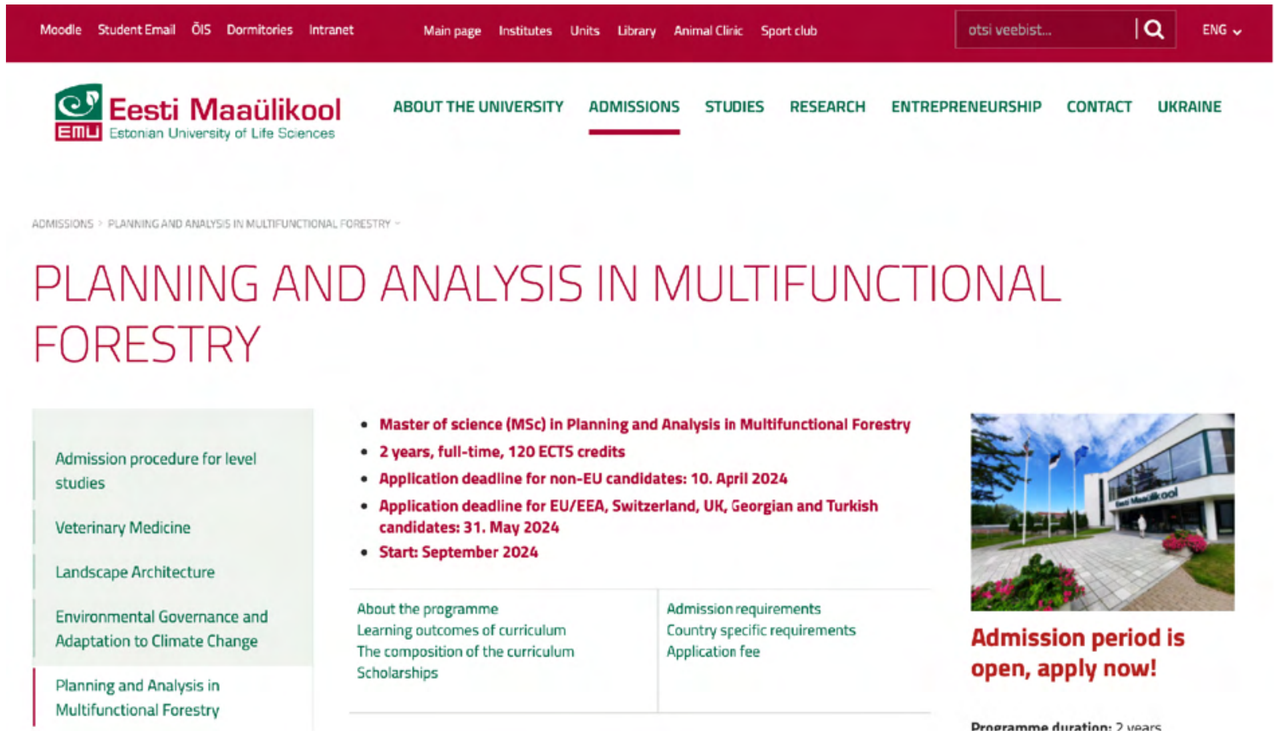
International master curriculum at EMÜ - Institute of Forestry and Engineering

Planning and Analysis in Multifunctional Forestry

- https://www.emu.ee/en/admissions/planning-and-analysis-in-multifunctional-forestry/

- To prepare leading specialists for planning and analysis in multifunctional forestry, who can take responsibility and make sustainable strategic decisions.

- Includes modelling, remote sensing, Big Data, policy, economy, and more...



EnCHiL

Environmental Changes in High Latitudes

- https://enchil.net/

thanks