Abiotic and biotic data of the rivers Pinka and Lafnitz 2012 - 2014

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Keywords
stream temperature, riparian vegetation, Pinka, Lafnitz, simulations, benthic invertebrates, fish, climate change, Heat Source, observations

Short description of the dataset/summary

During the project BIO_CLIC abiotic and biotic data of the rivers Pinka and Lafnitz were collected from the year 2012 until 2014, in order to analyse the present state of river morphology, riparian vegetation, riparian microclimate, fish species and benthic invertebrate abundance and diversity. This data was produced to be able to predict the near stream microclimate and stream water temperature until the end of the century, estimate the stress on aquatic organisms and the ability of vegetation to mitigate this stress.

Initially only stream water observations, predictions of the river Pinka and corresponding input data for extreme heat wave events used in Trimmel et al. (2016a) are available for download. Other parts of the data set may be included later after they have been published.

General information

dataset entry ID: FWM_8
name of the dataset: Abiotic and biotic data of the rivers Pinka and Lafnitz 2012 - 2014
full name of the dataset: BIO_CLIC
dataset short name: BIO_CLIC
type of dataset: species (taxonomic group) per site database including environmental information
data type: point data/observation data

science keywords according to GCMD:

topic: Atmosphere, Biosphere, Biological Classification, Climate Indicators

ISO topic category according to ISO 19115:

ISO topic category: Biota, Climatology/Meteorology/Atmosphere, Environment, Inland Waters

Technical and administrative specifications

data format: others/specify

others/details: different data formats: csv, txt, Access, Excel

operating system: all operating systems

others/details: some data is only available for Windows

data language: English

current access level: web (public)

web address (URL): http://data.freshwaterbiodiversity.eu/data/FWM_8-Pinka_Lafnitz/

data are deposited in the repository of the Freshwater Biodiversity Data Portal

currently available through GBIF: no

exchange planned: no

data in data repository: yes

specify repository: Initially only stream water observations, predictions of the river Pinka and corresponding input data for extreme heat wave events used in Trimmel et al. (2016a) are available for download. Other parts of the data set may be included after they have been published.

Do you plan to publish the data on the Freshwater Biodiversity Data Portal: already published through BioFresh

media for data delivery: online internet (HTTP)

web address: http://data.freshwaterbiodiversity.eu/data/FWM_8-Pinka_Lafnitz/

update level: completed, others/specify

others/details: some data are not analyzed yet

documentation:

type: scientific paper, others/specify

language: English

specify: final report

others/details: http://bioclic.boku.ac.at

contact details:

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comments:
other related websites:
  http://bioclic.boku.ac.at/
  http://www.wau.boku.ac.at/met/forschungsthemen/atmosphaerische-strahlung/
  /forschungsbereich-strahlung-energiebilanz-und-bodengebundene-fernerkundung/
  /forschungsschwerpunkte/strahlungtransport-und-energiebilanz-in-gewaessern

Intellectual property rights and citation

dataset publisher: Heidelinde Trimmel
dataset creator (data compiler):
  contact name: Heidelinde Trimmel
  contact email: heidelinde.trimmel@boku.ac.at
  contact institution: Institute of Meteorology, University of Natural Resources and Life Sciences
data contributors to/owners of this dataset:
  multiple
  number: 6
data contributor/owner 1:
  contact name: Gerda Kalny
  contact email: gerda.kalny@boku.ac.at
  contact institute: Institute of Soil Bioengineering and Landscape Construction, Univ. of Nat. Res.
criteria for using this part of the dataset:
  The dataset needs to be requested from dataset creator with specific conditions of use.
  comments: river morphology, field study
            riparian vegetation, field study
data contributor/owner 2:
  contact name: Philipp Weihs
  contact email: philipp.weihs@boku.ac.at
  contact institute: Institute of Meteorology, University of Natural Resources and Life Sciences
criteria for using this part of the dataset:
  The dataset needs to be requested from dataset creator with specific conditions of use.
  comments: stream water temperature, measurements
            near stream microclimate, measurements
data contributor/owner 3:
  contact name: Heidelinde Trimmel
  contact email: heidelinde.trimmel@boku.ac.at
  contact institute: Institute of Meteorology, University of Natural Resources and Life Sciences
criteria for using this part of the dataset:
  The dataset is publicly available (data portal, data archive) and can be used
without restrictions, but dataset creator/data contributors must be informed prior to publication. Data must be acknowledged and cited correctly.

stream water temperature, numerical predictions

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contact institute: Institute of Hydrobiology and Aquatic Ecosystem Management, Univ. of Nat. Res.
criteria for using this part of the dataset:
The dataset needs to be requested from dataset creator with specific conditions of use.
comments: fish species and assemblages, sampling

data contributor/owner 5:
contact name: Florian Dossi
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contact institute: Institute of Hydrobiology and Aquatic Ecosystem Management, Univ. of Nat. Res.
criteria for using this part of the dataset:
The dataset needs to be requested from dataset creator with specific conditions of use.
comments: benthic invertebrate abundance and diversity, sampling

data contributor/owner 6:
contact name: Herbert Formayer
contact email: herbert.formayer@boku.ac.at
contact institute: Institute of Meteorology, University of Natural Ressources and Life Sciences
criteria for using this part of the dataset:
The dataset needs to be requested from dataset creator with specific conditions of use.
comments: near stream microclimate, numerical predictions

citation of this dataset:
title: Abiotic and biotic data of the rivers Pinka and Lafnitz 2012 - 2014
year: 2016
doi: https://doi.org/10.13148/BFFWM8

citation of the metadata:
author(s): Trimmel H., Kalny G., Dossi F., Formayer H., Graf W., Leitner P., Leidinger D., Nadeem I., Rauch H. P., Weihs P. & Melcher A.
title and journal (name, number, pages):
year: 2017
doi: https://doi.org/10.15504/fmj.2017.22

dataset related references:
reference 1:
author(s): Trimmel, H., Gangneux, C., Kalny, G., Weihs, P.
Abiotic and biotic data of the rivers Pinka and Lafnitz 2012 - 2014

General data specifications

regional coverage of the dataset:
   scale of the dataset: catchment
   continents: Europe

spatial extent (bounding coordinates):
   southernmost latitude [°]: 46.9766
   northernmost latitude [°]: 47.5153
   westernmost longitude [°]: 15.8115
   easternmost longitude [°]: 16.4939
   minimum altitude: 240 metres
   maximum altitude: 1480 metres
   countries: Europe: Austria

world climatic regions according to Köppen:
   Group D: continental/microthermal climate

freshwater ecoregions of the world (FEOW) according to WWF:
   Europe: Upper Danube

European ecoregions according to Illies (WFD):
   Alps (ER4), Hungarian Lowlands (ER11)

ecosystem type: rivers

covered timeframe: 2012 - 2014
Site specifications

coordinate system/grid data: projected, others others: MGI_Austria_GK_M34, Transverse Mercator

datum (e.g. WGS84): Bessel_1841

site coding:
site coding available: yes, alphanumerical

number of digits: 12

element: L_ROHR_26,08

number of sites: <100

exact number of sites: 64

comments:
There are two different site codings used:
(1) The water temperature simulation dataset uses the side coding distance from mouth (km 89-38, each 500m). Here only the river Pinka is included. (2) In the additional datasets of each research group the data is sorted according to an alphanumerical code denoting the river distance from source of the field survey sample points.

Climate and environmental data

climate related data:
spatial resolution of the data (if not catchment/site related):

others/specify

at reference station

available parameters per catchment:
hourly air humidity, air temperature, wind, global radiation

data source: own measurements / regional climate scenarios

comments:
The following data are included in the downloadable data set: (1) hourly air humidity, air temperature, wind, global radiation was recorded at our reference station at an unobstructed site at Pinka DFS 39 (Trimmel et al. 2016a+b); (2) INCA data (Haiden et al. 2011) were compared and adjusted to fit the local site; (3) for future scenarios data was extracted from regional climate scenarios (Radu et al. 2008). The full methodology is described in Trimmel et al. 2016a. Additional continuous and campaign meteorological measurements were made to characterize the near stream microclimate and energy balance at the river surface, which are not included in the downloadable data (air temperature/air humidity/global radiation/PAR within the riparian vegetation buffer, radiation balance at the river).


environmental data:
available parameters per catchment:
catchment land cover/land use

data source: own measurements/field study

river morphology, riparian vegetation, water temperature measurements
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available parameters per site:
- **river length**
  - **data source:** own measurements/field study/simulations
- **distance to source**
  - **data source:** field study
- **distance to mouth**
  - **data source:** field study/ part of simulation input
- **stream order (according to Strahler)**
  - **data source:** field study
- **slope**
  - **data source:** part of simulation input, calculated with TTools
- **altitude**
  - **data source:** part of simulation input, calculated with TTools
- **hydrological regime/flow regime**
  - **data source:** own measurements/field study
- **discharge**
  - **data source:** part of simulation results
- **current velocity**
  - **data source:** part of simulation results
- **maximum depth**
  - **data source:** part of simulation results
- **mean depth**
  - **data source:** part of simulation results
- **substrate composition**
  - **data source:** part of simulation results

**physico-chemistry data:**
- **water temperature**
  - **comments:** Water temperature was sampled hourly at each site including measurements at tributaries. Vertical and horizontal sections were measured. Future water temperature was modeled using the deterministic model Heat Source version 9 (Boyd and Kasper 2003, Trimmel et al. 2016a).

**stressors influencing the sites:**
- **reference sites available:** yes

<table>
<thead>
<tr>
<th>stressor</th>
<th>restored sites available</th>
<th>data before/after restoration available</th>
<th>stressor gradient available</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>thermal stress</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
</tbody>
</table>

**Biological data**

- **biological data origin:** from sampling
- **specify project:** BIO_CLIC, Austria
- **organism group addressed:** fish, macro-invertebrates (Mollusca, Ephemeroptera, Odonata, Plecoptera, Coleoptera, Trichoptera, Chironomidae), angiosperms (riparian vegetation), invasive species
Sample specifications/sample resolution

**fish:**

**sample information:**
- covered timeframe: 1991 - 2013
- historical data: yes
- palaeo data: no
- season: spring, summer, autumn
- temporal resolution/frequency of sampling: once pro site
- time series data: no
- comments: Historical data (not sampled during the project BIO_CLIC) received from BAW Scharfling for the time period: 1991 - 2012.

**taxonomic resolution:**
- level: percentage of species level data: 100

**taxonomic coding:**
- taxalist according to: BMFLUW 2010

**sample specifications:**
- replicate samples: yes
- number of samples: 626
- specification of method(s) used for sampling and sorting: Allover, several transects at a total of 17 stretches (626 sampling points in the Lafnitz and 271 in the Pinka) were recorded to characterize the abiotic meso habitats. Beside the abiotic characterization of the habitats, point-abundance electric fish samplings (n = 35) were performed to record the occurring fish species and their life stages in 2012 and October 2013. To describe and analyze temporal trends of fish communities datasets were assembled from different sources (IHG DB) and ATFIBASE database (BAW Scharfling). Additionally, fish data from the river Lafnitz was provided by Gerhard Woschitz and Georg Wolfram. Altogether, 52 fish sampling events from external sources were included in the dataset for this study, covering the period from 1991 to 2013 (Guldenschuh 2014).

**reference(s):**
Guldenschuh M., 2014. Longitudinal zonation of habitat parameters and fish species assemblages in the Austrian lowland rivers Lafnitz and Pinka. Masterthesis at the University of Natural Resources and Life Sciences, Vienna.

**sample type (e.g. habitat specific samples, composite samples etc.):** Habitat sampling 2012 and 2013, additional historic quantitative and qualitative data from 1991 on.

**specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):** All river, from upstream down to the Hungarian border.

**macro-invertebrates:**

**sample information:**
- covered timeframe: 2012 - 2014
- historical data: no
- palaeo data: no
- season: spring, summer, autumn
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temporal resolution/frequency of sampling:
4 times in three years

time series data: no

comments: Samples were taken in: May 2012; August 2012; October 2012; March 2014.

taxonomic resolution:

level: percentage of species level data: 70

comments: Identification was mainly based on the Screening-Taxa List according to Ofenböck et al. (2010). However, in many cases Ephemeroptera, Plecoptera and Trichoptera taxa could be identified to a lower level, whereas Diptera taxa were mainly identified to family level. The taxonomic composition of each site was quantified using the Regional Zonation Index (RZI) calculated by the software Ecoprof 4.0 (Moog et al., 2013).

taxonomic coding:
taxalist according to: Ofenböck et al. (2010)

reference(s):


sample specifications:

replicate samples: no

number of samples: 406

specification of method(s) used for sampling and sorting:

- In May and August 2012 lithal substrates were sampled according to the Multi-Habitat-Sampling approach (AQEM-Consortium, 2002) (19 samples Lafnitz and 16 samples Pinka). Twenty pooled samples were taken at each investigation site, whereby each sample represents a 5% share of available habitats in the river section.
- In October 2012 and March 2014, single-habitat-samples per transects were taken (290 samples Lafnitz). At least 20 sampling units were taken at each site. Choriotope type as well as flow velocity (bottom; near and at 40% of water depth) was documented for each sample.
- Habitat structures directly linked to the riparian vegetation such as large wood (LW) were sampled separately at alle dates if present (58 LW samples Lafnitz and 6 LW samples Pinka). Length, width and volume of each large wood piece were measured to calculate macro-invertebrate densities (Ind/m²) and biomass per square meter.
- In addition, adults were collected with light traps and sweeping net to support the identification of Ephemeroptera, Plecoptera and Trichoptera species (11 sampling dates Lafnitz and 6 sampling dates Pinka).
- The screening taxa list according to Ofenböck et al. (2010) was used as reference species list.

reference(s):

- Ofenböck, T., Moog, O., Hartmann, A., & Stubauer, I., 2010. Leitfaden zur Erhebung der biologischen Qualitätselemente Teil A2-Makrozoobenthos. Bundesministerium für Land- und Forstwirtschaft, Umwelt- und Wasserwirtschaft,
sample type (e.g. habitat specific samples, composite samples etc.):
  - MHS sampling according to AQEM (2002) in May and August of 2012
  - Single habitat sampling in October 2012 and March 2014
  - Large wood sampling: May 2012; August 2012; October 2012; March 2014

angiosperms:
sample information:
  covered timeframe: 2013 - 2013
  historical data: no
  season: summer
  time series data: no
  comments: Area-wide from source to the Austrian border in a 50m buffer of the river banks.
taxonomic resolution:
  level: percentage of species level data: 75
  comments: Available in an additional data set.
taxonomic coding:
  taxalist according to: Cejka et al. (2005)
sample specifications:
  replicate samples: no
  number of samples: 1
  specification of method(s) used for sampling and sorting:
    Definition of areas of same vegetation composition by aerial photographs. Overall height, density and dominating species were recorded in field. Reference species lists were used from Cejka et al. (2005)
specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):
  Riparian vegetation in a 50 m buffer orographically left and right of the river bank from source to the Austrian border.

invasive species:
sample information:
  covered timeframe: 2013 - 2013
  historical data: no
  season: summer
  time series data: no
taxonomic resolution:
taxonomic coding:
sample specifications:
  comments: Invasive species are included in the angiosperm data set; rough estimation.
Other specifications

GIS layers, shapes related to the dataset:
- others (specify): others/specify
- availability of photos: measurement points and sampling habitats
- availability of maps: yes
- quality control procedures:
  - Were any quality control procedures applied to your dataset? yes
  - quality control protocols and comments: data mining analyses

Acknowledgements

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References


Guldenschuh, M., 2014. Longitudinal zonation of habitat parameters and fish species assemblages in the Austrian lowland rivers Lafnitz and Pinka. master thesis at the University of Natural Resources and Life Sciences, Vienna.


Moog, O., Hartmann, A., Schmidt-Kloiber, A., Vogl, R., Koller-Kreimel, V., 2013. ECOPROF Vers. 4.0 Software zur Bewertung des ökologischen Zustandes von Fließgewässern nach WRRL.


