



Kharaa river, Photo: R. Künzelmann (UFZ) 2016

Short Explanation of Kharaa Yeröö River Basin Water Quality Database

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Important remarks

- ➔ A long-term water quality monitoring programme has been conducted under the research aims of the project entitled “Integrated Water Resources Management (IWRM) in Central Asia: Model Region Mongolia (MoMo)” (<http://www.iwrm-momo.de>, 2006-2018) with the project partner IGB being responsible to integrate all quality assured data into an open access database and a River Basin Atlas [1]
- ➔ The projects surveillance monitoring had a focus on detailed longitudinal stream surveys (abiotic and biotic parameters) in spring, summer and autumn from 2006 to 2017 [2-6]
- ➔ The chemical parameters comprise nutrients (total nitrogen, ammonium, nitrate, nitrite, ortho-phosphate, total phosphorus), heavy metals and metalloid elements (Al, As, Cd, Cr, Cu, Fe, Mn, Hg, Ni, Pb, Zn), and chloride, boron as pollution indicators
- ➔ The physical parameters comprise electrical conductivity, temperature, pH and oxygen
- ➔ The Kharaa Yeröö River Basin Water Quality Database was set up with **Microsoft Excel 2010** and then transferred into **Access 2010**. The display may vary with older or English versions.
- ➔ For users of Open Access software we have prepared a version in the format of **PostgreSQL**
- ➔ To ensure a comprehensive and robust biological assessment, data on macroinvertebrate and fish populations were collected from over 20 sampling sites. However these data are not included in this data base. In case of interest please contact Prof. Dr. Dietrich Borchardt (Helmholtz-Centre for Environmental Research UFZ, E-mail: dietrich.borchardt@ufz.de)

Monitoring programme

Here we provide the metadata on the water quality monitoring database for the Kharaa-Yeröö River Basin in Northern Mongolia. In the framework of the BMBF funded project on Integrated Water Resources Management in Central Asia, Model region Mongolia (IWRM MoMo) the objective focused on supplementing, validating and extending the existing surveillance monitoring to the entire river basin for the time series 2006-2013.

The MoMo monitoring programme was set up in order to observe seasonal variations in nutrient concentrations along the main river course and its tributaries, extending from the headwaters in the Khentii Mountains to the outlet of the river basin. A detailed sampling survey was carried out along the Kharaa River in the spring, summer and autumn of 2006 to 2013, 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 2013.

The types of water sampling programs included reconnaissance 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.

Site Description

Fluvial drainage systems in northern Mongolia belong mostly to the Arctic Ocean Basin (AOB), with the Selenge River Basin (SRB, total catchment area of 459,000 km²) being the major inflow to Lake Baikal. The Kharaa and Yeröö Rivers (39,858 km²) originate in the Khentii Mountains in northern Mongolia and flow north- northwest joining the Orkhon River within the greater Selenge river basin (Figure 1). The boundaries and catchment sizes of the individual river basins are shown in Figure 2.

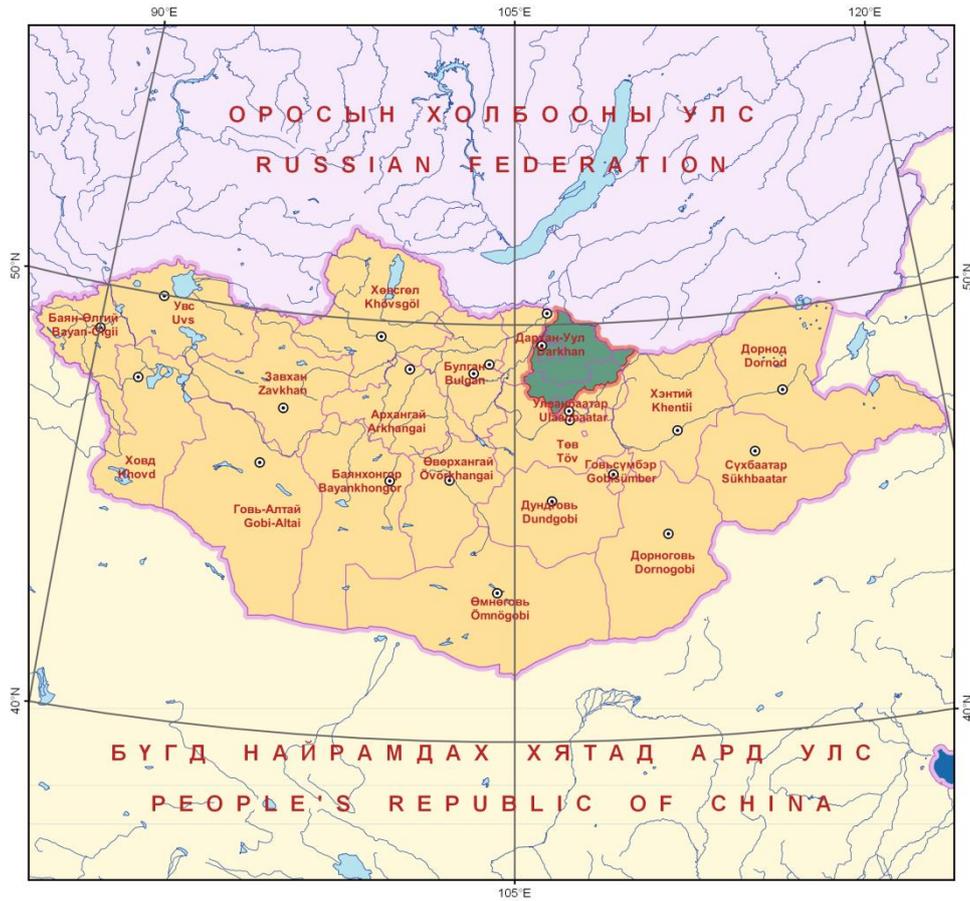


Figure 1: Location of the Kharaa Yeröö River Basin [1]

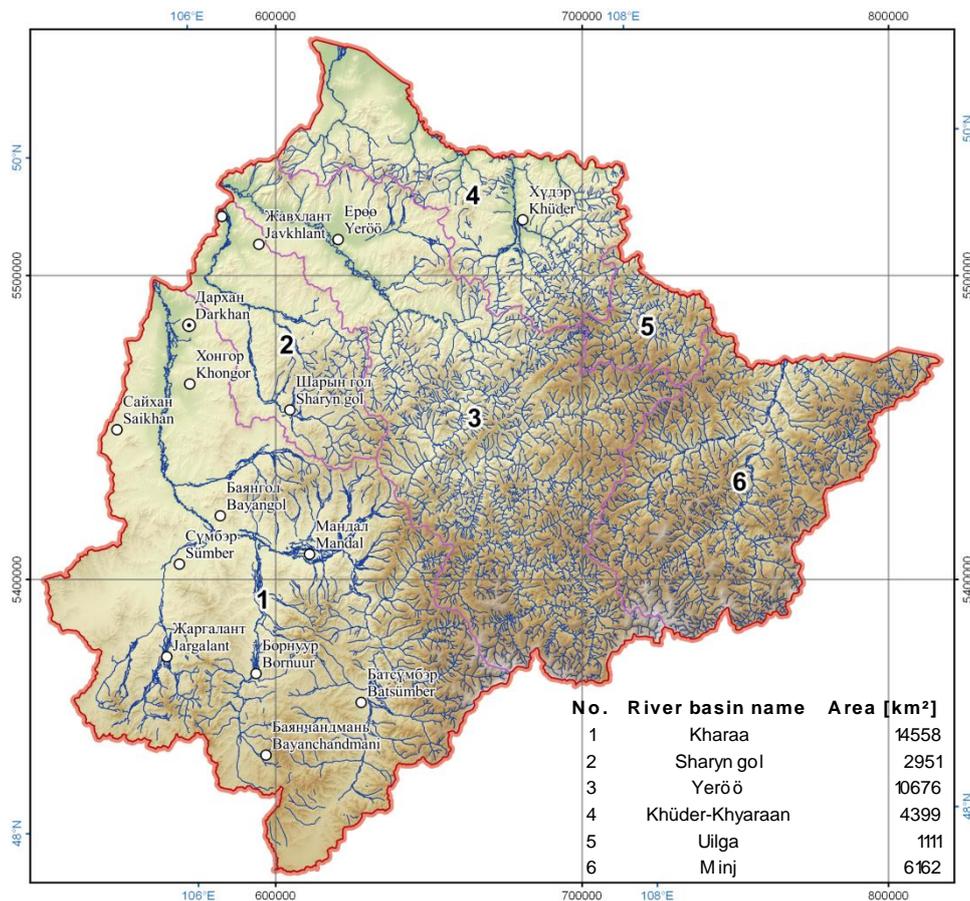


Figure 2: Hydrological catchments and river networks of the Kharaa Yeröö River Basin [1]

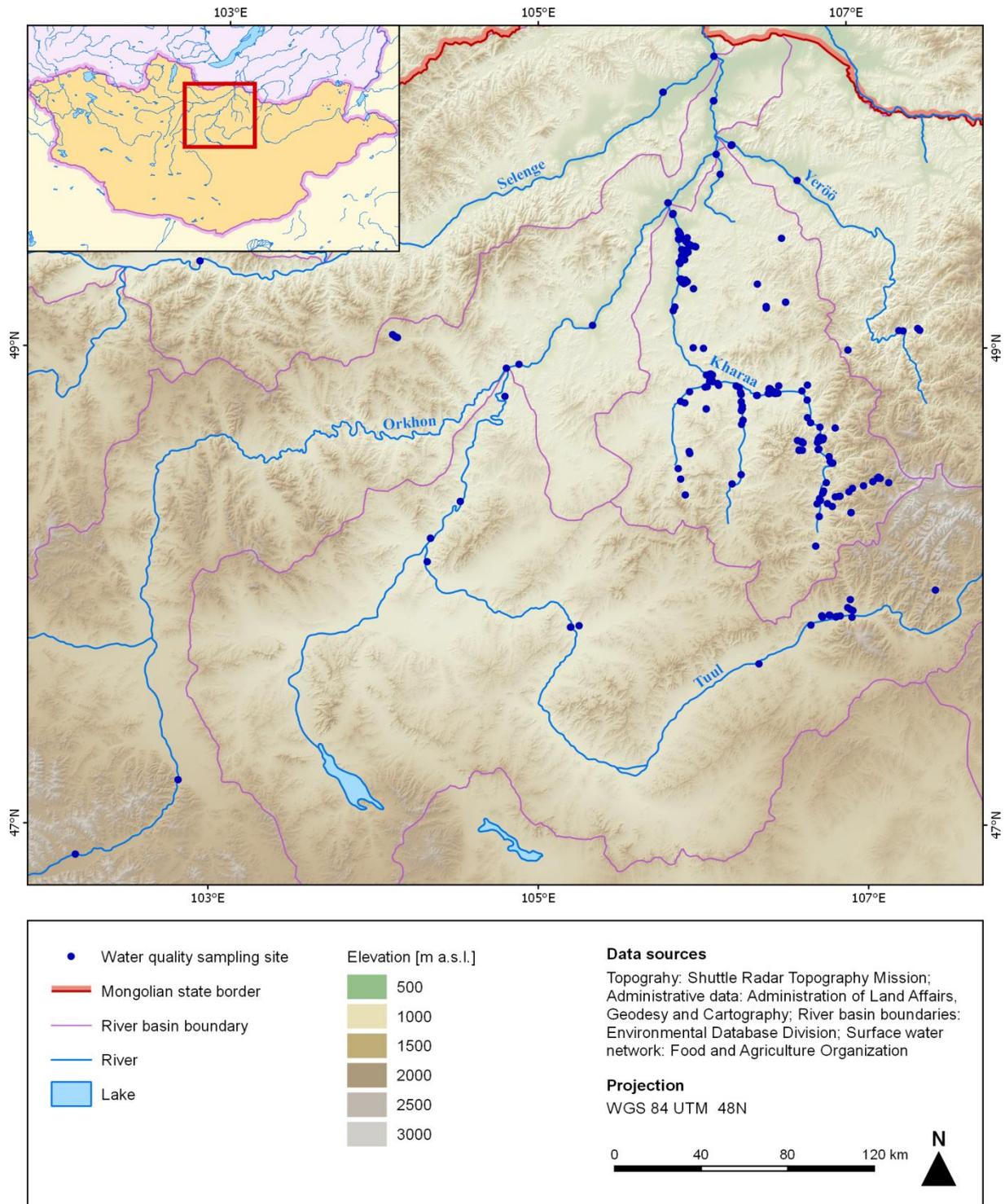


Figure 3: Location of water quality sampling sites within the Kharaa Yeröö River Basin [1]

An example of physical and chemical measurements (mean \pm SD) of the automatic water quality monitoring stations from upstream, midstream to downstream across Kharaa river is given in Table 1.

Table 1: Physical and chemical measurements (mean \pm SD) of the automatic water quality monitoring stations at Sugnuur (Khentii reference), Baruunkharaa (Middle/Lower Kharaa) and Buren Tolgoi (Lower Kharaa) for the vegetation period (May to October) in 2012

Station Primary Code ID	Sugnuur Sel_Kh03_009	Baruunkharaa Sel_Kh10_012	Buren Tolgoi Sel_Kh10_001
Temperature (°C)	7.1 \pm 3.9	12.9 \pm 5.3	14.8 \pm 6.2
Conductivity ($\mu\text{S}\cdot\text{cm}^{-1}$)	41.7 \pm 6.6	250.8 \pm 63.6	250.3 \pm 63.6
pH	7.19 \pm 0.26	8.1 \pm 0.2	8.36 \pm 0.12
Oxygen saturation (%) *	99.8 \pm 3.1	95.0 \pm 9.5	98.6 \pm 4.7 *
Oxygen concentration ($\text{mg}\cdot\text{L}^{-1}$) *	10.6 \pm 1.2	9.3 \pm 1.4	8.9 \pm 1.1 *

*Oxygen measurements at station Buren Tolgoi were conducted only until mid of September 2012

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