Metadata describing the Kharaa Yeröö River Basin Water Quality Database

Jürgen Hofmann, Ralf Ibisch, Daniel Karthe, Buren Scharaw, Michael Schäffer, Melanie Hartwig, Philipp Theuring, Michael Rode, Saulyegul Avlyush, Vanessa Watson, Vanessa Bremerich, Gerel Osor, Andrew Kaus, Katja Westphal, Martin Pfeiffer, Jörg Priess, Christian Schweitzer, Daniel Krätz, Jonas Gröning, Jens Hürdler, Gunsmaa Batbayar, Sonja Heldt, Olaf Büttner & Dietrich Borchardt

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Jürgen Hofmann [1], Ralf Ibisch [4], Daniel Karthe [7], Buren Scharaw [5], Michael Schäffer [4], Melanie Hartwig [4], Philipp Theuring [4], Michael Rode [3], Saulyegul Avlyush [9], Vanessa Watson [6], Vanessa Bremerich [1], Gerel Osor [8], Andrew Kaus [4], Katja Westphal [3], Martin Pfeiffer [3], Jörg Priess [3], Christian Schweitzer [4], Daniel Krätz [4], Jonas Gröning [1], Jens Hürdler [2], Gunsmaa Batbayar [7], Sonja Heldt [10], Olaf Büttner [3] & Dietrich Borchardt [3]

[1] Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany; corresponding author: j.hofmann@igb-berlin.de
[2] formerly: Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany
[3] Helmholtz-Centre for Environmental Research (UFZ), Magdeburg, Leipzig, Germany
[4] formerly: Helmholtz-Centre for Environmental Research (UFZ), Magdeburg, Leipzig, Germany
[5] Advanced System Technology (AST) Branch of Fraunhofer IOSB, Ilmenau, Germany
[6] formerly: Advanced System Technology (AST) Branch of Fraunhofer IOSB, Ilmenau, Germany
[7] German-Mongolian Institute for Resources and Technology (GMIT), Nalaikh, Mongolia
[8] formerly: Mongolian University of Science and Technology (MUST), Darkhan, Mongolia
[9] Institute of Geography and Geoecology (IGG), Mongolian Academy of Sciences (MAS), Ulaanbaatar, Mongolia
[10] formerly: University of Duisburg-Essen (UDE), Essen, Germany

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Keywords

river, fluvial sediments, freshwater systems, nutrients, heavy metals, metalloids, groundwater, environmental monitoring, water chemistry, pollution

Short description of the dataset/summary

In the framework of the BMBF funded project on Integrated Water Resources Management in Central Asia (Model region Mongolia, MOMO project, www.iwrm-momo.de) the objectives focused on supplementing, validating and extending the existing surveillance monitoring to the entire river basin for the time series 2006-2017.

The MOMO monitoring programme was set up in order to observe seasonal variation in various water quality parameters along the main river course and its tributaries. A detailed sampling survey was carried out along the Kharaa River in the spring, summer and autumn of 2006 to 2017, extending from the headwaters in the Khentii Mountains to the outlet of the river basin. An additional continuous monthly monitoring programme for surface water quality was carried out

upstream (Deed Guur) and downstream of Darkhan city (Buren Tolgoi) including the outlet of WWTP Darkhan in the time between 2007 and 2017.

This strategy provides information for the efficient and effective design of future monitoring programmes with a focus on operational or investigative issues. The types of water sampling programmes included initial surveys as well as investigative and operational monitoring, point-source characterization, intensive surveys, fixed-station-network monitoring, groundwater monitoring, and special surveys involving chemical and biological monitoring. The water analyses have a focus on nutrients, heavy metals and metalloids, chloride, boron and the main physical water parameters. The dataset comprises also fluvial sediment analyses on heavy metals. In addition in 2017 a special hygienic monitoring (total coliforms, E. coli and fecal coliforms) has been carried out and was included in this database.

General information

dataset entry ID:	FWM_14
name of the dataset:	
full name of the dataset:	Kharaa Yeröö River Basin Water Quality Database
dataset short name:	MoMo Water Quality Database
type of dataset:	environmental characteristics database
data type:	point data/observation data
science keywords according to GCMD:	
topic:	Terrestrial Hydrosphere
ISO topic category according to ISO 19115:	Environment, Inland Waters
INSPIRE keywords according to GEMET:	Environmental monitoring facilities
own science keywords:	river, fluvial sediments, freshwater systems, nutrients, heavy metals, metalloids, groundwater, water chemistry, pollution
related project:	Integrated Water Resources Management (IWRM) in Central Asia: Model Region Mongolia (MoMo)
funding:	German Federal Ministry of Education and Research (BMBF project No. 033W016DN)

Technical and administrative specifications

data format:	Access
others/details:	PostgreSQL
operating system:	all Windows systems
data language:	English
current access level:	web (public)
web address:	https://nimbus.igb-berlin.de/index.php/s/Wi0Fd78izfydYY2
currently available through GBIF:	no
exchange planned:	no
data in data repository:	no
Do you plan to publish the data on the Freshwater Biodiversity Data Portal:	no
update level:	completed, update planned
documentation:	
type:	manual
language:	English

contact details:

metadata contact person:

first, last name:	Jürgen Hofmann
phone:	+49 (0)30 6392 4073
email:	j.hofmann@igb-berlin.de
institution:	Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)
address:	Justus-von-Liebig-Str. 7
postal code, city:	12489 Berlin
country	Germany
web address:	http://www.igb-berlin.de/en

technical contact person:

first, last name:	Vanessa Bremerich
phone:	+49 (0)30 6392 4081
email:	bremerich@igb-berlin.de

scientific contact person:

first, last name:	Jürgen Hofmann
phone:	+49 (0)30 6392 4073
email:	j.hofmann@igb-berlin-de

Intellectual property rights and citation

dataset publisher: MoMo consortium

dataset creator (data compiler):

contact name:	Jürgen Hofmann
contact email:	j.hofmann@igb-berlin.de
contact institution:	Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)

data contributors to/owners of this dataset:

multiple

number: 24

data contributor/owner 1:

contact name:	Jürgen Hofmann
contact email:	j.hofmann@igb-berlin.de
contact institute:	Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)

criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 2:

contact name:	Ralf Ibisch
contact email:	ralf.ibisch@gmx.de
contact institute:	formerly: Helmholtz-Centre for Environmental Research (UFZ)

criteria for using this part of the dataset:

The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 3:

contact name:	Daniel Karthe
contact email:	karthe@gmit.edu.mn
contact institute:	German-Mongolian Institute for Resources and Technology (GMIT)

criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 4:
contact name: Buren Scharaw
contact email: buren.scharaw@iosb-ast.fraunhofer.de
contact institute: Advanced System Technology (AST) Branch of Fraunhofer IOSB
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 5:
contact name: Michael Schäffer
contact email: schaeffer@bafg.de
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 6:
contact name: Melanie Hartwig
contact email: MelanieHartwig@gmx.de
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 7:
contact name: Philipp Theuring
contact email: theuring@seba.de
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 8:
contact name: Michael Rode
contact email: michael.rode@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 9:
contact name: Saulyegul Avlyush
contact email: saulegul_a@daad-alumni.de
contact institute: Institute of Geography and Geoecology (IGG), Mongolian Academy of Sciences (MAS)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 10:
contact name: Vanessa Watson
contact email: vanessa.watson@iosb-ast.fraunhofer.de
contact institute: formerly: Advanced System Technology (AST) Branch of Fraunhofer IOSB

criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 11:
contact name: Vanessa Bremerich
contact email: bremerich@igb-berlin.de
contact institute: Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 12:
contact name: Gerel Osor
contact email:
contact institute: formerly: Mongolian University of Science and Technology (MUST)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 13:
contact name: Andrew Kaus
contact email: andrewkinglseykaus@gmail.com
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 14:
contact name: Katja Westphal
contact email: katja.westphal@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 15:
contact name: Martin Pfeiffer
contact email: martin.pfeiffer@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 16:
contact name: Jörg Priess
contact email: joerg.priess@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 17:
contact name: Christian Schweitzer
contact email: christian.schweitzer@uba.de
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used

without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 18:

contact name: Daniel Krätz
contact email: danielkraetz@gmx.de
contact institute: formerly: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 19:

contact name: Jonas Gröning
contact email: groening@igb-berlin.de
contact institute: Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 20:

contact name: Jens Hürdler
contact email: jens.huerdler@googlemail.com
contact institute: formerly: Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 21:

contact name: Gunsmaa Batbayar
contact email: gunsmaa@gmit.edu.mn
contact institute: German-Mongolian Institute for Resources and Technology (GMIT)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 22:

contact name: Sonja Heldt
contact email: heldt.sonja@eglv.de
contact institute: formerly: University of Duisburg-Essen (UDE)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 23:

contact name: Olaf Büttner
contact email: olaf.buettner@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

data contributor/owner 24:

contact name: Dietrich Borchardt
contact email: dietrich.borchardt@ufz.de
contact institute: Helmholtz-Centre for Environmental Research (UFZ)
criteria for using this part of the dataset:
The dataset is publicly available (data portal, data archive) and can be used without restrictions, but must be acknowledged and cited correctly.

citation of this dataset:

author(s): Hofmann, J., Ibisch, R., Karthe, D., Scharaw, B., Schäffer, M., Hartwig, M., Theuring, P., Rode, M., Avlyush, S., Watson, V., Bremerich, V., Osor, G., Kaus, A., Westphal, K., Pfeiffer, M., Priess, J., Schweitzer, C., Krätz, D., Gröning, J., Hürdler, J., Batbayar, G., Heldt, S., Büttner, O. & Borchardt, D.

title and journal (name, number, pages): Kharaa Yeröö River Basin Water Quality Database.

year: 2018

citation of the metadata:

author(s): Hofmann J., Ibisch R., Karthe D., Scharaw B., Schäffer M., Hartwig M., Theuring P., Rode M., Avlyush S., Watson V., Bremerich V., Osor G., Kaus A., Westphal K., Pfeiffer M., Priess J., Schweitzer C., Krätz D., Gröning J., Hürdler J., Batbayar G., Heldt S., Büttner O. & Borchardt D.

title and journal (name, number, pages): Metadata describing the Kharaa Yeröö River Basin Water Quality Database. Freshwater Metadata Journal 36: 1-10

year: 2018

doi: https://doi.org/10.15504/fmj.2018.36

dataset related references:

reference 1:

author(s): Batbayar, G., Pfeiffer, M., von Tümpling, W., Kappas, M. & Karthe, D.

title: Chemical water quality gradients of the sub catchments of the Mongolian Selenga River basin. Environmental Monitoring and Assessment 189: 420.

year: 2017

doi: https://doi.org/10.1007/s10661-017-6123-z

reference 2:

author(s): Hofmann, J., Watson, V. & Scharaw, B.

title: Groundwater quality under stress: contaminants in the Kharaa River basin (Mongolia). Environmental Earth Sciences 73(2): 629-648.

year: 2015

doi: https://doi.org/10.1007/s12665-014-3148-2

reference 3:

author(s): Pfeiffer, M., Batbayar, G., Hofmann, J., Siegfried, K., Karthe, D. & Hahn-Tomer, S.

title: Investigating arsenic (As) occurrence and sources in ground, surface, waste and drinking water in northern Mongolia. Environmental Earth Sciences 73(2): 649-662.

year: 2015

doi: https://doi.org/0.1007/s12665-013-3029-0

reference 4:

author(s): Kaus, A., Schäffer, M., Karthe, D., Büttner, O., von Tümpling, W. & Borchardt, D.

title: Regional patterns of heavy metal concentrations in water, sediment and five consumed fish species of the Kharaa River basin, Mongolia. Regional Environmental Change 17(7): 2023-2037.

year: 2017

doi: https://doi.org/10.1007/s10113-016-0969-4

reference 5:

author(s): Hofmann, J., Karthe, D., Ibisch, R., Schäffer, M., Kaus, A., Avlyush, S. & Heldt, S.

title:	Initial characterization and water quality assessment of stream landscapes in Northern Mongolia and its integration into a River Basin Management Plan. Water 7(7): 3166-3205.
year:	2015
doi:	https://doi.org/10.3390/w7073166

General data specifications

regional coverage of the dataset:

spatial extent of the dataset:	catchment
continents:	Asia

spatial extent (bounding coordinates):

southernmost latitude [°]:	46.8761
northernmost latitude [°]:	50.2525
westernmost longitude [°]:	102.1911
easternmost longitude [°]:	107.4601
minimum altitude:	599 metres
maximum altitude:	1478 metres
countries:	Asia: Mongolia

world climatic regions according to Köppen:
Group B: dry (arid and semiarid) climates
Group D: continental/microthermal climate

freshwater ecoregions of the world (FEOW) according to WWF:
Asia: Lake Baikal

ecosystem type:	rivers, lakes/ponds, groundwater, general freshwater
covered timeframe:	2006 - 2017

Site specifications

coordinate system/grid data:	latitude/longitude, format: DD
datum (e.g. WGS84):	WGS84
grid data available:	no
site coding:	
site coding available:	yes, alphanumerical
number of digits:	12
example:	Sel_Kh01_001
number of sites:	100 - 1000
exact number of sites:	246

Climate and environmental data

climate related data:	no climate data available

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

comments:	The Kharaa Yeröö River basin belongs partly to cold semi-arid climates (BSk) and sub-alpine/boreal climate (Dwc) according to the KÖPPEN classification scheme.

environmental data:

no environmental data per catchment available
no environmental data per site avaiable

physico-chemical data: total P, nitrate, nitrite, total N, ammonium, sulphate, chloride, sodium, magnesium, labile aluminium, calcium, TOC (total organic carbon), water temperature, pH, conductivity, suspended solids

other physico-chemical parameters:

air temperature, antimony, arsenic, barium, beryllium, bismuth, boron, bromide, cadmium, chromium, chromium(VI), cobalt, copper, cyanide, diphosphorus pentoxide, dissolved inorganic carbon, dissolved inorganic nitrogen, dissolved nitrogen, dissolved organic carbon, dissolved organic nitrogen, Eschericha coli, fecal coliforms, fluoride, iron, lead, lithium, manganese, mercury, molybdenum, nickel, organic matter in suspended solids, oxygen concentration, oxygen saturation, phosphate, potassium, rubidium, silicic acid, silver, soluble reactive phosphorus, strontium, thallium, tin, titanium, total dissolved solids, total hardness, total coliforms, turbidity, uranium, vanadium, water quality index, zinc

availability of physico-chemical data, if there is more than one sample per site:

per sample

stressors influencing the sites:

reference sites available: yes

stressor	restored sites available	data before/after restoration available	stressor gradient available	comments
eutrophication	no	no	yes	
hydromorphological degradation	no	no	yes	
organic pollution	no	no	no	
toxic stress	no	no	yes	
general degradation	no	no	yes	

Other specifications

GIS layers, shape files related to the dataset:

hydrological information (as HydroBASINS)
catchments, river-sub-basins
land use
protected areas
population density
environmental variables (freshwater or terrestrial)

availability of photos: yes

availability of maps: yes

quality control procedures:

quality control protocols and comments:

The quality of data resulting from water and wastewater sampling surveys included the following six major activities: (a) formulating the particular objectives of the water sampling program, (b) collecting representative water samples, (c) maintaining the integrity of the water samples through proper handling and preservation, (d) adhering to adequate chain-of-custody and

sample identification procedures, (e) practicing quality assurance in the field by using, and (f) properly analyzing the pollutants in the water samples. These areas were equally important for insuring that environmental data are of the highest validity and quality.

Acknowledgements

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References

Batbayar, G., Pfeiffer, M., von Tümpling, W., Kappas, M. & Karthe, D., 2017. Chemical water quality gradients of the sub catchments of the Mongolian Selenga River basin. Environmental Monitoring and Assessment 189: 420. https://doi.org/10.1007/s10661-017-6123-z

Hofmann, J., Karthe, D., Ibisch, R., Schäffer, M., Kaus, A., Avlyush, S. & Heldt, S., 2015. Initial Characterization and Water Quality Assessment of Stream Landscapes in Northern Mongolia and its Integration into a River Basin Management Plan. Water 7(7): 3166-3205. https://doi.org/10.3390/w7073166

Hofmann, J., Venohr, M., Behrendt, H. & Opitz, D., 2010. Integrated Water Resources Management in Central Asia: Nutrient and heavy metal emissions and their relevance for the Kharaa River Basin, Mongolia. Water Science and Technology 62(2): 353-363. https://doi.org/10.2166/wst.2010.262

Hofmann, J., Watson, V. & Scharaw, B., 2015. Groundwater quality under stress: contaminants in the Kharaa River basin (Mongolia). Environmental Earth Sciences 73(2): 629-648. https://doi.org/10.1007/s12665-014-3148-2

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Kaus, A., Schäffer, M., Karthe, D., Büttner, O., von Tümpling, W. & Borchardt, D., 2017. Regional patterns of heavy metal concentrations in water, sediment and five consumed fish species of the Kharaa River basin, Mongolia. Regional Environmental Change 17(7): 2023-2037. https://doi.org/10.1007/s10113-016-0969-4

Malsy, M., Flörke, M. & Borchardt, D., 2016. What drives the water quality changes in the Selenga Basin: climate change or socio-economic development? Regional Environmental Change 17(7): 1977-1989. https://doi.org/10.1007/s10113-016-1005-4

Menzel, L., Hofmann, J. & Ibisch, R., 2011. Untersuchung von Wasser- und Stoffflüssen als Grundlage für ein Integriertes Wasserressourcen-Management im Kharaa-Einzugsgebiet (Mongolei). Hydrologie und Wasserbewirtschaftung 55(2): 88-103.

Pfeiffer, M., Batbayar, G., Hofmann, J., Siegfried, K., Karthe, D. & Hahn-Tomer, S., 2015. Investigating arsenic (As) occurrence and sources in ground, surface, waste and drinking water in northern Mongolia. Environmental Earth Sciences 73(2): 649-662. https://doi.org/0.1007/s12665-013-3029-0

Priess, J., Schweitzer, C., Batkhishig, O., Koschitzki, T. & Wurbs, D., 2015. Impacts of land-use dynamics on erosion risks and water management in Northern Mongolia. Environmental Earth Sciences 73(2): 697-708. https://doi.org/10.1007/s12665-014-3380-9.

Theuring, P., Collins, A.L. & Rode, M., 2015. Source identification of fine-grained suspended sediment in the Kharaa River basin, northern Mongolia. Science of the Total Environment 526: 77-87. https://doi.org/10.1016/j.scitotenv.2015.03.134

Appendix

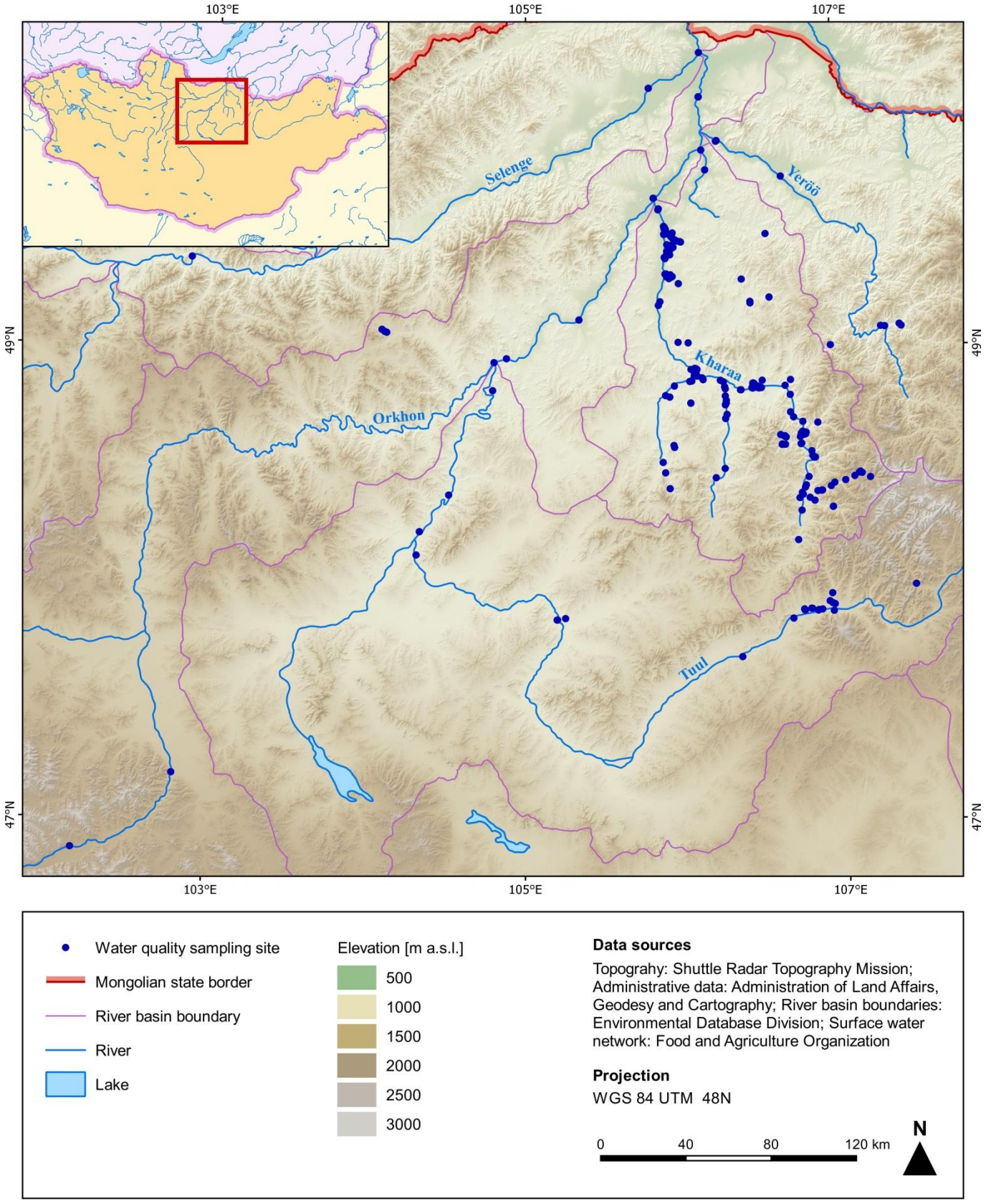

Figure 1: *Spatial distribution of all measuring points and sample locations in the Kharaa Yeröö River Basin Water Quality Database*