Updates to INARCH Portion of GWFNet Catalogue

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GWFNet is an information resource and metadata catalogue on water research

GWFNet is a fully searchable, well-indexed **catalogue** of interrelated template-based records with information on datasets, data feeds, publications, models, model outputs, observatories, research sites, stations, and other information related to water research across the programs it serves: GWF, **INARCH**, GWF Observatories along with programs it has served in the past: MAGS, DRI, IP3, CCRN, along with information of a to-be-determined form in the future.

GWFNet allows information and data on water research from the past, present, and future from various possibly overlapping programs to be steadily accumulated, improved, organized (and re-organized), and interrelated through time.

Main Ideas Shaping GWFNet

Decentralized Data – For practical reasons it is best to keep our data decentralized into databases, data feeds, and repositories best suited for the research in question, and track this information through a central catalogue of data

Iterative Improvement – We prefer a flexible data system that can accommodate to-be-perfected and partial data so baseline information can be obtained without delay and enhanced later as time and improved knowledge become available.

Legacy – Process of refinement results a collection of (meta)data which improves with time and becomes tomorrow's legacy. A desirable "today's legacy is tomorrow's future" pattern is intrinsically established – which motivates quality and upkeep.

Continuity – Our collection of Water Research data is a "critical mass" constant which spans and survives intact across different programs (often overlapping each other) and decades, continuing to be relevant, referenced, and improved.

Information to be Tracked in GWFNet

What is out there:

- Research sites/stations
- Detailed inventories on instrumentation/equipment at sites/stations
- Programs/projects
- Data sources/dataset publications/paper publications

Where it is:

- Maps - locations, shapes, bounding boxes
- Repositories (Relational Databases, WISKI, FRDR, GitHub, Zenodo, DataStream, Compute Canada, Web Services)
- Under Embargo or Private (Instructions, “Go talk to Sam and arrange to obtain a copy”)

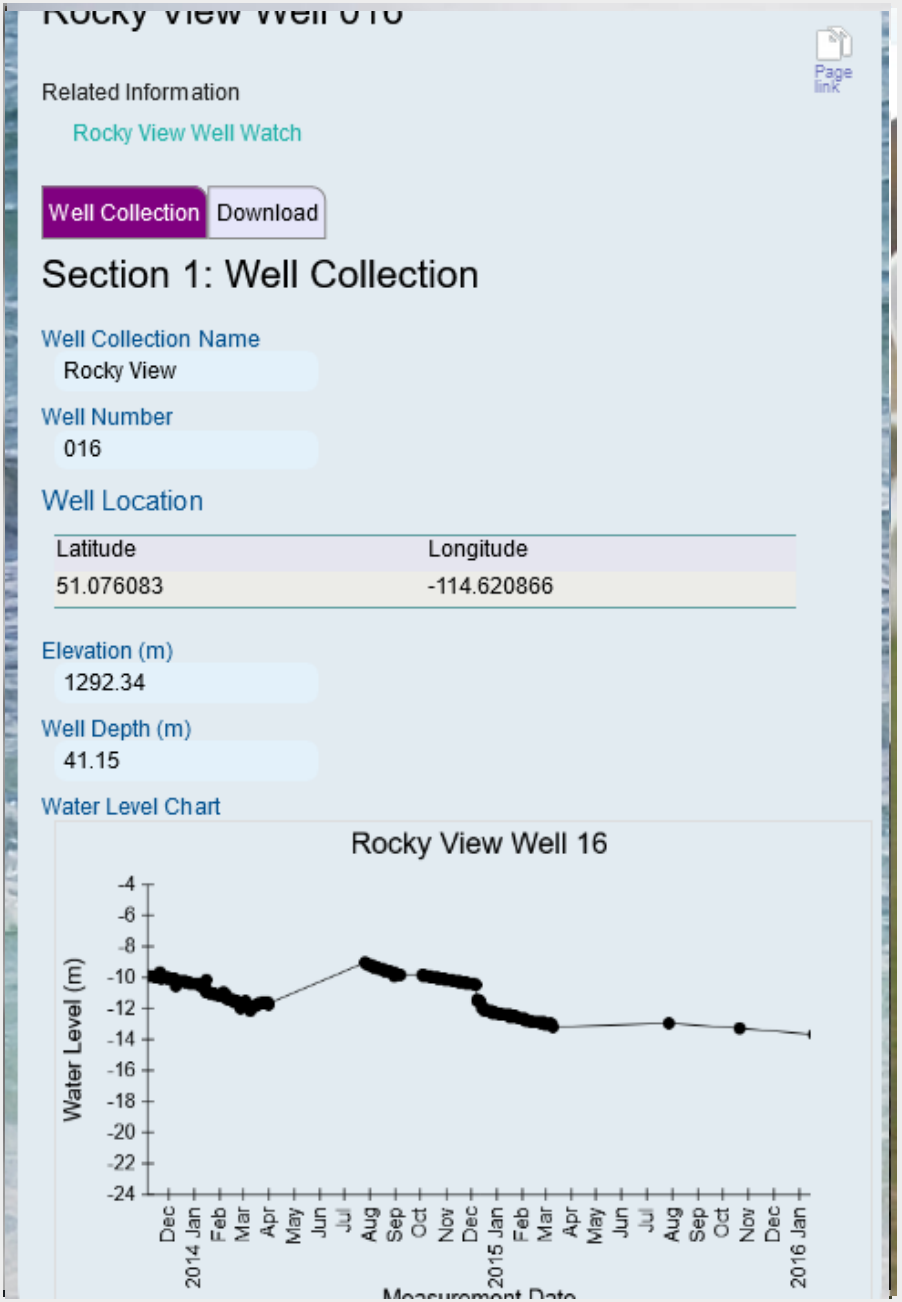
Who is responsible for or has it:

- Authorship, Technicians, Principal Investigators, Model users and creators

Context:

- Context through cross-referencing links and index records to relate above information together

GWFNet Catalogue



GWFNet is a data catalogue originally created for Global Water Futures (GWF) but will prevail well into the future to include and interrelate information from:

- programs prior to GWFO (e.g., MAGS, DRI, IP3, CCRN, INARCH ph1, GWF),
- current programs (e.g., GWF Synthesis/GWFO, INARCH ph2/COPE), and
- future programs (e.g., INARCH ph2, GWFO, Other contributors),

GWFNet contains cross-linked, well-**indexed** records (based on easily defined XML templates controlling visual appearance and database variable content) on:

- **observatories**, **research sites**, **stations**
- **models** -- descriptions, workflows, inputs, outputs, database requirements, links to source code, and extra information related to setup and operation
- **datasets, paper publications** -- including DOIs, authorship, abstracts, and download locations,
- **persons** associated with projects, data, datasets, models,
- **projects** within programs, (e.g., Mountain Water Futures within GWF),
- other record types, e.g., **videos** (e.g., locations, model usage, etc.),
- interactive **graphs** (GWFNet-2 to incorporate real-time data from live data sources), and
- any other types of records needed in future (simply add new record templates).
- records based on earlier templates can be transformed into records based on new templates at any time, and all information matching the new template is copied to the new record automatically

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        <Label>Longitude</Label>
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    <Row>
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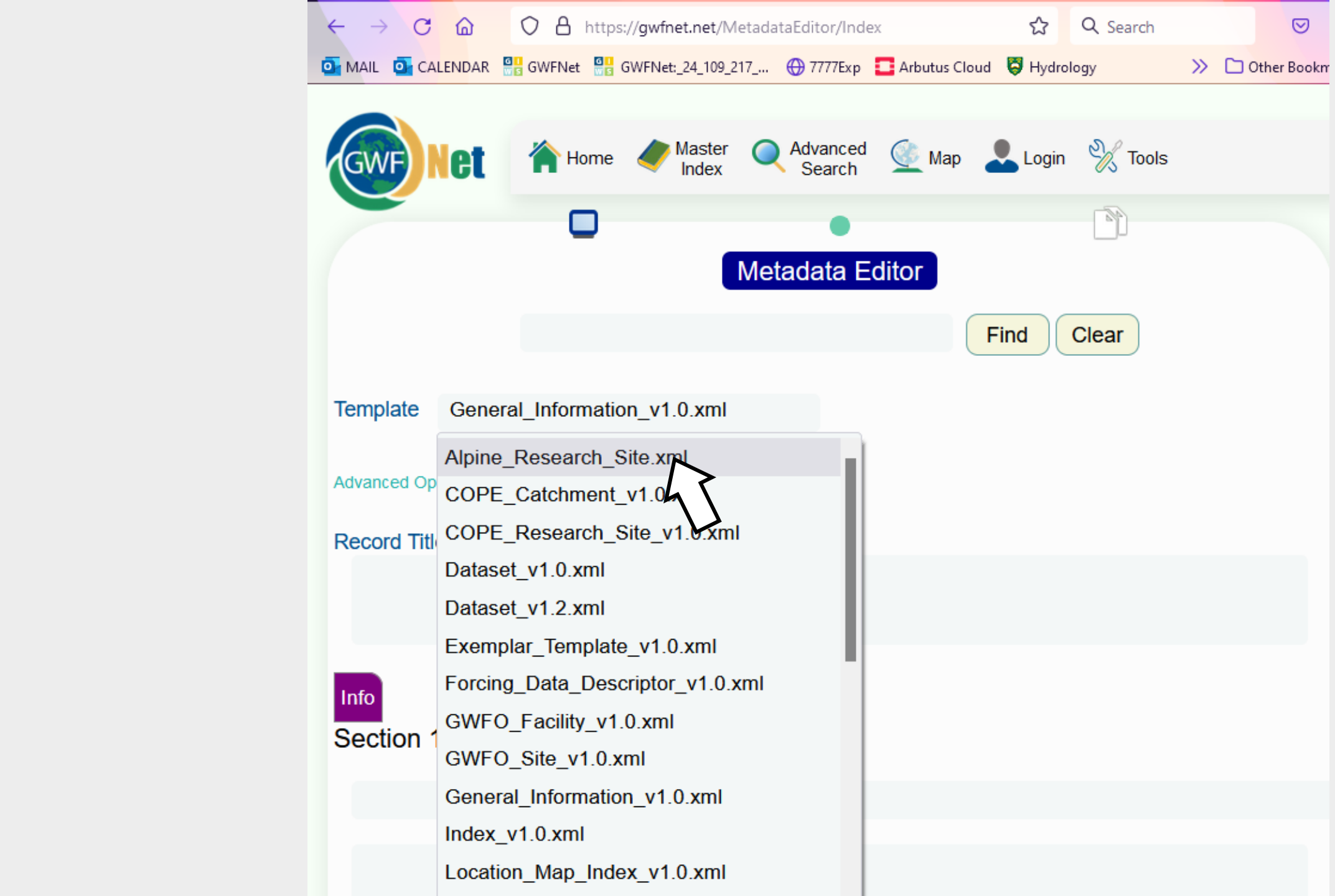
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Index_v1.0.xml
Location_Map_Index_v1.0.xml
Info

Metadata Editor

Find Clear

Template Alpine_Research_Site.xml

Alpine Research Site 1.0

Advanced Options

Record Title

Site Overview | Data and Observations | Map of Research Site

Section 1: Site Overview

Identity

Basin / Site Name	
Country; Province/State	

Basin / Site Name	
Country; Province/State	
Website (if available)	
Operational Management	

Oversight/Contacts

	Name	Role	Contact Information
^ X v			

Basin / Site Location (Centroid Coordinates)

Coordinate Format	Latitude	Longitude
Degrees Minutes Seconds		
Decimal Degrees		

Purpose / Scientific Focus

Purpose / Scientific Focus

Basin / Site Characteristics

Location (Physiographic Region)	
Area (km2)	
Elevation (m; Mean, Maximum, Minimum)	
Description (Physical–Ecological–Climatic Characteristics)	
Drainage / River System	
Site History or Historical Context	

Metadata Editor

Find Clear

Template Alpine_Research_Site.xml

Alpine Research Site 1.0

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Basin / Site Name	
Country; Province/State	

Metadata Editor

Find | Clear

Template: Alpine_Research_Site.xml
Alpine Research Site 1.0

Advanced Options

Record Title

Site Overview | Data and Observations | Map of Research Site

Section 2: Data and Observations

Available Geospatial Data

Digital Elevation Model	

Site Overview | Data and Observations | Map of Research Site

Section 2: Data and Observations

Available Geospatial Data

Digital Elevation Model	
Landcover and Soils	
Stream/River Network	
Basin Delineation / Shapefile	

Observation Stations

	Type	Station Name	Latitude	Longitude	Elevation	N
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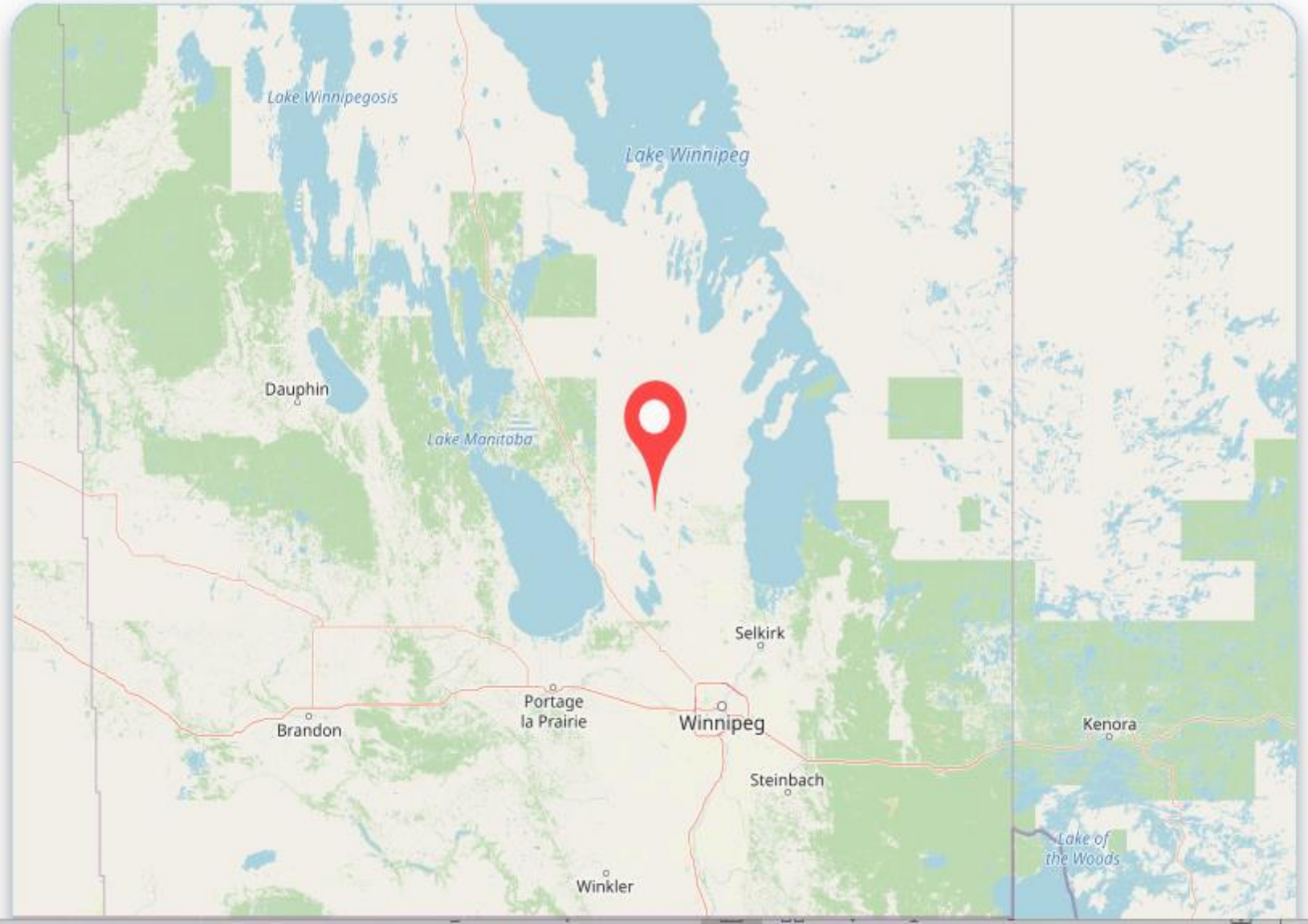
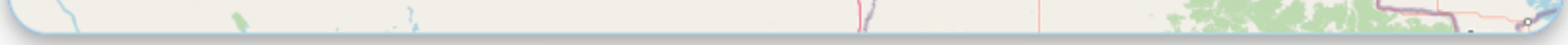
Site Overview | Data and Observations | Map of Research Site

Section 3: Map of Research Site

Map of Research Site





Toggle Interactive

- +

Center Reset

Display Default

View on Global Map

Description:

Latitude:

Longitude:

Clear Lat/Long

Classification:

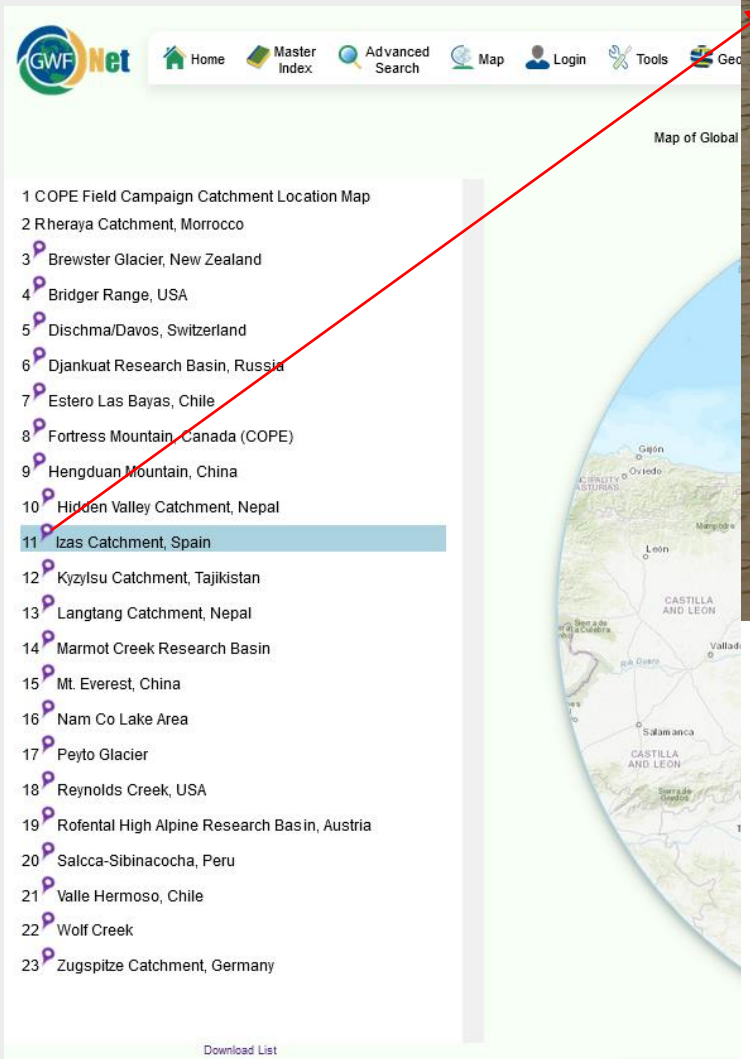
Subclassification:

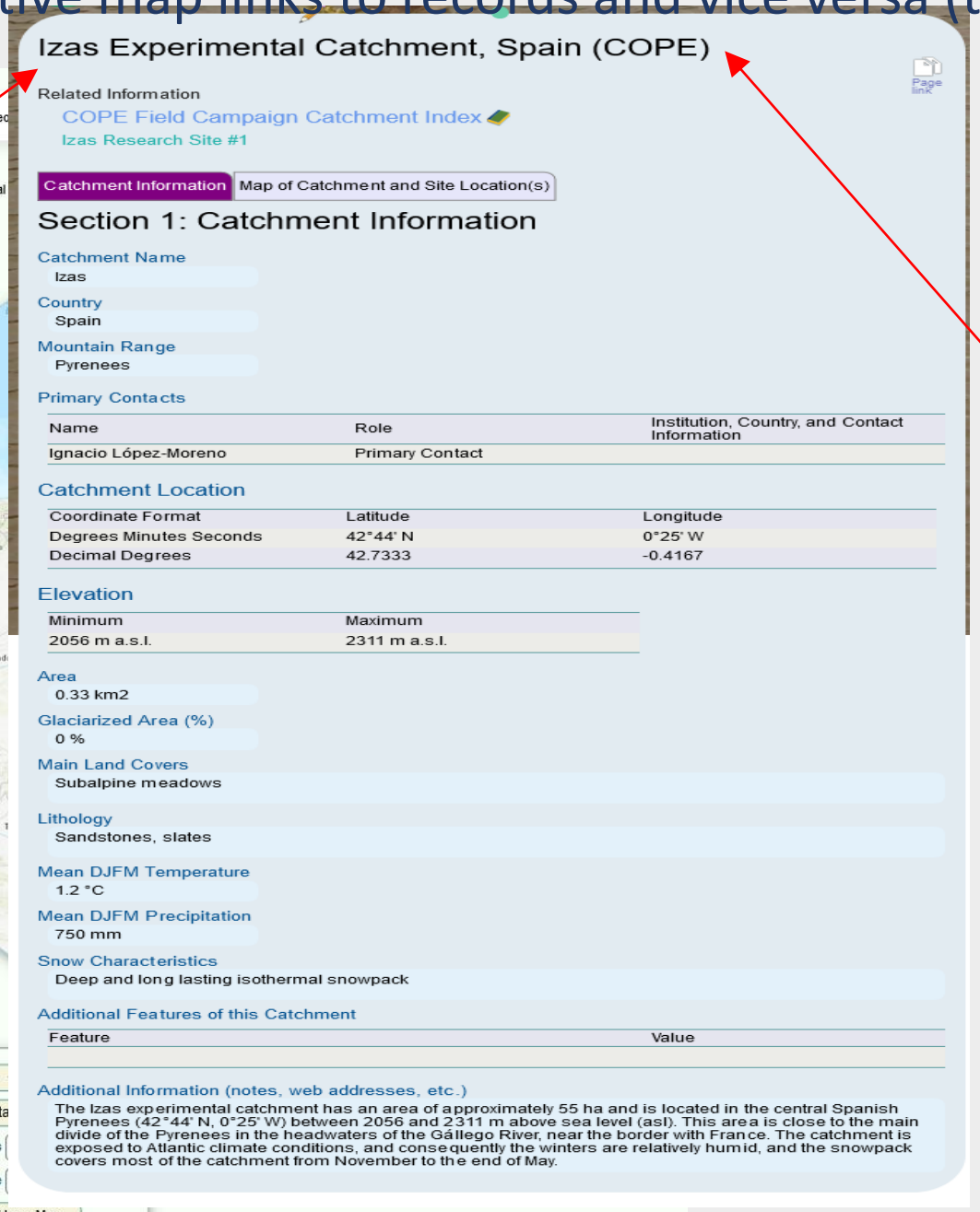
Regions, Bounding Boxes, and Pins:

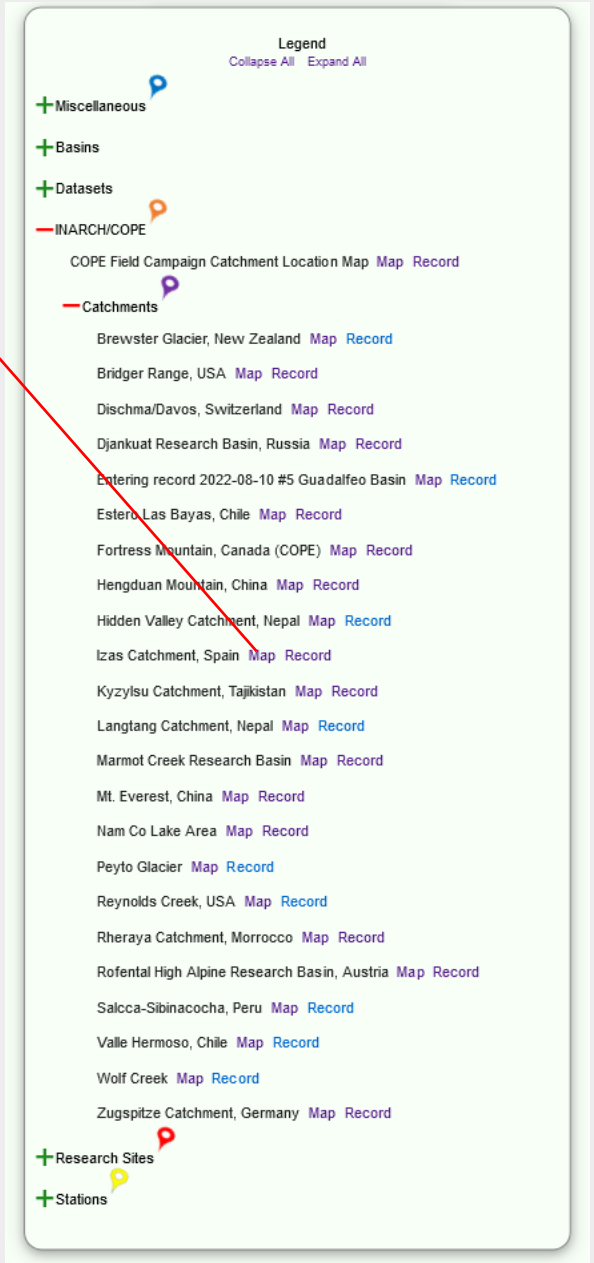
GWF Net

Home | Master Index | Advanced Search | Map | Login | Tools

GWFNet Catalogue – Interactive map links to records and vice versa (two-way interaction)

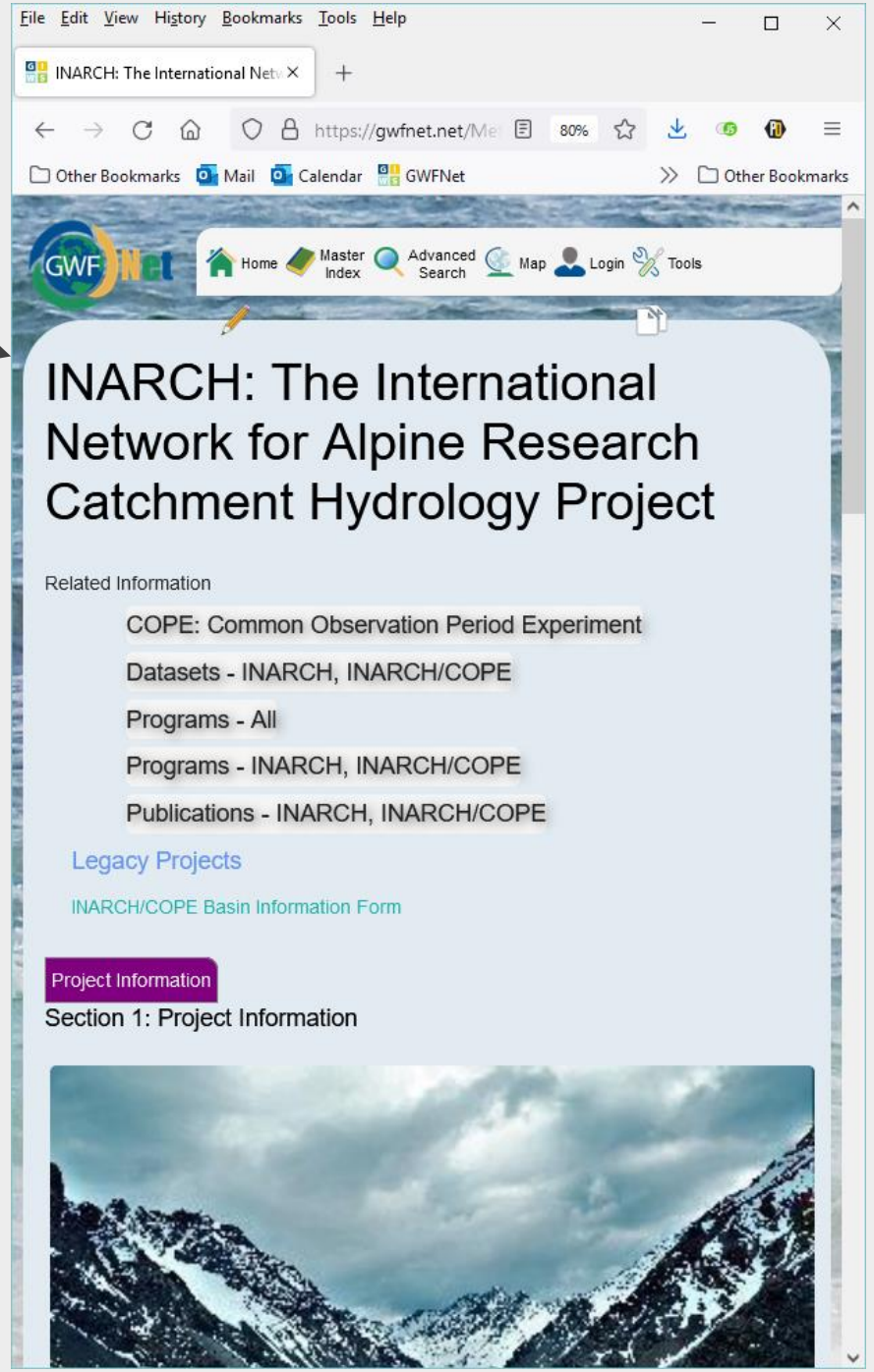






GWFNet and INARCH/COPE

gwfnet.net/inarch

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Canada's Data Catalogue for Everything Water
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Example: Caraboo Alpine Mesonet
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Search-engine Algorithm
Search
Master Index
World Map
Advanced Search
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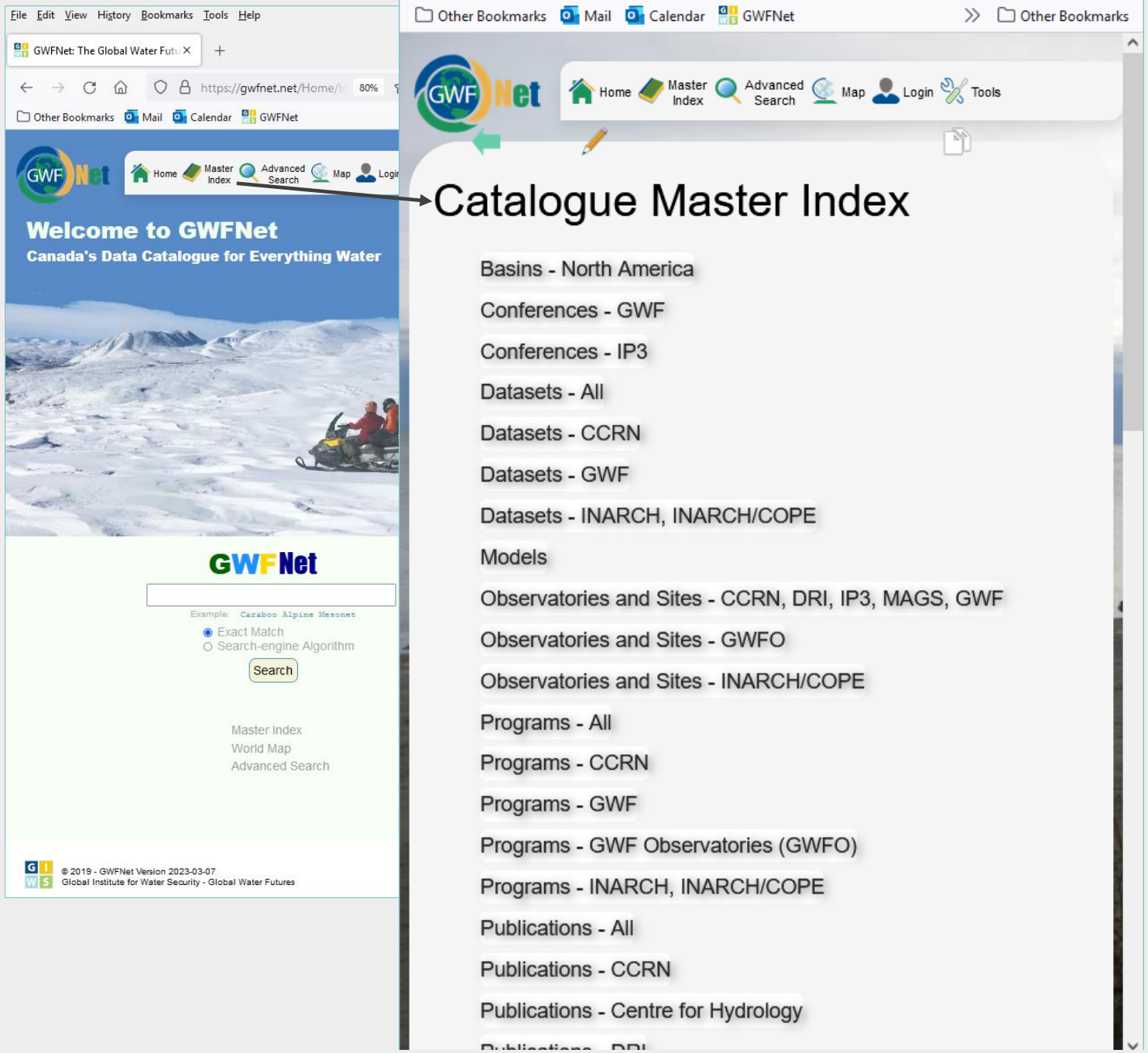
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Tools
Catalogue Master Index
Basins - North America
Conferences - GWF
Conferences - IP3
Datasets - All
Datasets - CCRN
Datasets - GWF
Datasets - INARCH, INARCH/COPE
Models
Observatories and Sites - CCRN, DRI, IP3, MAGS, GWF
Observatories and Sites - GWFO
Observatories and Sites - INARCH/COPE
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Programs - CCRN
Programs - GWF
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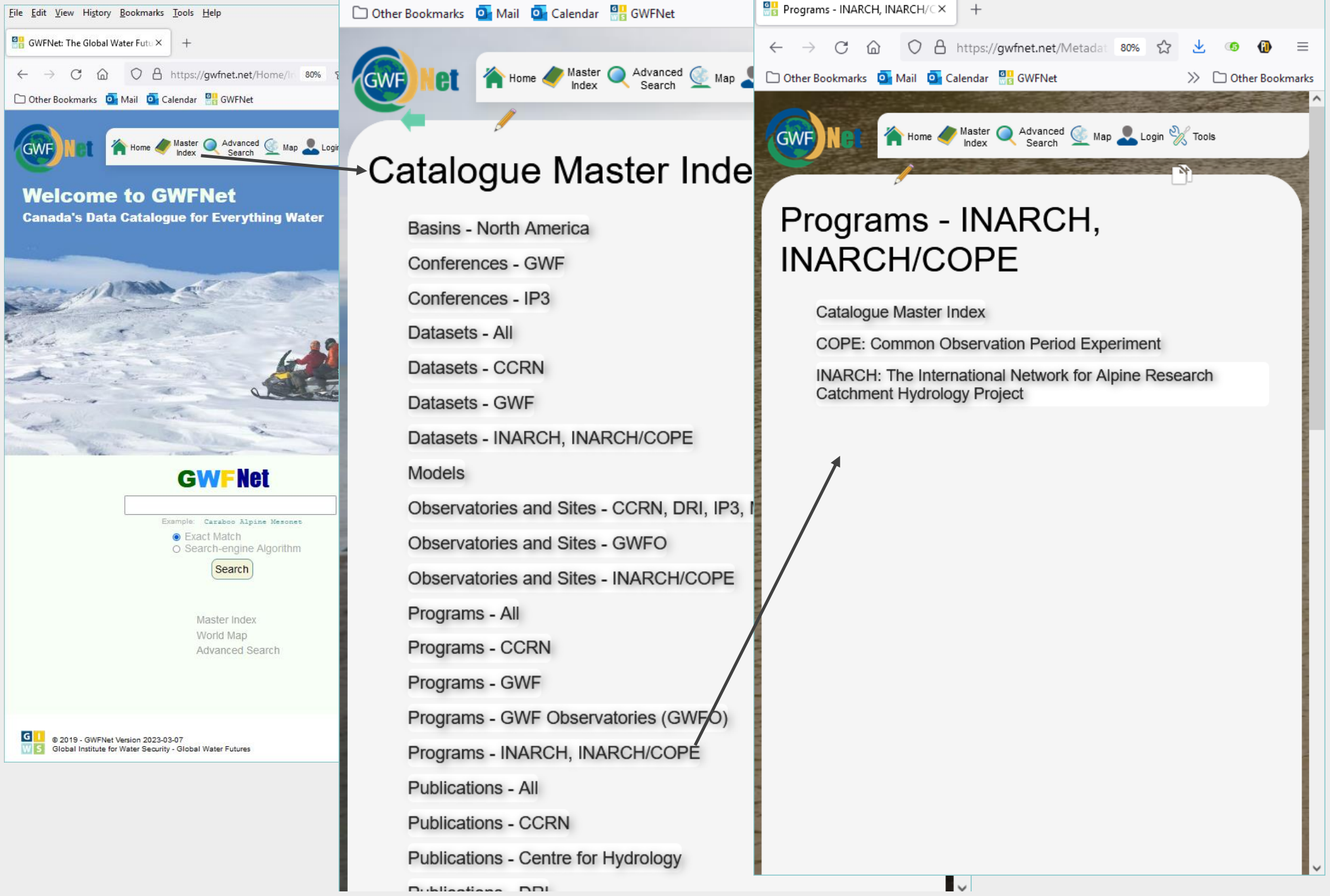
Programs - INARCH, INARCH/COPE
Publications - All
Publications - CCRN
Publications - Centre for Hydrology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Conferences - IP3
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Observatories and Sites - GWFO
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Programs - All
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Programs - GWF Observatories (GWFO)
Programs - INARCH, INARCH/COPE
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Publications - CCRN
Publications - Centre for Hydrology
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Programs - INARCH, INARCH/COPE
Catalogue Master Index
COPE: Common Observation Period Experiment
INARCH: The International Network for Alpine Research Catchment Hydrology Project

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INARCH: The International Net

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INARCH: The International Network for Alpine Research Catchment Hydrology Project

Related Information

- COPE: Common Observation Period Experiment
- Datasets - INARCH, INARCH/COPE
- Programs - All
- Programs - INARCH, INARCH/COPE
- Publications - INARCH, INARCH/COPE

Legacy Projects

INARCH/COPE Basin Information Form

Project Information

Section 1: Project Information

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Programs - INARCH, INARCH/C

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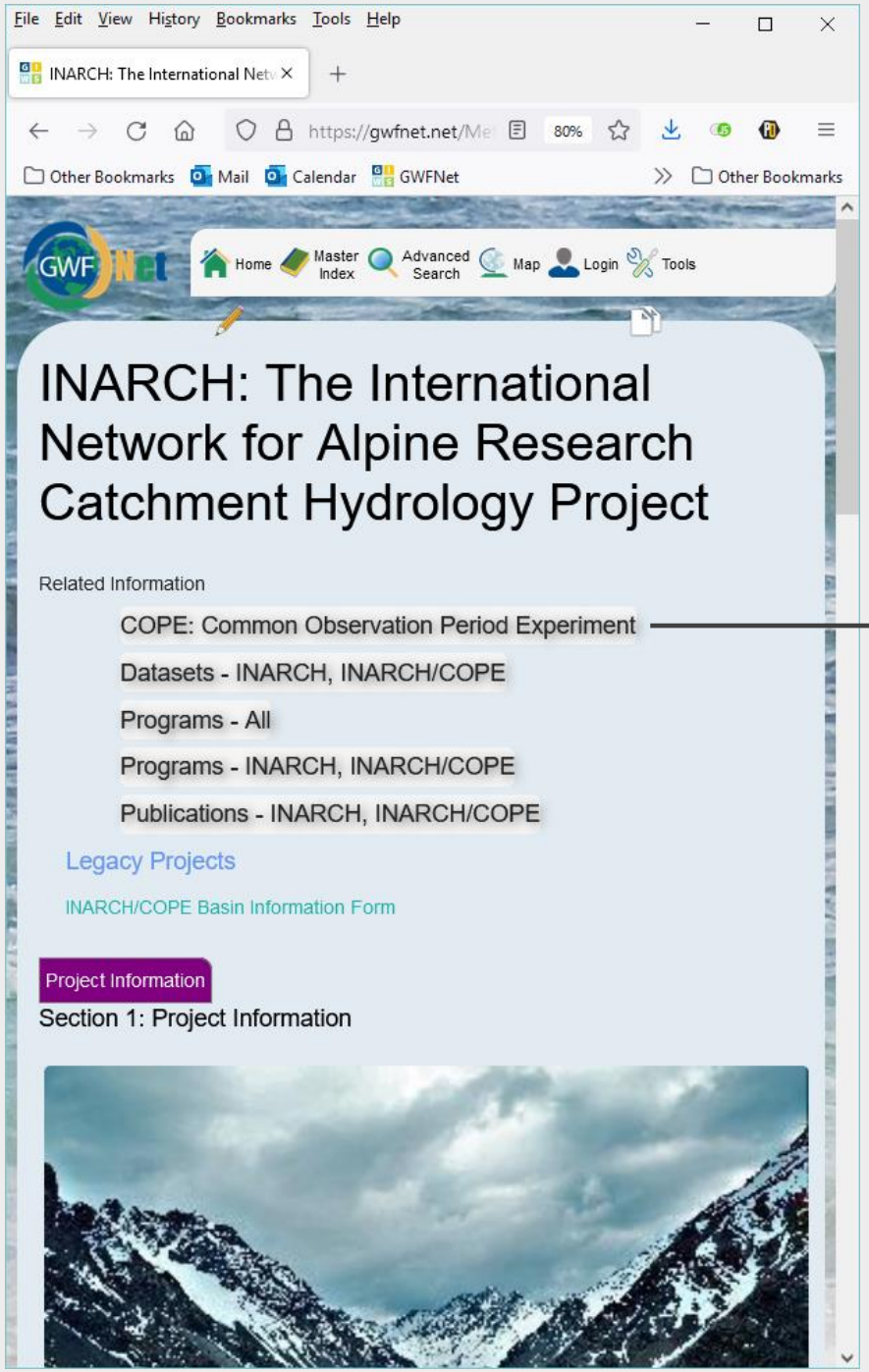
Programs - INARCH, INARCH/COPE

- Catalogue Master Index
- COPE: Common Observation Period Experiment
- INARCH: The International Network for Alpine Research Catchment Hydrology Project



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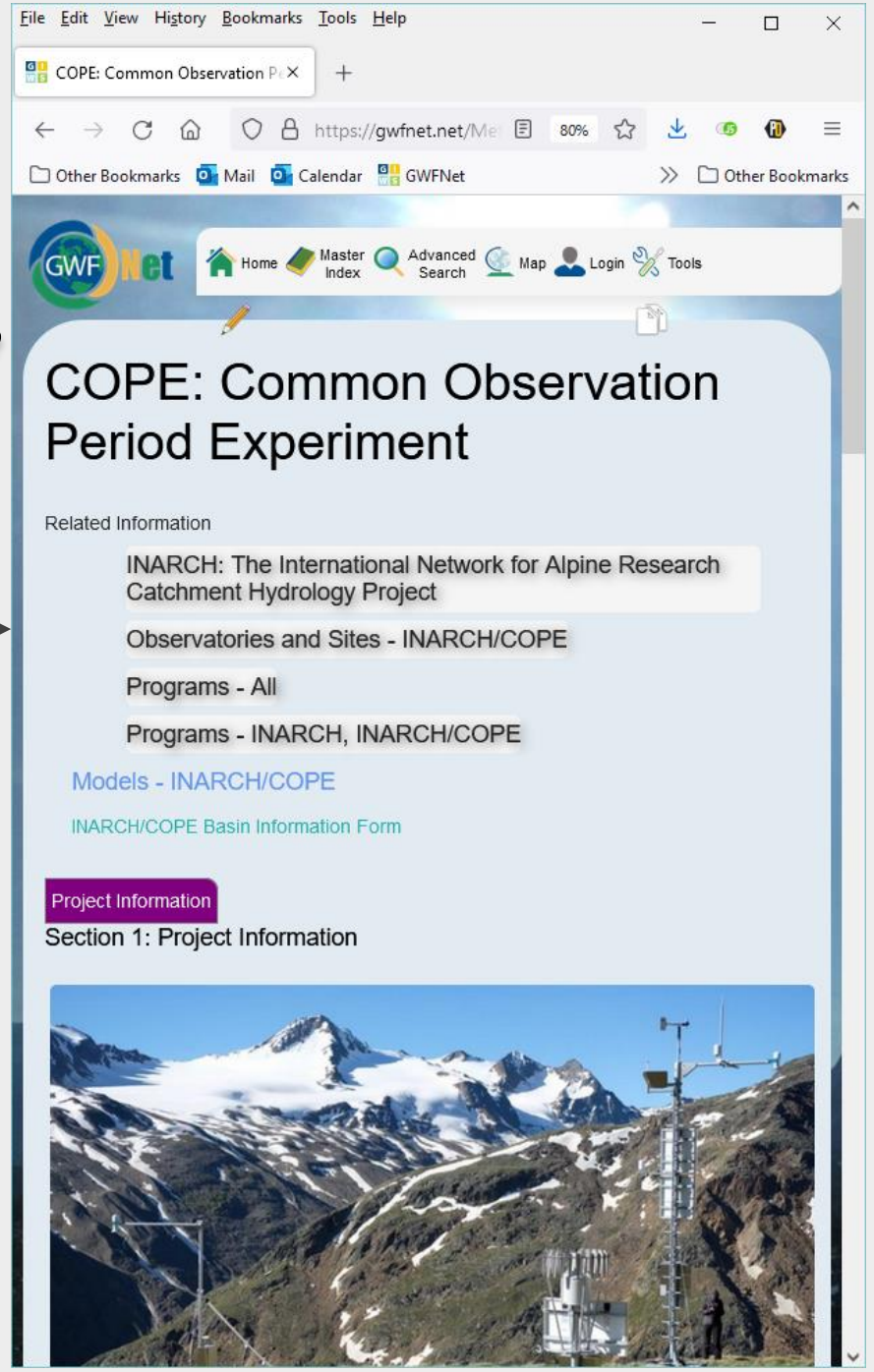

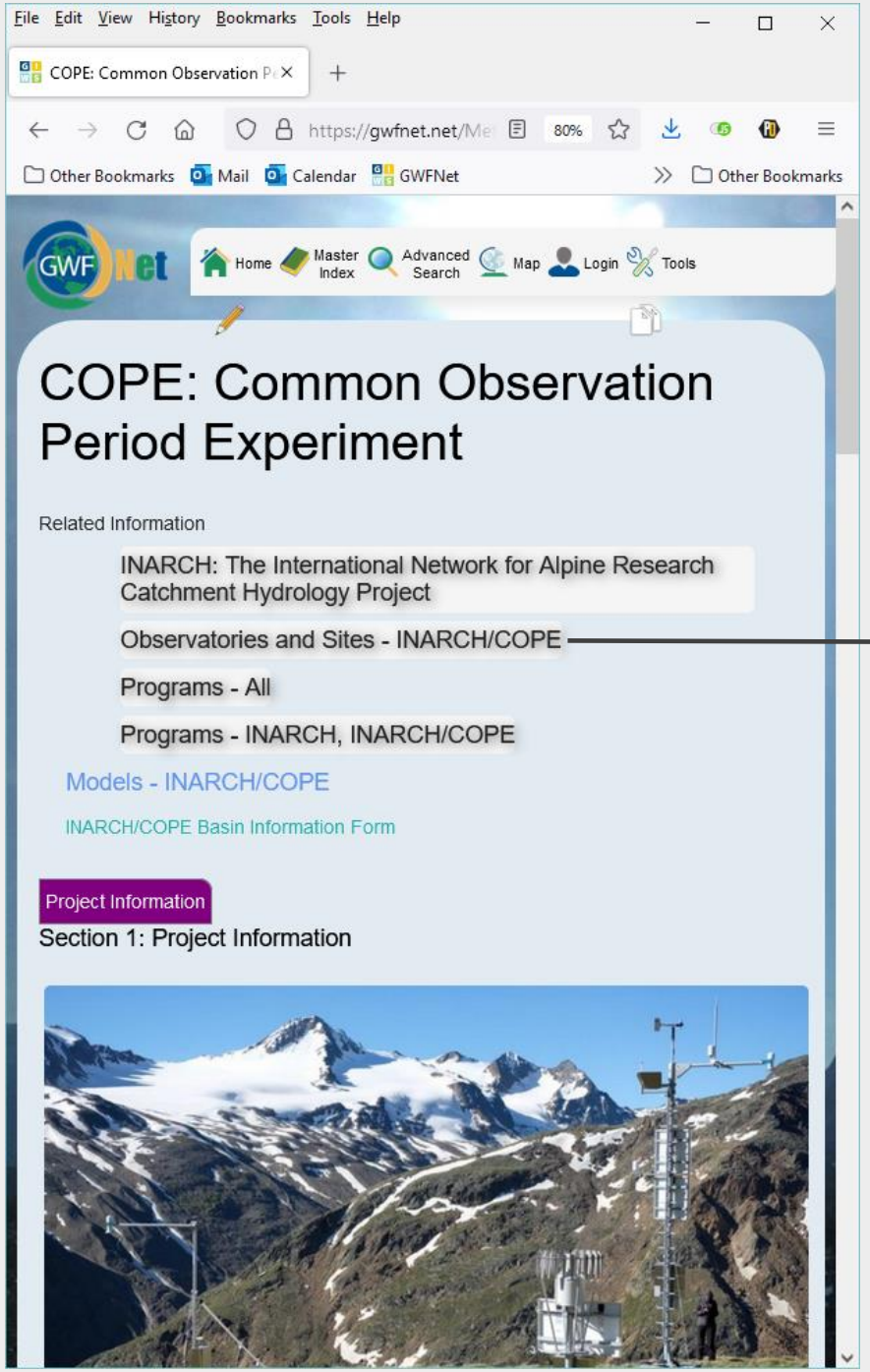
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Related Information
INARCH: The International Network for Alpine Research Catchment Hydrology Project
Observatories and Sites - INARCH/COPE
Programs - All
Programs - INARCH, INARCH/COPE
Models - INARCH/COPE
INARCH/COPE Basin Information Form
Project Information
Section 1: Project Information


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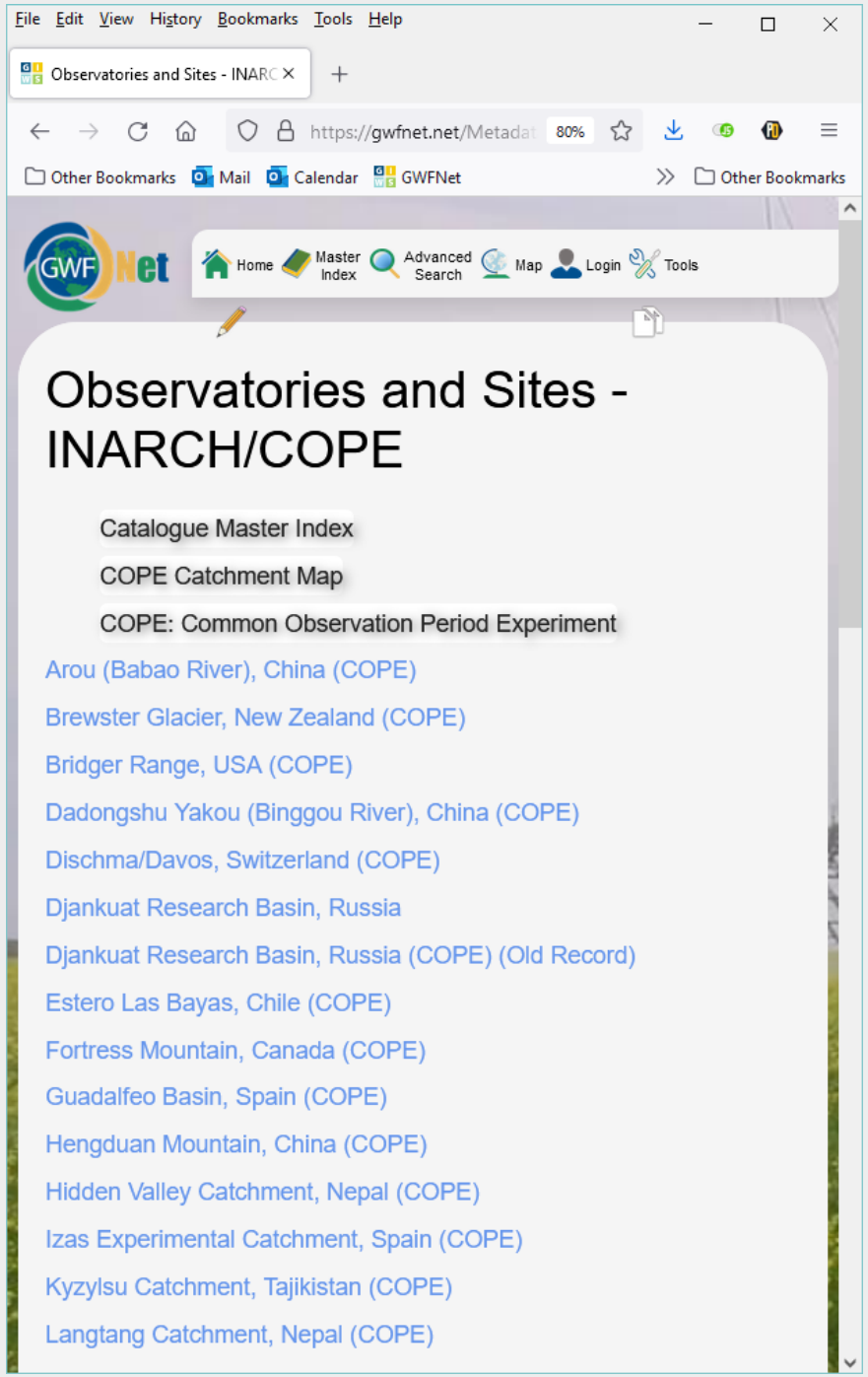
COPE Catchment Map
COPE: Common Observation Period Experiment
Arou (Babao River), China (COPE)
Brewster Glacier, New Zealand (COPE)
Bridger Range, USA (COPE)
Dadongshu Yakou (Binggou River), China (COPE)
Dischma/Davos, Switzerland (COPE)
Djankuat Research Basin, Russia
Djankuat Research Basin, Russia (COPE) (Old Record)
Estero Las Bayas, Chile (COPE)
Fortress Mountain, Canada (COPE)
Guadalfeo Basin, Spain (COPE)
Hengduan Mountain, China (COPE)
Hidden Valley Catchment, Nepal (COPE)
Izas Experimental Catchment, Spain (COPE)
Kyzylsu Catchment, Tajikistan (COPE)
Langtang Catchment, Nepal (COPE)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Bridger Range, USA (COPE)
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Dischma/Davos, Switzerland (COPE)
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Djankuat Research Basin, Russia (COPE) (Old Record)
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Fortress Mountain, Canada (COPE)
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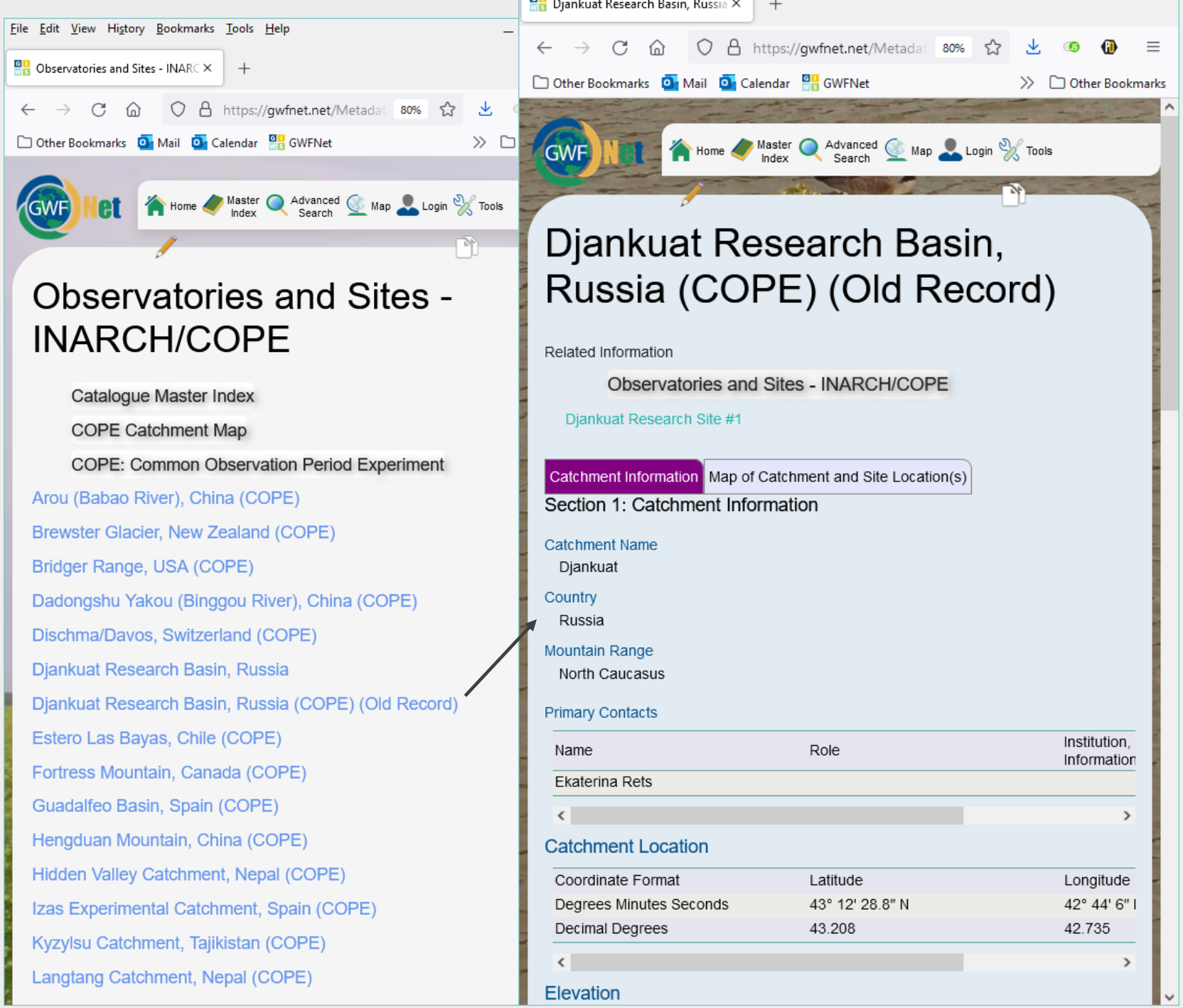
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Related Information
Observatories and Sites - INARCH/COPE
Djankuat Research Site #1
Catchment Information
Map of Catchment and Site Location(s)
Section 1: Catchment Information
Catchment Name
Djankuat
Country
Russia
Mountain Range
North Caucasus
Primary Contacts
Name
Role
Institution, Information
Ekaterina Rets
Catchment Location
Coordinate Format
Latitude
Longitude
Degrees Minutes Seconds
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42° 44' 6" I
Decimal Degrees
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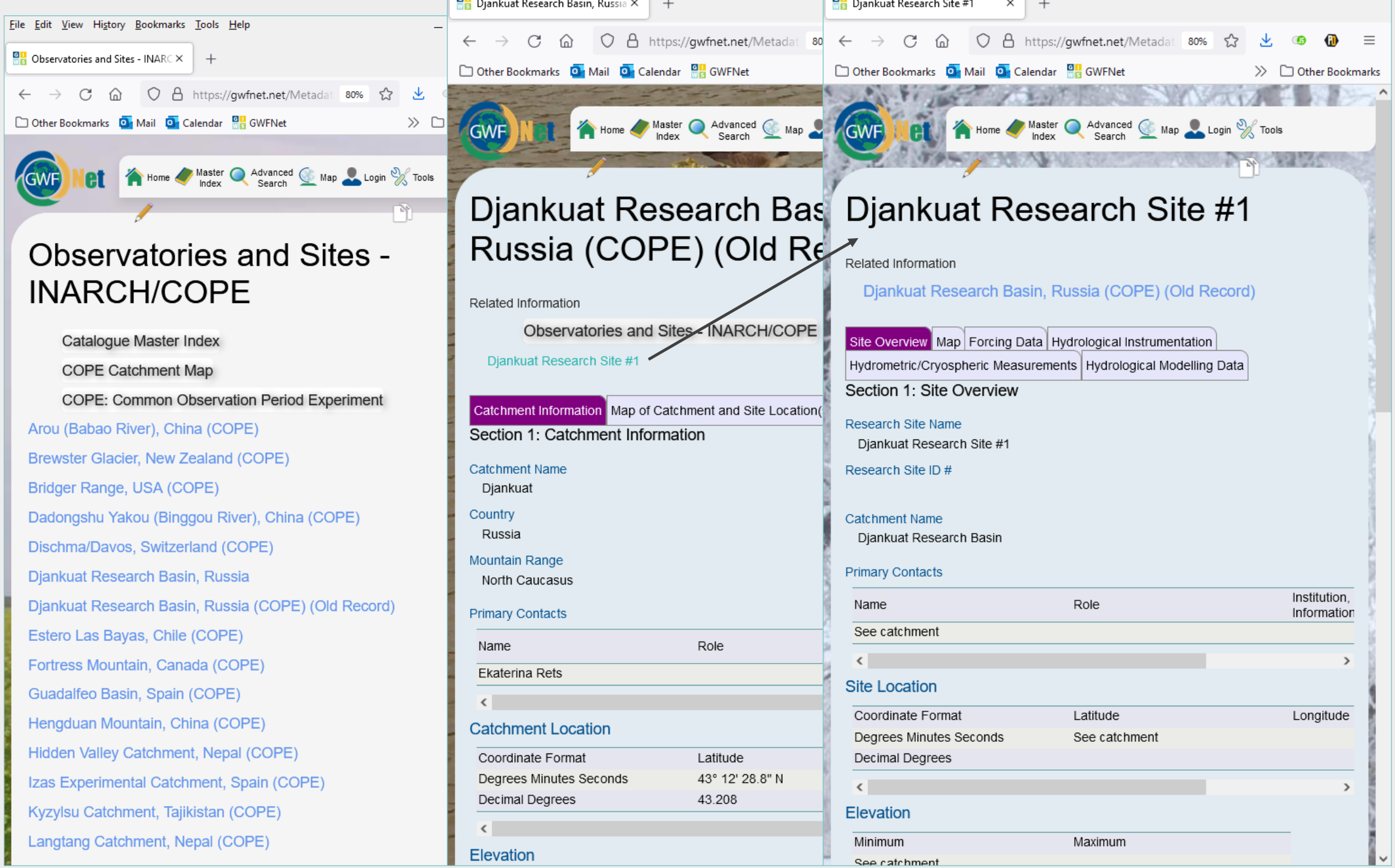
42.735
Elevation


Observatories and Sites - INARCH/COPE
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Section 1: Catchment Information
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Djankuat
Country
Russia
Mountain Range
North Caucasus
Primary Contacts
Name
Role
Ekaterina Rets
Catchment Location
Coordinate Format
Latitude
Degrees Minutes Seconds
43° 12' 28.8" N
Decimal Degrees
43.208
Elevation
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Research Site ID #
Catchment Name
Djankuat Research Basin
Primary Contacts
Name
Role
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Site Location
Coordinate Format
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Longitude
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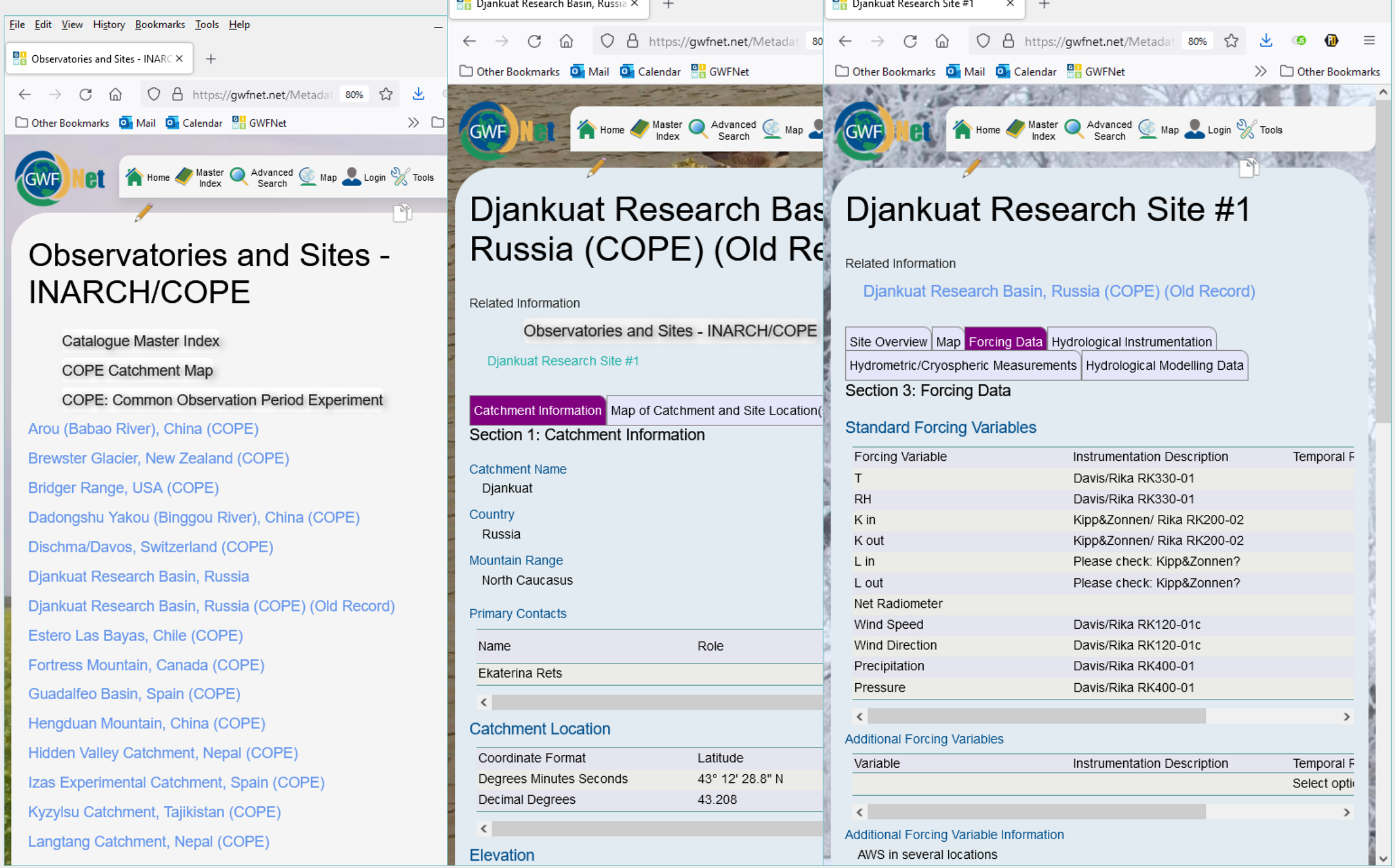
Decimal Degrees
Elevation
Minimum
Maximum
See catchment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Hydrological Modelling Data
Section 3: Forcing Data
Standard Forcing Variables
Forcing Variable
Instrumentation Description
Temporal F
T
Davis/Rika RK330-01
RH
Davis/Rika RK330-01
K in
Kipp&Zonnen/ Rika RK200-02
K out
Kipp&Zonnen/ Rika RK200-02
L in
Please check: Kipp&Zonnen?
L out
Please check: Kipp&Zonnen?
Net Radiometer
Wind Speed
Davis/Rika RK120-01c
Wind Direction
Davis/Rika RK120-01c
Precipitation
Davis/Rika RK400-01
Pressure
Davis/Rika RK400-01
Additional Forcing Variables
Variable
Instrumentation Description
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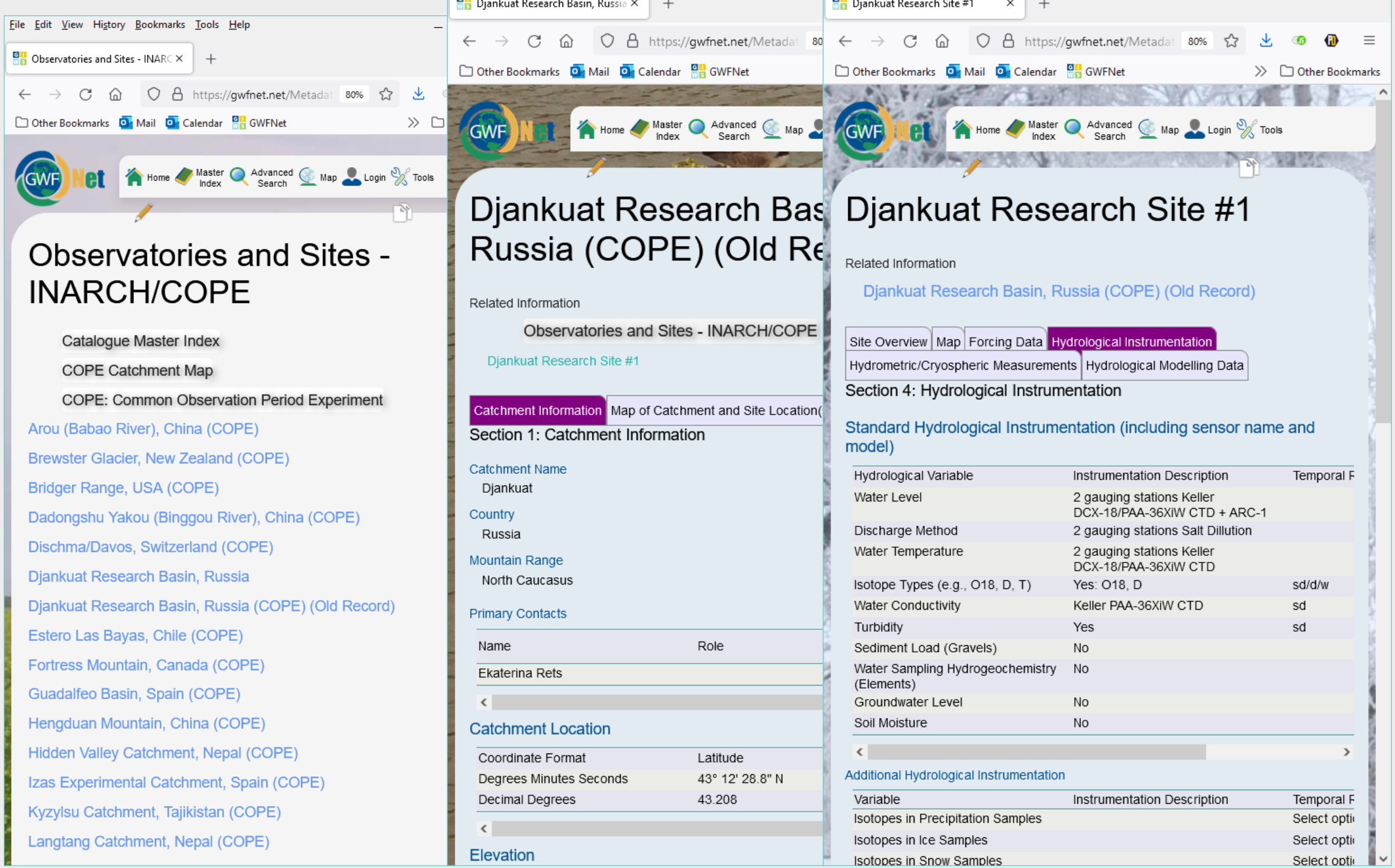
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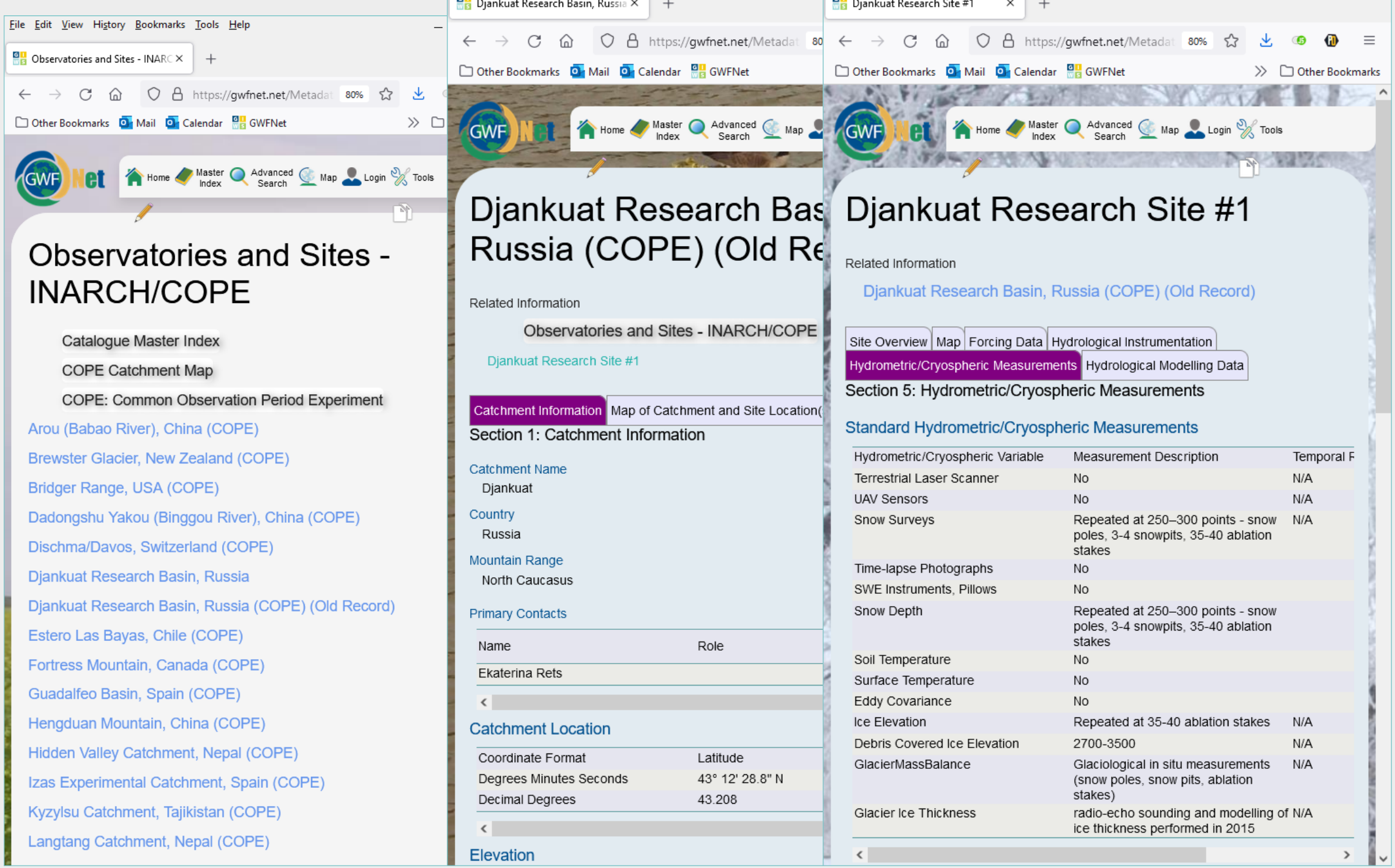
Section 4: Hydrological Instrumentation
Standard Hydrological Instrumentation (including sensor name and model)
Hydrological Variable
Instrumentation Description
Temporal F
Water Level
2 gauging stations Keller DCX-18/PAA-36XiW CTD + ARC-1
Discharge Method
2 gauging stations Salt Dillution
Water Temperature
2 gauging stations Keller DCX-18/PAA-36XiW CTD
Isotope Types (e.g., O18, D, T)
Yes: O18, D
sd/d/w
Water Conductivity
Keller PAA-36XiW CTD
sd
Turbidity
Yes
sd
Sediment Load (Gravels)
No
Water Sampling Hydrogeochemistry (Elements)
No
Groundwater Level
No
Soil Moisture
No
Additional Hydrological Instrumentation
Variable
Instrumentation Description
Temporal F
Isotopes in Precipitation Samples
Isotopes in Ice Samples
Isotopes in Snow Samples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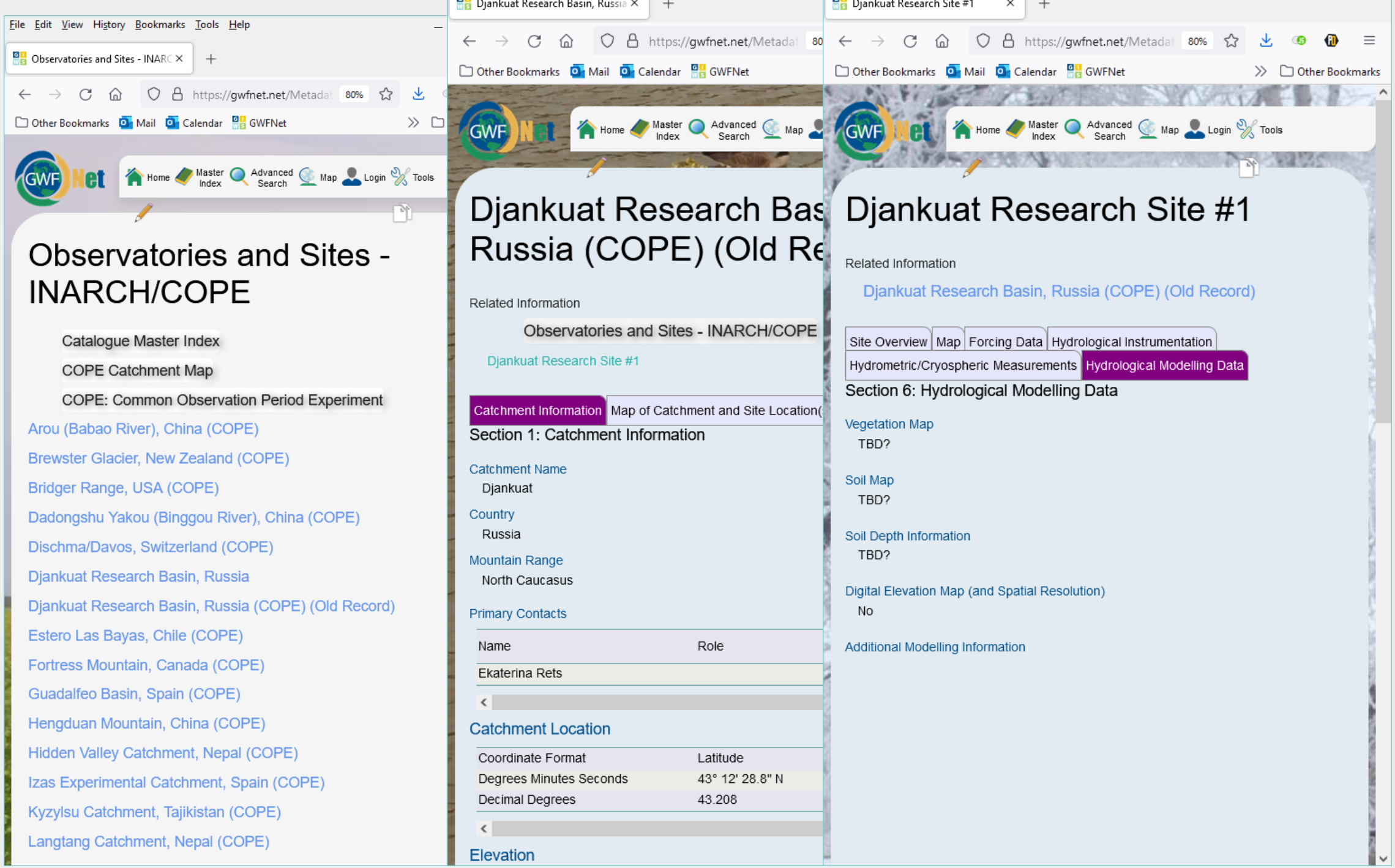
Hydrometric/Cryospheric Variable
Measurement Description
Temporal F
Terrestrial Laser Scanner
No
N/A
UAV Sensors
No
N/A
Snow Surveys
Repeated at 250–300 points - snow poles, 3-4 snowpits, 35-40 ablation stakes
N/A
Time-lapse Photographs
No
SWE Instruments, Pillows
No
Snow Depth
Repeated at 250–300 points - snow poles, 3-4 snowpits, 35-40 ablation stakes
Soil Temperature
No
Surface Temperature
No
Eddy Covariance
No
Ice Elevation
Repeated at 35-40 ablation stakes
N/A
Debris Covered Ice Elevation
2700-3500
N/A
GlacierMassBalance
Glaciological in situ measurements (snow poles, snow pits, ablation stakes)
N/A
Glacier Ice Thickness
radio-echo sounding and modelling of ice thickness performed in 2015
N/A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Section 6: Hydrological Modelling Data
Vegetation Map
TBD?
Soil Map
TBD?
Soil Depth Information
TBD?
Digital Elevation Map (and Spatial Resolution)
No
Additional Modelling Information

INARCH/COPE Basin Information Form

Related Information

COPE: Common Observation Period Experiment

INARCH: The International Network for Alpine Research Catchment Hydrology Project

Info

Section 1: Info

Basin Information Form

Please use the blank Basin Information Form and complete as much information for your basin as you can.
An example form completed for Wolf Creek has also been provided in the links below.
Thank you for your participation in INARCH/COPE.
The most up-to-date version of the form will always be available from this page
www.gwfnet.net/basin_information_form

Please return yourcompleted Basin Information Form to the INARCH/COPE Secretariate (for primary review by the Science Manager, Chris DeBeer) and the Data Management Team lead, Stephen O'Hearn:
Chirs.DeBeer@usask.ca
Stephen.OHearn@usask.ca

Blank Form
www.gwfnet.net/fileserver/T-2023-10-05-d3d1FE4ThllUqjbVq00Gqsyg/INARCH_COPE_Basin_Information_Form_Rev202306.docx

Exemplar (Wolf Creek)
www.gwfnet.net/fileserver/T-2023-10-05-d3d1FE4ThllUqjbVq00Gqsyg/INARCH_COPE_Basin_Information_Form_Exemplar-Wolf_Creek-2023-05.docx

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Related Information

INARCH: The International Net Catchment Hydrology Project

Observatories and Sites - INAR

Programs - All

Programs - INARCH, INARCH/

Models - INARCH/COPE

INARCH/COPE Basin Information Form

Project Information

Section 1: Project Information

INARCH/COPE I Information Form

Related Information

COPE: Common Observatio

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Info

Section 1: Info

Basin Information Form

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www.gwfnet.net/basin_information_form

Please return yourcompleted Basin Informa Secretariate (for primary review by the Scie Management Team lead, Stephen O'Hearn
Chirs.DeBeer@usask.ca
Stephen.OHearn@usask.ca

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Exemplar (Wolf Creek)
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INARCH Basin/Site Information Form

Basin/Site Name

Country; Province/State

Website (If Available)

Operational Management

Basin/Site Location (Centroid Coordinates)

Coordinate Format Decimal Degrees	Latitude	Longitude

Oversight/Contacts

Name	Role	Contact Information

Purpose/Scientific Focus

Basin/Site Characteristics

Location (Physiographic Region)	
Area (km²)	
Elevation (m; Mean, Maximum, Minimum)	
Description (Physical–Ecological–Climatic Characteristics)	
Drainage/River System	
Site History or Historical Context	
Years of Data	

Other Info

Glacierized Area (% and year(s) measured)	
Main Land Cover(s)	
Lithology/Soils	
Mean Monthly and Annual Temperature (°C)	
Mean Total Monthly and Annual Precipitation (mm)	
Snow Characteristics	
Additional Noteworthy Characteristics of Basin/Site	

Data and Observations

Available Geospatial Data	Notes (e.g., Source, Resolution, Error/Uncertainty, Date, etc.)
Elevation	
Landcover and Soils	
Stream/River Network	
Basin Delineation/Shapefile	
Other Geospatial Data (add rows as necessary)	

Observation Stations (Specific Instrument/Sensor Details to be Filled Below)

Type	Station Name	Latitude	Longitude	Elevation	Notes/Details
Other Stations (add rows as necessary)					

Data Availability and Access (Please provide links/DOIs to published or available data and descriptions; Add rows as necessary)

Meteorological Variables and Sensor Details

Variable	Station	Sensor(s)	Height/ Depth (m)	Record Period and Frequency	Notes/Details
Air temperature and Relative Humidity					
Solar Radiation					
Longwave Radiation					
Net Radiation					
Snow Water Equivalent					
Snow Depth					
Soil Moisture					
Soil Temperature					
Stream Level/Discharge					
Groundwater Level					
Other Variables (add rows as necessary)					

Water Quality Variables

Water					

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COPE: Common Observation P

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Related Information

INARCH: The International Net Catchment Hydrology Project

Observatories and Sites - INAR

Programs - All

Programs - INARCH, INARCH/

Models - INARCH/COPE

INARCH/COPE Basin Information Form

Project Information

Section 1: Project Information

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Related Information

COPE: Common Observatio

INARCH: The International N Catchment Hydrology Projec

Info

Section 1: Info

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Please return yourcompleted Basin Informa Secretariate (for primary review by the Scie Management Team lead, Stephen O'Hearn
Chirs.DeBeer@usask.ca
Stephen.OHearn@usask.ca

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Entered__INARCH COPE Djankuat Basin Information Form June 2023 copy.docx - Word

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INARCH Basin/Site Information Form

Basin/Site Name Djankuat Research Basin

Country; Province/State Russia

Website (If Available)

Operational Management Lomonosov Moscow State University
Water problems institute Russian Academy of Sciences

Basin/Site Location (Centroid Coordinates)

Coordinate Format	Latitude	Longitude
Decimal Degrees	43.208 N	42.735 E

Oversight/Contacts

Name	Role	Contact Information
Ekaterina Rets	Curator of the Research Catchment in the INARCH Network, Hydrological and meteorological monitoring	Email: ekaterina.p.rets@gmail.com
Viktor Popovnin	Head of the Station, Glaciological monitoring	Email: begemotina@hotmail.com

Purpose/Scientific Focus

The Djankuat glacier was chosen as representative of the central North Caucasus during the International Hydrological Decade (IHD) - research program on water problems launched by UNESCO in 1965 - and is one of 30 'reference' glaciers in the world which has annual mass balance series longer than 50 years. The mass-balance measurements have been carried out on Djankuat glacier since 1967 till now regularly (www.wgms.ch) based on standard methods. Detailed hydrological and meteorological measurements were included in the monitoring program of the station during the IHD and came to an end in the late 1970s. The comprehensive hydrometeorological observation was resumed in the Djankuat research basin since 2007. Hydrometeorological measurements were done during the ablation season every year since 2007, all-year round hydrological gauge since 2021, and the observational program gradually expanded during 2007–2023 and now goes beyond the standard network hydrological and meteorological observations.

Basin/Site Characteristics

Location (Physiographic Region)	Alpine zone of the North Caucasus
Area (km²)	12.4 km²
Elevation (m; Mean, Maximum, Minimum)	between 2600 and 4000 m
Description (Physical–Ecological–Climatic Characteristics)	The Djankuat research basin is situated on the northern slope of the central part of the Main Caucasian Ridge. The climate is moderate continental to high-alpine
Drainage/River System	The Djankuat River is a source of the Adul-Su River – a tributary of the Baksan River which drains into the Caspian Sea via the Terek River.
Site History or Historical Context	The Djankuat glacier was chosen as representative of the central North Caucasus during the International Hydrological Decade (IHD) - research program on water problems launched by UNESCO in 1965 - and is one of 30 'reference' glaciers in the world which has annual mass balance series longer than 50 years.
Years of Data	(1970s) – 2007 – ongoing

Other Info

Glacierized Area (% and year(s) measured)	In the 2017 glaciers occupied 27% of the territory of the basin. The main glacier with the same name – Djankuat glacier – is the source of the Djankuat River. It is a valley glacier, with the lowest point of the tongue at approximately 2750 m, the elevation of the bergschrund is at 3600 m. The mean elevation of the glacier is 3210 m, the area is 2.42 km², and its length is 3.0 km. The maximum measured thickness of the glacier is 105 m, and the average thickness is 31 m. The Djankuat River basin also contains three small glaciers with areas less than 0.5 km²: Koyavgan, Via-Tau, and Visyachiy.
Main Land Cover(s)	Alpine highlands with steep slopes and a wide development of coarse-grained deposits, with numerous outcrops of exposed rocks, with alpine lawns in the lower part of the basin and with glacial-nival landscapes in its middle and upper parts
Lithology/Soils	crystalline schists and gneisses; gravelly shallow humus soils
Mean Monthly and Annual Temperature (°C)	J F M A M J J A S O N D **A** -7.3; -6.4; -3.2; 2.1; 6.8; 10.0; 12.5; 12.2; 8.5; 3.9; ; -1.3; -5.2; **2.7** (According to the closest all-year round meteorological station in Terskol)
Mean Total Monthly and Annual Precipitation (mm)	J F M A M J J A S O N D **A** 58; 45; 67; 86; 92; 93; 102; 94; 100; 85; 64; 59; **942** (According to the closest all-year round meteorological station in Terskol)
Snow Characteristics	Stable snow cover is generally observed on the whole basin area from October-November to May. In the accumulation zone of glaciers snow persists through the year. Mean measured snowdepth on the Djankuat Glacier is 3600 mm, Maximum is 11550 mm.
Additional Noteworthy Characteristics of Basin/Site	

Data and Observations

Available Geospatial Data	Notes (e.g., Source, Resolution, Error/Uncertainty, Date, etc.)
Elevation	Available on request
Landcover and Soils	Aleynikova, A. M. Struktura i dinamika priledníkovykh landshaftov Priel'brus'ya / A. M. Aleynikova, M. N. Petrushina // Lod i sneg. – 2011. – № 2(114). – S. 127-134. – EDN PJEMMH. (in Russian)
Stream/River Network	Available on request
Basin Delineation/Shapefile	Available on request

Observation Stations (Specific Instrument/Sensor Details to be Filled Below)

Type	Station Name	Latitude	Longitude	Elevation	Notes/Details
Meteorological	Djankuat Base Camp AWS	43.208	42.736	2640	
Meteorological	Djankuat Glacier AWS 1	43.198	42.757	3000	IV zone of the Djankuat glacier on the ice surface
Meteorological	Djankuat Glacier AWS 2	43.200	42.759	3050	IV zone of the Djankuat glacier on the debris covered ice
Meteorological	Djankuat Glacier AWS 3	43.193	42.759	3200	
Hydrological	Djankuat River Base				

	Djankuat Base Camp AWS	DAVIS AWS	2640	2007 - ongoing, 15 min
Solar Radiation	Djankuat Glacier AWS 1	Campbell AWS -KEEP & ZONNEN radiometers	3000	2007-2021, 15 min
	Djankuat Glacier AWS 2	Campbell AWS -KEEP & ZONNEN radiometers	3050	2007-2009, 15 min
Longwave Radiation	Djankuat Glacier AWS 1	Campbell AWS -KEEP & ZONNEN radiometers	3000	2007-2021, 15 min
	Djankuat Glacier AWS 2	Campbell AWS -KEEP & ZONNEN radiometers	3050	2007-2009, 15 min
Wind Speed/Direction	Djankuat Glacier AWS 1	Campbell AWS - wind sensor	3000	2007-2021, 15 min
	Djankuat Glacier AWS 2	Campbell AWS - wind sensor	3050	2007-2009, 15 min

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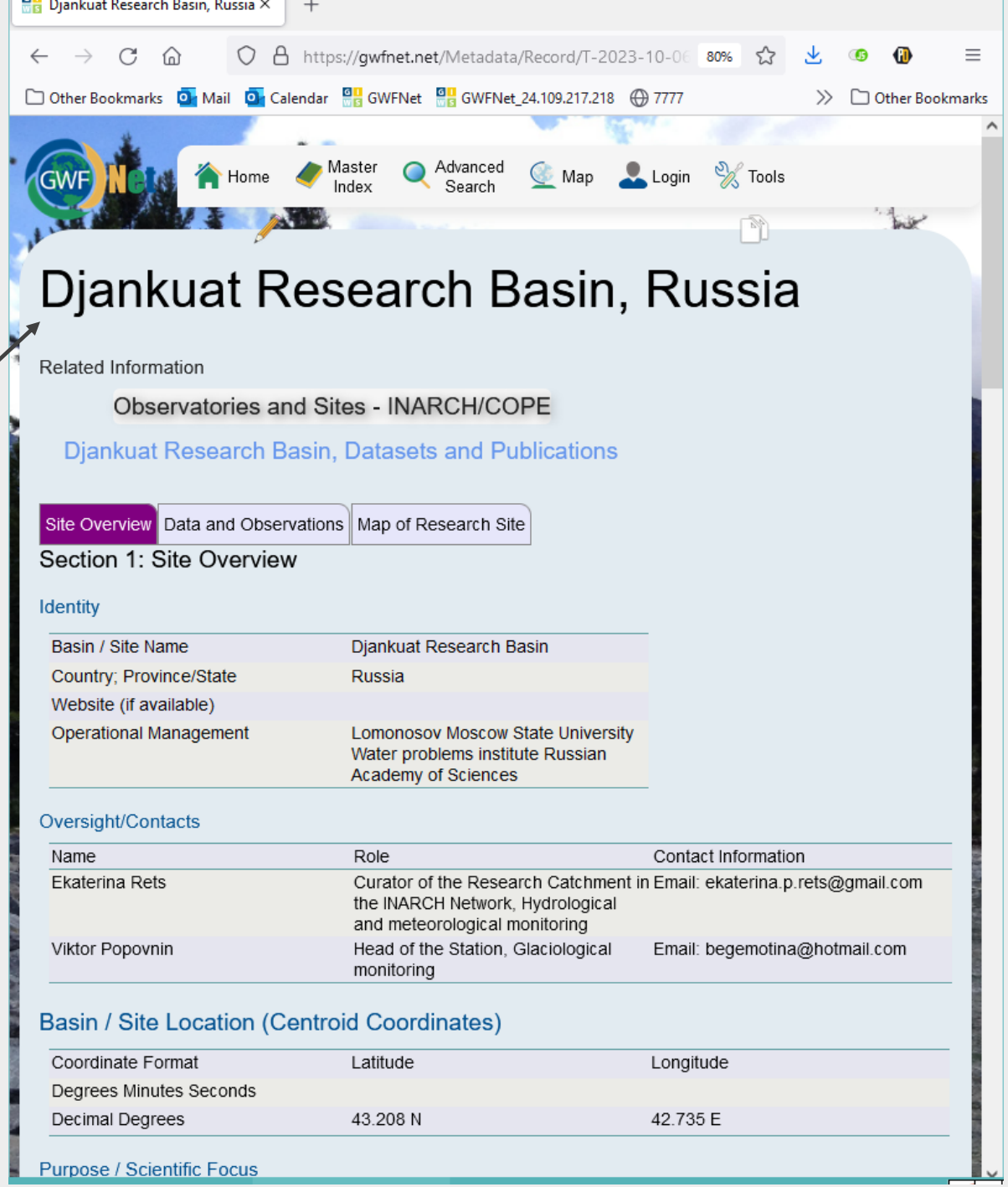
Kyzylsu Catchment, Tajikistan (COPE)
Langtang Catchment, Nepal (COPE)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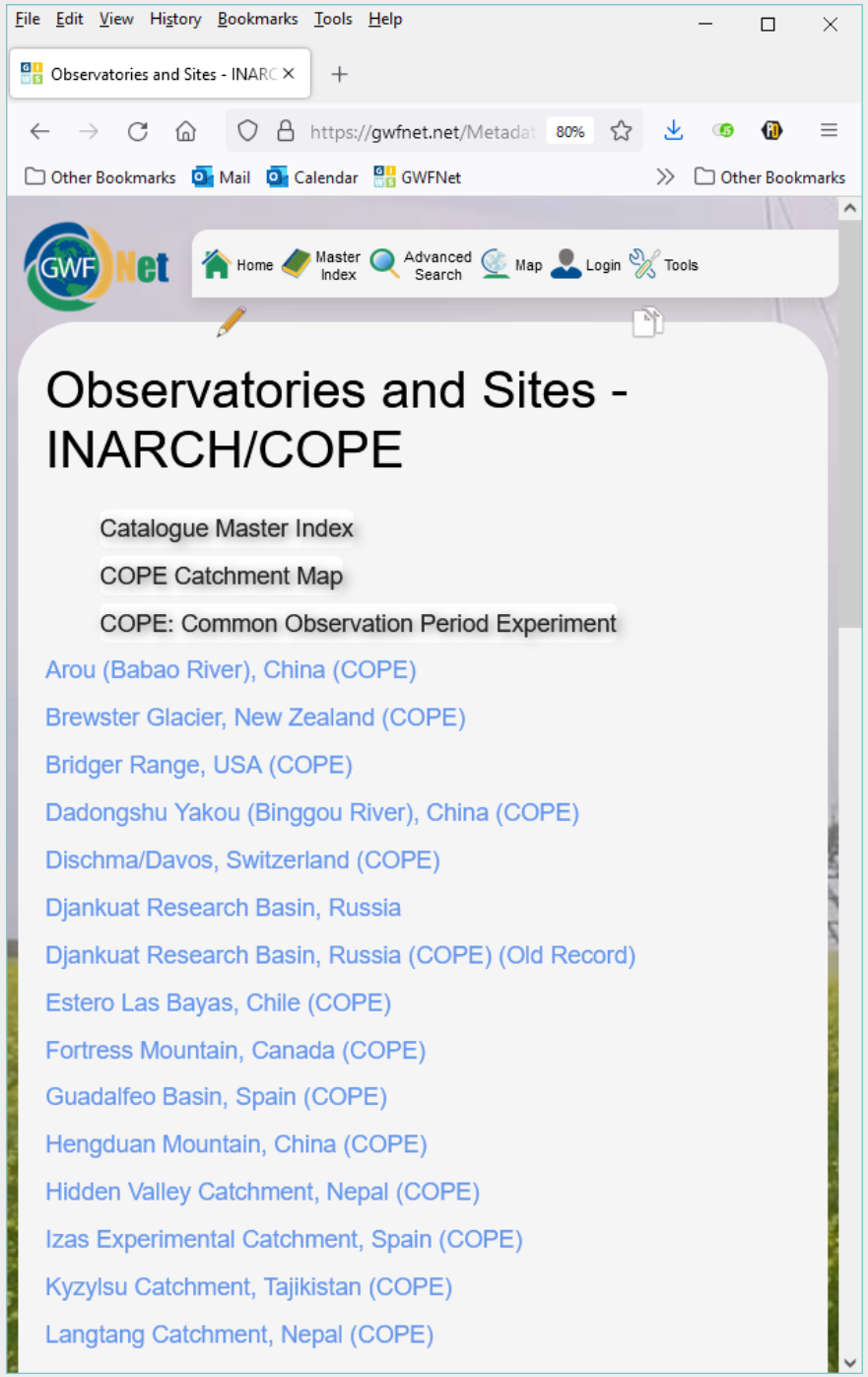
Related Information
Observatories and Sites - INARCH/COPE
Djankuat Research Basin, Datasets and Publications
Site Overview
Data and Observations
Map of Research Site
Section 1: Site Overview
Identity
Basin / Site Name
Djankuat Research Basin
Country; Province/State
Russia
Website (if available)
Operational Management
Lomonosov Moscow State University Water problems institute Russian Academy of Sciences
Oversight/Contacts
Name
Role
Contact Information
Ekaterina Rets
Curator of the Research Catchment in the INARCH Network, Hydrological and meteorological monitoring
Email: ekaterina.p.rets@gmail.com
Viktor Popovnin
Head of the Station, Glaciological monitoring
Email: begemotina@hotmail.com
Basin / Site Location (Centroid Coordinates)
Coordinate Format
Latitude
Longitude
Degrees Minutes Seconds
Decimal Degrees
43.208 N
42.735 E
Purpose / Scientific Focus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Fortress Mountain, Canada (COPE)
Guadalfeo Basin, Spain (COPE)
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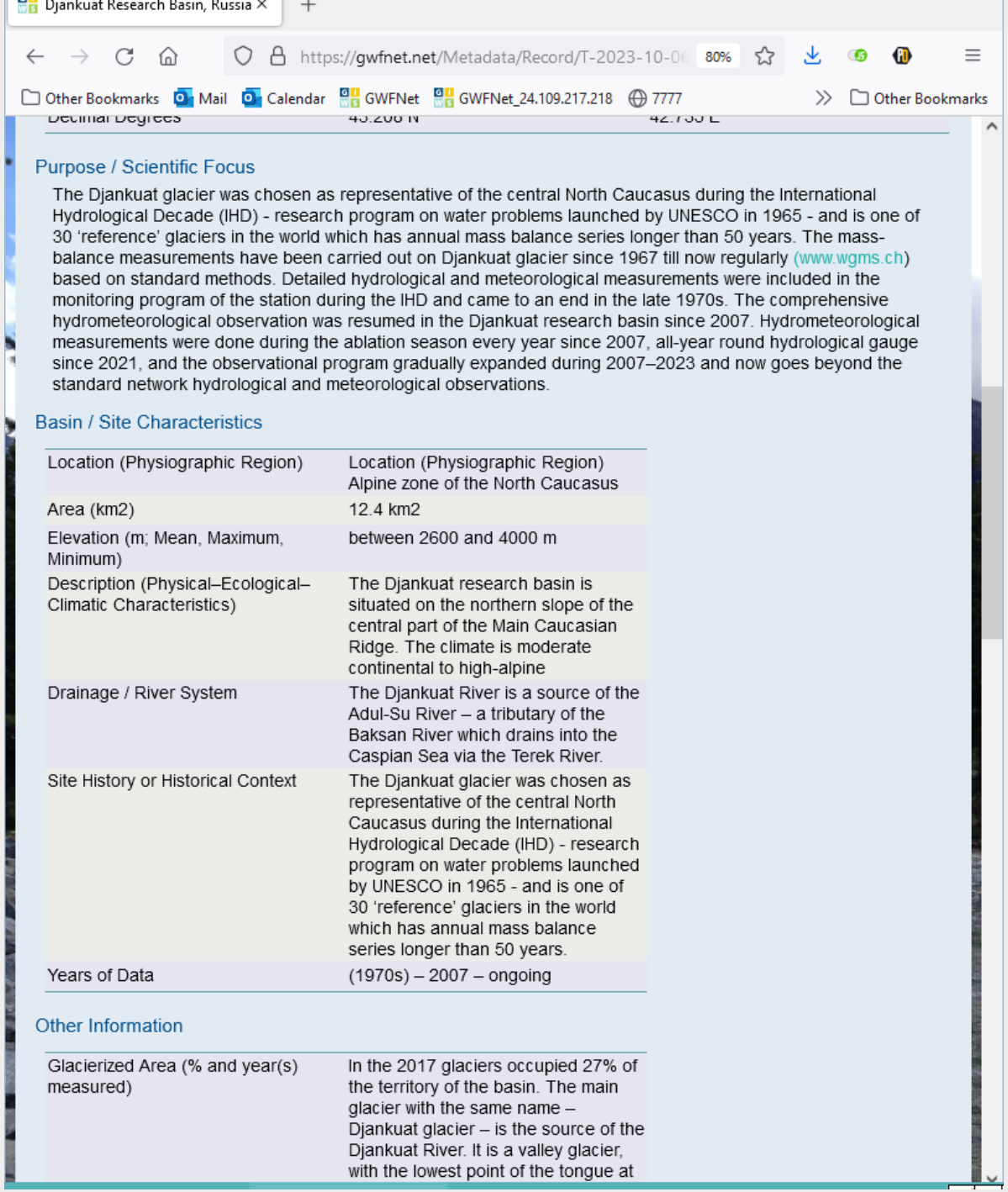
Langtang Catchment, Nepal (COPE)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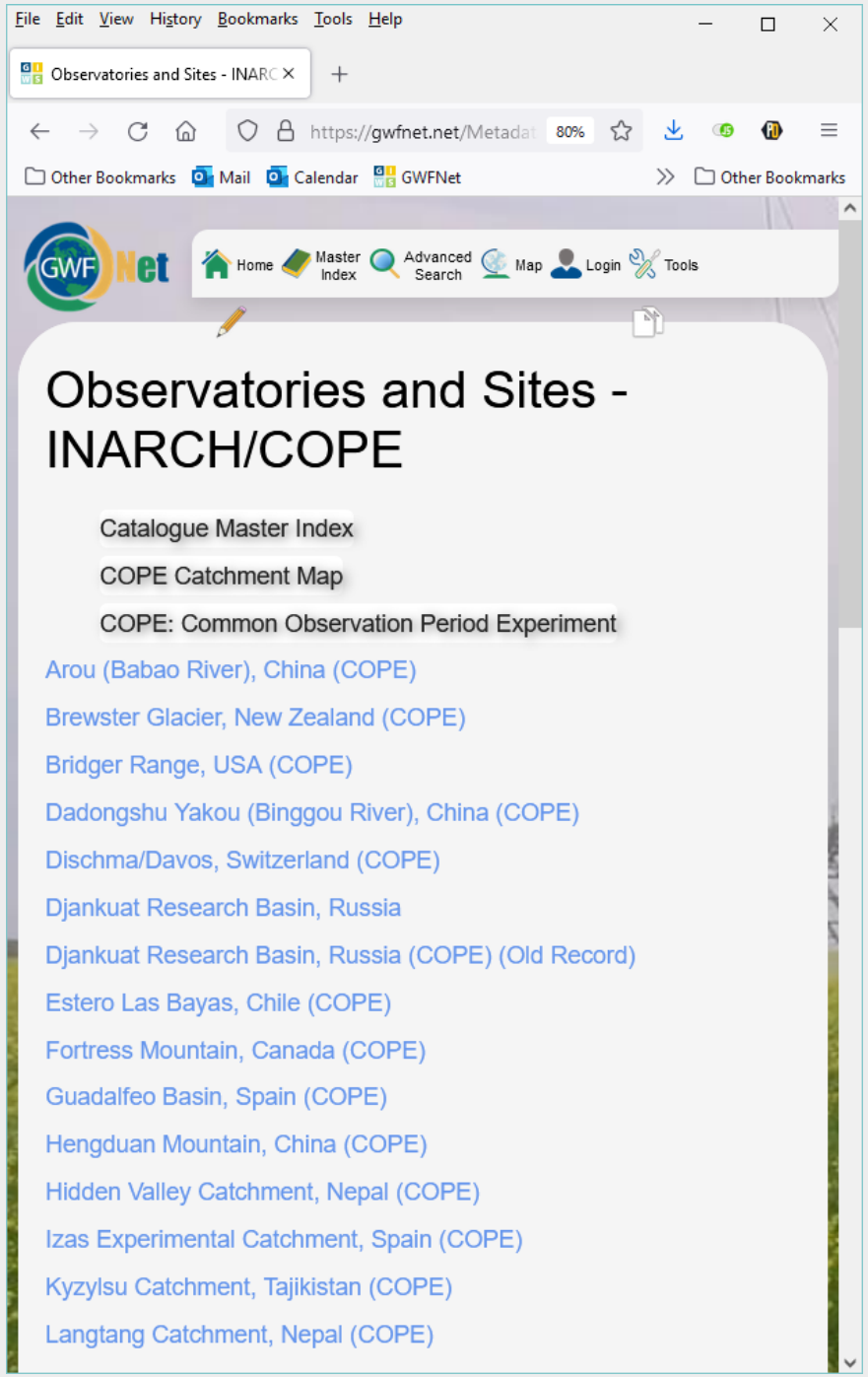
Purpose / Scientific Focus
The Djankuat glacier was chosen as representative of the central North Caucasus during the International Hydrological Decade (IHD) - research program on water problems launched by UNESCO in 1965 - and is one of 30 'reference' glaciers in the world which has annual mass balance series longer than 50 years. The mass-balance measurements have been carried out on Djankuat glacier since 1967 till now regularly (www.wgms.ch) based on standard methods. Detailed hydrological and meteorological measurements were included in the monitoring program of the station during the IHD and came to an end in the late 1970s. The comprehensive hydrometeorological observation was resumed in the Djankuat research basin since 2007. Hydrometeorological measurements were done during the ablation season every year since 2007, all-year round hydrological gauge since 2021, and the observational program gradually expanded during 2007–2023 and now goes beyond the standard network hydrological and meteorological observations.
Basin / Site Characteristics
Location (Physiographic Region) | Location (Physiographic Region) Alpine zone of the North Caucasus
Area (km2) | 12.4 km2
Elevation (m; Mean, Maximum, Minimum) | between 2600 and 4000 m
Description (Physical–Ecological–Climatic Characteristics) | The Djankuat research basin is situated on the northern slope of the central part of the Main Caucasian Ridge. The climate is moderate continental to high-alpine
Drainage / River System | The Djankuat River is a source of the Adul-Su River – a tributary of the Baksan River which drains into the Caspian Sea via the Terek River.
Site History or Historical Context | The Djankuat glacier was chosen as representative of the central North Caucasus during the International Hydrological Decade (IHD) - research program on water problems launched by UNESCO in 1965 - and is one of 30 'reference' glaciers in the world which has annual mass balance series longer than 50 years.
Years of Data | (1970s) – 2007 – ongoing
Other Information
Glacierized Area (% and year(s) measured) | In the 2017 glaciers occupied 27% of the territory of the basin. The main glacier with the same name – Djankuat glacier – is the source of the Djankuat River. It is a valley glacier, with the lowest point of the tongue at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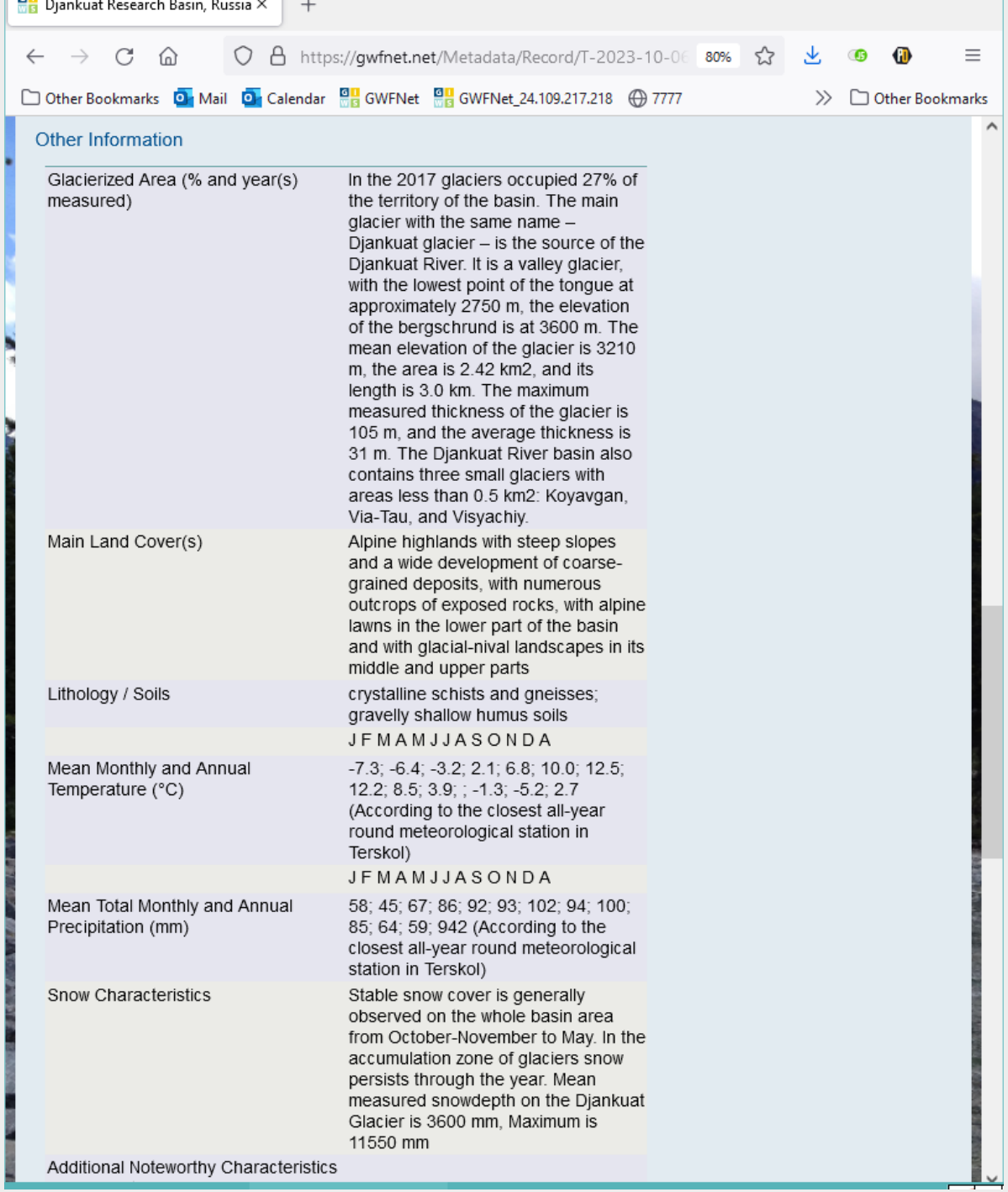
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Other Information
Glacierized Area (% and year(s) measured)
In the 2017 glaciers occupied 27% of the territory of the basin. The main glacier with the same name – Djankuat glacier – is the source of the Djankuat River. It is a valley glacier, with the lowest point of the tongue at approximately 2750 m, the elevation of the bergschrund is at 3600 m. The mean elevation of the glacier is 3210 m, the area is 2.42 km2, and its length is 3.0 km. The maximum measured thickness of the glacier is 105 m, and the average thickness is 31 m. The Djankuat River basin also contains three small glaciers with areas less than 0.5 km2: Koyavgan, Via-Tau, and Visyachiy.
Main Land Cover(s)
Alpine highlands with steep slopes and a wide development of coarse-grained deposits, with numerous outcrops of exposed rocks, with alpine lawns in the lower part of the basin and with glacial-nival landscapes in its middle and upper parts
Lithology / Soils
crystalline schists and gneisses; gravelly shallow humus soils
J F M A M J J A S O N D A
Mean Monthly and Annual Temperature (°C)
-7.3; -6.4; -3.2; 2.1; 6.8; 10.0; 12.5; 12.2; 8.5; 3.9; ; -1.3; -5.2; 2.7 (According to the closest all-year round meteorological station in Terskol)
J F M A M J J A S O N D A
Mean Total Monthly and Annual Precipitation (mm)
58; 45; 67; 86; 92; 93; 102; 94; 100; 85; 64; 59; 942 (According to the closest all-year round meteorological station in Terskol)
Snow Characteristics
Stable snow cover is generally observed on the whole basin area from October-November to May. In the accumulation zone of glaciers snow persists through the year. Mean measured snowdepth on the Djankuat Glacier is 3600 mm, Maximum is 11550 mm
Additional Noteworthy Characteristics

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Dischma/Davos, Switzerland (COPE)

Djankuat Research Basin, Russia

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Langtang Catchment, Nepal (COPE)

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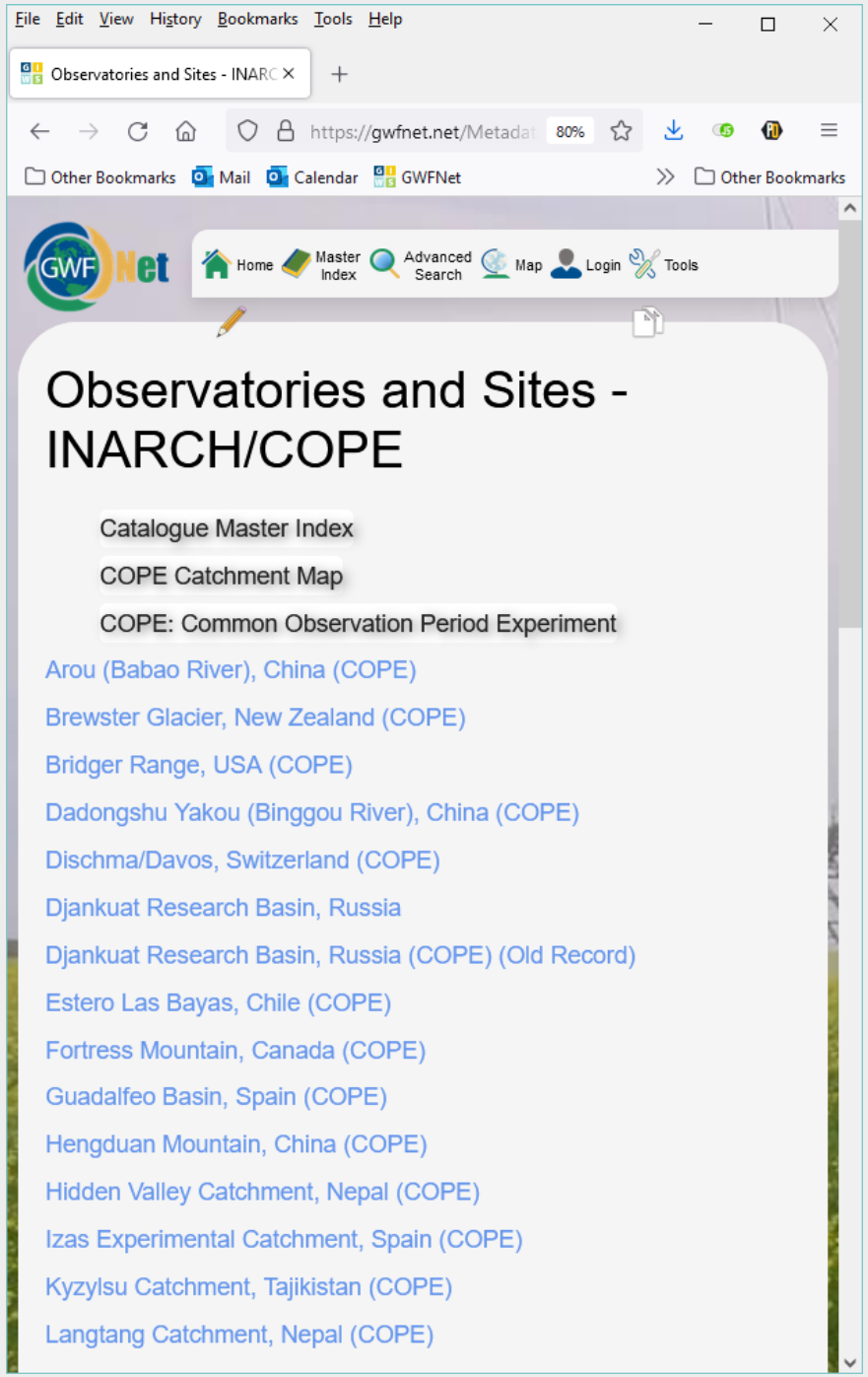
Snow Characteristics	Stable snow cover is generally observed on the whole basin area from October-November to May. In the accumulation zone of glaciers snow persists through the year. Mean measured snowdepth on the Djankuat Glacier is 3600 mm, Maximum is 11550 mm
Additional Noteworthy Characteristics of Basin/Site	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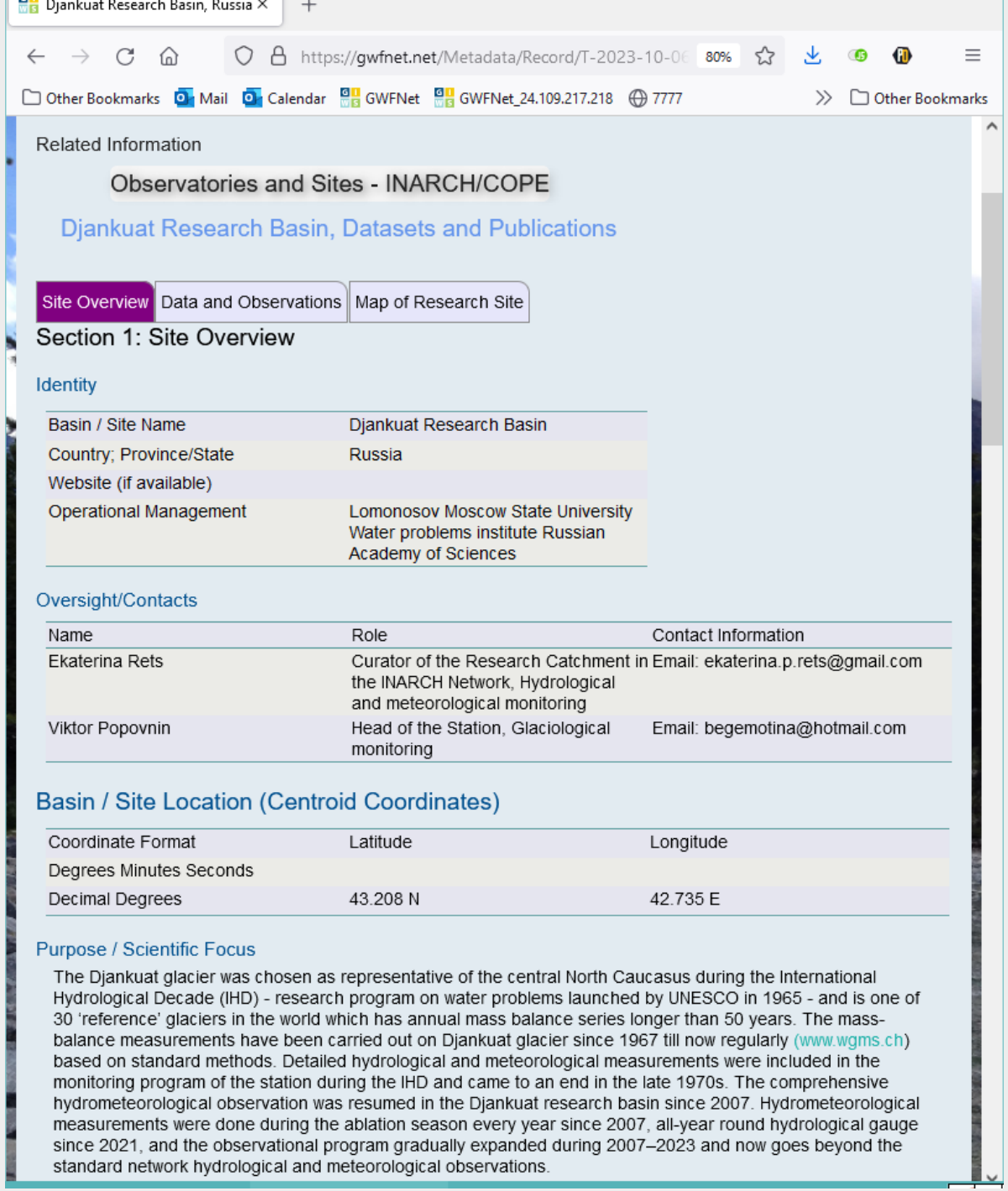
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Related Information
Observatories and Sites - INARCH/COPE
Djankuat Research Basin, Datasets and Publications
Site Overview
Data and Observations
Map of Research Site
Section 1: Site Overview
Identity
Basin / Site Name
Djankuat Research Basin
Country; Province/State
Russia
Website (if available)
Operational Management
Lomonosov Moscow State University Water problems institute Russian Academy of Sciences
Oversight/Contacts
Name
Role
Contact Information
Ekaterina Rets
Curator of the Research Catchment in the INARCH Network, Hydrological and meteorological monitoring
Email: ekaterina.p.rets@gmail.com
Viktor Popovnin
Head of the Station, Glaciological monitoring
Email: begemotina@hotmail.com
Basin / Site Location (Centroid Coordinates)
Coordinate Format
Latitude
Longitude
Degrees Minutes Seconds
Decimal Degrees
43.208 N
42.735 E
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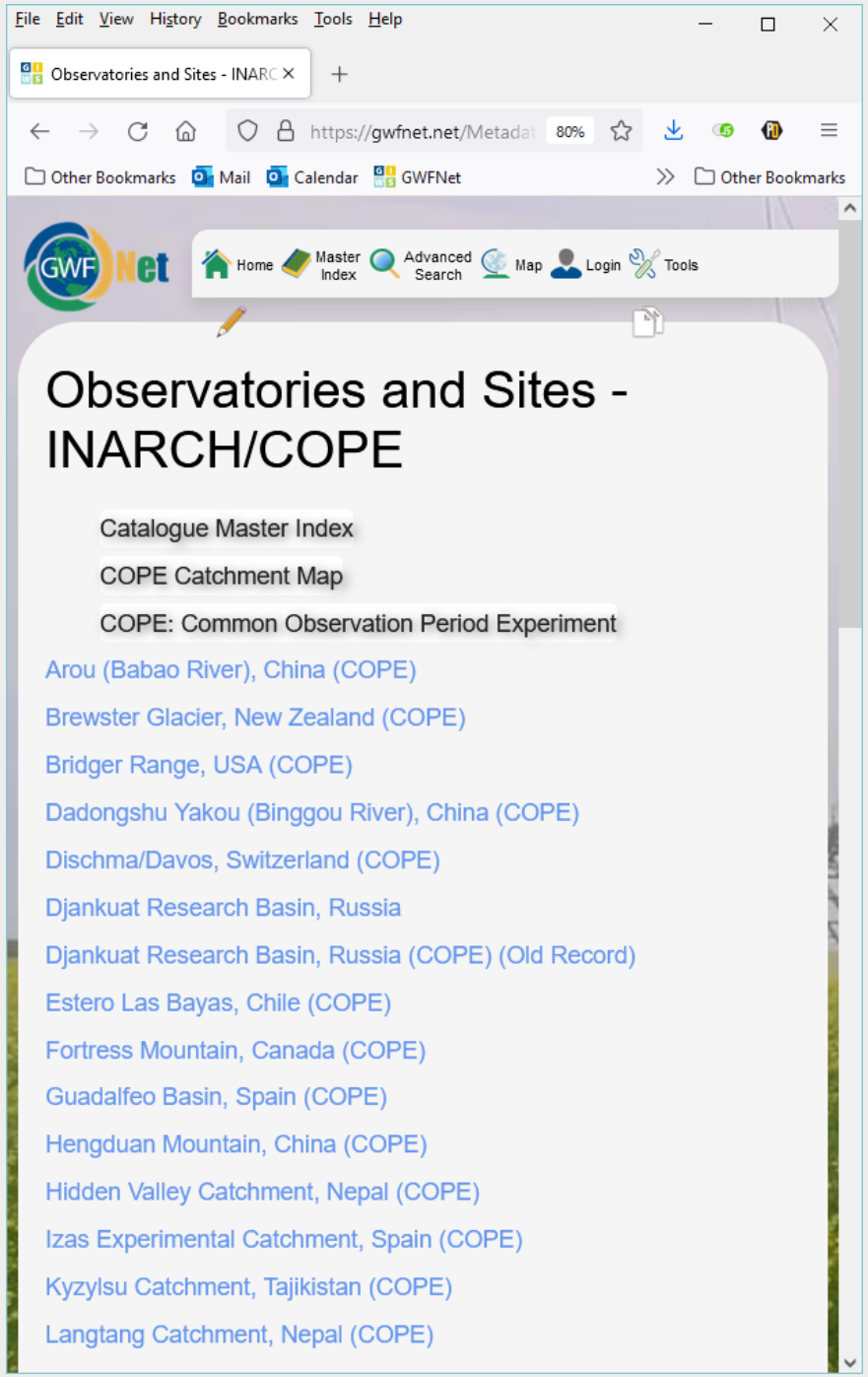
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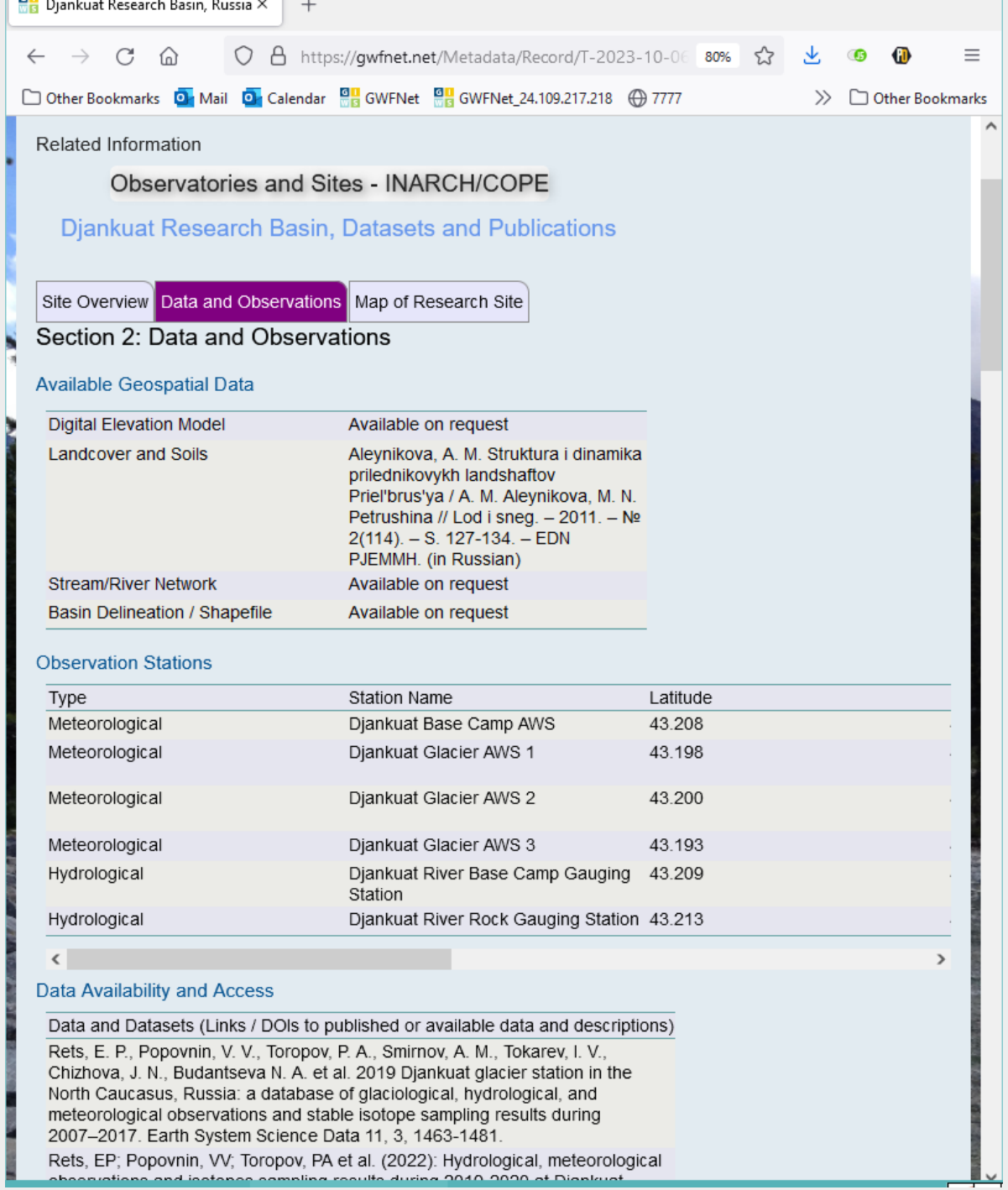
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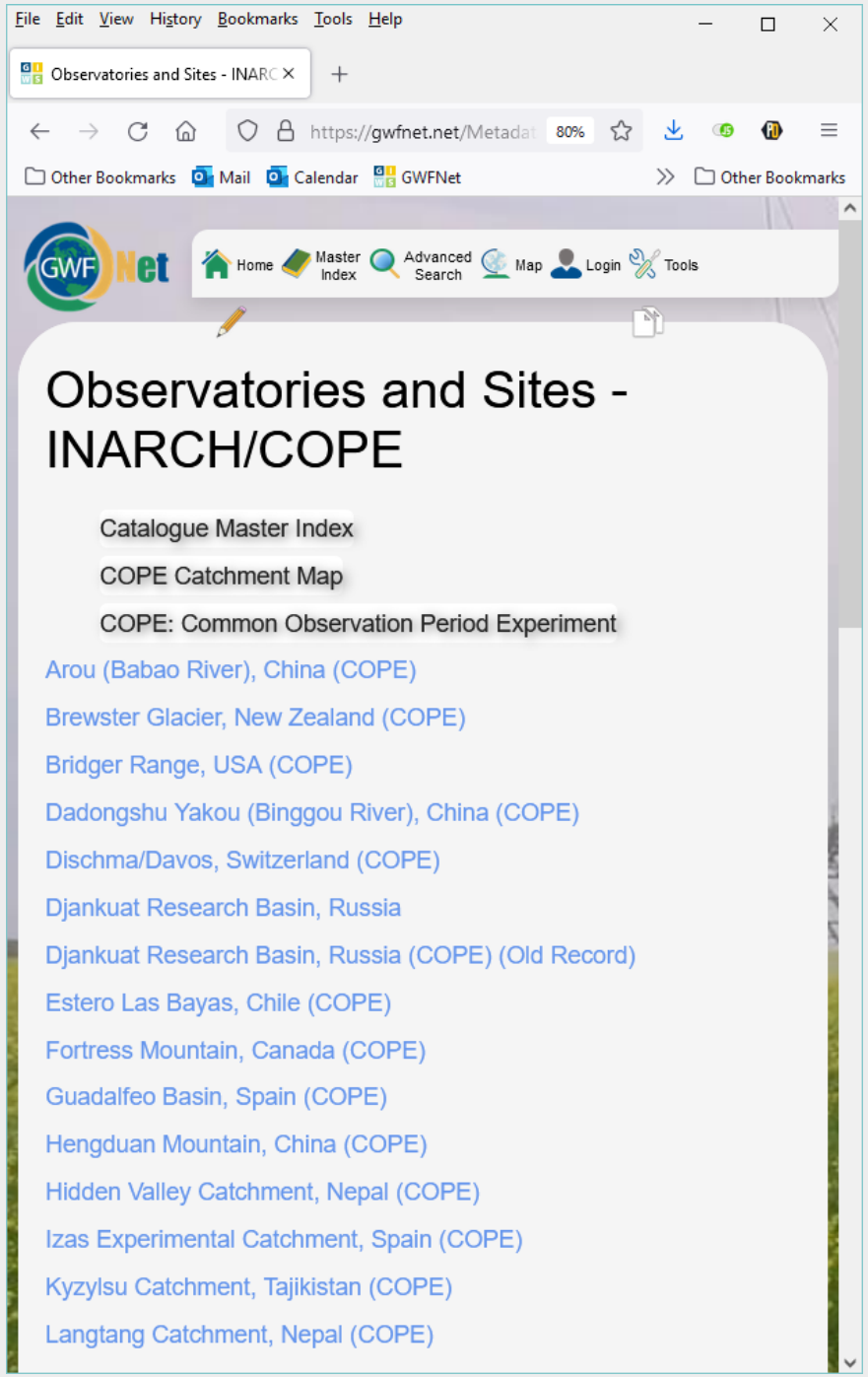
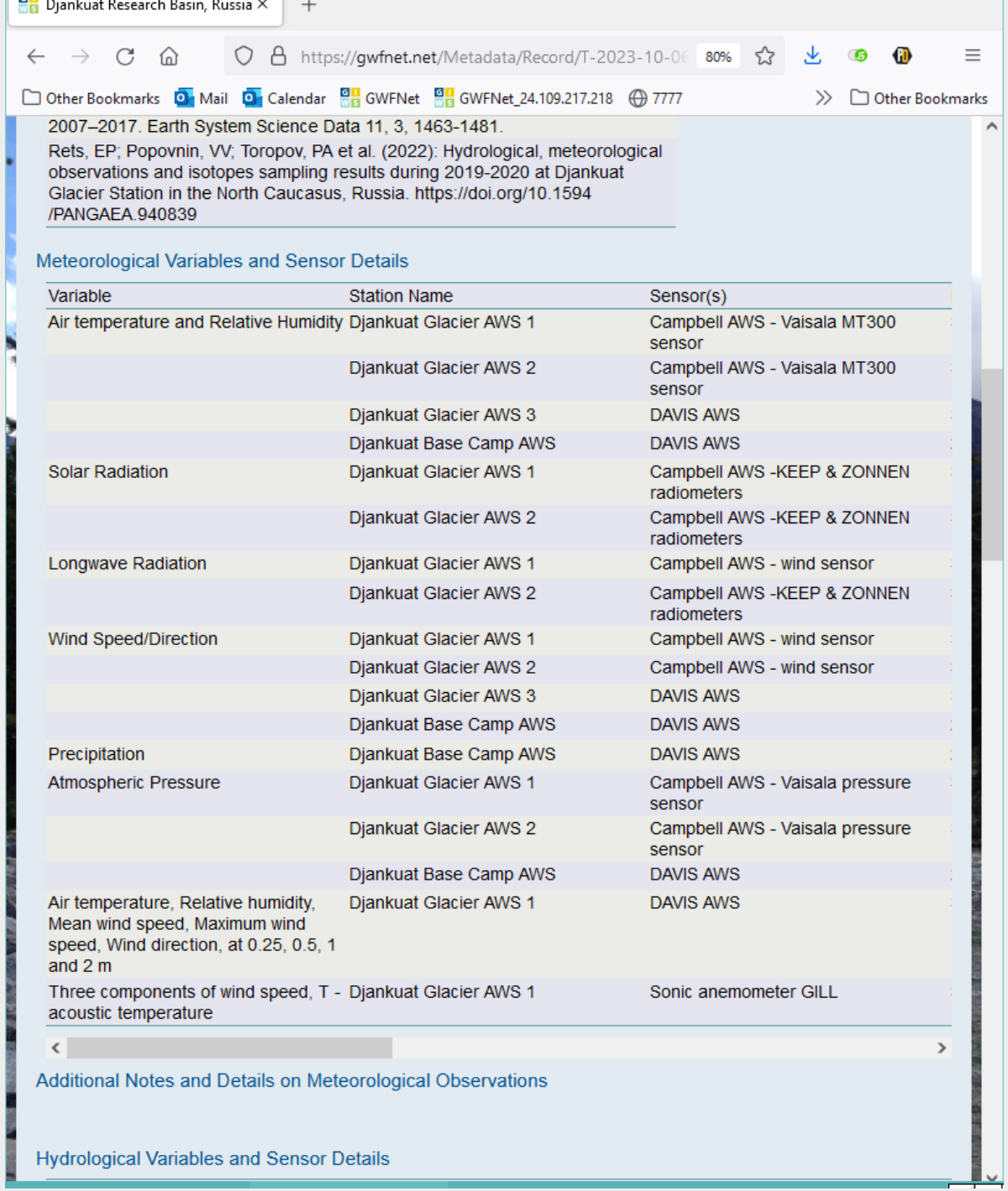
Section 2: Data and Observations
Available Geospatial Data
Digital Elevation Model
Available on request
Landcover and Soils
Aleynikova, A. M. Struktura i dinamika priednikovykh landshaftov Priel'brus'ya / A. M. Aleynikova, M. N. Petrushina // Lod i sneg. – 2011. – № 2(114). – S. 127-134. – EDN PJEMMH. (in Russian)
Stream/River Network
Available on request
Basin Delineation / Shapefile
Available on request
Observation Stations
Type
Station Name
Latitude
Meteorological
Djankuat Base Camp AWS
43.208
Meteorological
Djankuat Glacier AWS 1
43.198
Meteorological
Djankuat Glacier AWS 2
43.200
Meteorological
Djankuat Glacier AWS 3
43.193
Hydrological
Djankuat River Base Camp Gauging Station
43.209
Hydrological
Djankuat River Rock Gauging Station
43.213
Data Availability and Access
Data and Datasets (Links / DOIs to published or available data and descriptions)
Rets, E. P., Popovnin, V. V., Toropov, P. A., Smirnov, A. M., Tokarev, I. V., Chizhova, J. N., Budantseva N. A. et al. 2019 Djankuat glacier station in the North Caucasus, Russia: a database of glaciological, hydrological, and meteorological observations and stable isotope sampling results during 2007–2017. Earth System Science Data 11, 3, 1463-1481.
Rets, EP; Popovnin, VV; Toropov, PA et al. (2022): Hydrological, meteorological





2007–2017. Earth System Science Data 11, 3, 1463-1481.

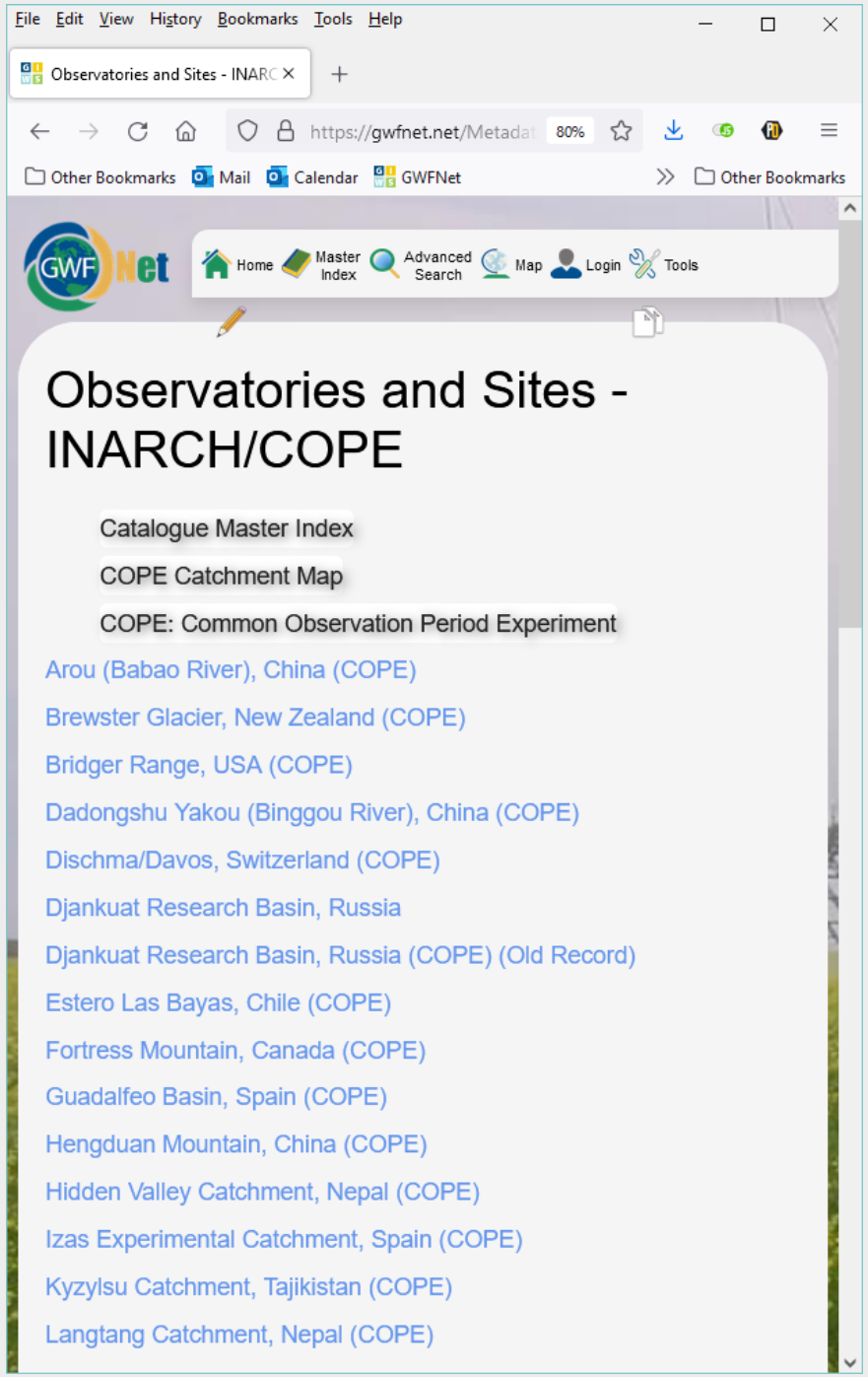
Rets, EP; Popovnin, VV; Toropov, PA et al. (2022): Hydrological, meteorological observations and isotopes sampling results during 2019-2020 at Djankuat Glacier Station in the North Caucasus, Russia. https://doi.org/10.1594/PANGAEA.940839

Meteorological Variables and Sensor Details

Variable	Station Name	Sensor(s)
Air temperature and Relative Humidity	Djankuat Glacier AWS 1	Campbell AWS - Vaisala MT300 sensor
	Djankuat Glacier AWS 2	Campbell AWS - Vaisala MT300 sensor
	Djankuat Glacier AWS 3	DAVIS AWS
	Djankuat Base Camp AWS	DAVIS AWS
Solar Radiation	Djankuat Glacier AWS 1	Campbell AWS -KEEP & ZONNEN radiometers
	Djankuat Glacier AWS 2	Campbell AWS -KEEP & ZONNEN radiometers
Longwave Radiation	Djankuat Glacier AWS 1	Campbell AWS - wind sensor
	Djankuat Glacier AWS 2	Campbell AWS -KEEP & ZONNEN radiometers
Wind Speed/Direction	Djankuat Glacier AWS 1	Campbell AWS - wind sensor
	Djankuat Glacier AWS 2	Campbell AWS - wind sensor
	Djankuat Glacier AWS 3	DAVIS AWS
	Djankuat Base Camp AWS	DAVIS AWS
Precipitation	Djankuat Base Camp AWS	DAVIS AWS
Atmospheric Pressure	Djankuat Glacier AWS 1	Campbell AWS - Vaisala pressure sensor
	Djankuat Glacier AWS 2	Campbell AWS - Vaisala pressure sensor
	Djankuat Base Camp AWS	DAVIS AWS
Air temperature, Relative humidity, Mean wind speed, Maximum wind speed, Wind direction, at 0.25, 0.5, 1 and 2 m	Djankuat Glacier AWS 1	DAVIS AWS
Three components of wind speed, T - acoustic temperature	Djankuat Glacier AWS 1	Sonic anemometer GILL

Additional Notes and Details on Meteorological Observations

Hydrological Variables and Sensor Details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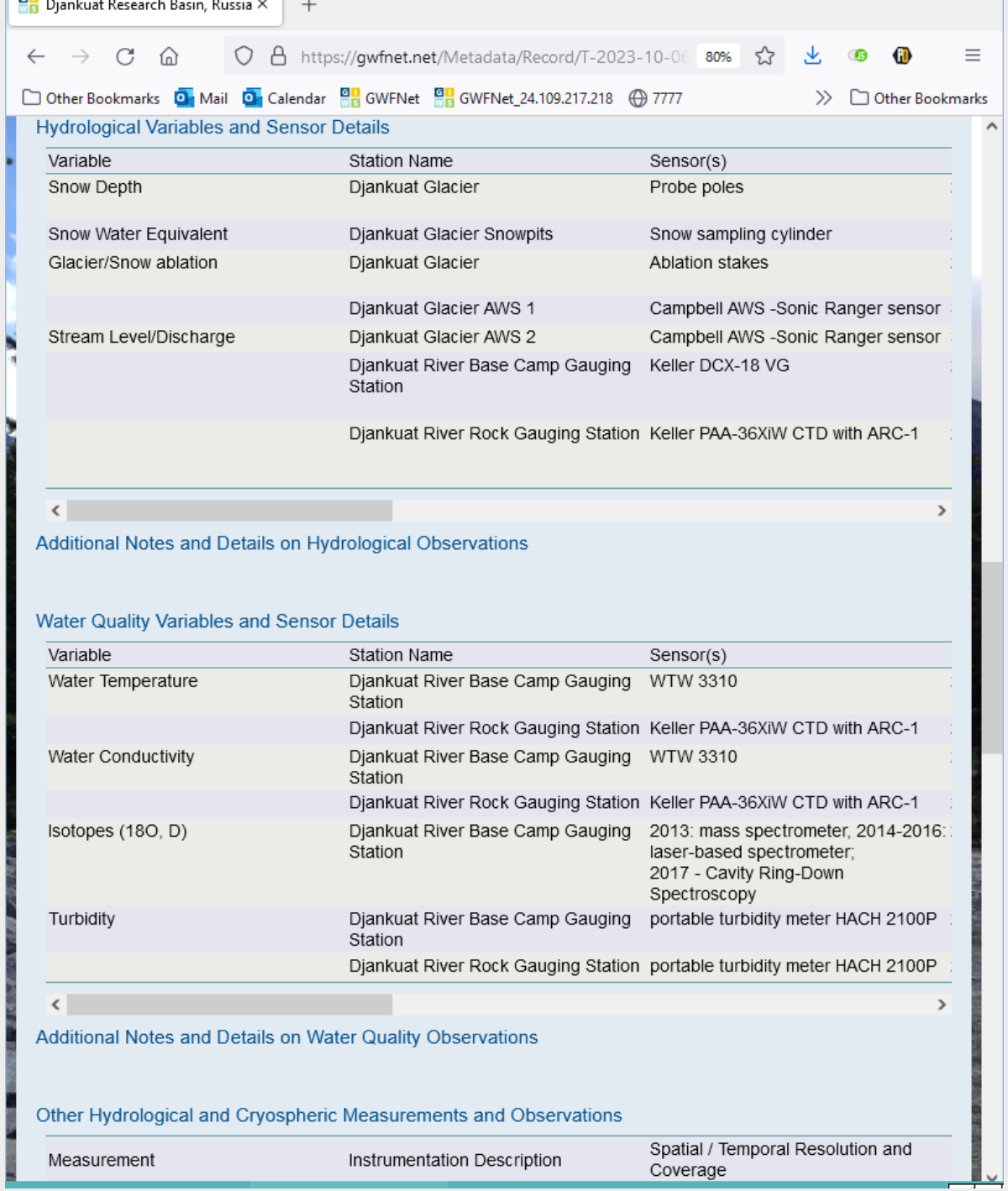
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Hydrological Variables and Sensor Details
Variable
Station Name
Sensor(s)
Snow Depth
Djankuat Glacier
Probe poles
Snow Water Equivalent
Djankuat Glacier Snowpits
Snow sampling cylinder
Glacier/Snow ablation
Djankuat Glacier
Ablation stakes
Djankuat Glacier AWS 1
Campbell AWS -Sonic Ranger sensor
Stream Level/Discharge
Djankuat Glacier AWS 2
Campbell AWS -Sonic Ranger sensor
Djankuat River Base Camp Gauging Station
Keller DCX-18 VG
Djankuat River Rock Gauging Station
Keller PAA-36XiW CTD with ARC-1
Additional Notes and Details on Hydrological Observations
Water Quality Variables and Sensor Details
Variable
Station Name
Sensor(s)
Water Temperature
Djankuat River Base Camp Gauging Station
WTW 3310
Djankuat River Rock Gauging Station
Keller PAA-36XiW CTD with ARC-1
Water Conductivity
Djankuat River Base Camp Gauging Station
WTW 3310
Djankuat River Rock Gauging Station
Keller PAA-36XiW CTD with ARC-1
Isotopes (18O, D)
Djankuat River Base Camp Gauging Station
2013: mass spectrometer, 2014-2016: laser-based spectrometer; 2017 - Cavity Ring-Down Spectroscopy
Turbidity
Djankuat River Base Camp Gauging Station
portable turbidity meter HACH 2100P
Djankuat River Rock Gauging Station
portable turbidity meter HACH 2100P
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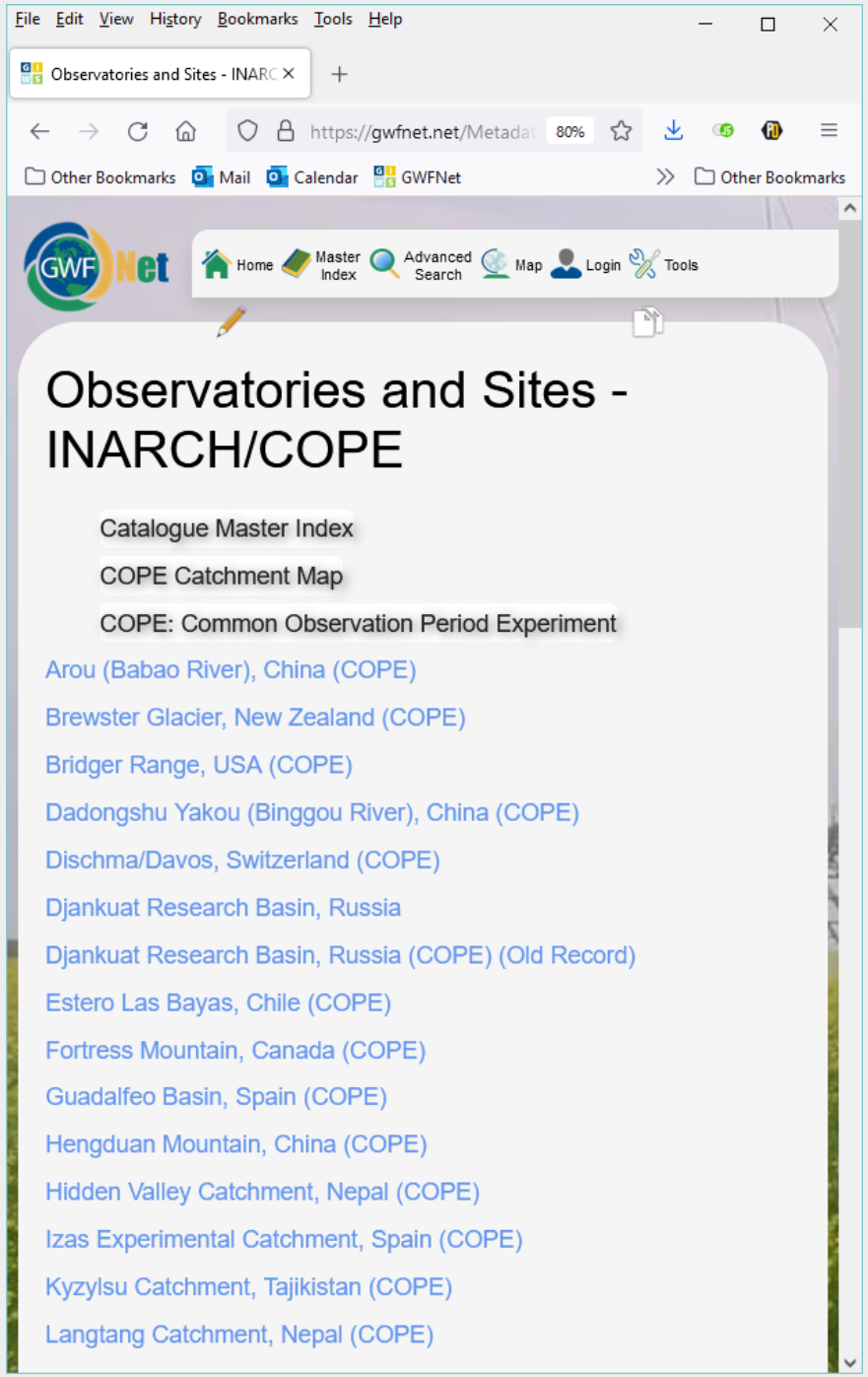
Other Hydrological and Cryospheric Measurements and Observations
Measurement
Instrumentation Description
Spatial / Temporal Resolution and Coverage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Glacier Ice Thickness
radio-echo sounding and modelling
2012-2013
Additional Notes and Details on Other Measurements and Observations
Relevant Modelling Activity (Model Applications, Purpose, Advancements, etc.)
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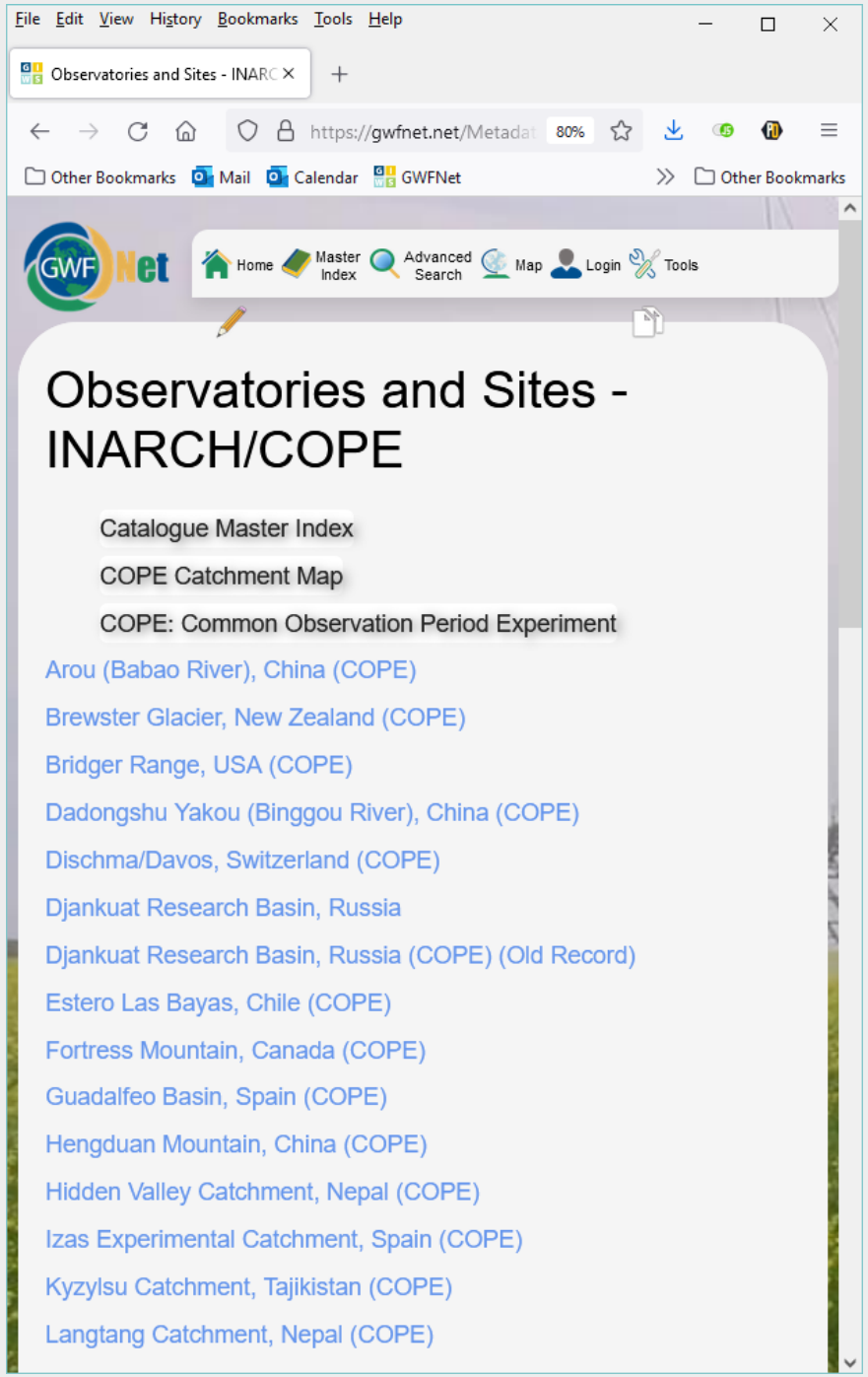
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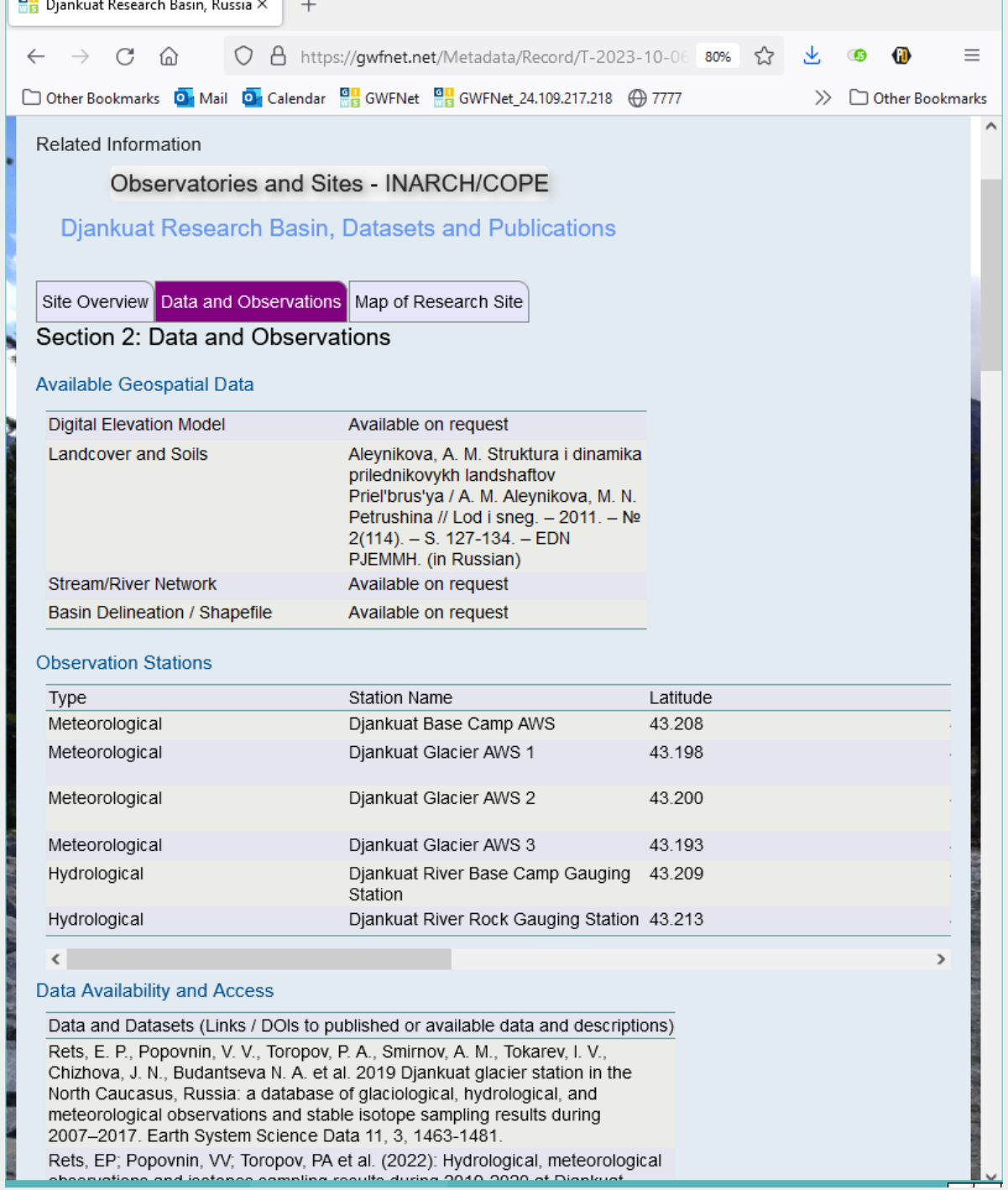
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Aleynikova, A. M. Struktura i dinamika priednikovykh landshaftov Priel'brus'ya / A. M. Aleynikova, M. N. Petrushina // Lod i sneg. – 2011. – № 2(114). – S. 127-134. – EDN PJEMMH. (in Russian)
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Rets, E. P., Popovnin, V. V., Toropov, P. A., Smirnov, A. M., Tokarev, I. V., Chizhova, J. N., Budantseva N. A. et al. 2019 Djankuat glacier station in the North Caucasus, Russia: a database of glaciological, hydrological, and meteorological observations and stable isotope sampling results during 2007–2017. Earth System Science Data 11, 3, 1463-1481.
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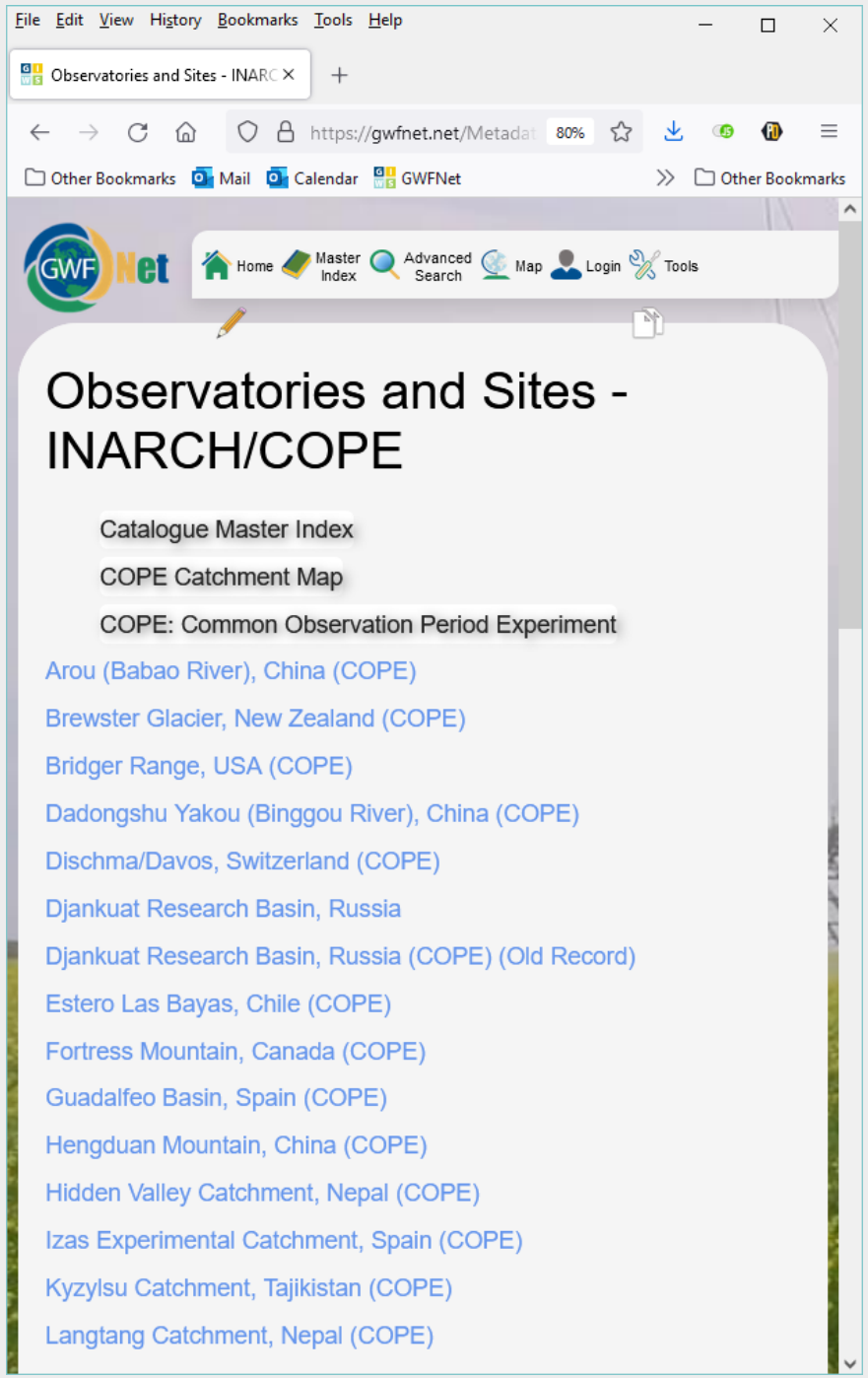
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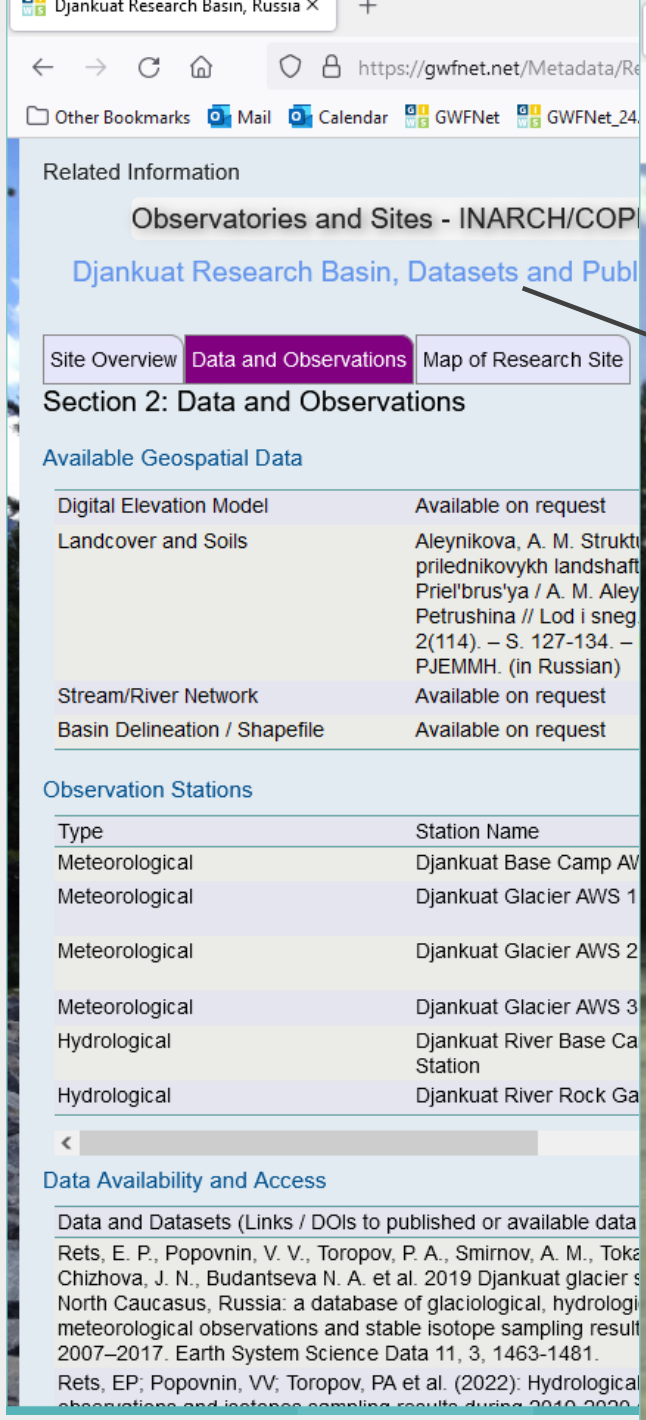
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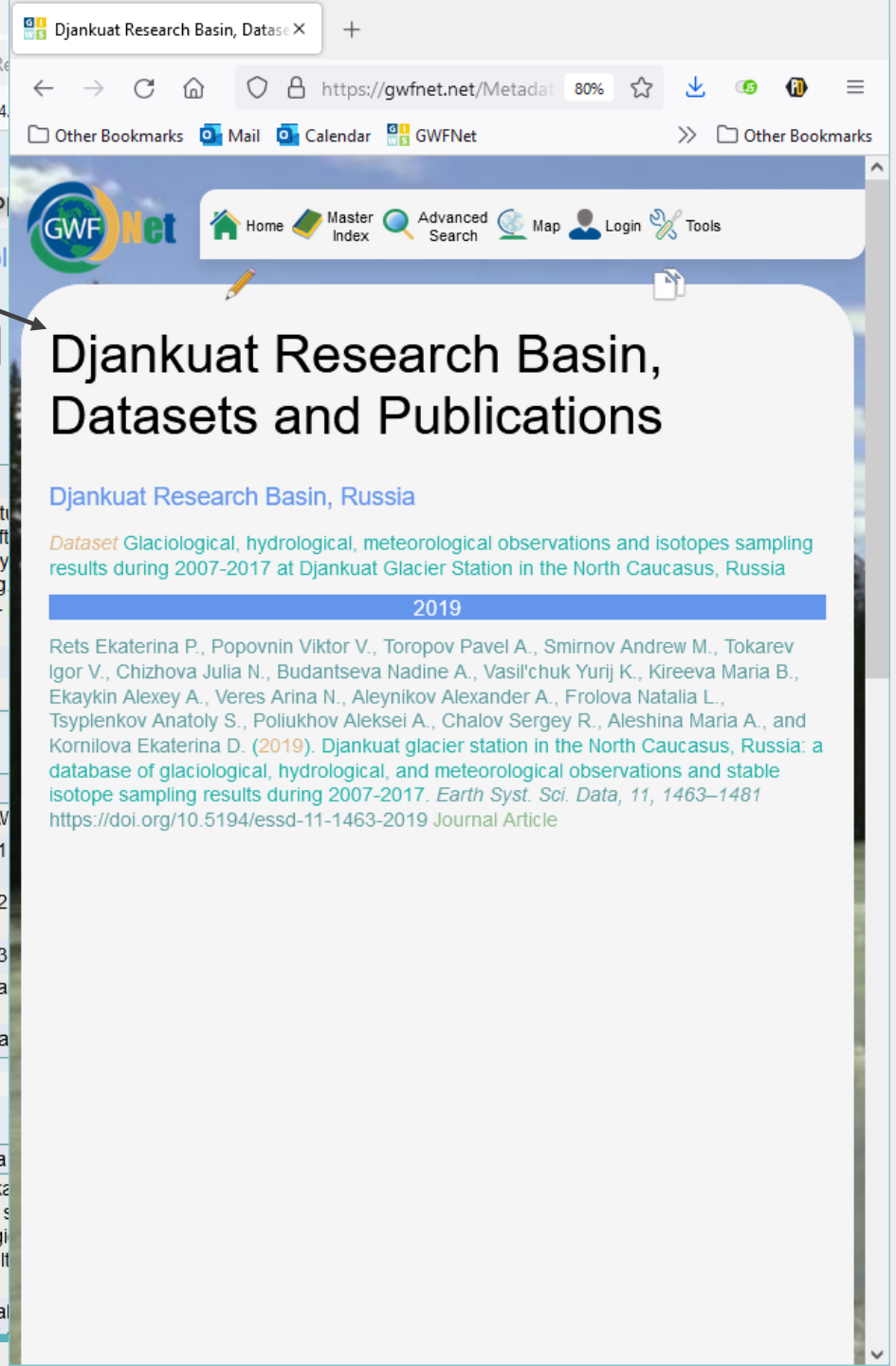
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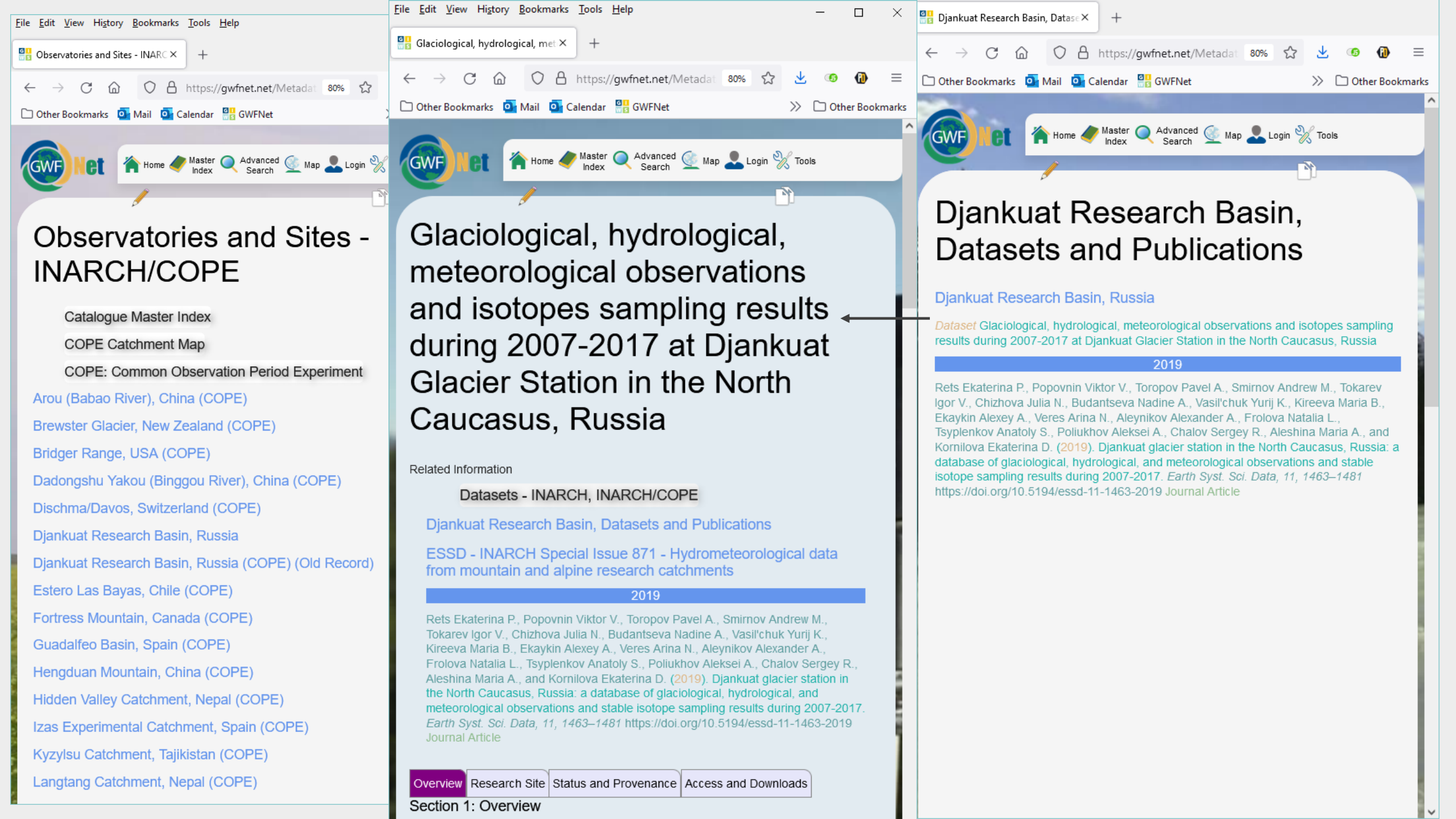
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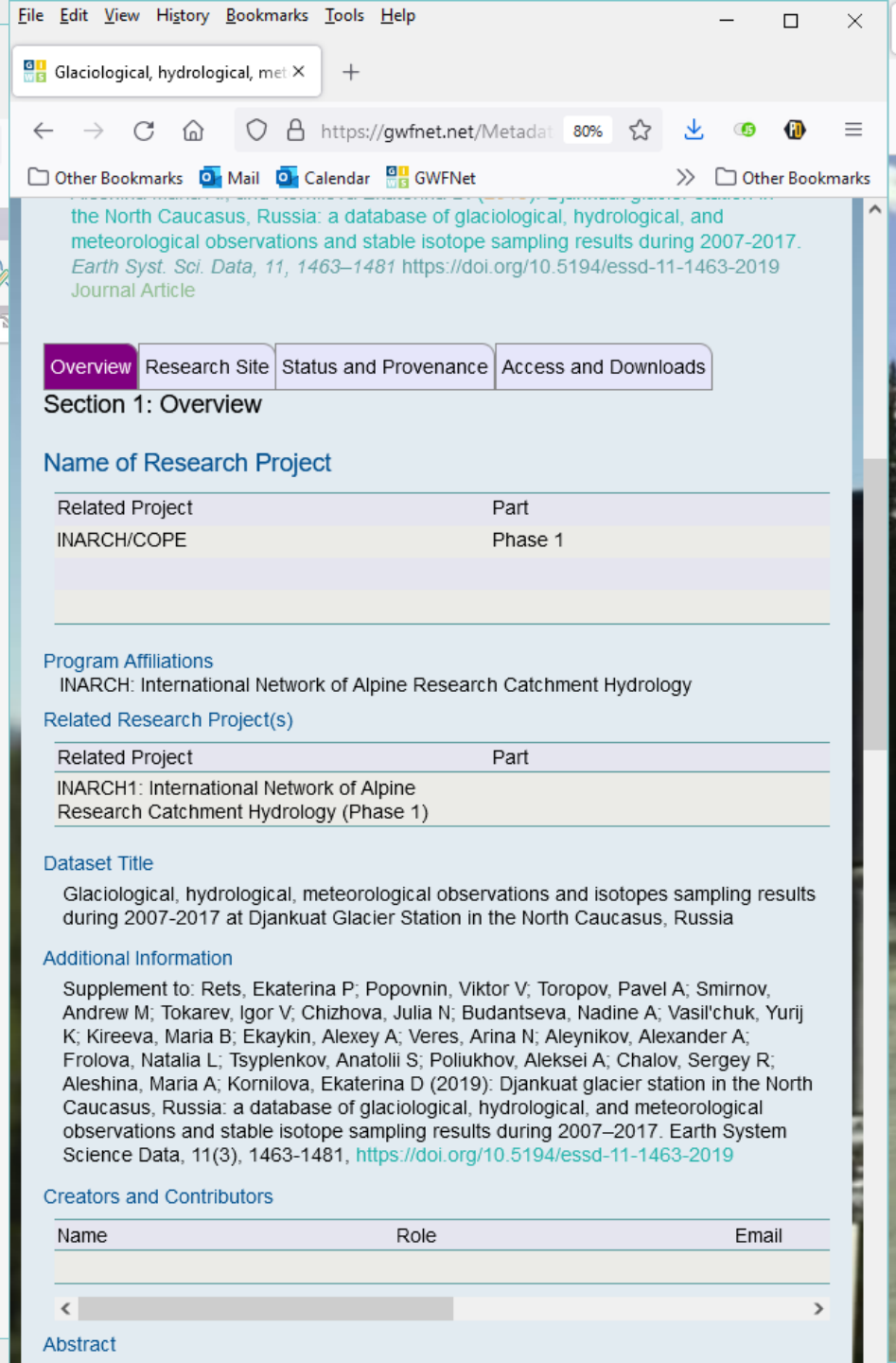
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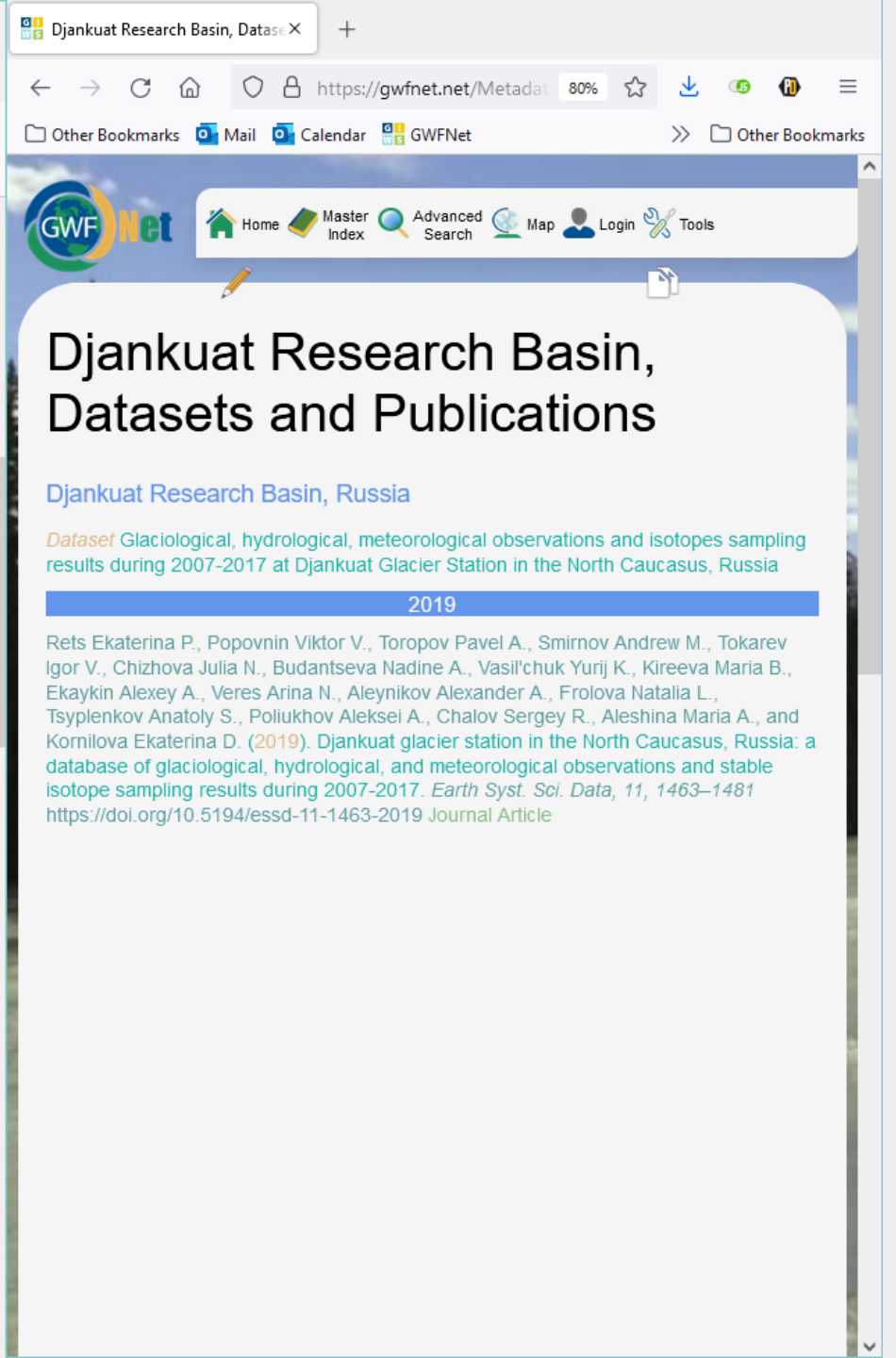
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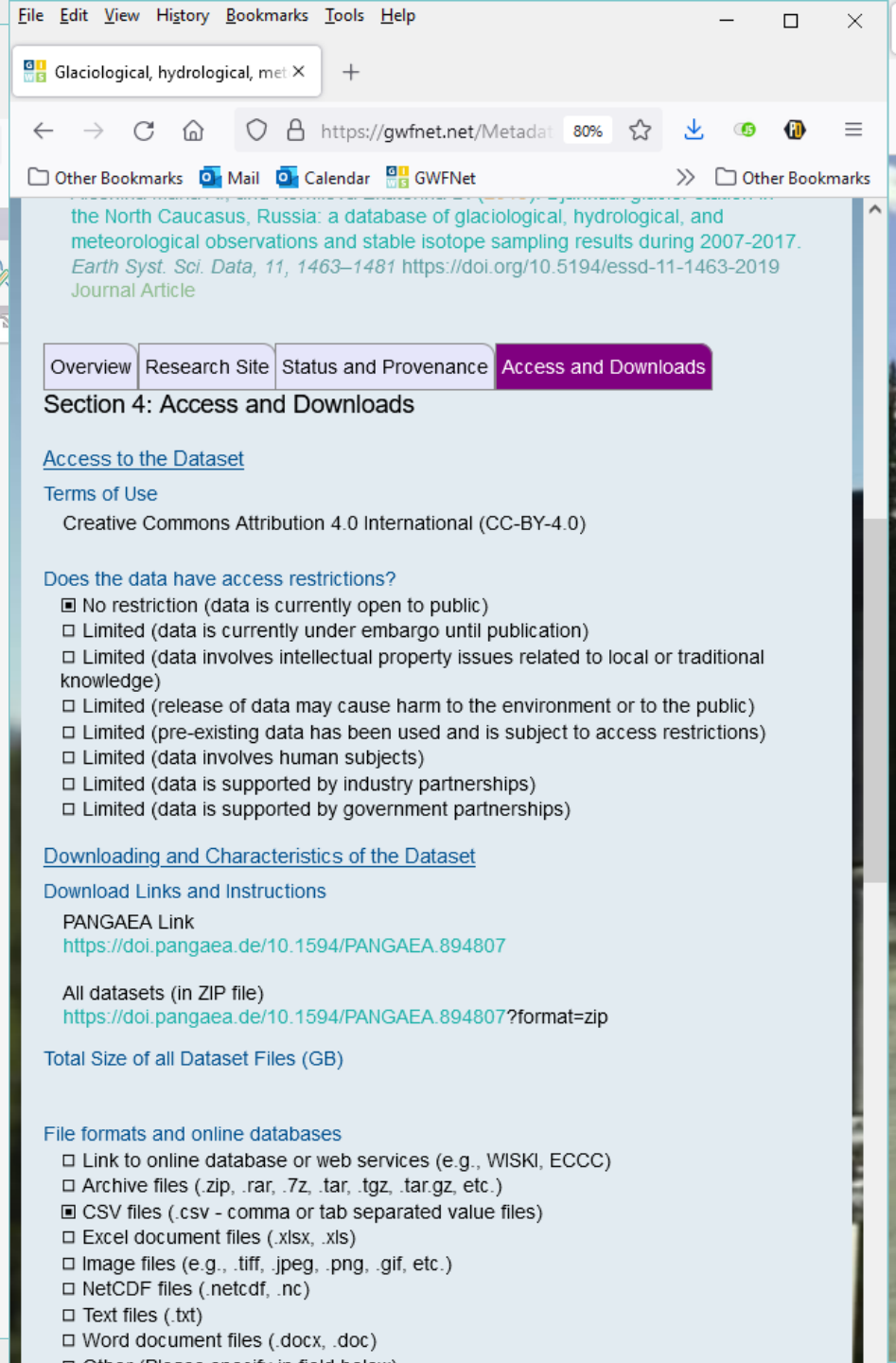
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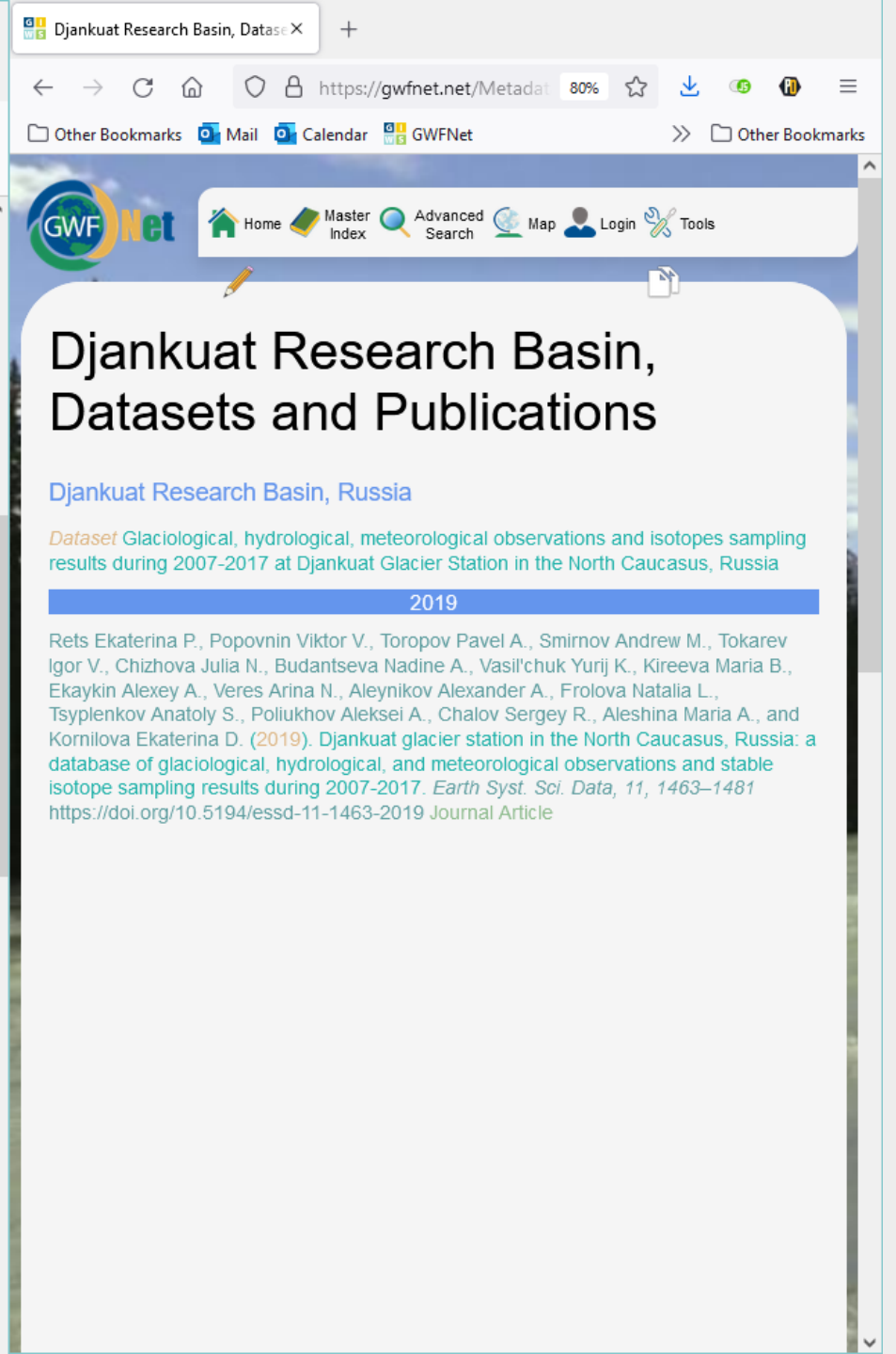
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Rets Ekaterina P., Popovnin Viktor V., Toropov Pavel A., Smirnov Andrew M., Tokarev Igor V., Chizhova Julia N., Budantseva Nadine A., Vasil'chuk Yurij K., Kireeva Maria B., Ekaykin Alexey A., Veres Arina N., Aleynikov Alexander A., Frolova Natalia L., Tsyplenkov Anatoly S., Poliukhov Aleksei A., Chalov Sergey R., Aleshina Maria A., and Kornilova Ekaterina D. (2019). Djankuat glacier station in the North Caucasus, Russia: a database of glaciological, hydrological, and meteorological observations and stable isotope sampling results during 2007-2017. Earth Syst. Sci. Data, 11, 1463–1481 https://doi.org/10.5194/essd-11-1463-2019 Journal Article


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Supplement to: Rets, Ekaterina P; Popovnin, Viktor V; Toropov, Pavel A; Smirnov, Andrew M; Tokarev, Igor V; Chizhova, Julia N; Budantseva, Nadine A; Vasil'chuk, Yurij K; Kireeva, Maria B; Ekaykin, Alexey A; Veres, Arina N; Aleynikov, Alexander A; Frolova, Natalia L; Tsyplenkov, Anatolii S; Poliukhov, Aleksei A; Chalov, Sergey R; Aleshina, Maria A; Kornilova, Ekaterina D (2019): Djankuat glacier station in the North Caucasus, Russia: a database of glaciological, hydrological, and meteorological observations and stable isotope sampling results during 2007–2017. Earth System Science Data, 11(3), 1463-1481, https://doi.org/10.5194/essd-11-1463-2019
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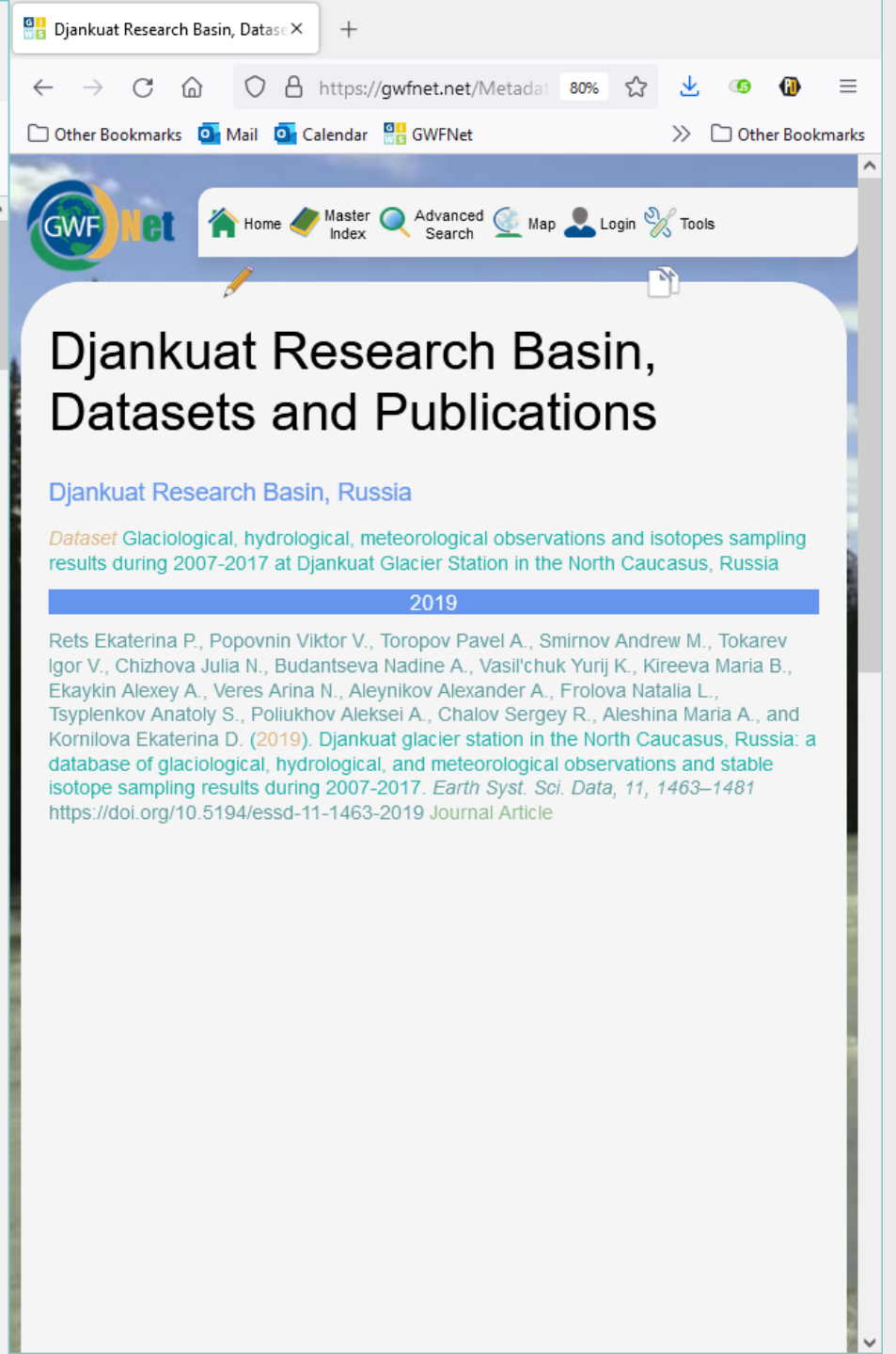
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3. Rets, EP (in review): Meteorological daily measurements of automatic weather station 'AWS1' in the Djankuat research basin from 2007-2017. https://doi.pangaea.de/10.1594/PANGAEA.895698
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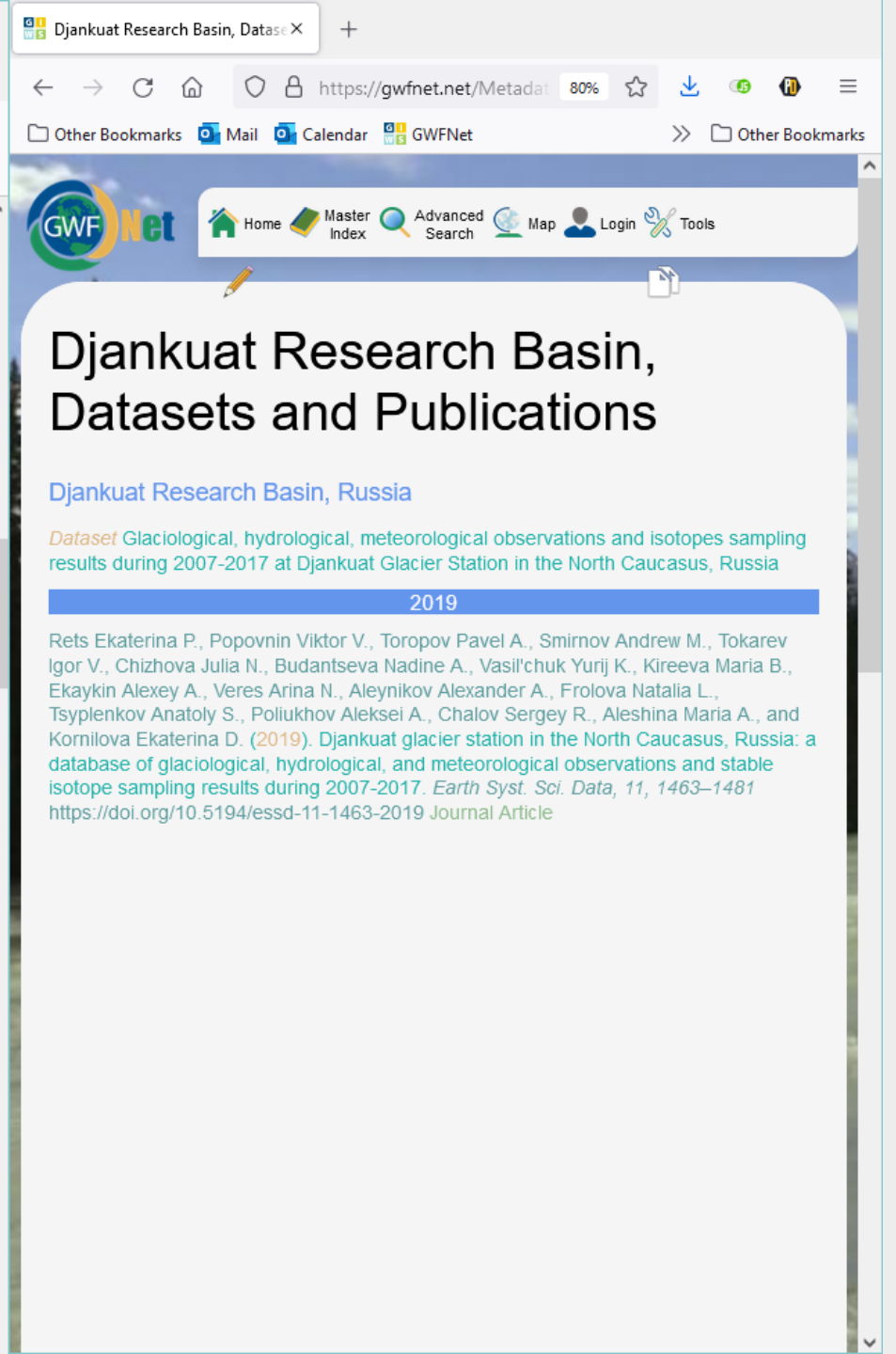
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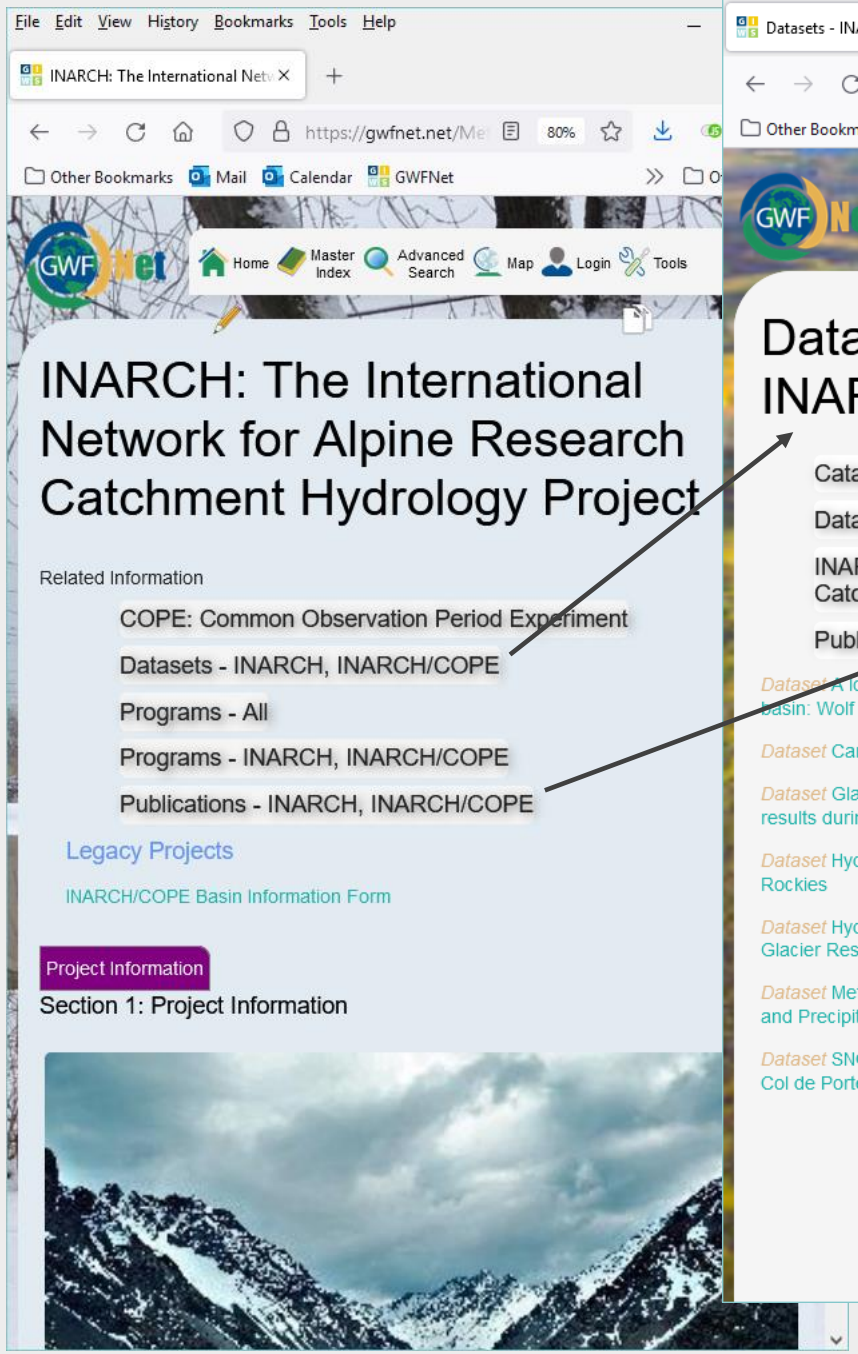
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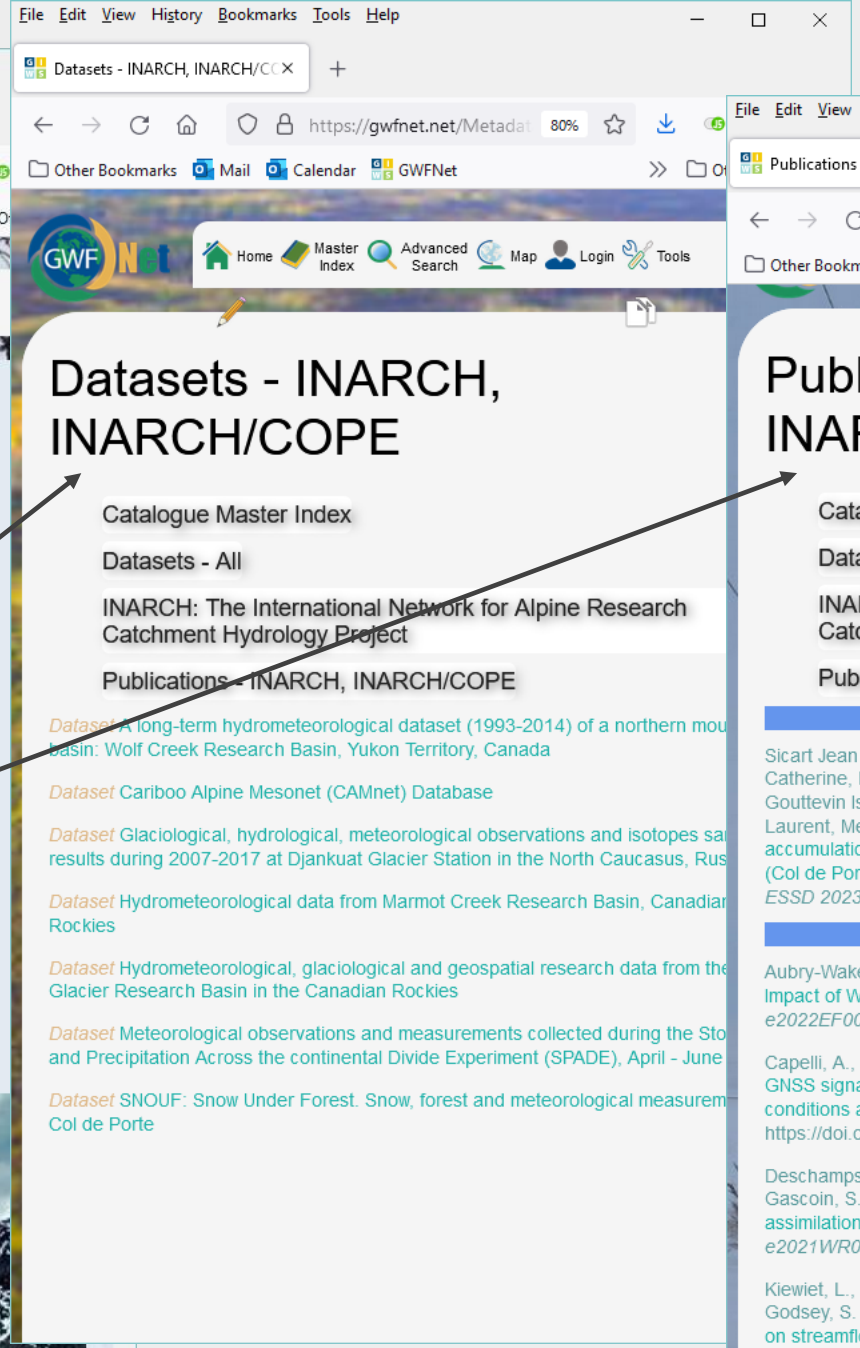
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Dataset Cariboo Alpine Mesonet (CAMnet) Database
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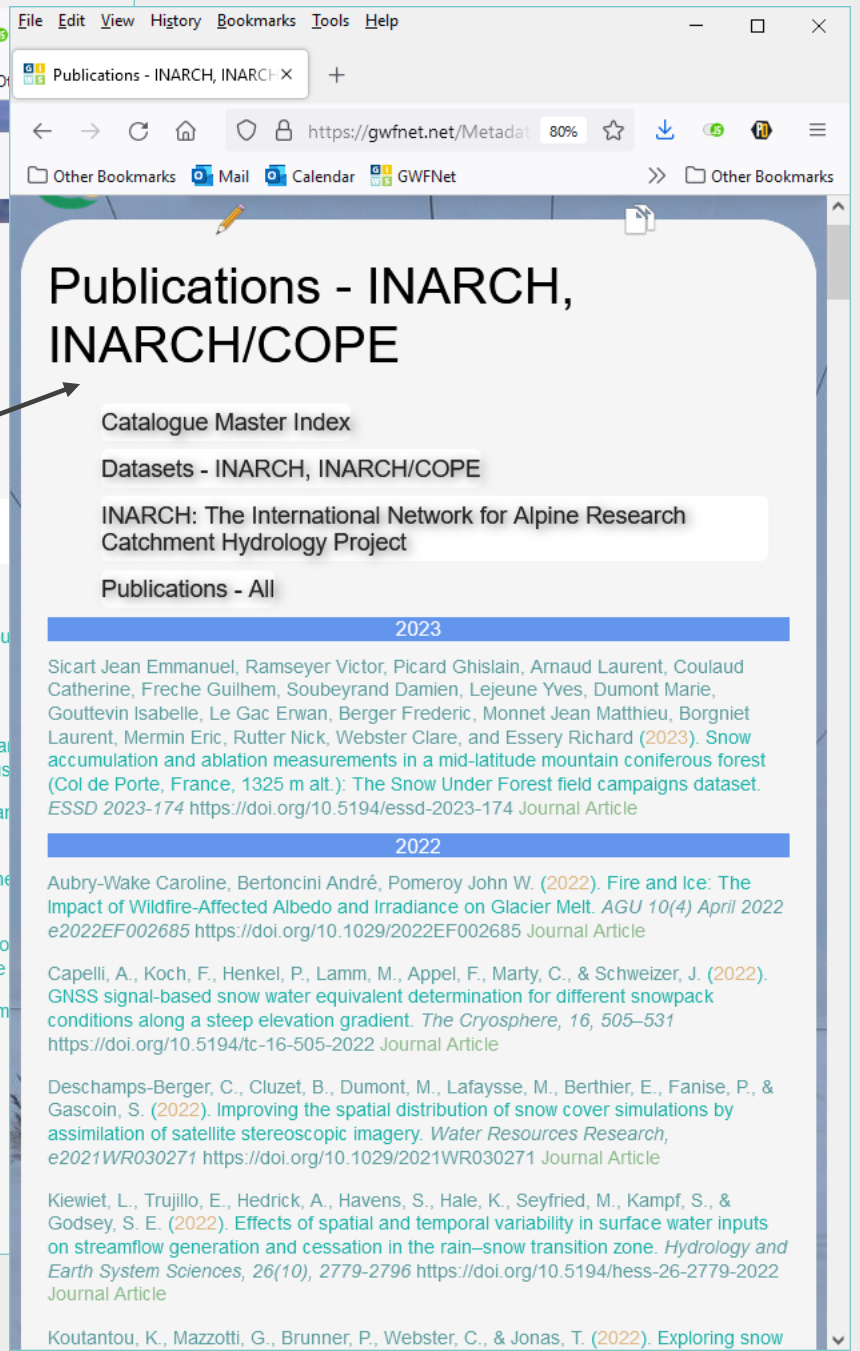
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Sicart Jean Emmanuel, Ramseyer Victor, Picard Ghislain, Arnaud Laurent, Coulaud Catherine, Freche Guilhem, Soubeyrand Damien, Lejeune Yves, Dumont Marie, Gouttevin Isabelle, Le Gac Erwan, Berger Frederic, Monnet Jean Matthieu, Borgniet Laurent, Mermin Eric, Rutter Nick, Webster Clare, and Essery Richard (2023). Snow accumulation and ablation measurements in a mid-latitude mountain coniferous forest (Col de Porte, France, 1325 m alt.): The Snow Under Forest field campaigns dataset. ESSD 2023-174 https://doi.org/10.5194/essd-2023-174 Journal Article
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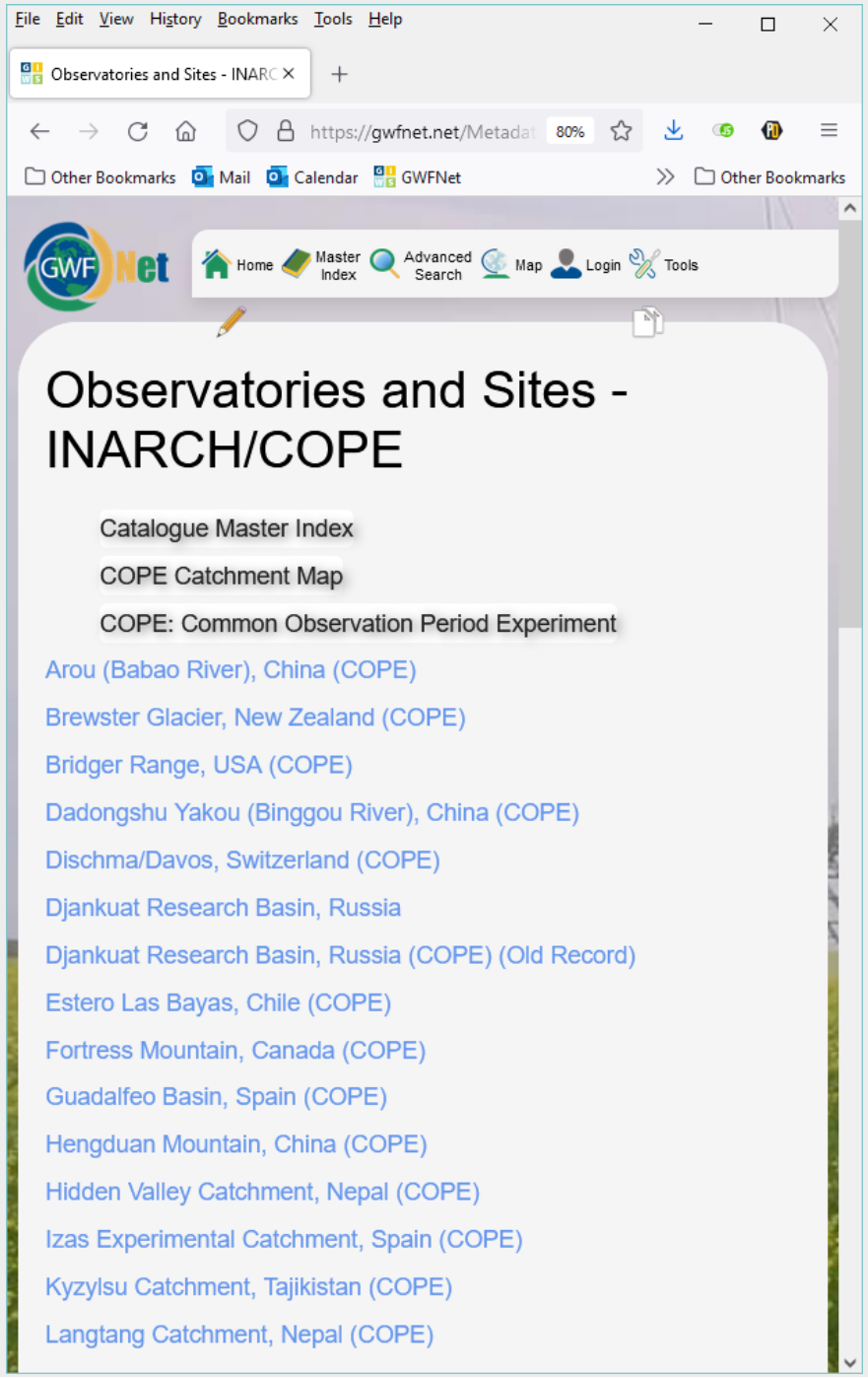
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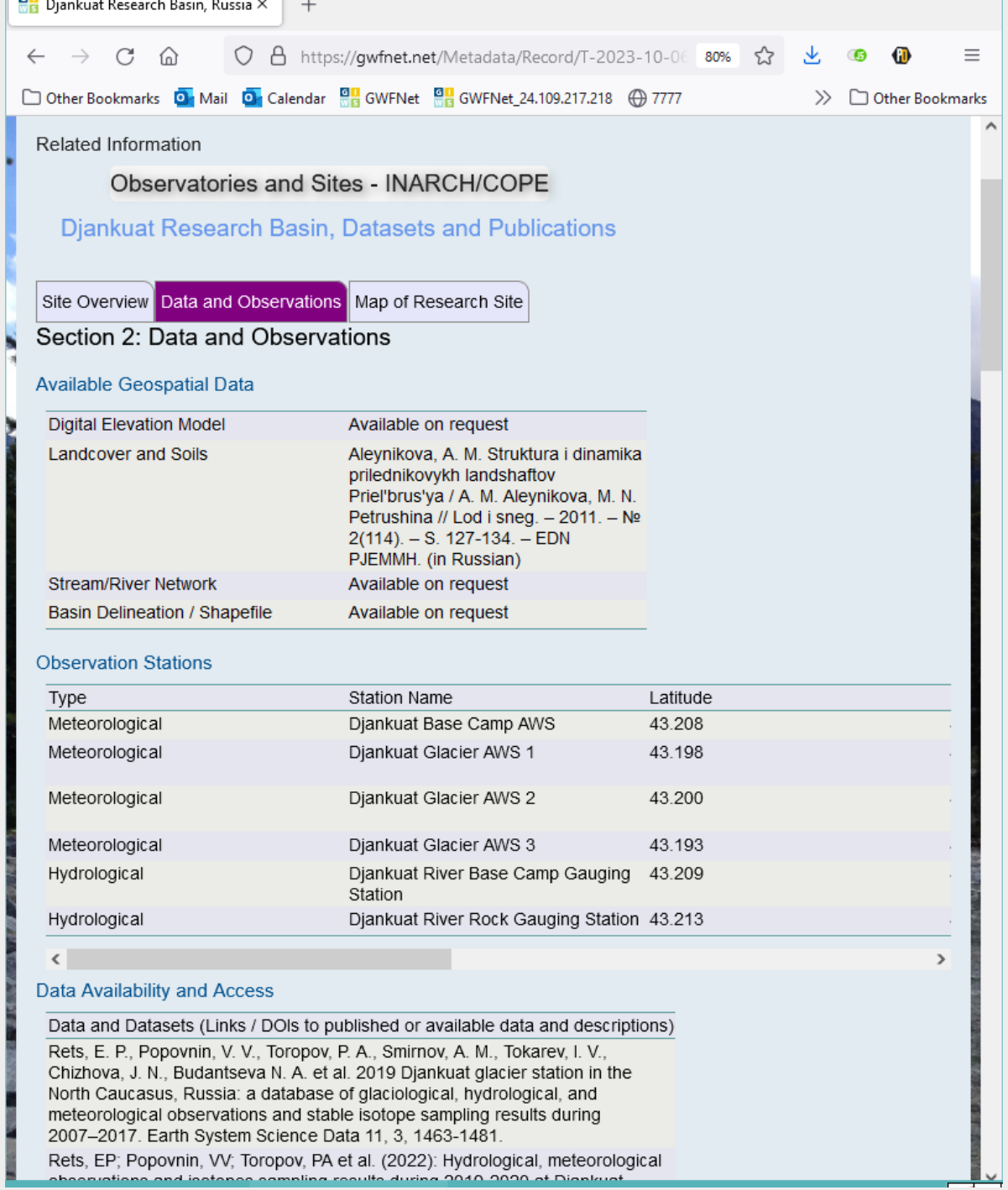
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Landcover and Soils
Aleynikova, A. M. Struktura i dinamika priednikovykh landshaftov Priel'brus'ya / A. M. Aleynikova, M. N. Petrushina // Lod i sneg. – 2011. – № 2(114). – S. 127-134. – EDN PJEMMH. (in Russian)
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Rets, EP; Popovnin, VV; Toropov, PA et al. (2022): Hydrological, meteorological

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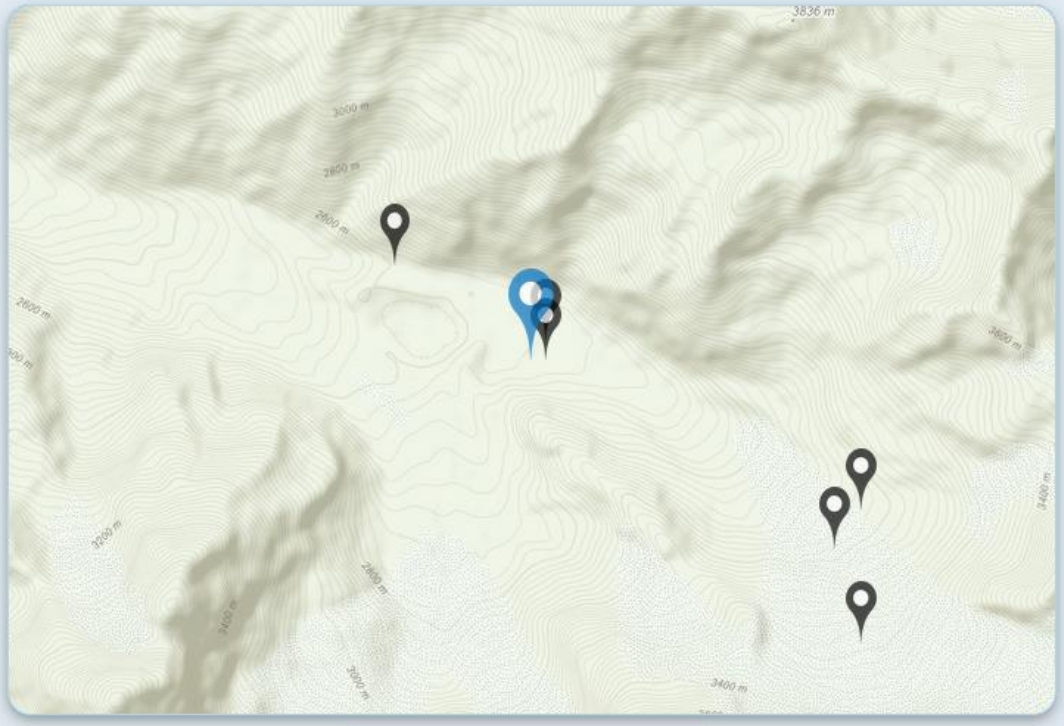

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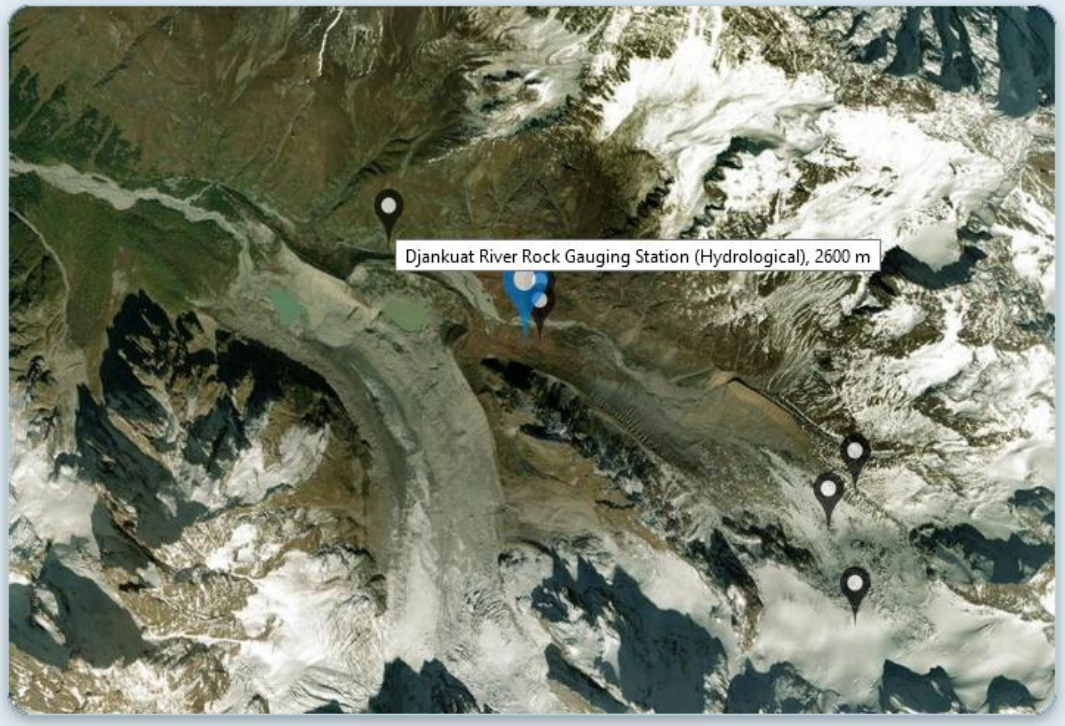

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Djankuat Research Basin, Russia

Latitude:
43.208

Longitude:
42.735

Classification:
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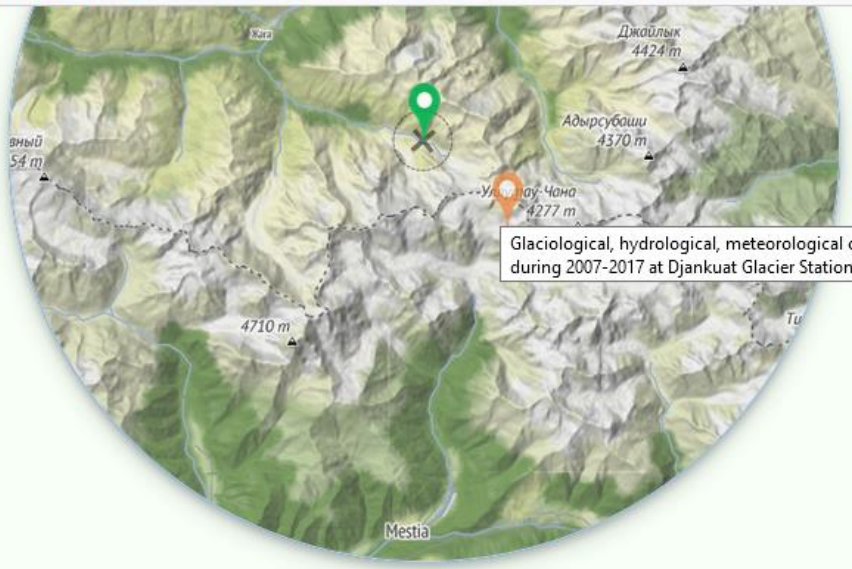

Glaciological, hydrological, meteorological observations and isotop
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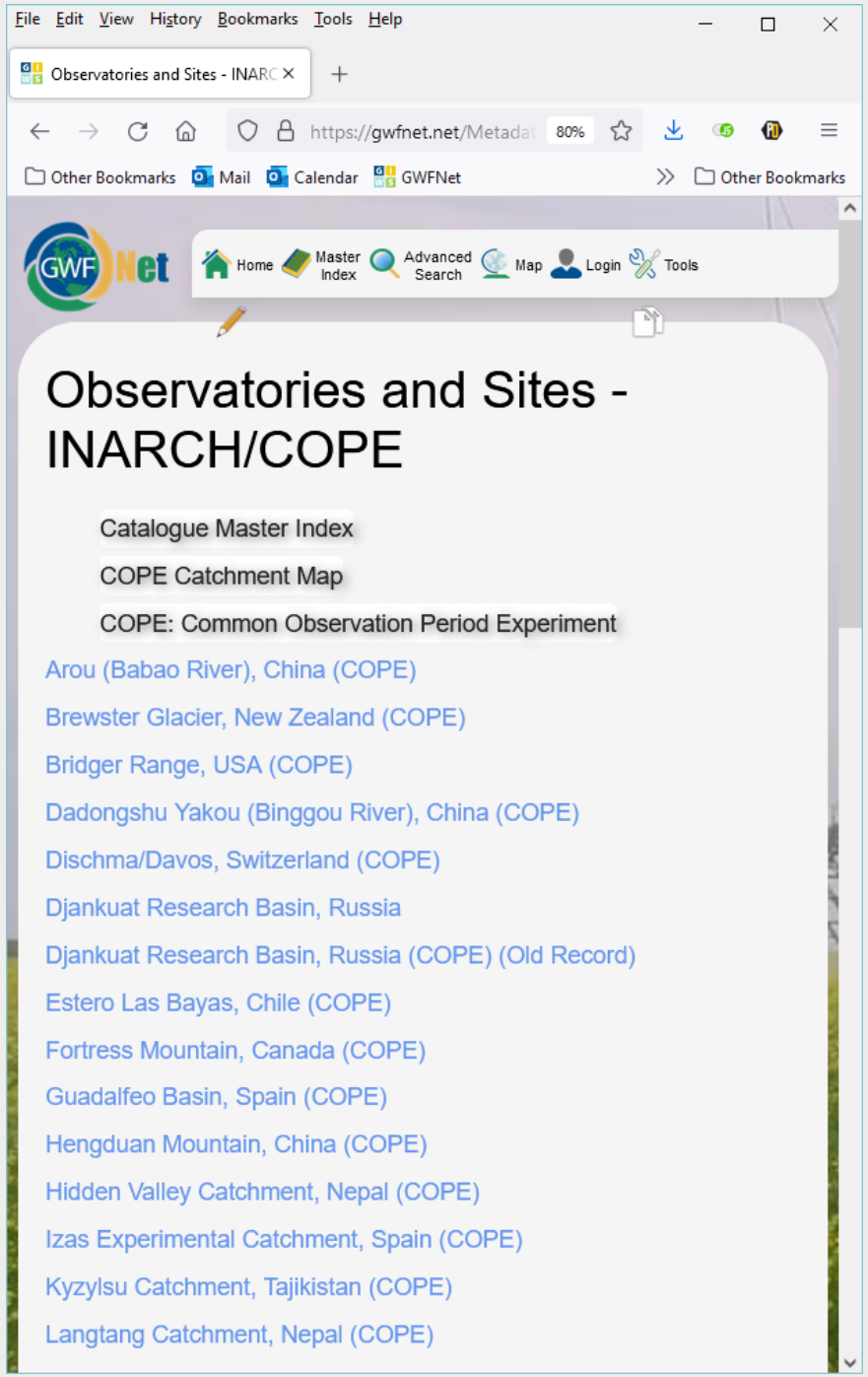
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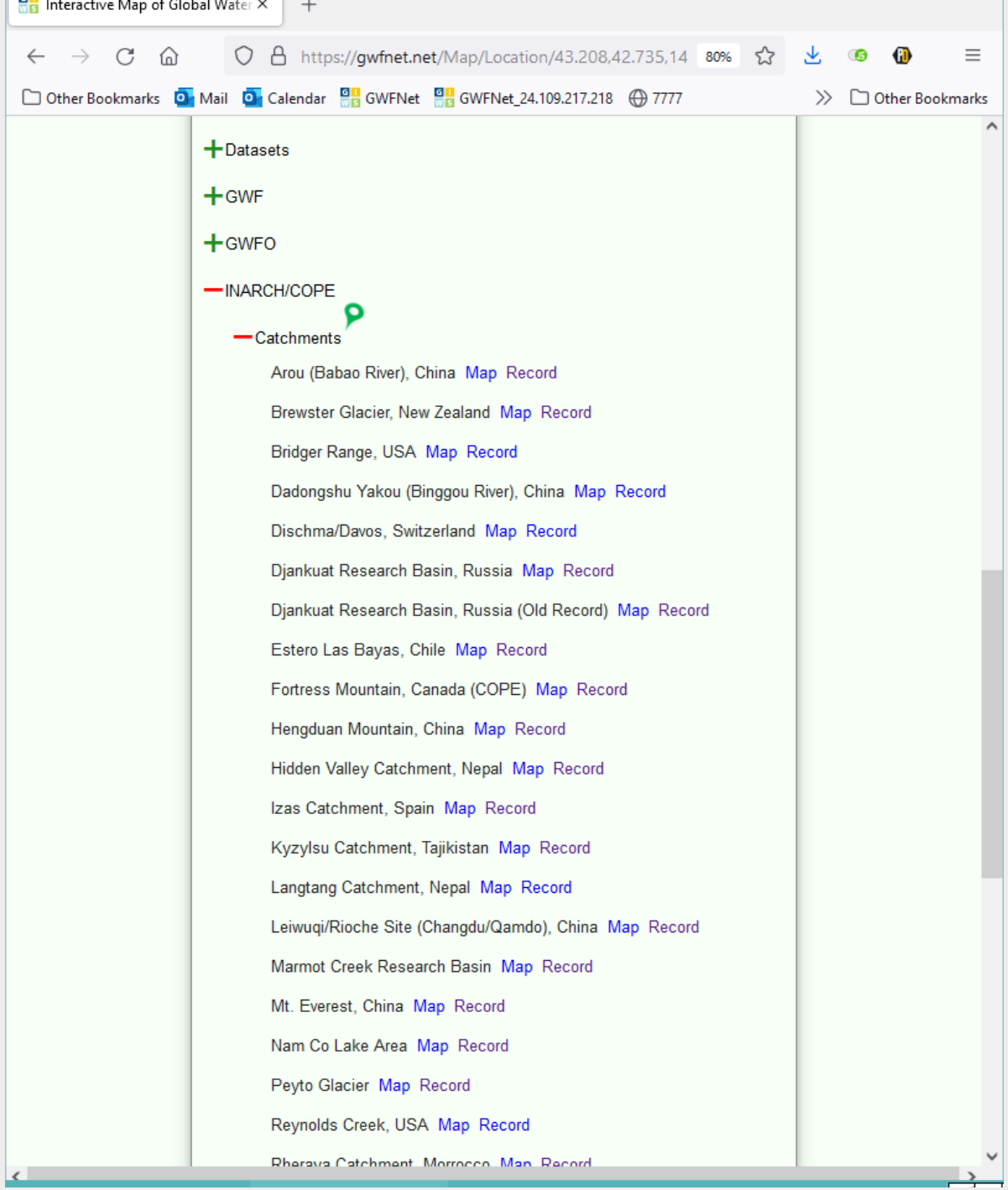
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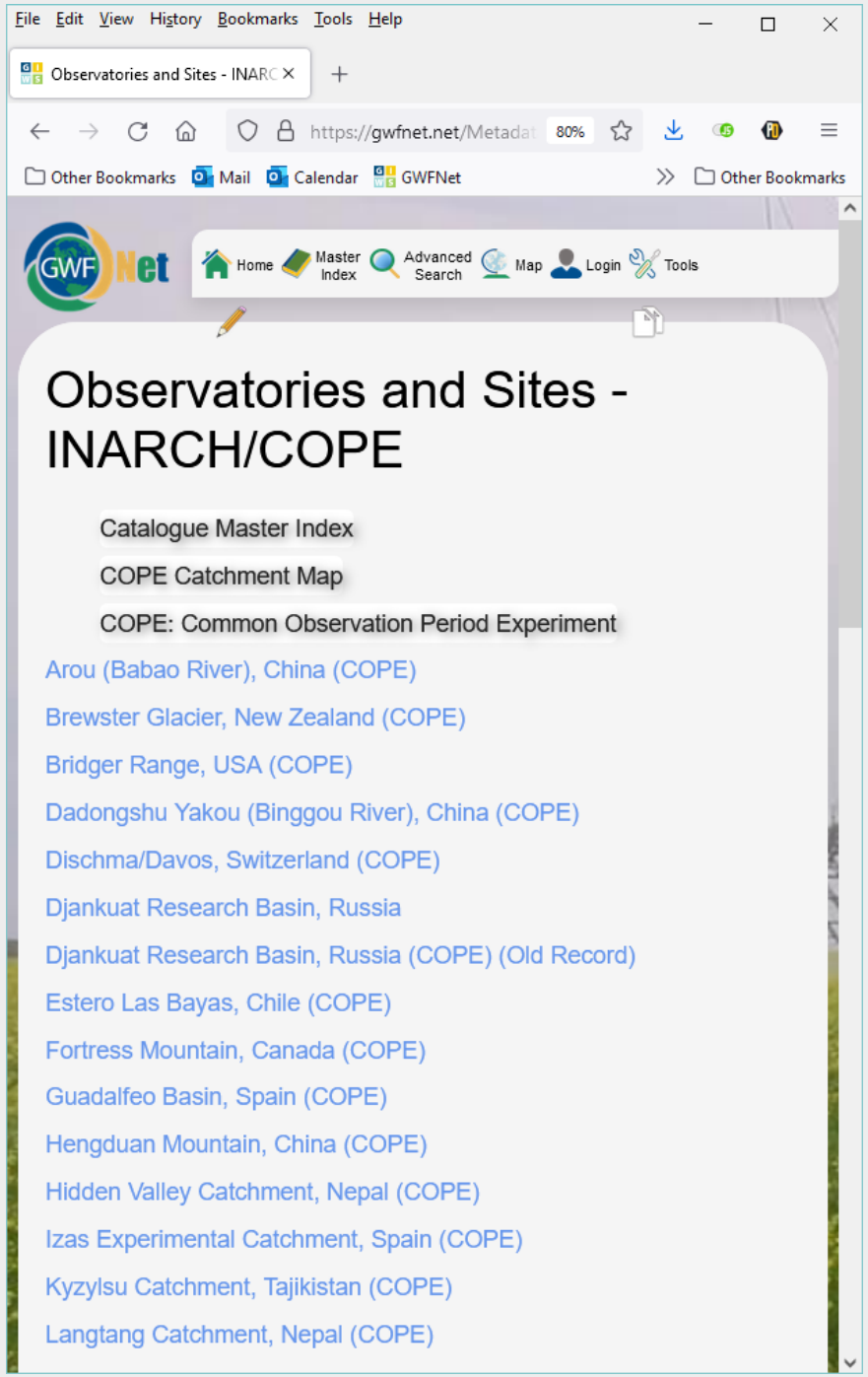
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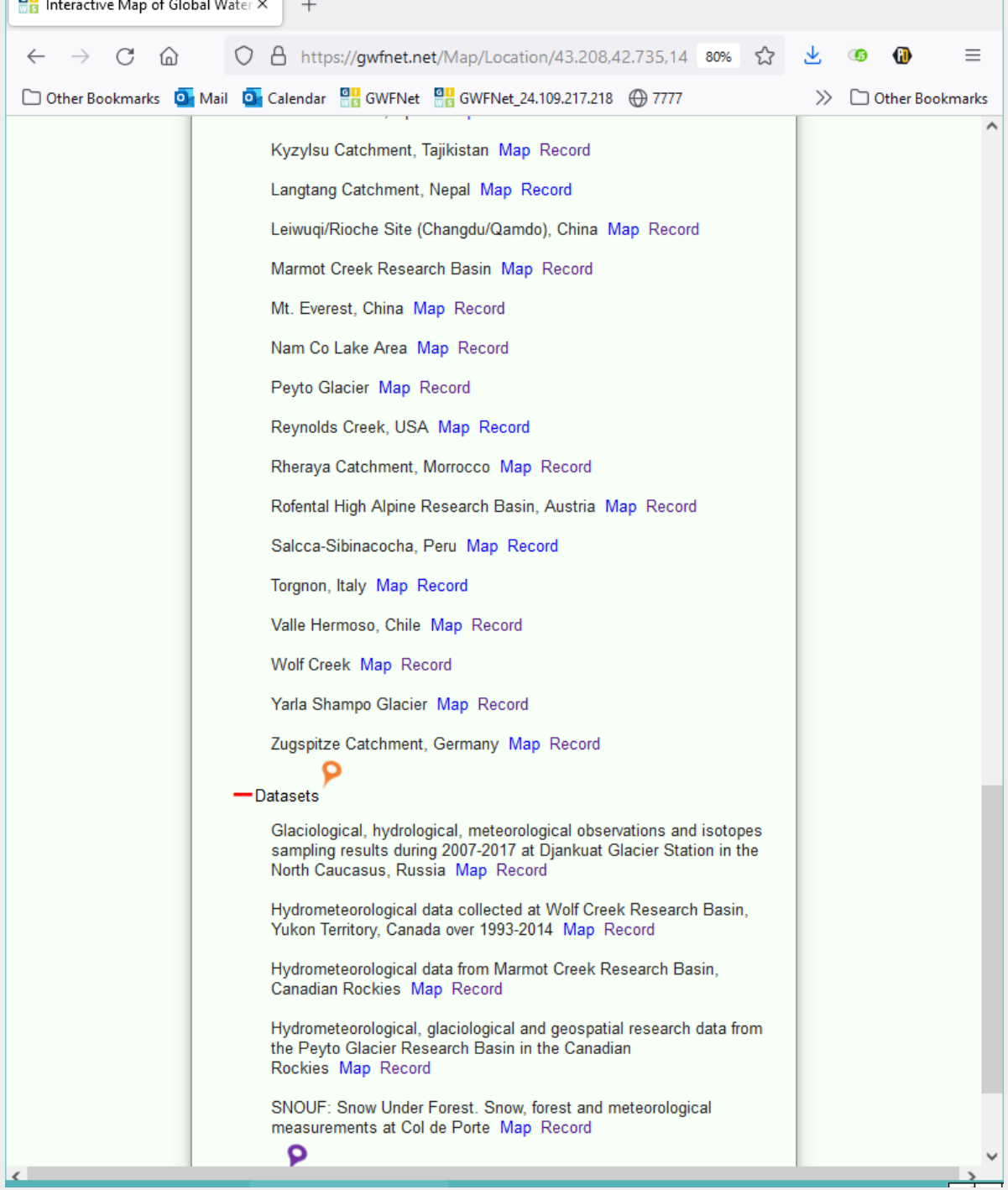
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15 Leiwuqi/Rioche Site (Changdu/Qamdo), China

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17 Mt. Everest, China

18 Nam Co Lake Area

19 Peyto Glacier

20 Reynolds Creek, USA

21 Rheraya Catchment, Morrocco

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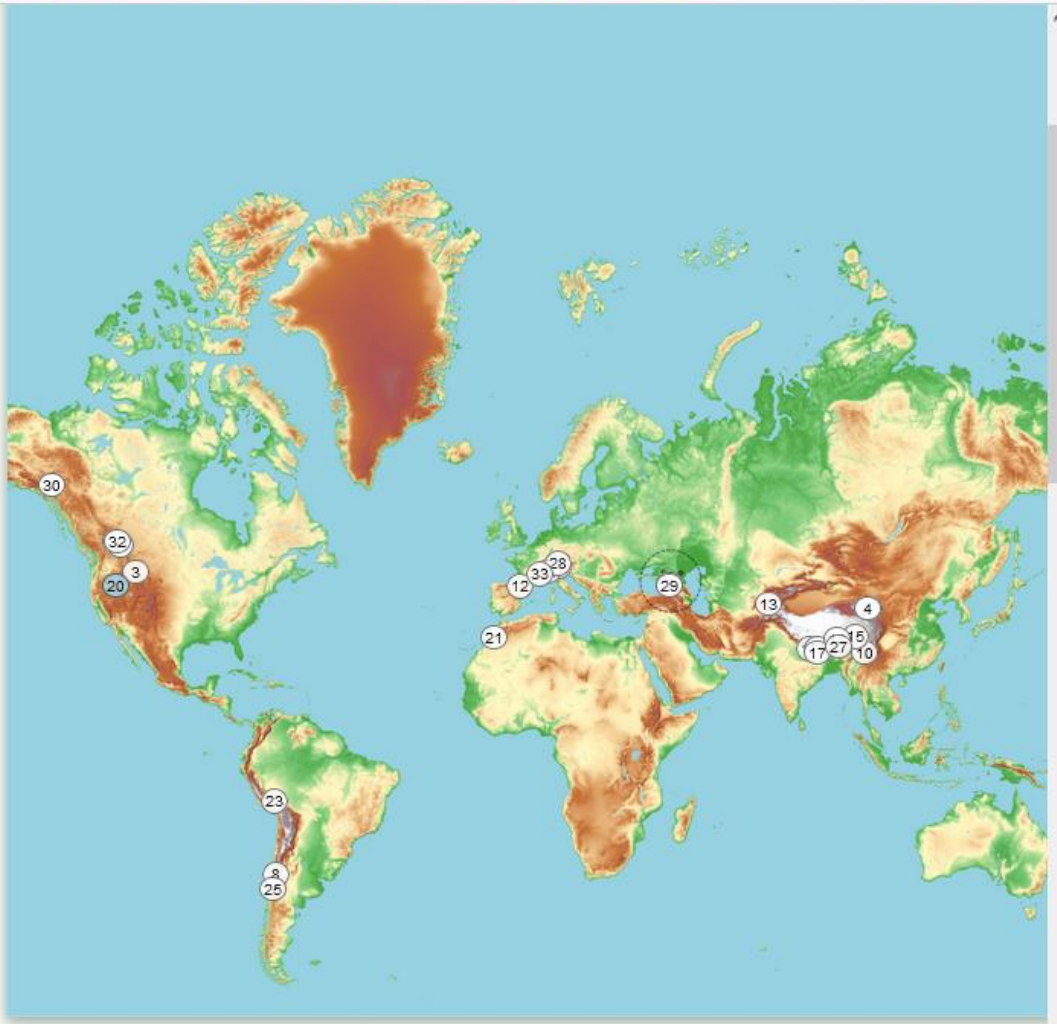

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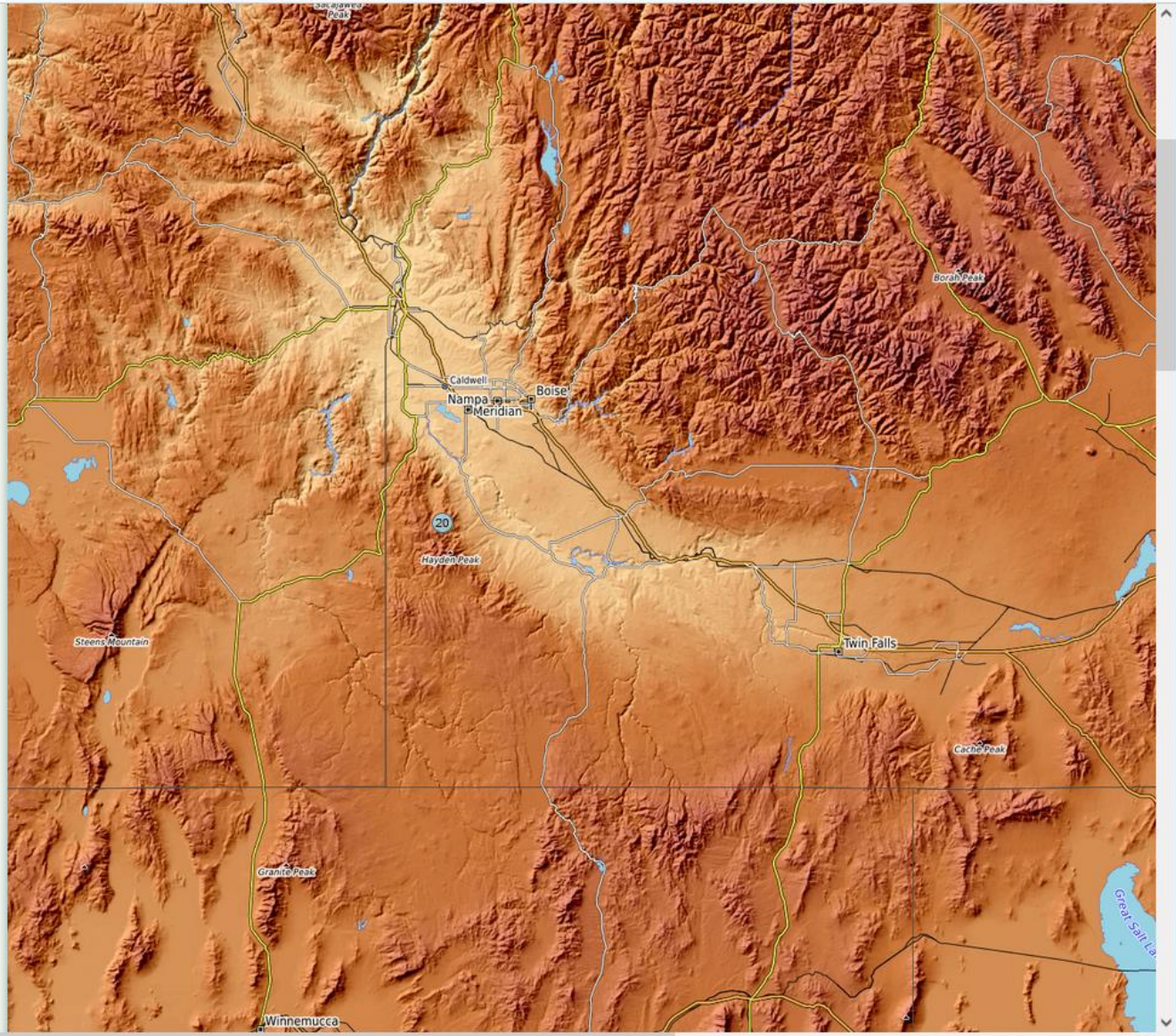
30 Hydrometeorological data collected at Wolf Creek Research Basin, Yukon Territory, Canada over 1993-2014



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Models - INARCH/COPE

COPE: Common Observation Period Experiment

Models

CRHM (Cold Regions Hydrological Model)

Cosipy

OGGM (Open Global Glacier Model)

openAMUNDSEN

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COPE: Common Observ Period Experiment

Related Information

INARCH: The International Network for Alpin Catchment Hydrology Project

Observatories and Sites - INARCH/COPE

Programs - All

Programs - INARCH, INARCH/COPE

Models - INARCH/COPE

INARCH/COPE Basin Information Form

Project Information

Section 1: Project Information

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Cosipy

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Cosipy

Related Information

Models - INARCH/COPE

Model Information | Inputs | Outputs | Workflow

Section 1: Model Information

Name (e.g., CRHM)

Cosipy

Full Name (e.g., Cold Regions Hydrological Model)

COupled Snowpack and Ice surface energy and mass balance model in PYthon (COSIPY)

Description

Cosipy is a framework for modeling distributed snow and glacier mass changes.

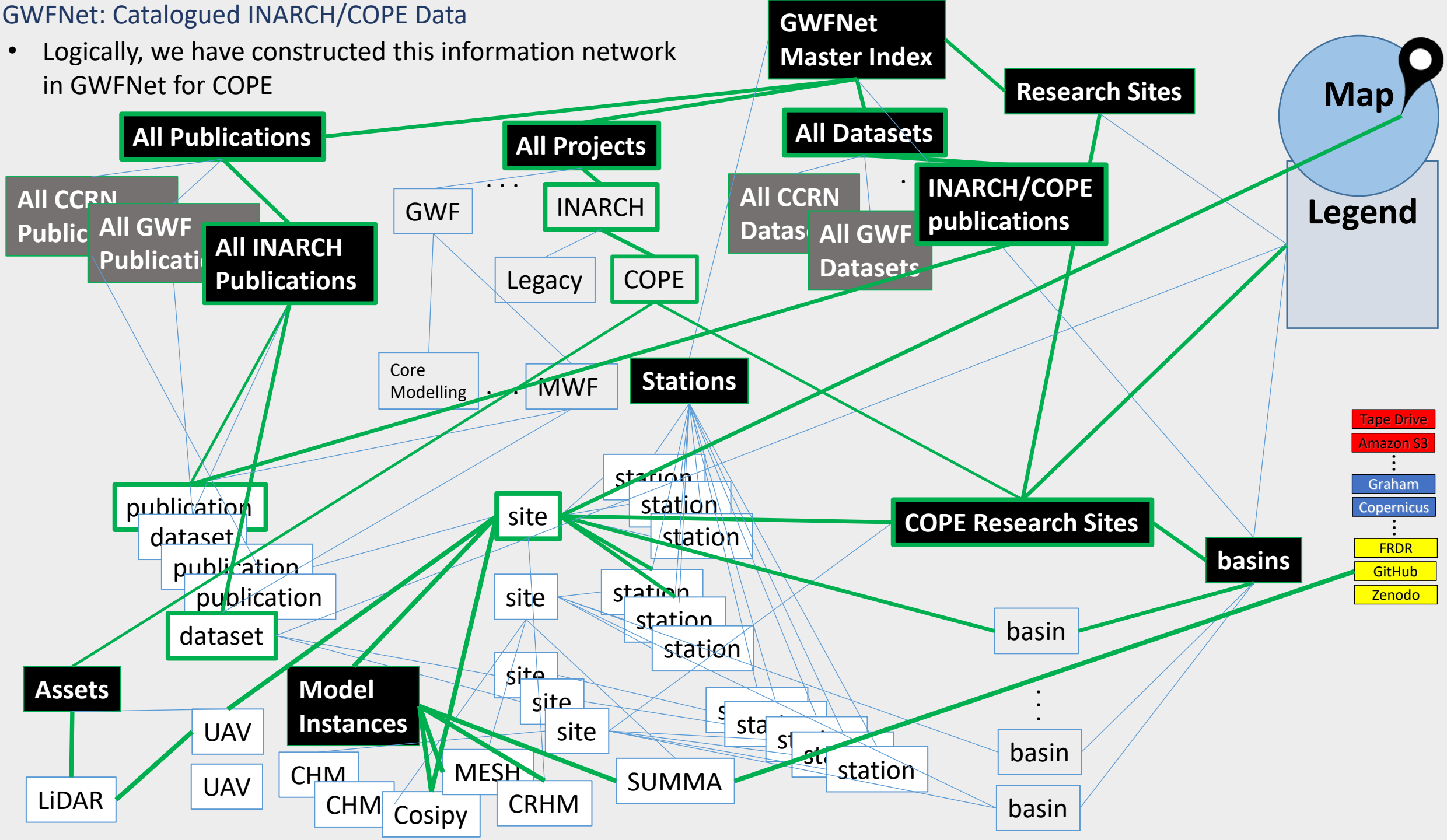
Cosipy has a modular structure so that an exchange of routines or parameterizations of physical processes is possible with little effort. The framework consists of a computational kernel, which forms the runtime environment and takes care of the initialization, the input–output routines, and the parallelization, as well as the grid and data structures. This structure offers maximum flexibility without having to worry about the internal numerical flow. The adaptive subsurface scheme allows an efficient and fast calculation of the otherwise computationally demanding fundamental equations. The surface energy balance scheme uses established standard parameterizations for radiation as well as for the energy exchange between atmosphere and surface. The schemes are coupled by solving both surface energy balance and subsurface fluxes iteratively such that consistent surface skin temperature is returned at the interface. COSIPY uses a one-dimensional approach limited to the vertical fluxes of energy and matter but neglects any lateral processes. Accordingly, the model can be easily set up in parallel computational environments for calculating both energy balance and climatic surface mass balance of glacier surfaces based on flexible horizontal grids and with varying temporal resolution.

https://cryo-tools.org/tools/cosipy

Institution

GWFNet: Catalogued INARCH/COPE Data

- Logically, we have constructed this information network in GWFNet for COPE



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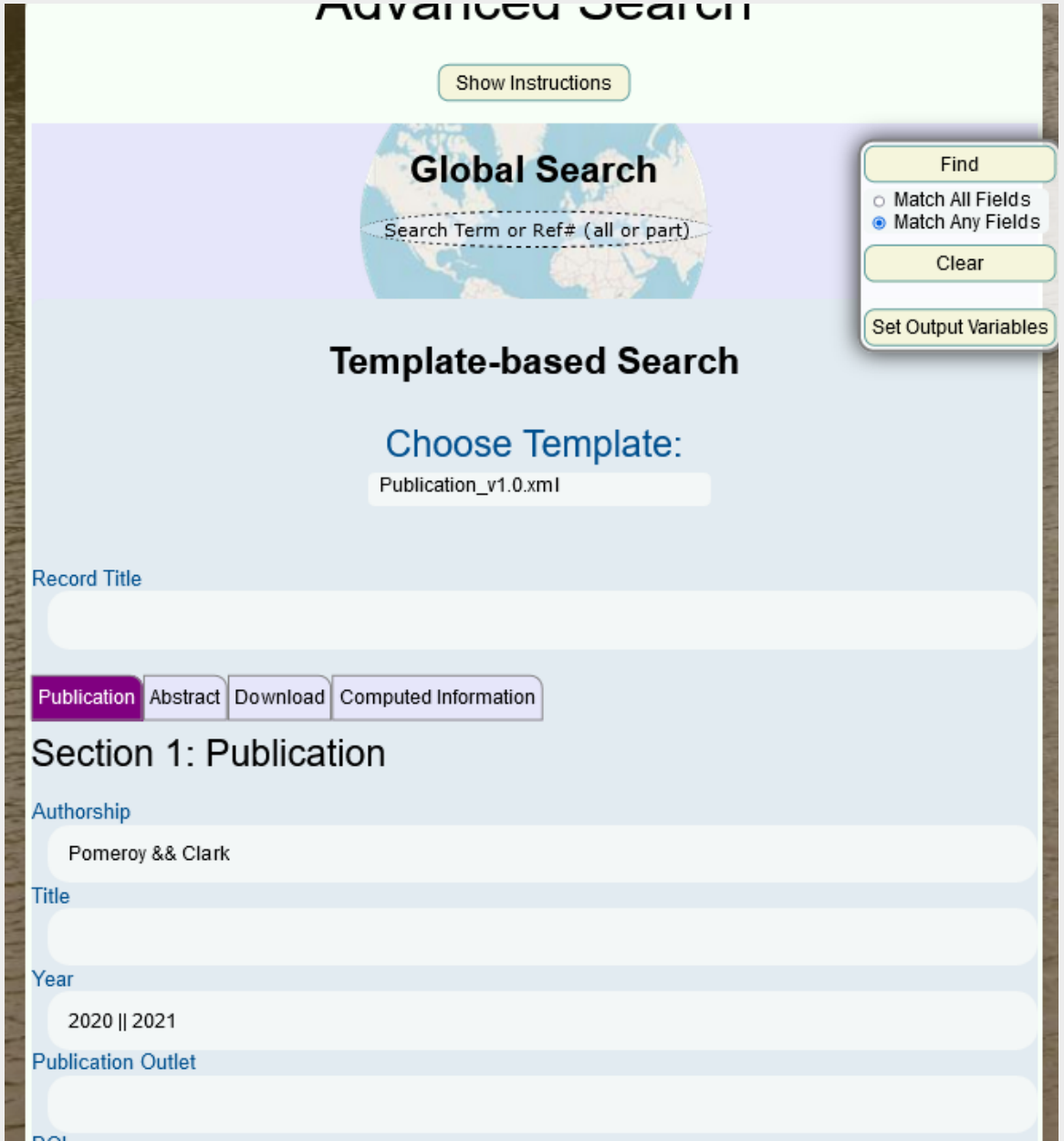

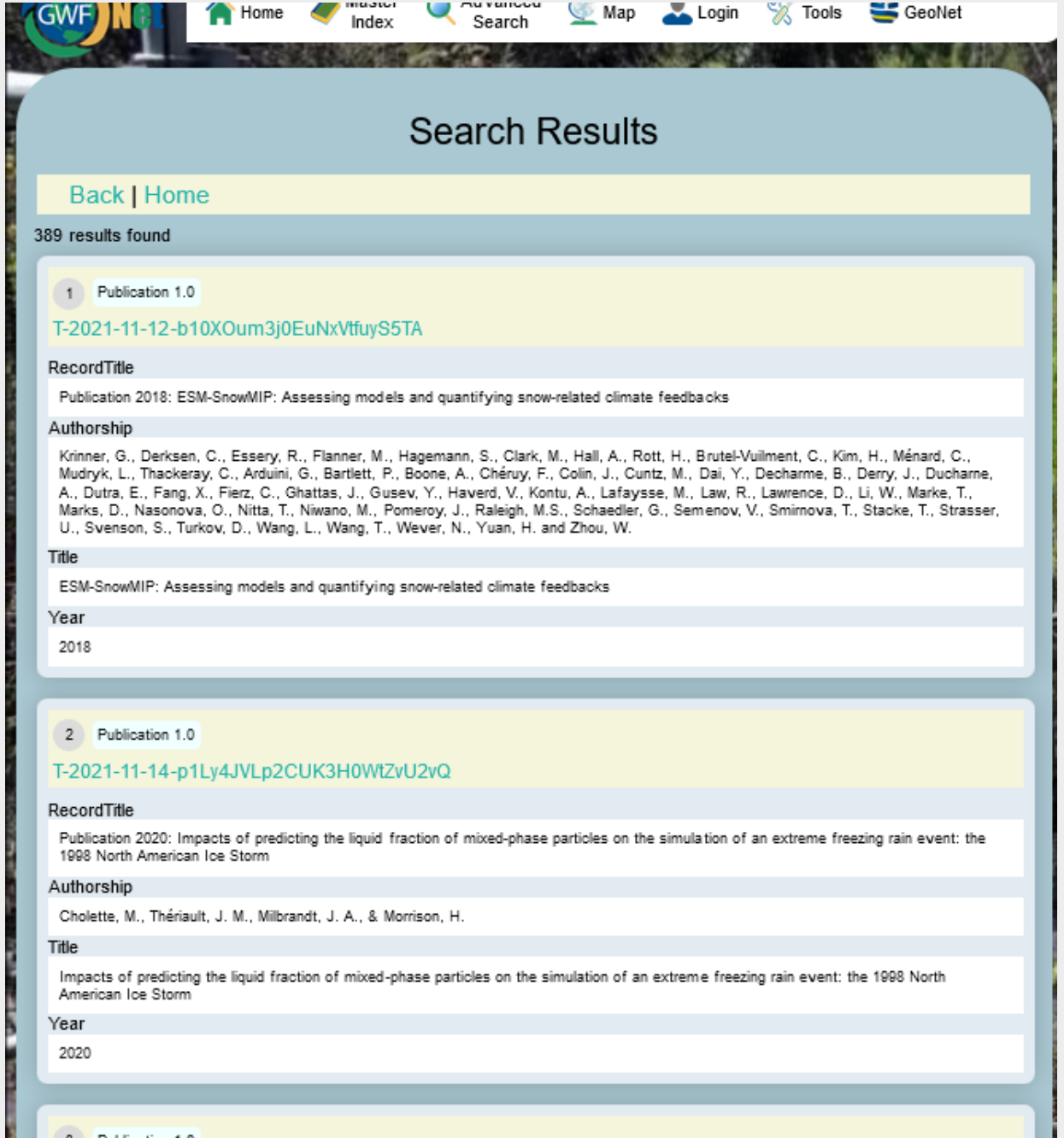

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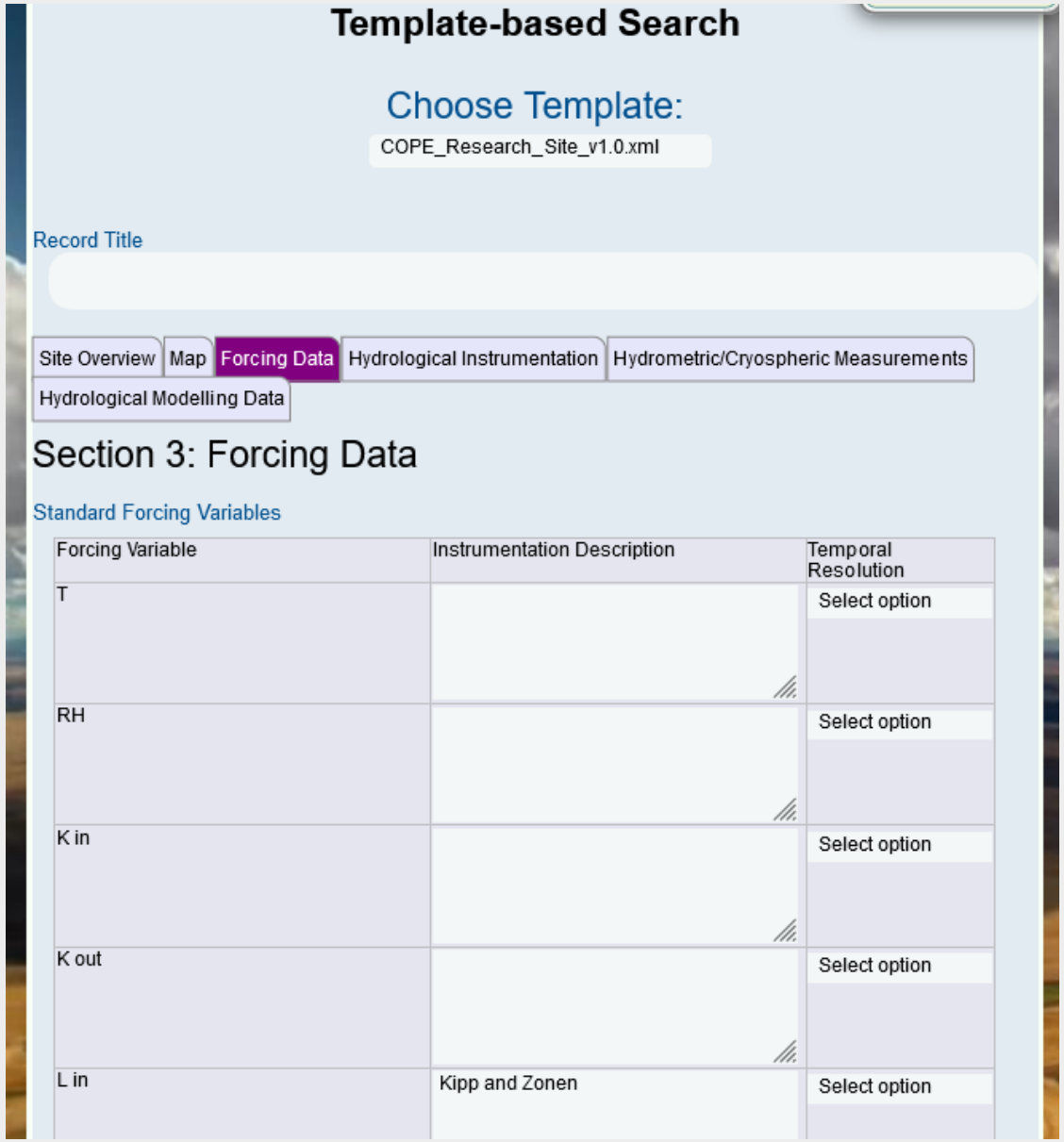
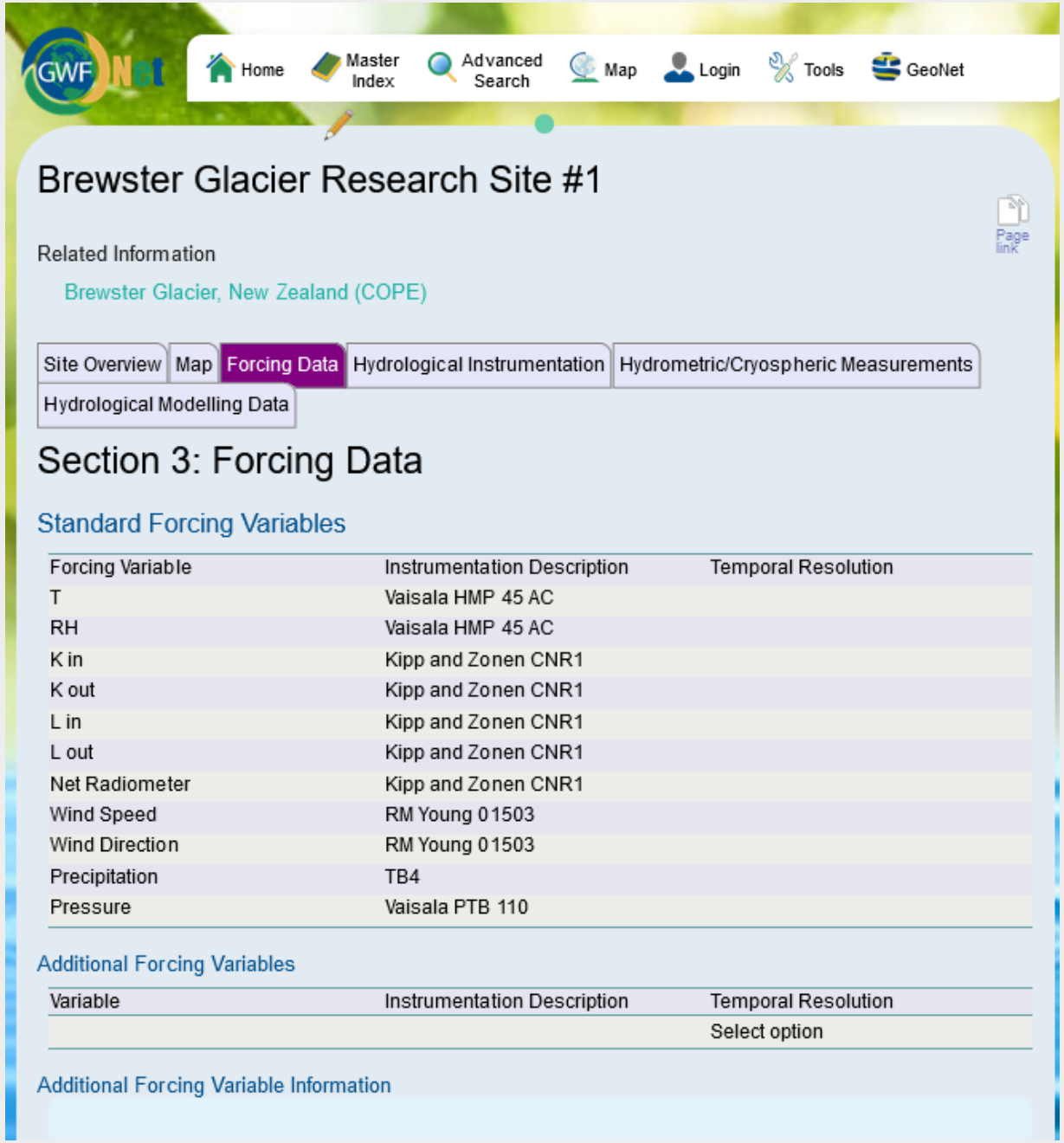
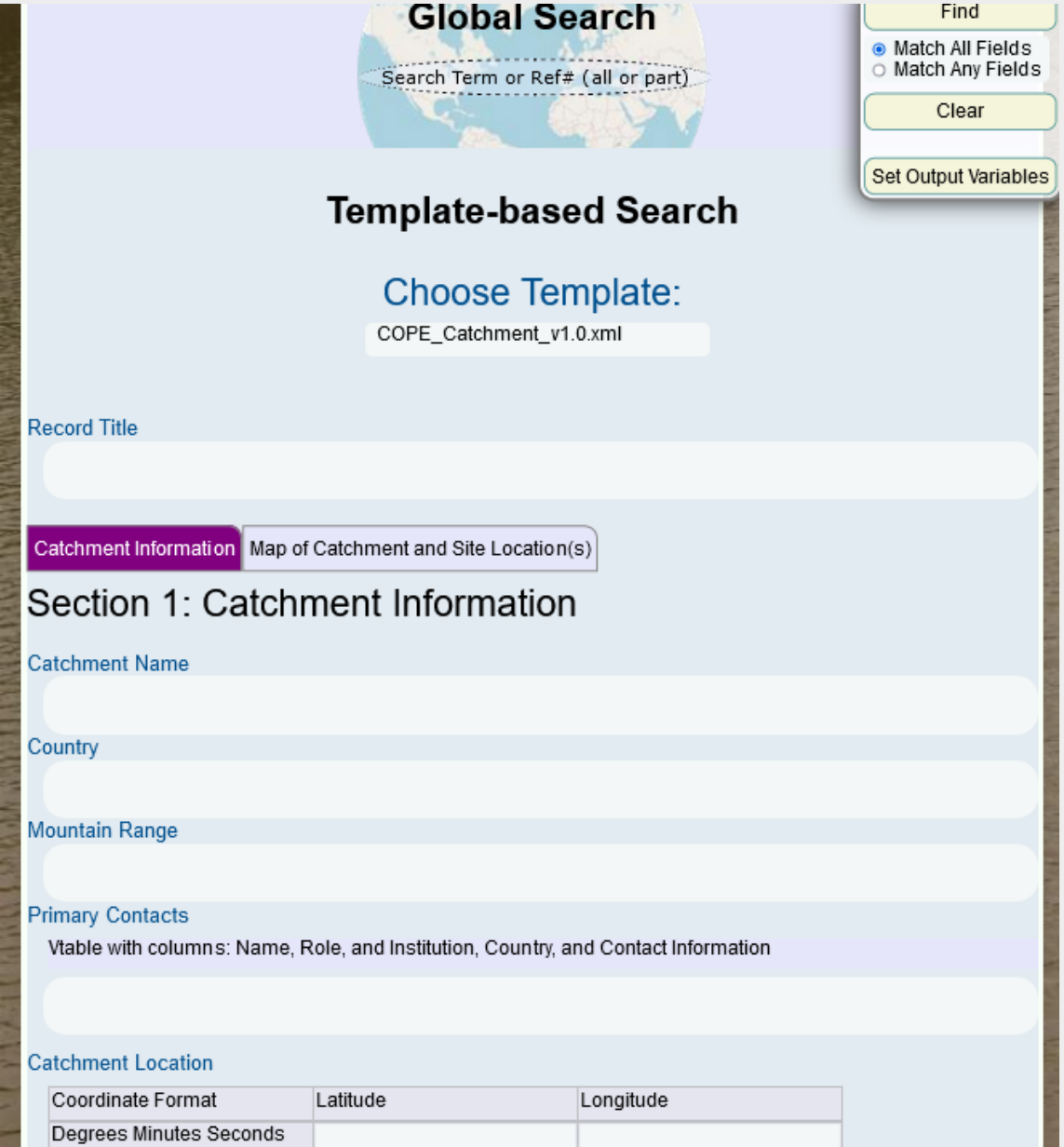




Advanced Search

- Select Template (e.g., Catchment) and immediately press Find -- gives list of all Catchment records!



Version 2

GWFNet2

Appearance and Operation:

Exact same appearance

Current features are exactly the same or improved

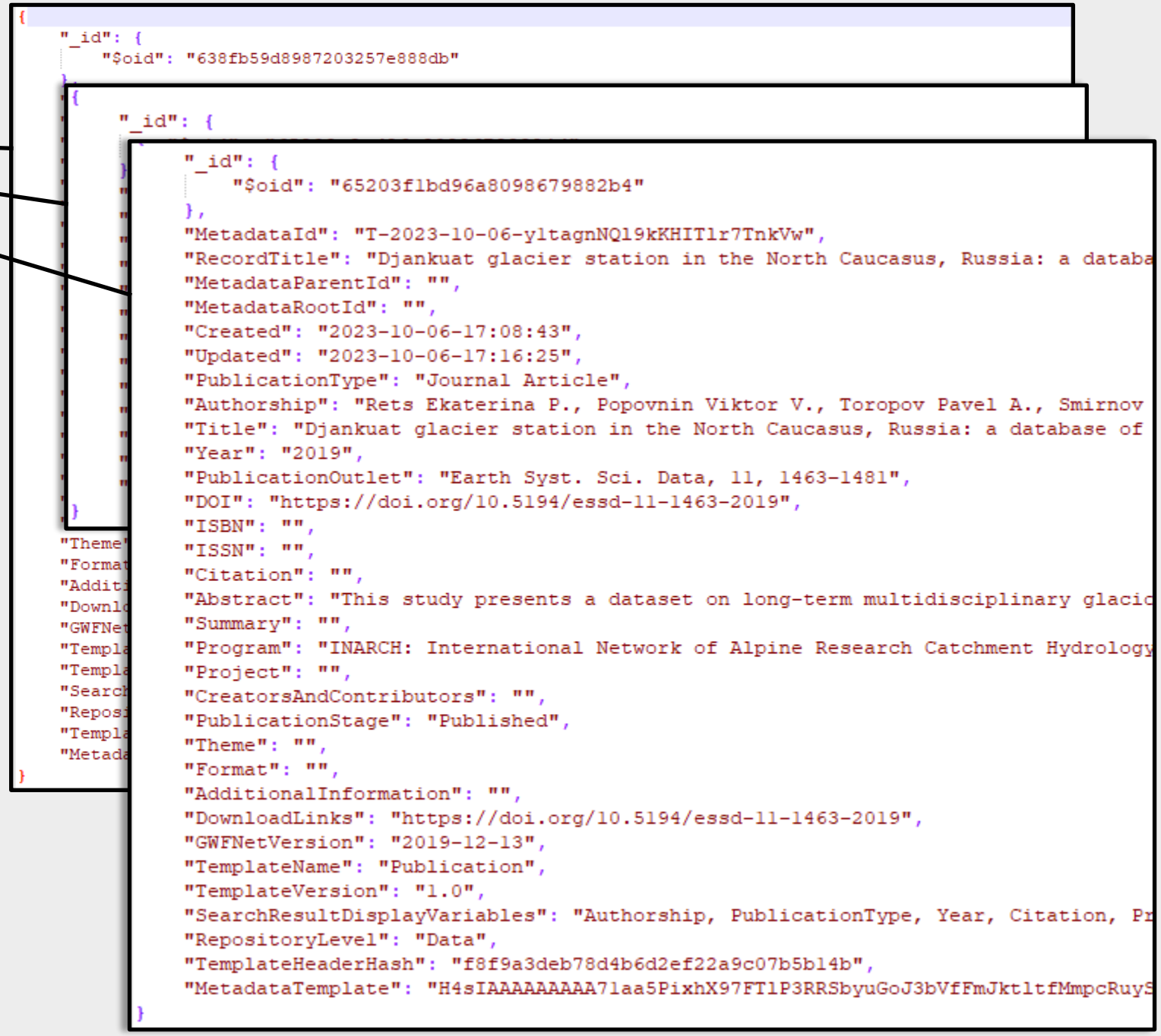
Database:

Moves away from NoSQL (MongoDB):

Collection

GWFNetDB.**Metadata**

Documents



GWFNet2

Appearance and Operation:

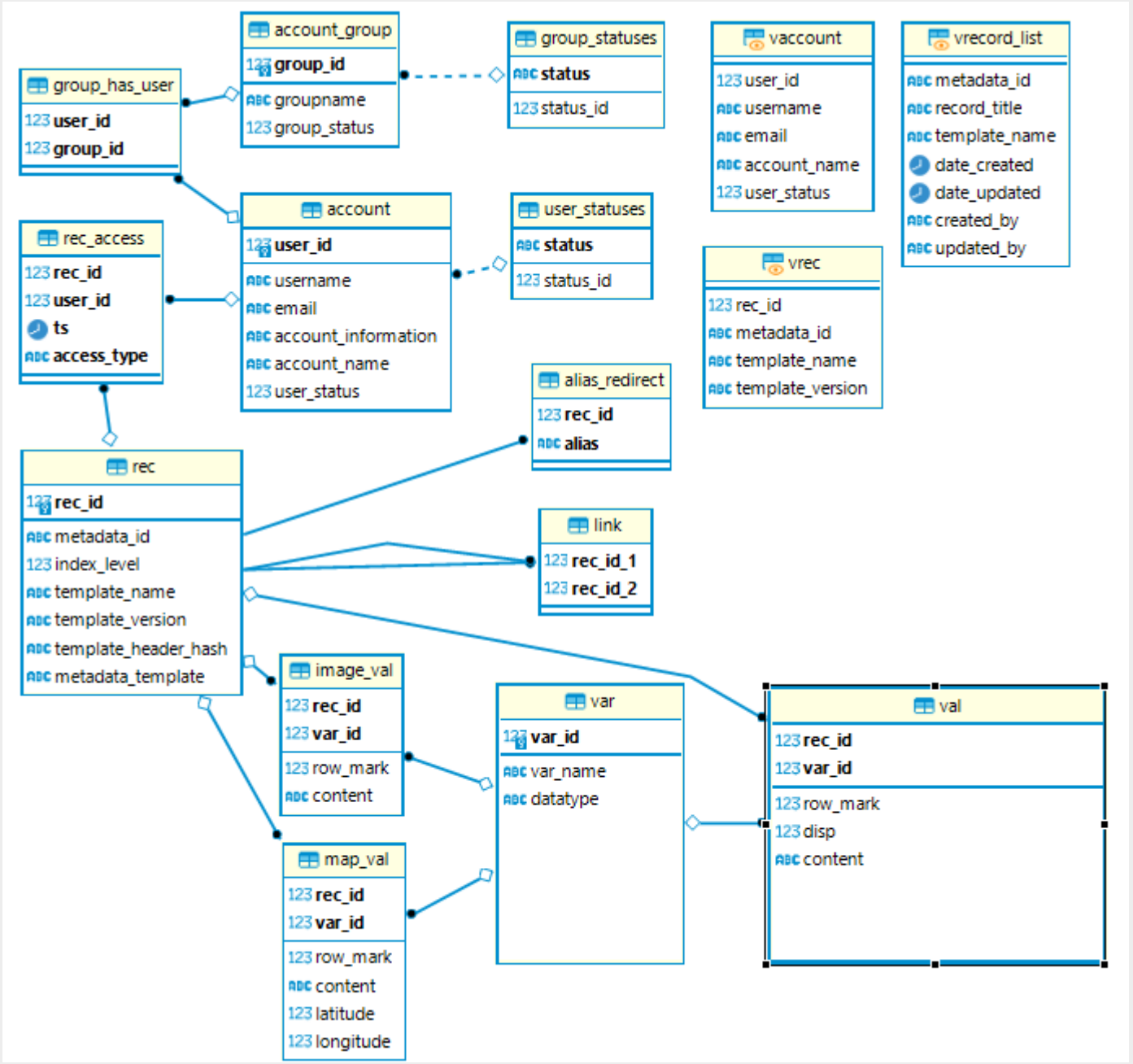
Exact same appearance

Current features are exactly the same or improved

Database:

Moves away from NoSQL (MongoDB) to equivalently flexible SQL schema enabling overlaying of features needed for various programs (e.g., GWFO, Canada Water Agency)

Schema is value-centric (rather than record-centric) as the value will be under significant scrutiny by rapid searches, complex searches, machine learning and artificial intelligence algorithms thay may be implemented to create “inferred links” available to the user when switched on: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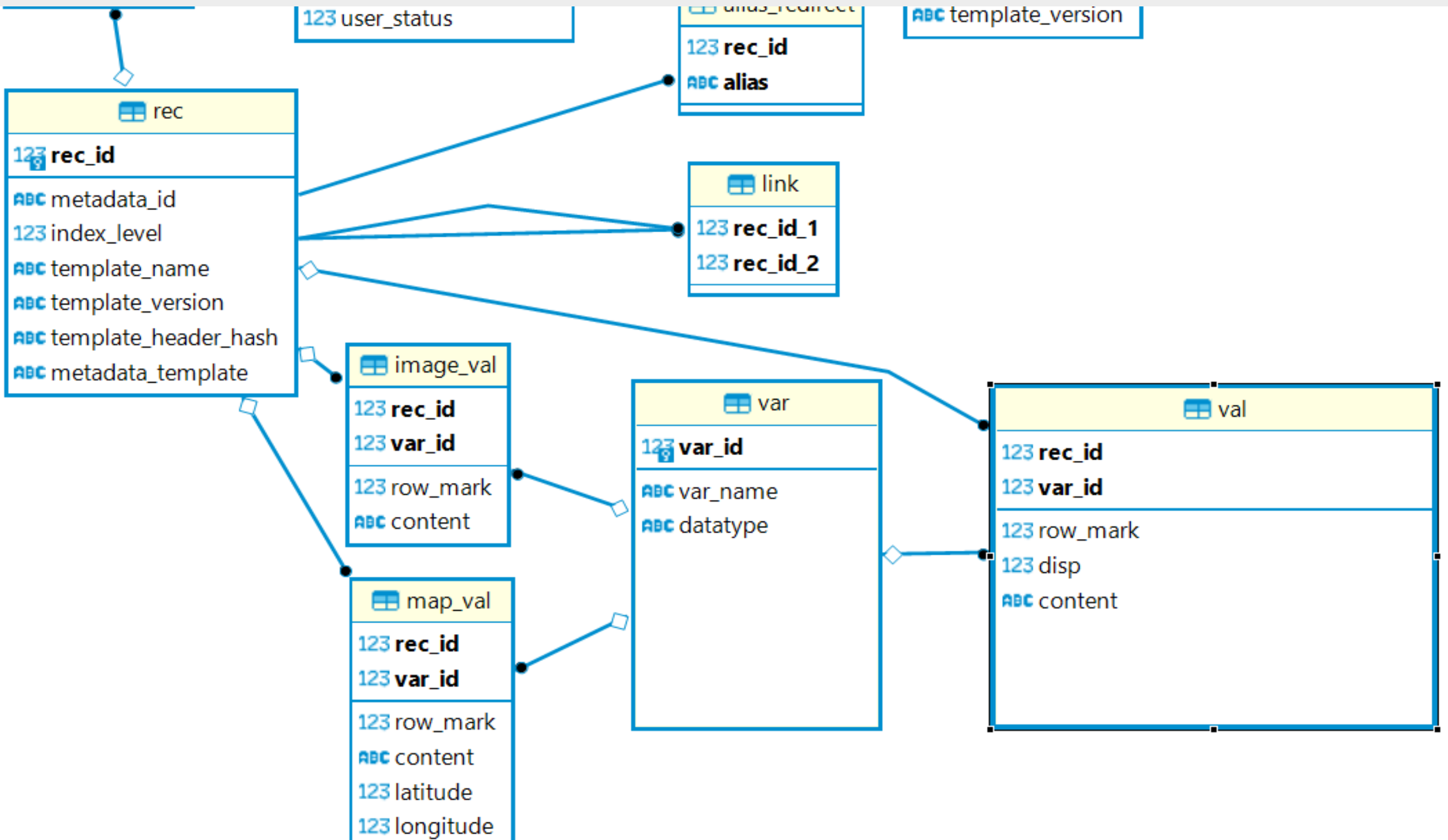
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GWFNet2

Appearance and Operation:

Exact same appearance

Current features are exactly the same or improved

Database:

Moves away from NoSQL (MongoDB) to equivalently flexible SQL schema enabling overlaying of features needed for various programs (e.g., GWFO, Canada Water Agency)

Schema is value-centric (rather than record-centric) as the value will be under significant scrutiny by rapid searches, complex searches, machine learning and artificial intelligence algorithms thay may be implemented to create “inferred links” available to the user when switched on

In addition, values can be given private access to individual users or groups where needed (e.g., distribution of keys to unlock datasets restricted to only certain users)

With version 2, GWFNet will employ standard databases (choice of SQLServer, PostgreSQL, and MySQL) rather than MongoDB –standard databases will not go away anytime soon, whereas MongoDB is getting a bit iffy

Searches

Very, very fast using trigram indexing (especially for inexact and regular expression searches)

Improved advanced search enabling per-field usage of quotes, plus sign, and minus sign, e.g.,

`Abstract: beaver +”j.*pomeroy” -rainfall –”northern alberta”`

Status

Equivalence with GWFNet1 has been completed

Testing is being performed now and GWFNet version2 will come online in early November/2023

The end, thank you.