

ICOS Data

Datasets produced by the Integrated Carbon ObServatory at Svartberget and Degerö.

SE_SVARTBERGET_ICOS_ECOSYSTEM_*

ICOS Ecosystem data for 2014-2019 from the SE-Svb ICOS site at Svartberget. Data downloaded from ICOS Carbon Portal 2020-12-03.

Data description

Below canopy data. **Ts**: soil temperature (depths: -0.02m, -0.05m, -0.15m, -0.3m, -0.5m), **SWC**: vol. soil moisture (depths: vertical 0- -0.06m, hor: , -0.05m, -0.15m, -0.3m, -5m), **G**: soil heat flux plate (-0.08m); **GWL**: ground water level below surface. Indices **_horPlace** **_vertPlace** **_repetition**. Timestamp at end of the averaging interval. More information: <https://www.icos-sweden.se>

Credit

Please credit ICOS Svartberget as the data producer.

SE_SVARTBERGET_ICOS_FLUXES_*

ICOS Flux data for 2014-2019 from the SE-Deg ICOS site at Svartberget. Data downloaded from ICOS Carbon Portal 2020-12-08.

Data description

Ecosystem fluxes calculated by Eddypro 6.0, gapfilling by REddyProc online gapfilling tool (MPI Jena, <http://www.bgc-jena.mpg.de/REddyProc/brew/REddyProc.rhtml>). **H**: sensible heat flux, **LE**: latent heat flux, **Fc**: carbon dioxide flux, **Fch4**: methane flux (raw: fluxes without any correction during flux calculation, no post-processing QC), **Ustar**: friction velocity, **WS**: wind speed, **WD**: wind direction, **L**: Monin-Obukhov length, **var_v**: variance of cross-wind component; **NEE**: gap-filled net ecosystem exchange, **LE_f**: gap-filled LE, **H_f**: gap-filled H, **Fch4_f**: gap-filled Fch4, **Reco**: ecosystem respiration, **GPP_f**: gross primary production. Timestamp at end of the averaging interval, flux measurement height: 3m. More information: <https://www.icos-sweden.se>

Credit

Please credit ICOS Degerö as the data producer.

SE_SVARTBERGET_ICOS_METEOROLOGY_*

ICOS Meteorology data for 2014-2019 from the SE-Svb ICOS site at Svartberget. Data downloaded from ICOS Carbon Portal 2020-12-08.

Data description

Above canopy data. **Swin**: incoming solar radiation (50 m), **Swnet**: net short-wave radiation (50m), **Lwnet**: net longwave radiation (50m), **NetRad**: net radiation (50m), **Swin**: incoming short-wave radiation (50m), **Swout**: reflected SW radiation (50 m), **Lwin**: downward long-wave radiation (50m), **Lwout**: LW emitted radiation (50m), **Pa**: air pressure (1.5 m), **PPFD_IN**: incoming photosynthetically active radiation (50m), **PPFD_OUT**: reflected PPFD (50m), **PPFD_DIR**: direct PPFD (50m), **PPFD_DIFF**: diffuse PPFD(50m), **Sun**: sunshine duration (50m), **T_canopy**: canopy surface temperature (50m), **Ta**: air temperature (32.5 m), **RH**: relative humidity (32.5 m), **P**: precipitation, **D_SNOW**: snow depth. Timestamp at end of the averaging interval. More information: <https://www.icos-sweden.se>

Credit

Please credit ICOS Svartberget as the data producer.

Krycklan Catchment Study (KCS) Data

Datasets produced as part of the Krycklan Catchment Study (KCS).

Credit

For all datasets, please credit the Krycklan Catchment Study at Svartberget research station, and the SITES Water programme at the Swedish Infrastructure for Ecosystem Science.

Laudon, H., I. Taberman, A. Ågren, M. Futter, M. Ottosson-Löfvenius, and K. Bishop (2013), The Krycklan Catchment Study—A flagship infrastructure for hydrology, biogeochemistry, and climate research in the boreal landscape, Water Resour. Res., 49, doi:10.1002/wrcr.20520.

SE_SVARTBERGET_KCS_COORDINATES_1981-2020_V20201208.gdb

Coordinates of sampling locations for stream water, groundwater, runoff and water temperature. Includes depth of groundwater sampling. All coordinates given as SWEREF99TM (EPSG:4326).

SE_SVARTBERGET_KCS_DEPOSITION_199406-201909_V20201208.csv

Atmospheric deposition data from Svartberget research station, spanning the period may 1994 to september 2019. Monthly values.

Data description

Precipitation collected year-round and above ground on a clearcut. **NH4-N kg/ha**: Kilograms ammonium-nitrogen per hectare, **NO3-N kg/ha**: Kilograms combined nitrogen dioxide-nitrogen and nitrate-nitrogen per hectare, **P kg/ha**: Kilograms phosphorous per hectare, **K kg/ha**: Kilograms potassium per hectare. All nitrogen dioxide catalysed to nitrate before analysis.

Below analysis methods cover the last 10 years, for more details please get in touch.

NO3-N and NH4-N method: SS-EN ISO 13 395 for Bran & Leubbe Method G-284-08 Rev. 4, Instrument: Autoanalyzer 3 HR from Seal Analytical (2011), Detection limits: *NO3-N: 0.4 µg N L-1, NH4-N: 0.4 µg P L-1.*

P and K method: ISO 17294-2:2016, Instrument: ELEMENT 2, ThermoScientific, Germany, Detection limits: *P: 0.2 µg P L-1, K: 5 µg K L-1.*

SE_SVARTBERGET_KCS_METEOROLOGY_20180628-20201126_V20201208.csv

Meteorology data collected as part of the SITES Water programme at lake stortjärn within Krycklan, spanning the period 2018-06-28 to 2020-11-26.

Data description

Measurements taken 2 meters above the water level of lake Stortjärn on a fixed platform. TA: Air temperature in °C, WS: Wind speed in meter per second, WD: Wind direction as degrees from true north. RH: Average relative humidity, RH_Max: Maximum relative humidity, RH_Min: Minimum relative humidity, PA: Atmospheric pressure in millimeters mercury. Measurement location (EPSG:4326): 19.7635, 64.261534.

SE_SVARTBERGET_KCS_GWCHEM_19890616-20200909.csv

Chemical data from various groundwater chemistry monitoring locations throughout the KCS spanning in total the period 1989-06-16 to 2020-09-09. Available variables varies from location and time-period.

Data description

Br (mg/l): milligrams bromine per litre, **Cl (mg/l)**: milligrams chlorine per litre, **F (mg/l)**: milligrams fluorine per litre, **NO3-N (mg/l)**: milligrams combined nitrogen dioxide-nitrogen and nitrate-nitrogen per litre, **PO4-P (mg/l)**: phosphate-phosphorous in milligrams per litre, **SO4-S (mg/l)**: sulfate-sulfur in milligrams per litre,

Na (mg/l): milligrams sodium per litre, **Mg (mg/l):** milligrams magnesium per litre, **K (mg/l):** milligrams potassium per litre, **Ca (mg/l):** milligrams calcium per litre, **DOC (mg/l):** milligrams dissolved organic carbon per litre, **TOC (mg/l):** milligrams total organic carbon per litre. DOC samples are run through several 0.45µm filters before analysis. All nitrogen dioxide catalysed to nitrate before analysis.

Below analysis methods cover the last 10 years, for more details please get in touch.

Br, Cl, F and SO4-S method: Isocratic system with conductivity detector, Instrumentation: IC Metrohm Net. Version 2.3. Detection limits: *F: 0.2 mg L-1, Cl: 0.2 mg L-1, SO4-S 0.1 mg L-1.*

NO23-N method: SS-EN ISO 13 395 for Bran & Leubbe Method G-284-08 Rev. 4, Instrument: Autoanalyzer 3 HR from Seal Analytical (2011), Detection limit NO3-N: 0.4 µg N L-1.

Na, Mg, K and Ca method: ISO 17294-2:2016, Instrument: ELEMENT 2, ThermoScientific, Germany, Detection limits: *Na: 10 µg L-1, Mg: 0.1 µg L-1, K: 5 µg L-1, Ca: 2.74 µg L-1*

DOC and TOC method: SS-EN 1484, Instrument: Shimadzu TOC-VCPH equipped with a TNM-1 unit and an ASI-V autosampler. Detection limit: 0.5 mg C L-1.

SE_SVARTBERGET_KCS_STREAMCHEM_19850711-20200922_V20201208.csv

Chemical data from various stream monitoring locations throught the KCS spanning in total the period 1985-07-11 to 2020-09-22. Available variiaables varies from location and time-period.

Data description

pH: pH, **EC (mS/m):** Electrical conductivity in millisiemens per metre. **Br (mg/l):** milligrams bromine per litre, **Cl (mg/l):** milligrams chlorine per litre, **F (mg/l):** milligrams fluorine per litre, **NO23-N (mg/l):** milligrams combined nitrogen dioxide-nitrogen and nitrate-nitrogen per litre, **PO4-P (mg/l):** phosphate-phosphorous in milligrams per litre, **SO4-S (mg/l):** sulfate-sulfur in milligrams per litre, **Na (mg/l):** milligrams sodium per litre, **Mg (mg/l):** milligrams magnesium per litre, **K (mg/l):** milligrams potassium per litre, **Ca (mg/l):** milligrams calcium per litre, **P (mg/l):** milligrams phosphorous per litre, **DOC (mg/l):** milligrams dissolved organic carbon per litre, **TOC (mg/l):** milligrams total organic carbon per litre. DOC samples are run through several 0.45µm filters before analysis. All nitrogen dioxide catalysed to nitrate before analysis.

Below analysis methods cover the last 10 years, for more details please get in touch.

Br, Cl, F and SO4-S method: Isocratic system with conductivity detector, Instrumentation: IC Metrohm Net. Version 2.3. Detection limits: *F: 0.2 mg L-1, Cl: 0.2 mg L-1, SO4-S 0.1 mg L-1.*

NO23-N method: SS-EN ISO 13 395 for Bran & Leubbe Method G-284-08 Rev. 4, Instrument: Autoanalyzer 3 HR from Seal Analytical (2011), Detection limit NO3-N: 0.4 µg N L-1.

Na, Mg, K, Ca and P method: ISO 17294-2:2016, Instrument: ELEMENT 2, ThermoScientific, Germany, Detection limits: *Na: 10 µg L-1, Mg: 0.1 µg L-1, K: 5 µg L-1, Ca: 2.74 µg L-1, P: 0.2 µg L-1*

DOC and TOC method: SS-EN 1484, Instrument: Shimadzu TOC-VCPH equipped with a TNM-1 unit and an ASI-V autosampler. Detection limit: 0.5 mg C L-1.

SE_SVARTBERGET_KCS_STREAMFLOW_19810101-20200116_V20201208.csv

Daily average discharge from 13 stream monitoring sites within the KCS, in total spanning the period 1981-01-01 to 2020-01-16. Discharge is calculated from water level using our own rating curves.

SE_SVARTBERGET_KCS_STREAMTEMP_20041001-20200812_V20201208.csv

Daily average water temperature from 13 stream monitoring sites within the KCS, in total spanning the period 2004-10-01 to 2020-08-12. The temperature is measured using thermistors once per minute and averaged over 24 hours.

SE_SVARTBERGET_KCS_TDR_20081126-20200930_V20201216.csv

4-hourly measurements of soil water content and soil electrical conductivity at three sites within the KCS, in total spanning the period 2008-11-26 to 2020-09-30. Measurements are taken using a Time-Domain Reflectometer (TDR).

Other datasets

SE_SVARTBERGET_DEG_AUTOCHAMBER_*

Data from 2015 and 2016. The automated chamber system consists of 12 chambers, sorted into 4 replicate groups with each 3 adjacent chambers (1 transparent, 1 opaque and 1 opaque on bare soil) placed within the lawn communities.

Chamber number 1, 4, 7 and 10 are **transparent** chambers (i.e. NEE). Chamber number 2, 5, 8 and 11 are **opaque** chambers (i.e. Reco). Chamber number 3, 6, 9 and 12 are **opaque chambers on bare soil** (i.e. experimental vegetation removal plots, Rh).

The measurement cycle for each chamber is once per hour and lasts for 5 min (incl 3 min of chamber closure and 1 min of flushing the tubing with ambient air before and after closure). CO₂ fluxes with both R² < 0.95 and RMSE > 0.5 were defined as poor quality fluxes and set to NaN.

Data description

min: minute timestamp represents the end of the 5min chamber cycle, **chamber#**: chamber number, **CO₂-flux**: CO₂ flux (μmol CO₂/m²/s), **CO₂-R²**: R² of CO₂ flux, **CO₂-RMSE**: RMSE of CO₂ flux, **CO₂_PAR_mean**: Mean photosynthetically active radiation inside the chamber during measurement (μmol photon/m²/s), **CO₂_PAR_std**: Standard deviation for mean photosynthetically active radiation inside the chamber during measurement (μmol photon/m²/s), **CO₂_PAR_amb**: Ambient mean photosynthetically active radiation outside the chamber during measurement (μmol photon/m²/s), **CO₂_Ta_mean**: Mean air temperature inside the chamber during measurement (degree C), **CO₂_Ta_std**: Standard deviation for mean air temperature inside the chamber during measurement (degree C), **CO₂_Ta_amb**: Ambient mean air temperature outside the chamber during measurement (degree C), **Ts_2**: Mean soil temperature (2cm depth) during measurement (degree C), **Ts_10**: Mean soil temperature (10cm depth) during measurement (degree C), **WTL**: Mean water table level (relative to surface; negative values indicate water table level below the surface) during measurement (m), **PPT**: Total precipitation (mm), **WS**: Mean windspeed (m/s), **P**: Atmospheric pressure (Pa), **VPD**: Vapour pressure deficit (kPa), **RH**: Relative humidity (%).

Credit

Please cite acknowledge the Svartberget research station and cite *Järveoja, J., M.B. Nilsson, M. Gažovič, P.M. Crill and M. Peichl. 2018. Partitioning of the net CO₂ exchange using an automated chamber system reveals plant phenology as key control of production and respiration fluxes in a boreal peatland. Global Change Biology 24, 3436-3451*