Inter- and transdisciplinary mountain data across the HKH: Identifying user requirements and access preferences

GEO MOUNTAINS
Observing Mountain Environments

A workshop and survey coordinated by GEO Mountains

30 June 2022

MOUNTAIN RESEARCH INITIATIVE

ICIMOD

ADAPTATION AT ALTITUDE
Taking Action in the Mountains

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Agenda (CEST)

10:00 – 10:10: ***Welcome, introductions & workshop aims***
Carolina Adler & James Thornton (MRI & GEO Mountains)

10:10 – 10:30: *Access to scientific data to facilitate mountain specific research*
Sudip Pradhan, ICIMOD

10:30 – 10:50: *Biodiversity data mobilization from the HKH*
Lily Shrestha, GBIF Asia Regional Support Team

10:50 – 11:20: *The GEO Mountains data inventories & other relevant work*
Dr. James Thornton, MRI and GEO Mountains

11:20 – 11:30: *Tea Break*
All

11:30 – 12:30: *Open discussion of several key questions*
All

12:30 – 12:45: *Continue (or begin) the survey*
All

12:45 – 13:00: *Summary and identification of next steps*
Invited speakers & Co-convenors

Welcome from the MRI's Executive Director

GEO MOUNTAINS
Observing Mountain Environments

Carolina Adler

Introductions

James Thornton

Sudip Pradhan

Mandira Shrestha

GEO MOUNTAINS
Observing Mountain Environments

ICIMOD

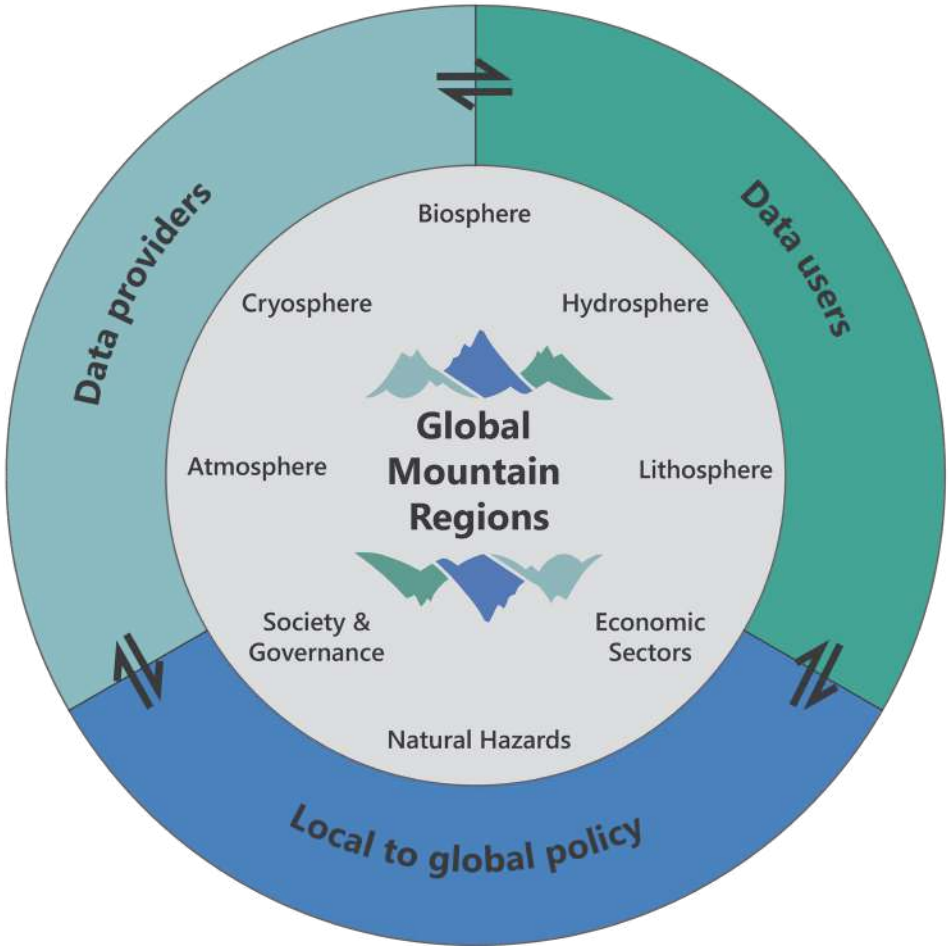
GEO Mountains

The Global Network for Observations and Information in Mountain Environments

An Initiative of the Group on Earth Observations (GEO) co-lead by the Mountain Research Initiative (MRI) & the National Research Council of Italy

Objectives:

- ❑ To increase the discoverability, accessibility, and usability of a wide range of data and information pertaining to mountain globally
- ❑ To integrate and apply such data and information for scientific, policy, and practical impact
- ❑ To build, connect, and share capacity across a community of mountain researchers, practitioners, and policy makers



Website

geomountains.org

Adaptation at Altitude

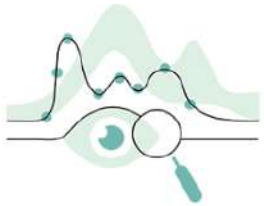
https://adaptationataltitude.org/adaptation-at-altitude

ADAPTATION AT ALTITUDE

Taking Action in the Mountains

Objective:

- To increase the resilience and adaptive capacity of mountain communities and ecosystems climate change



DATA, INFORMATION & MONITORING

We strengthen GEO Mountains, a flagship activity of the Mountain Research Initiative (MRI), under the framework of the intergovernmental Group on Earth Observations (GEO).

MORE ▷

REGIONAL EXCHANGE & COLLABORATION

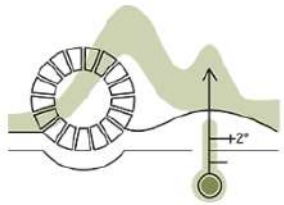
We facilitate science-policy dialogues in the Andes, East Africa, Hindu Kush Himalaya, South Caucasus and inter-regional collaboration and sharing of experience.

MORE

KNOWLEDGE & SHARING

We support a community of practice on climate change adaptation in mountains and build a global database of adaptation solutions for mountain regions.

MORE



GLOBAL POLICY MAINSTREAMING

We influence policy processes related to climate change (UNFCCC, Paris Agreement, Global Stocktake), disaster risk reduction (Sendai Framework for DRR), and the Sustainable Development Goals (Agenda 2030).

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Adaptation at Altitude

https://adaptationataltitude.org/adaptation-at-altitude

ADAPTATION AT ALTITUDE

Taking Action in the Mountains

Workshop objectives

Draw upon the insights of **regional experts** and an overview of as many as possible **previous/ongoing efforts**, to:

- ❑ **Understand the current "data landscape"** across the Hindu Kush Himalaya region, with an emphasis on climate, climate change, and climate change impacts
- ❑ **Gap analyses:** "what we have vs. what we need"
- ❑ **Identify priorities** (sub-regions / themes) upon which GEO Mountains, in collaboration with our global and local partner organizations, can focus upon to help improve the situation
- ❑ **Develop recommendations / propose actions** to close key data gaps / overcome key barriers identified

In a way that is:

- ❑ **Broad, interdisciplinary** ("mountains as complex social-ecological systems") & **systematic**
- ❑ **One of several similar consultations**: Andes, Central Asia, Caucasus, Africa, [European Alps & North America]

Initial interactive component!

- *What do you consider to be the **main barrier(s)** to the wider generation, sharing, and re-use of interdisciplinary data across the mountains of the HKH?*

- Please upload any relevant materials (papers, reports, presentations, etc. on data) that you would like to share with GEO Mountains here

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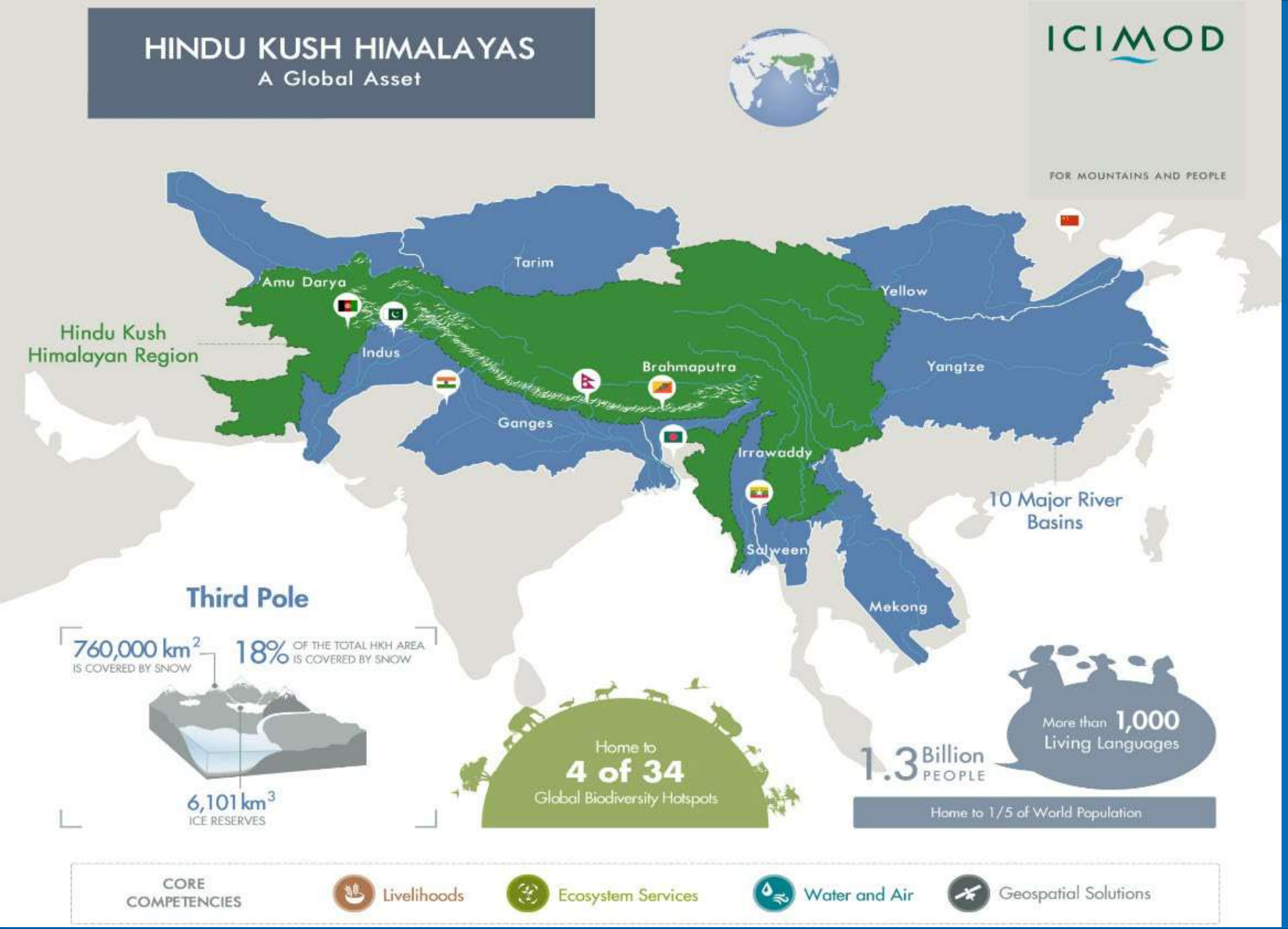
Accessing scientific data to facilitate mountain specific research

Sudip Pradhan

30 June 2022



An inter-governmental regional mountain learning and knowledge centre

Regional Database System

- ICIMOD believes that access to access to timely and high-quality scientific data is essential:
  - to promote and accelerate learning on the challenges facing mountain ecosystems and people
  - to enable independent research and scientific enquiries, and support informed decision making
  - to develop knowledge products and innovations that improve the wellbeing and livelihoods of mountain communities
- ICIMOD places high importance on generation, curation, and sharing of data to relevant stakeholders

Regional Database System

a central data repository for different thematic areas in the Hindu Kush Himalayan (HKH) region

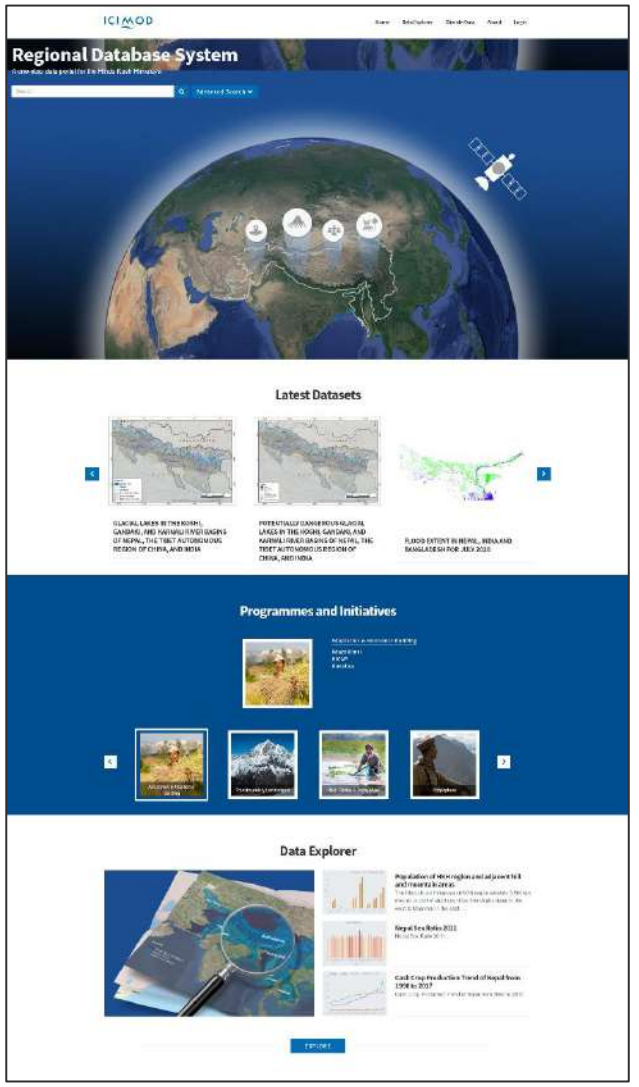
- Infrastructure to facilitate storage and management of data centrally with a proper backup systems
- Adoption of standards, interoperable technologies in data management and sharing
- Tools for easy access to data.
- Data sharing policy and operation guidelines

Various thematic data at different geographical (local, national, regional) and temporal scale

Regional Database System Portal

Provides a gateway to data stored in RDS.

- enables finding data by initiatives and programmes or browsing the data by Subject Areas.
- allows searching of data and viewing detailed metadata.
- public datasets downloadable after simple registration.



rds.icimod.org

Regional Database System

land cover

Advanced Search

Filters

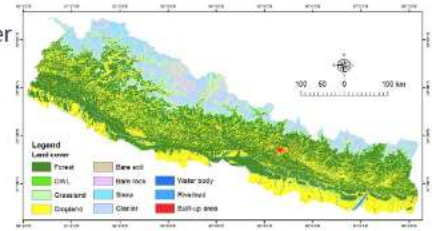
Keywords

Nepal (32)
Environment (28)
Land Cover (25)
Land use (23)
servircat (22)
icimod-servir (22)
Geoscientific information (21)
Land cover (20)
Pakistan (18)
Bhutan (13)
Central Karakoram National Park (12)
CKNP (12)
Land Cover Classification (11)
India (10)
Biodiversity (8)

71 Record(s) found

Land cover of Nepal

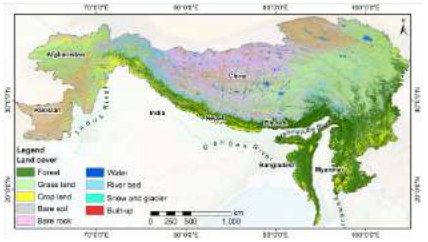
The annual land cover data of Nepal (2000-2019) have been created through the National Land Cover Monitoring System (NLCMS) for Nepal. The system uses freely available remote-sensing data (Landsat) a..



DOWNLOAD

Land cover of HKH region

Land cover change is a significant contributor to environmental change. The degradation of forests and conversion of natural areas, forests, and farmlands to other land use impact ecosystem services ..



DOWNLOAD

Land Cover of Pakistan 1990

Land cover data of Hindu Kush Himalayan region of Pakistan for 1990. This dataset is created using

Regional Database System

Search

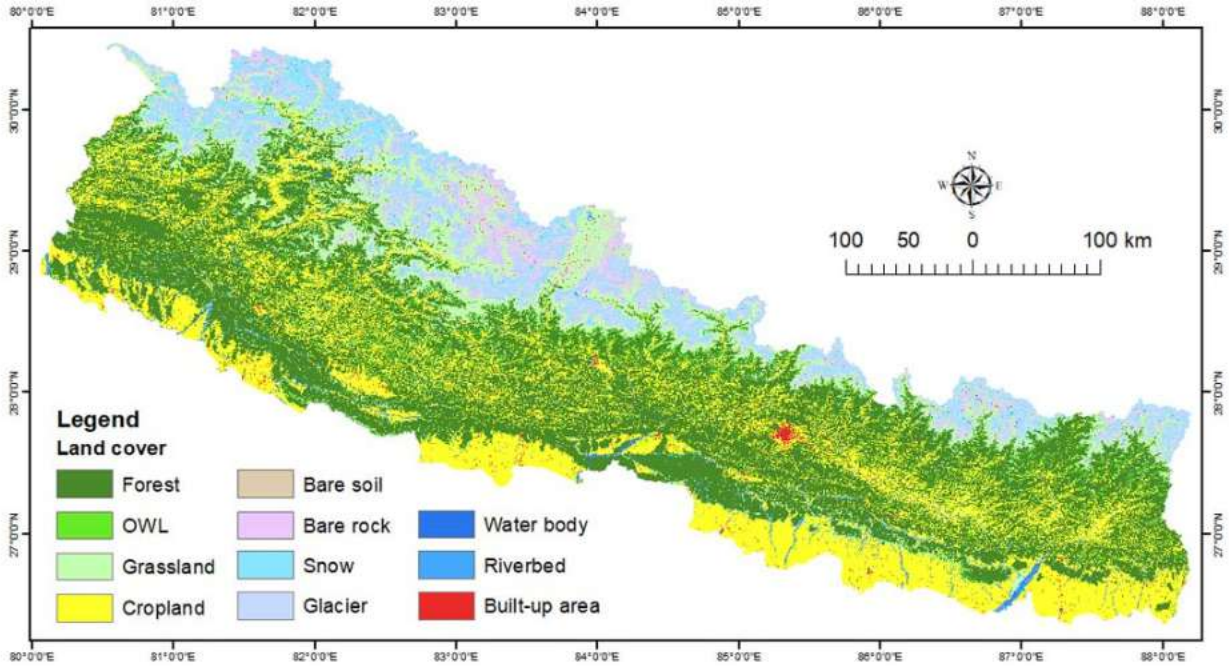
Advanced Search

Land cover of Nepal

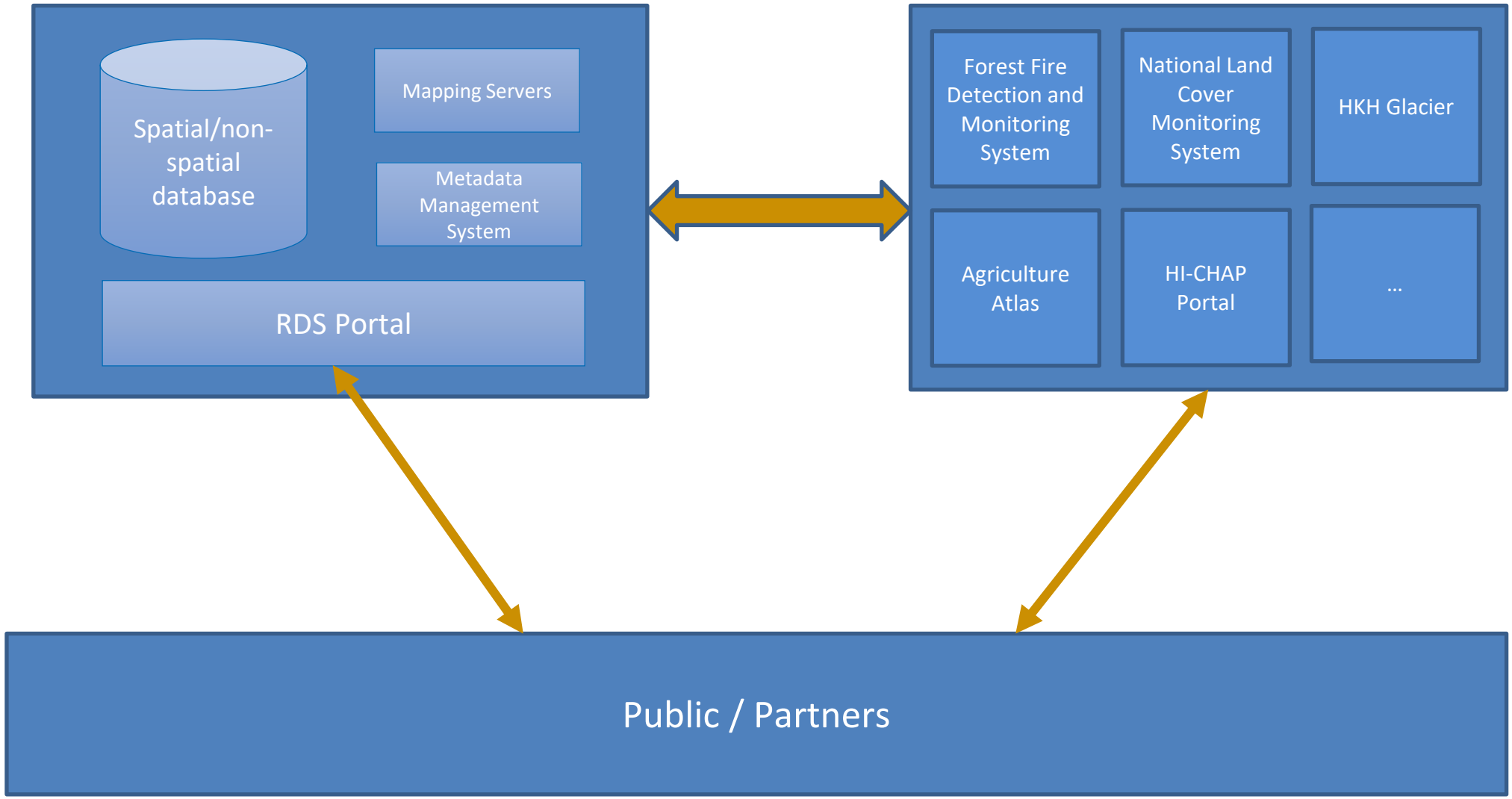
UPDATED DATE: 4/21/2022 3:48:22 PM

DOWNLOAD

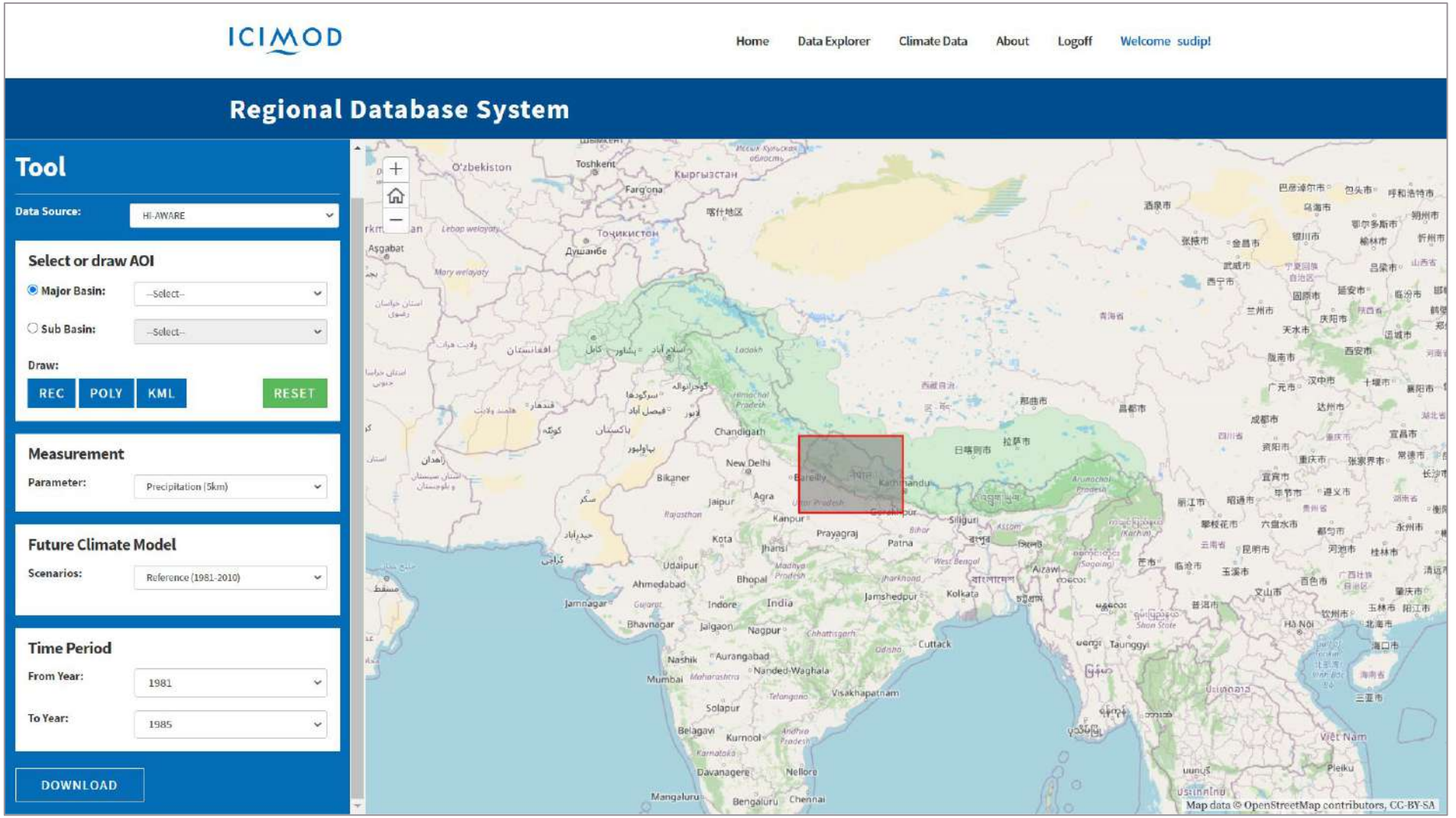
The annual land cover data of Nepal (2000-2019) have been created through the National Land Cover Monitoring System (NLCMS) for Nepal. The system uses freely available remote-sensing data (Landsat) and a cloud-based machine learning architecture in the Google Earth Engine (GEE) platform to generate land cover maps on an annual basis using a harmonized and consistent classification system. The NLCMS is developed by the Forest Research and Training Centre (FRTC), Ministry of Forests and Environment, Government of Nepal with support from the International Centre for Integrated Mountain Development (ICIMOD) through SERVIR Hindu Kush Himalaya (SERVIR-HKH), a joint initiative in partnership with the National Aeronautics and Space Administration (NASA) and the United States Agency for International Development (USAID). Collaborators include SERVIR-Mekong at the Asian Disaster Preparedness Center (ADPC), SilvaCarbon, Global Land Analysis and Discovery (GLAD) group at the University of Maryland, and the US Forest Service.



RDS and Information Systems

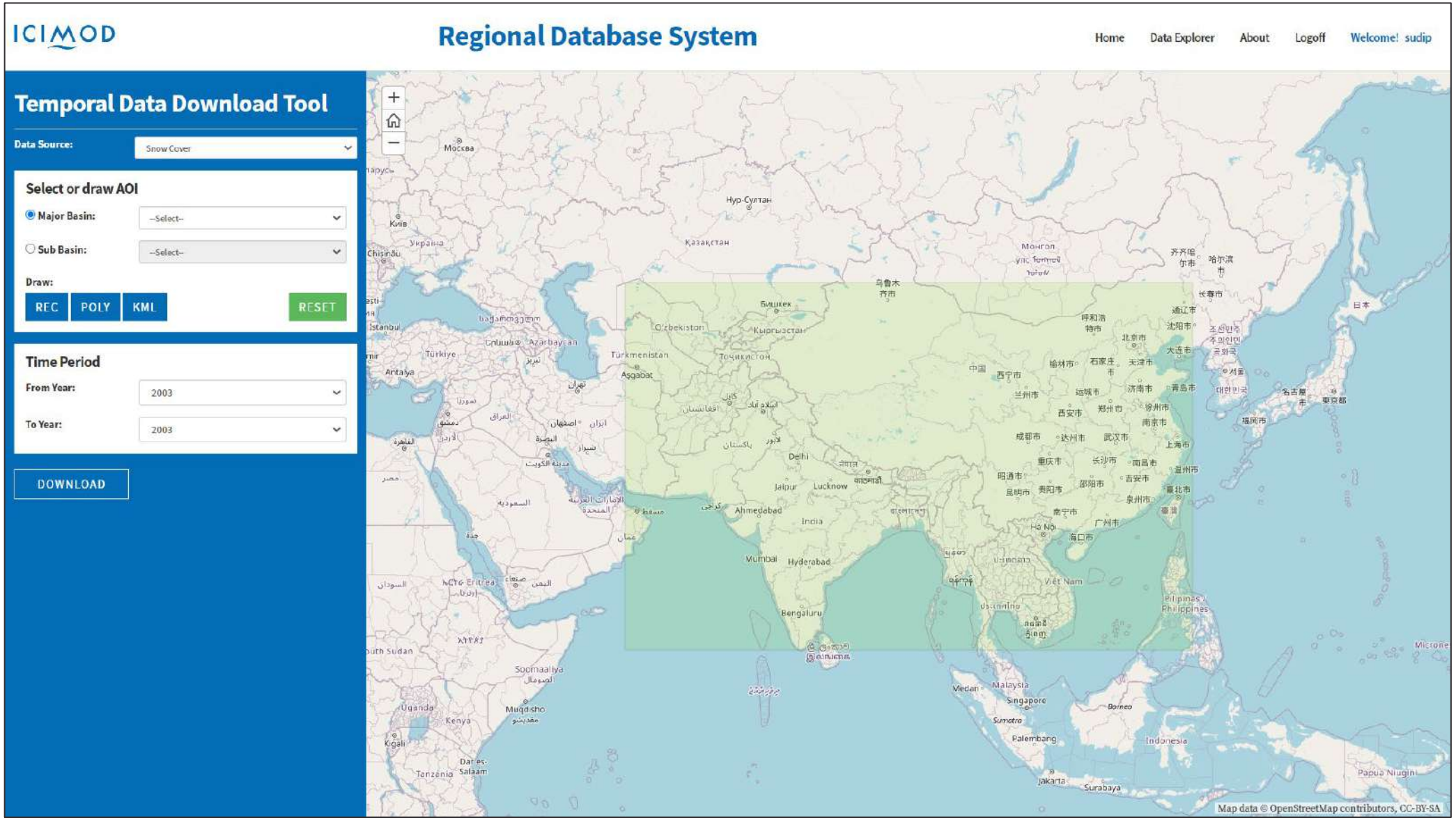


Climate Data Download Tool

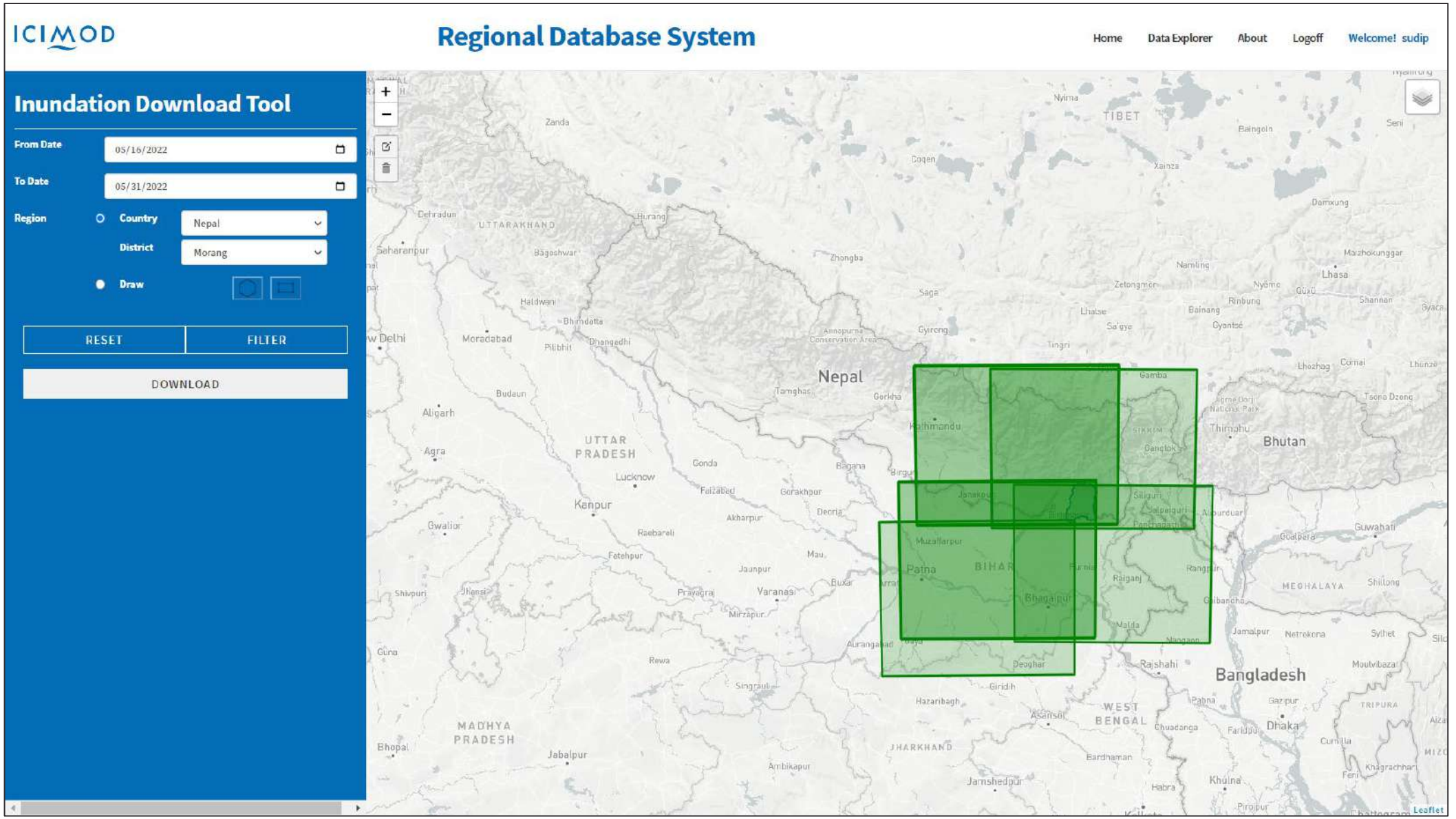


Includes dissemination of NASA GCM, Cordex, and CMIP6 data

Temporal Data Download Tool



Inundation Data Download Tool

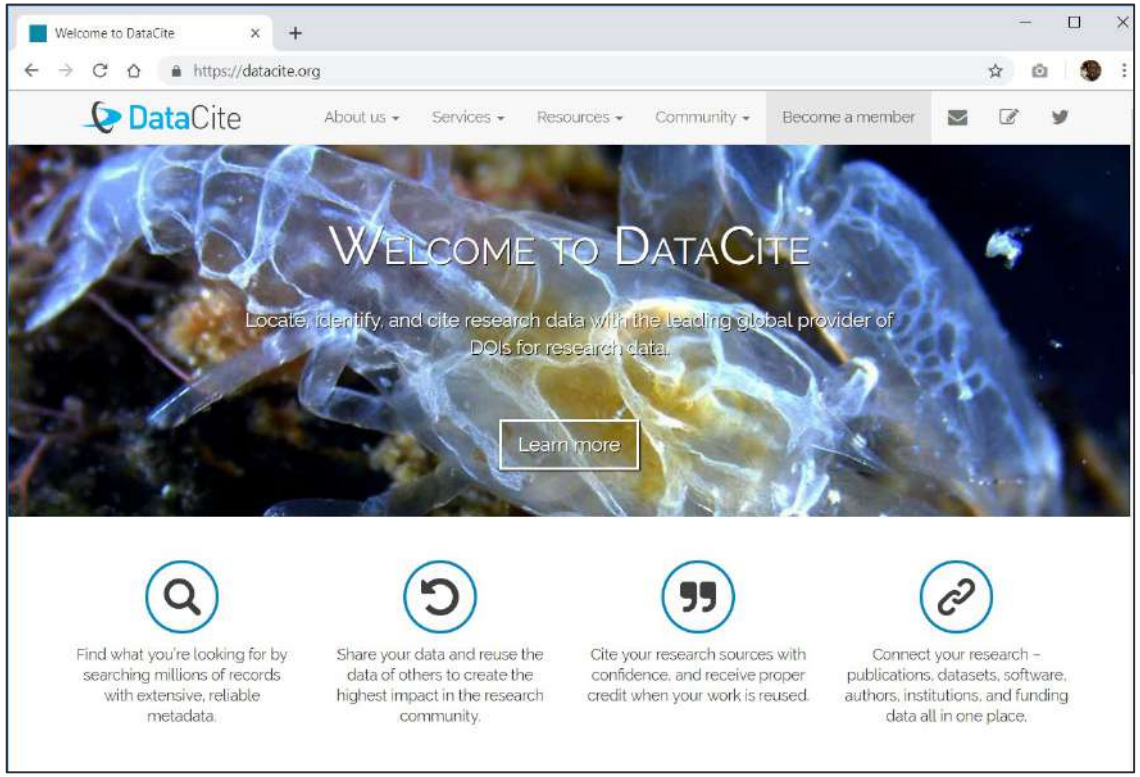


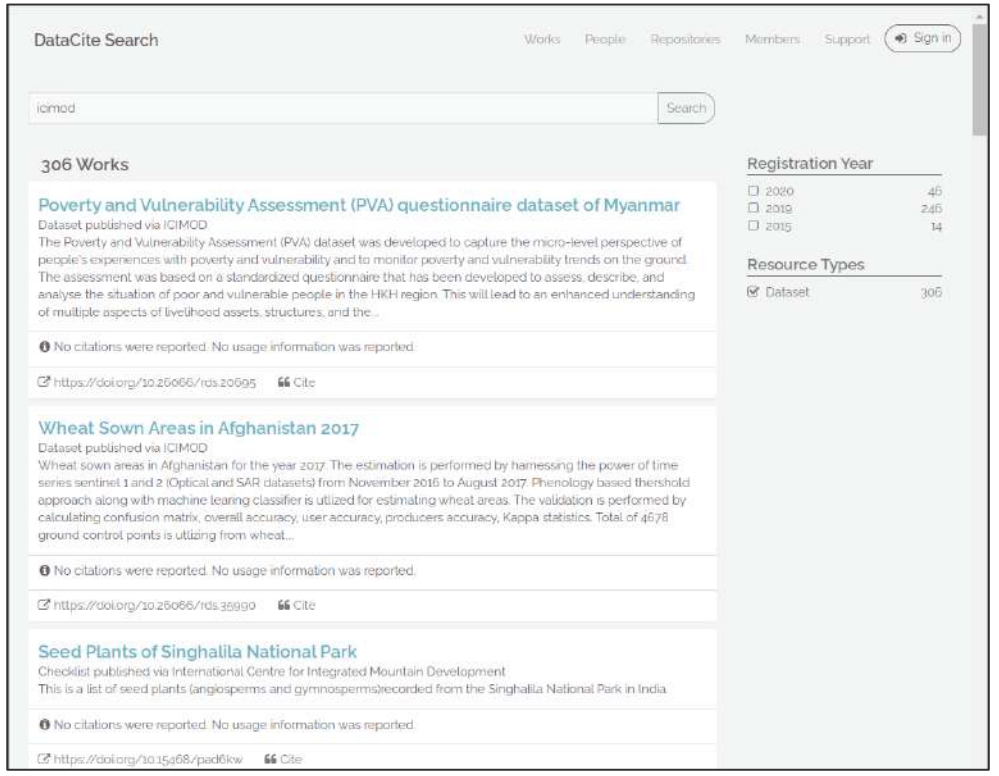
ICIMOD Data Policy aligns with philosophy of open and free access to scientific information and knowledge

ICIMOD data are licensed under
Creative Commons Attribution (CC-BY)
that allows users to share and adapt the data as long as the creator is appropriately credited.

DataCite Member

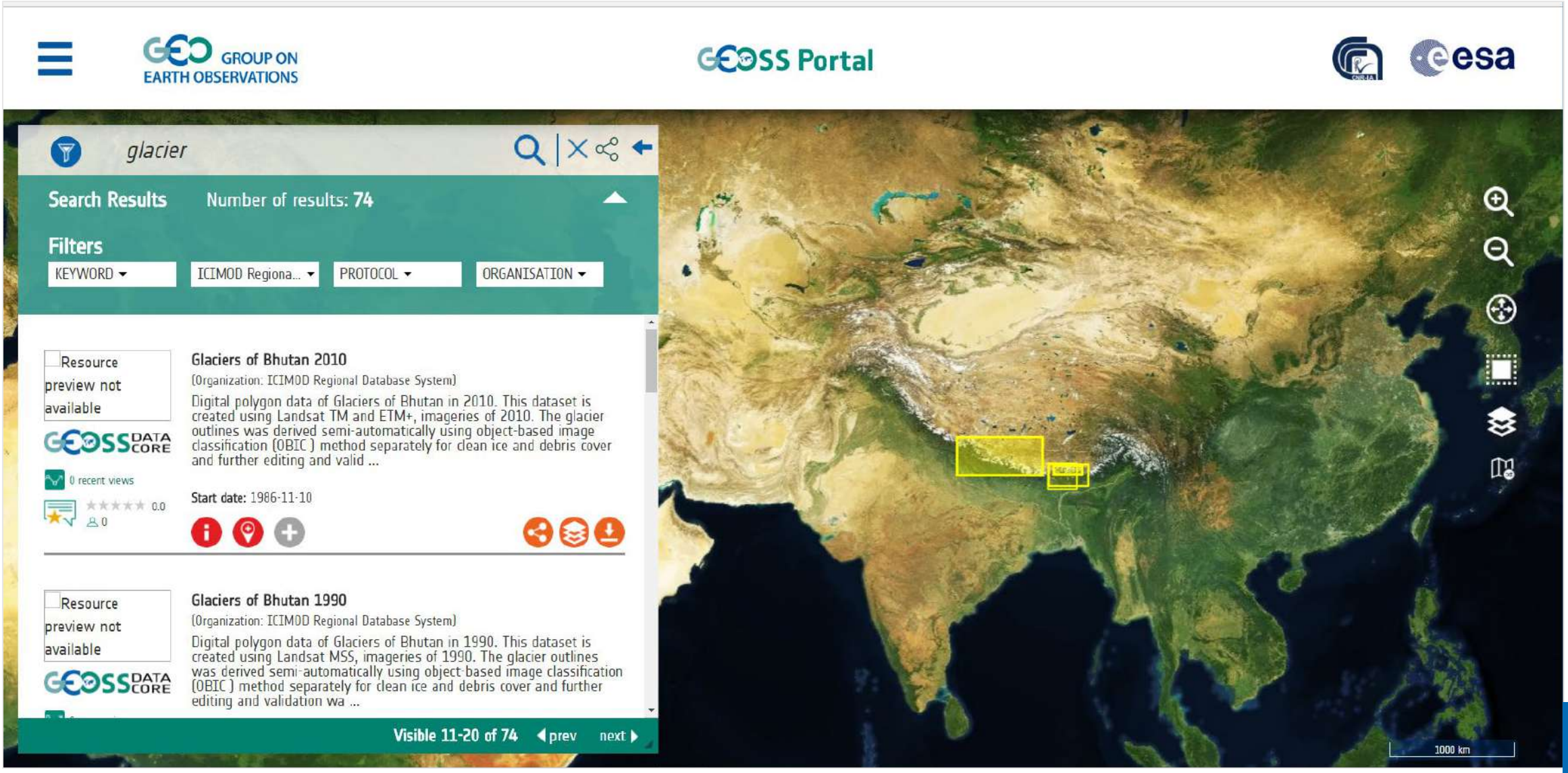
Generation of Digital Object Identifiers (DOIs) for all public data.



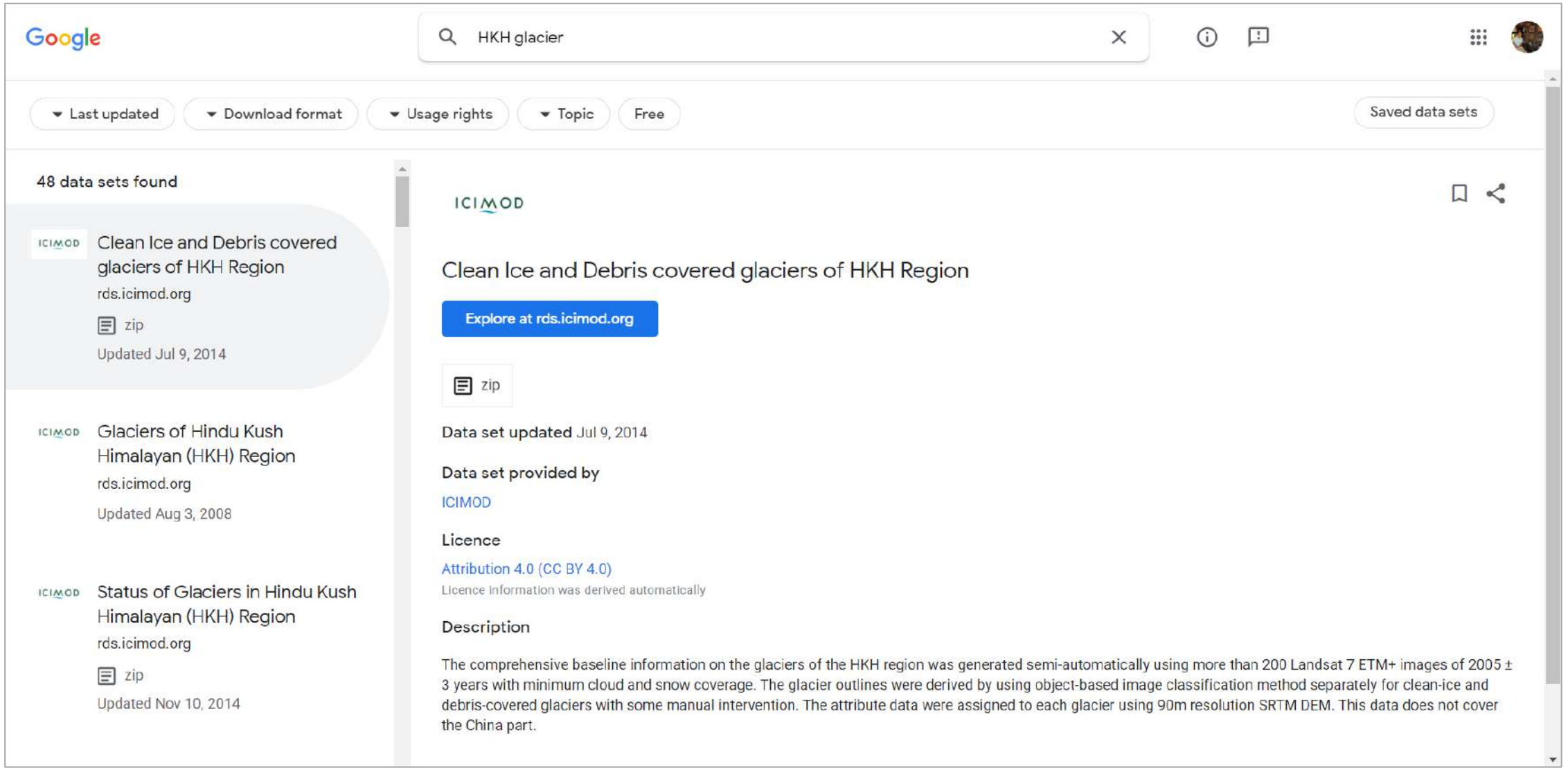


ICIMOD. (2018). *The Status of Glacial Lakes in the Hindu Kush Himalaya* [Data set]. ICIMOD. https://doi.org/10.26066/RDS.35856

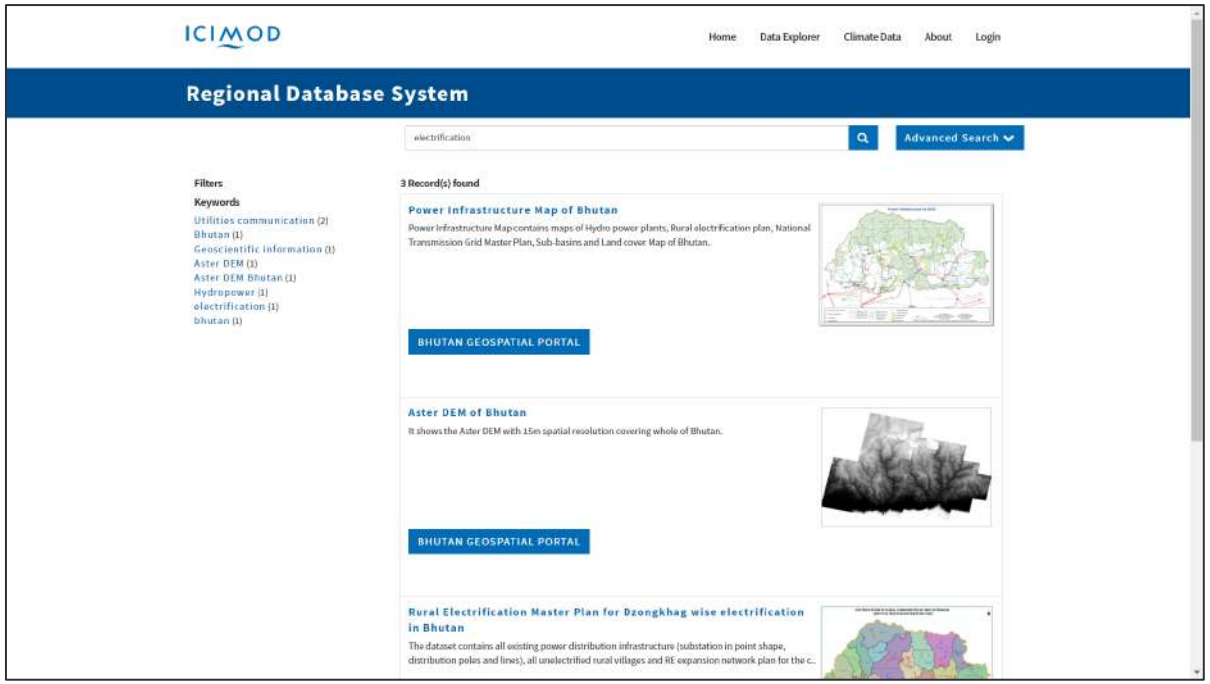
RDS datasets discoverable through GEOSS GeoPortal

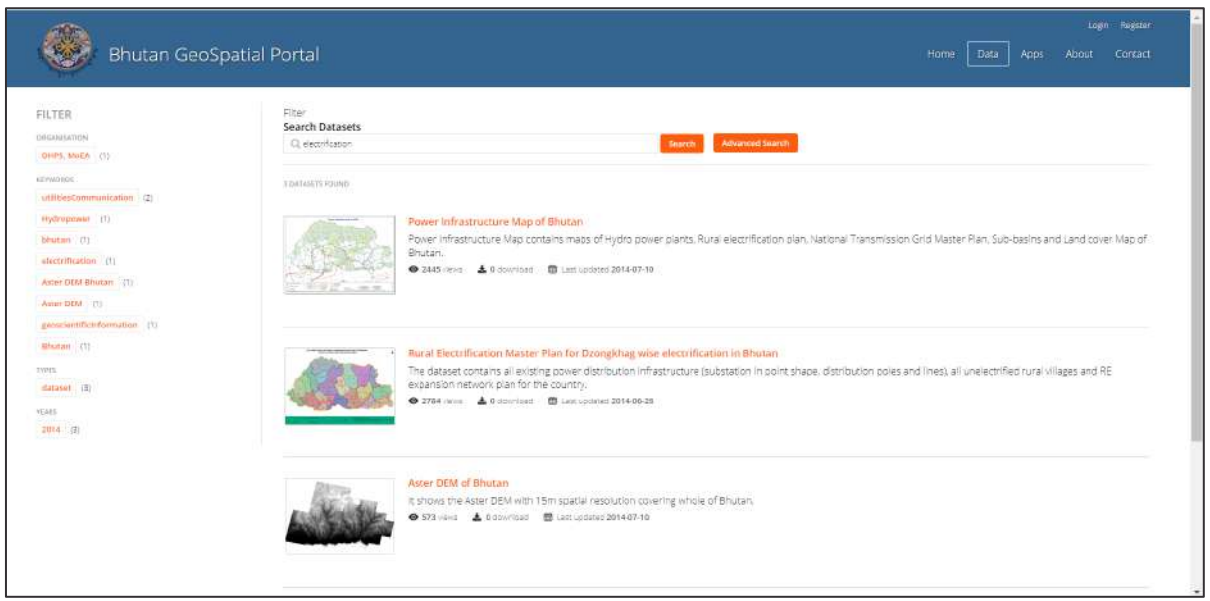


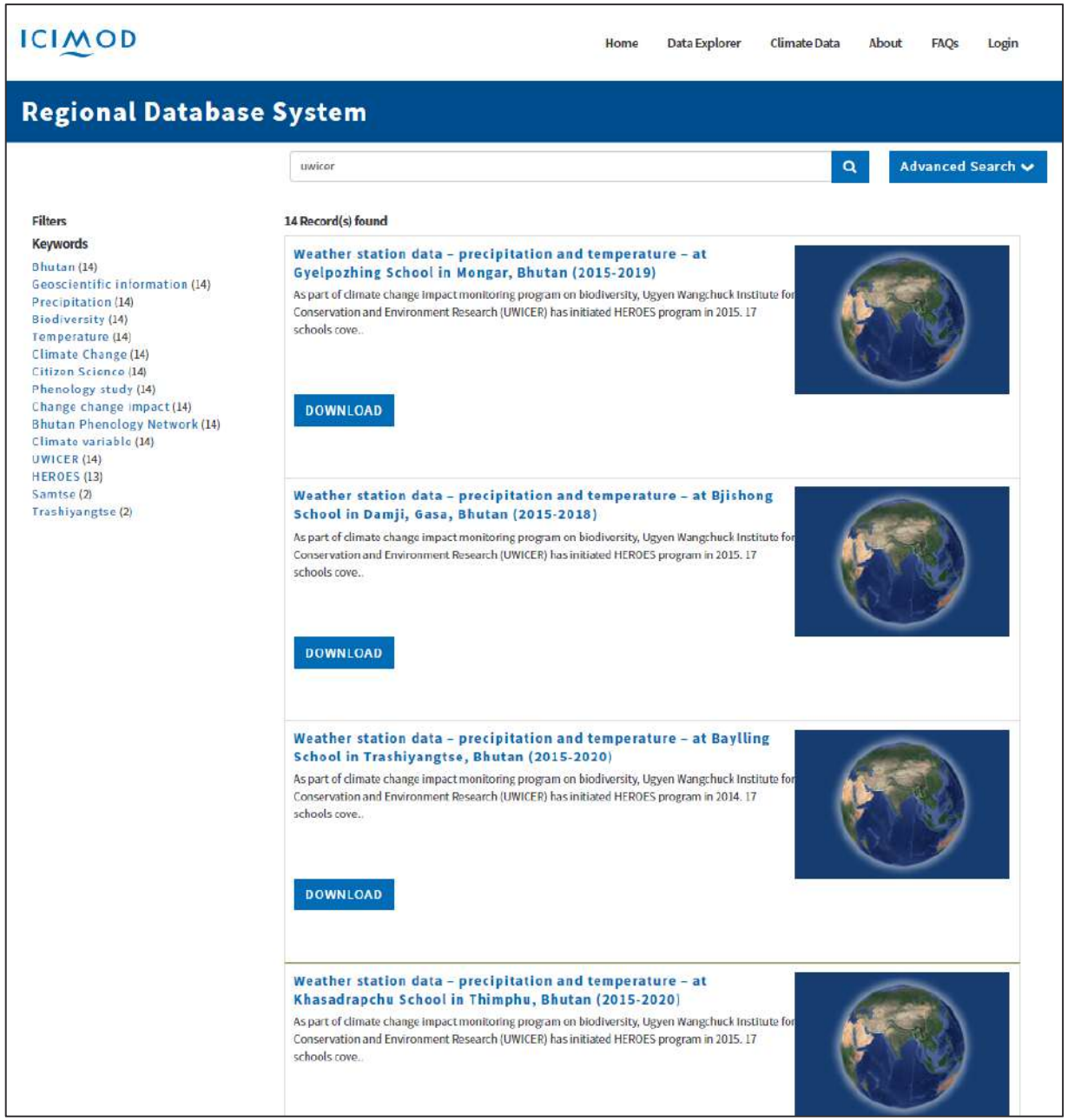
Google Data Search
(https://datasetsearch.research.google.com)



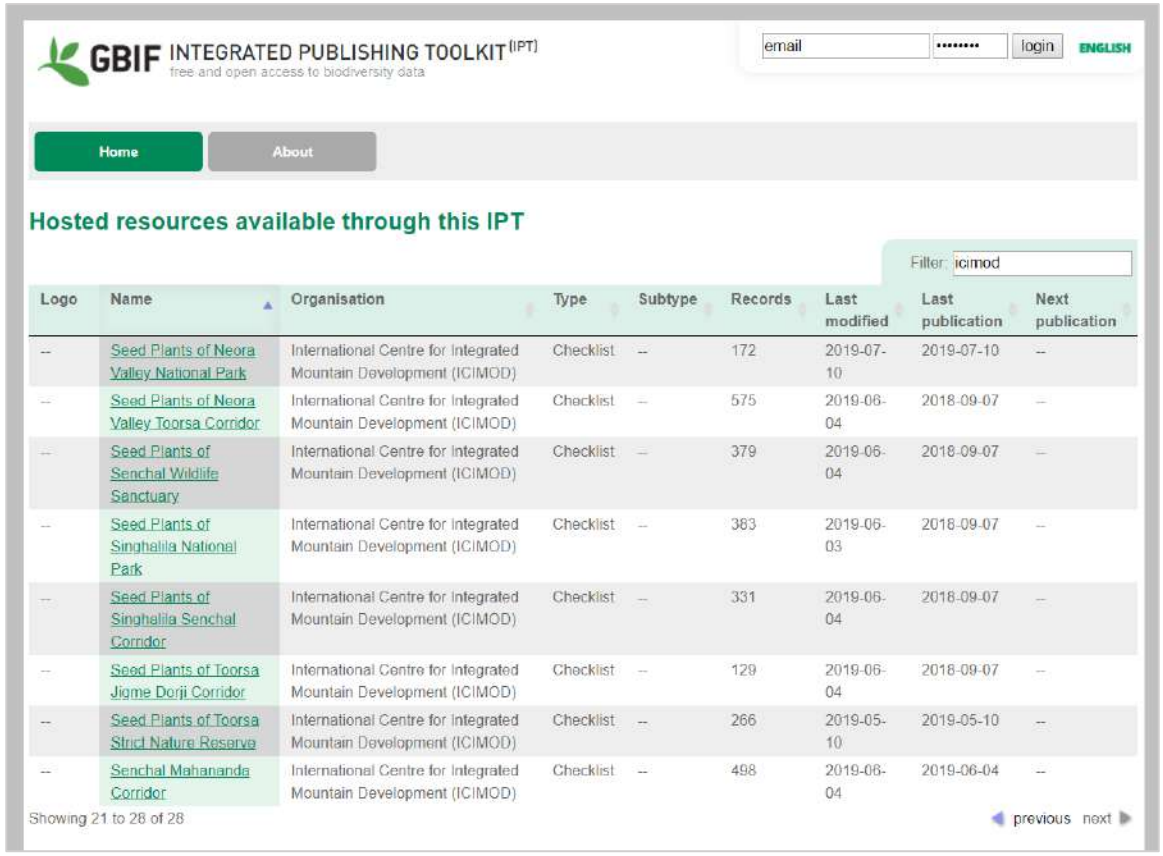
Data from Partners







GBIF Integrating Publishing Toolkit



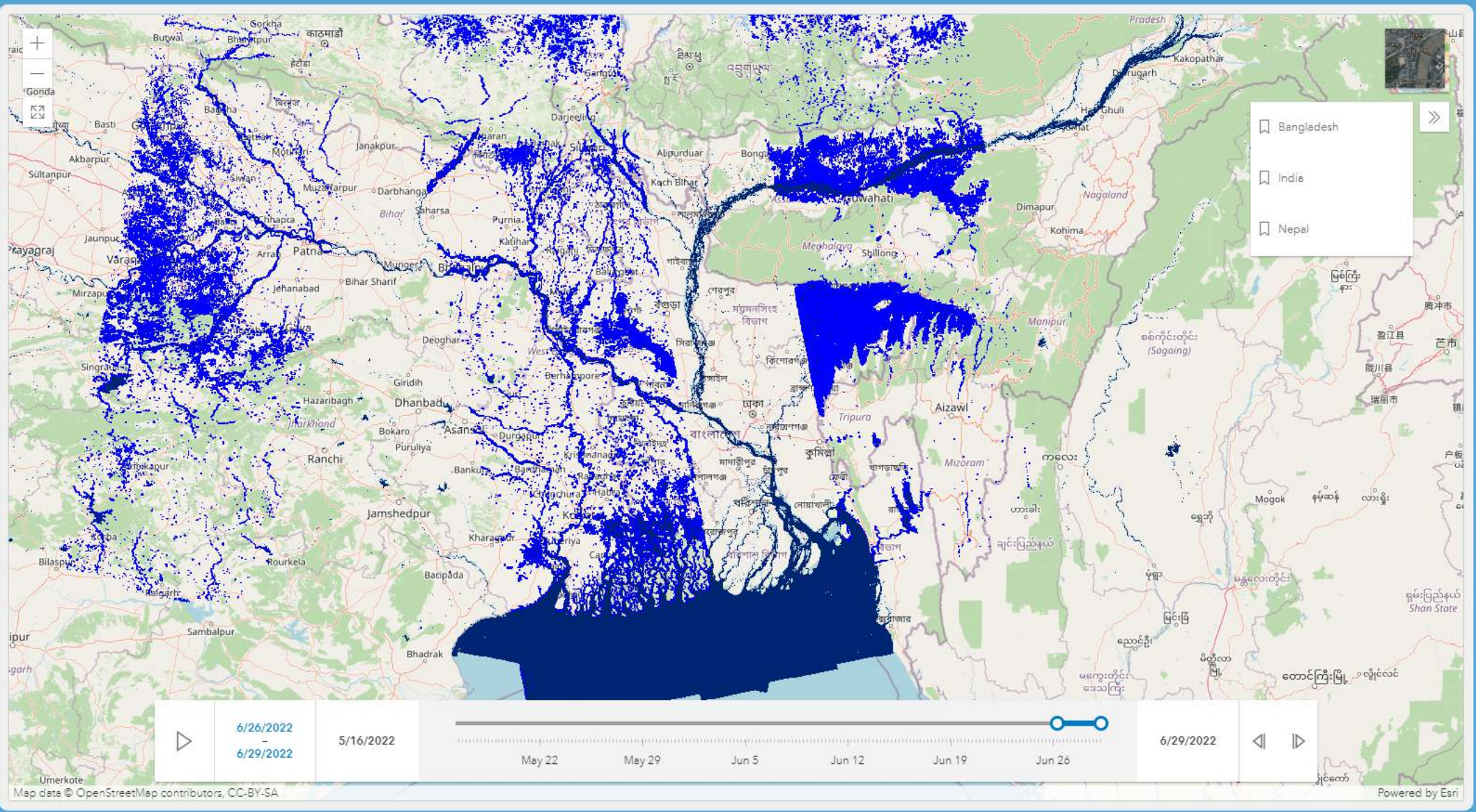
GBIF Integrated Publishing Toolkit (IPT) operationalized at ICIMOD and linked to GBIF.ORG

- ICIMOD's biodiversity data populated to GBIF platform.

Information Systems / Applications

Flood Inundation Mapping

ICIMOD



Layers

- [x] Flood Extent
- [x] Perennial Waterbodies
- [ ] RGB Layer

Download Inundation Data

About

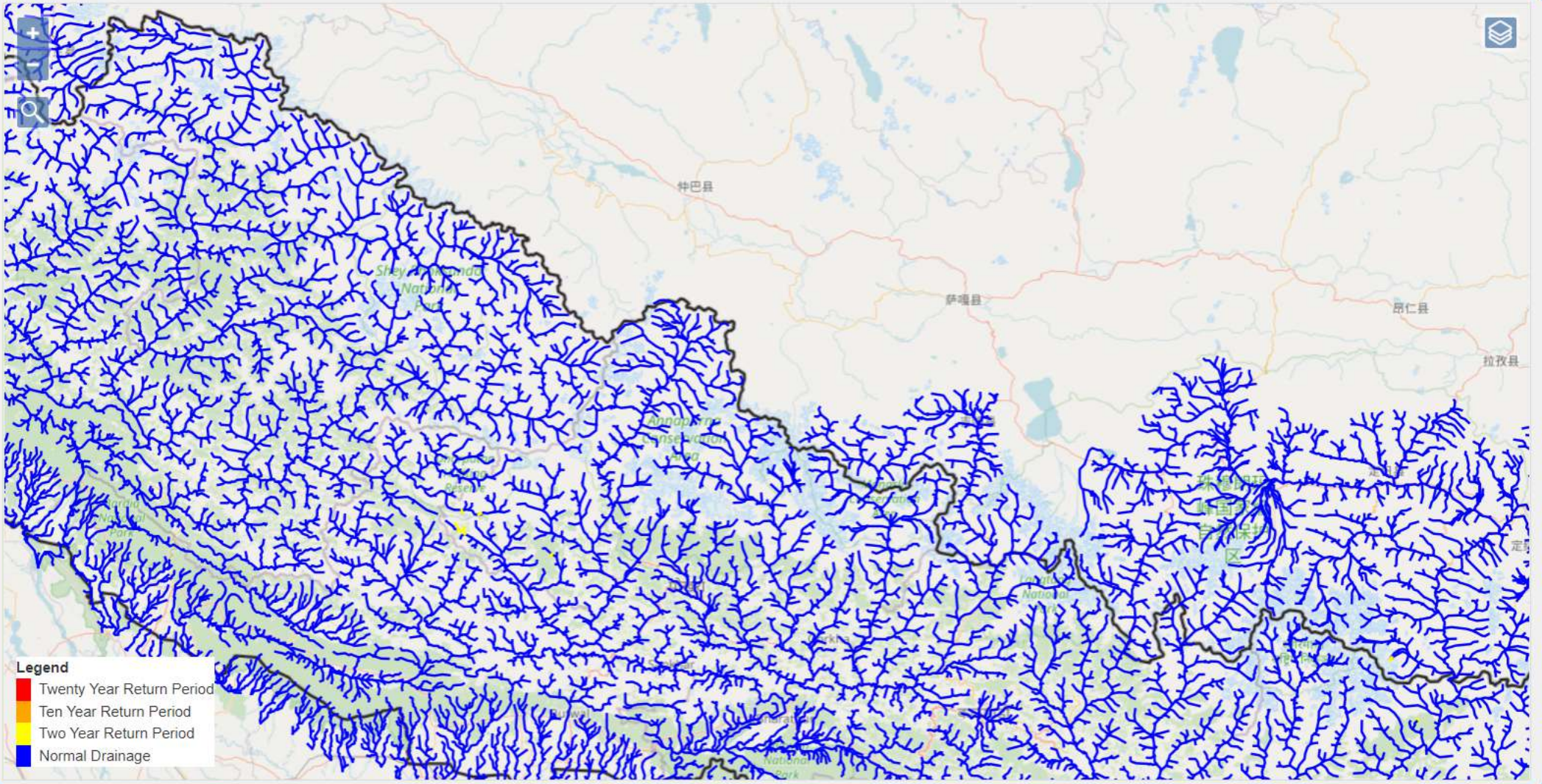
Floods are a major disaster in the Hindu Kush Himalaya (HKH) during monsoon season. Timely and accurate mapping of floods is important for efficient and effective management of relief activities.

View More...

https://geoapps.icimod.org/FloodInundation

HIWAT Streamflow Prediction Tool - Nepal

ICIMOD



Layers

- [x] Outline
- [ ] District
- [ ] River Names
- [ ] Station Names
- [x] HIWAT Rivers Nepal

Select District

Achham

Select River

Achhariya Nala

About Streamflow Prediction

Description:

The Streamflow prediction application is the collection of river network created within specific countries which has the unique ID which then is connected to the database to have the 48-hours forecast. The user

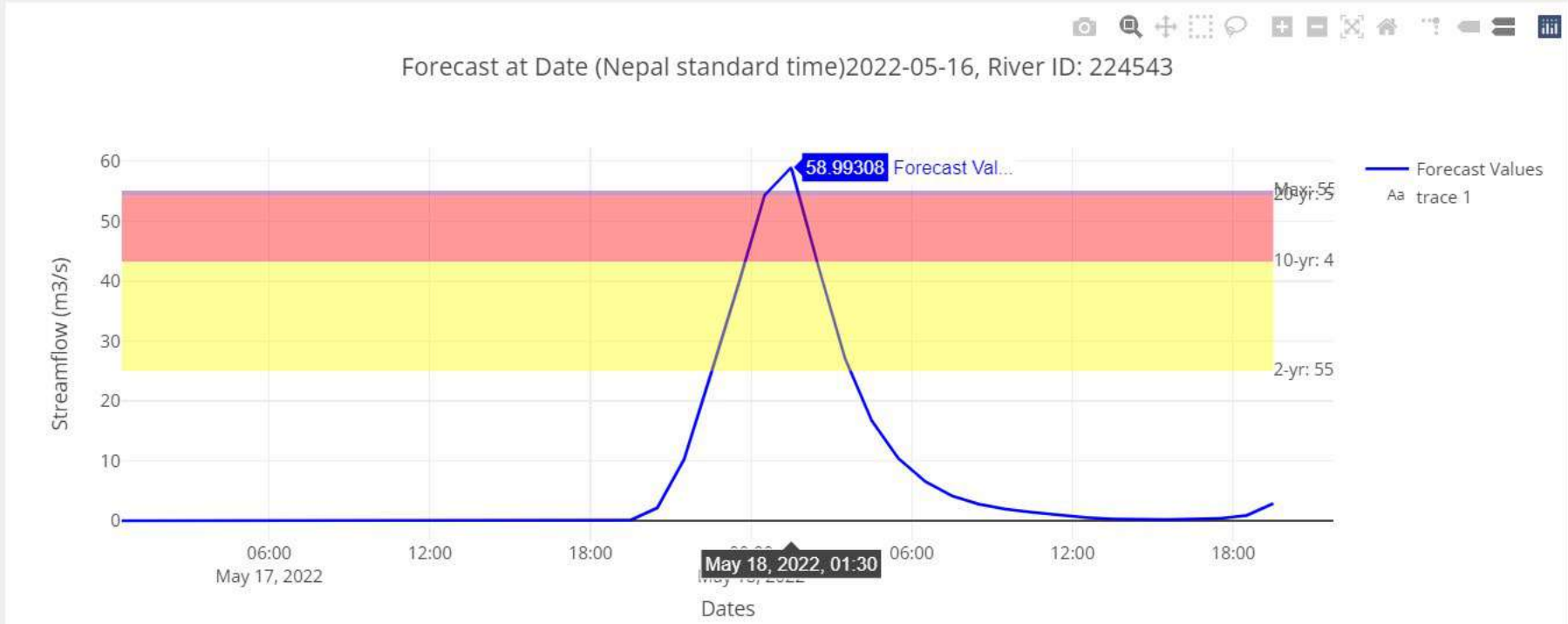
http://tethys.icimod.org/apps/hiwatnepal/

HIWAT Streamflow Prediction Tool - Nepal

ICIMOD

Forecast | Historical | Download

Select Date 20220517



Close

Layers

Outline

District

River Names

Station Names

HIWAT Rivers Nepal

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ut Streamflow Prediction

scription:

e Streamflow prediction
plication is the collection
river network created
hin specific countries
ich has the unique ID
ich then is connected to
database to have the
hours forecast. The user

Legend

Twenty Year Return Perio
Ten Year Return Period
Two Year Return Period
Normal Drainage

http://tethys.icimod.org/apps/hiwatnepal/

Government of Nepal
Ministry of Forests and Environment
Department of Forests and Soil Conservation

Forest Fire Detection and Monitoring System in Nepal

Login | नेपाली

Fire Incident Query

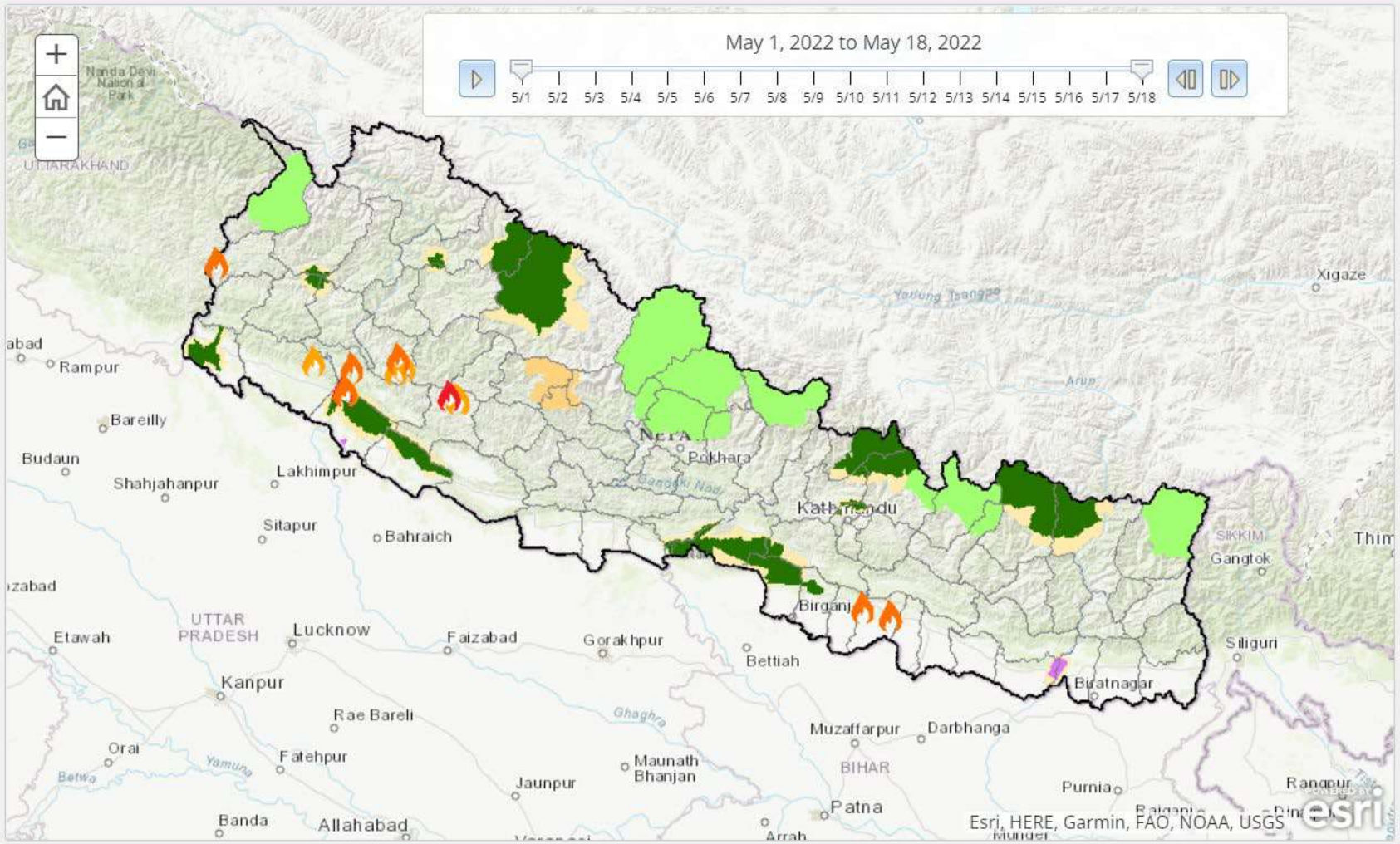
- Nepal
- Province
  - Province-1
- District
  - Achham
- Protected Area
  - All

Start Date: 5/1/2022
End Date: 5/18/2022

View on Map
View on Table

Fire Statistics (MODIS) 14

District	Count
Baitadi	1
Bardiya	3
Dailekh	3
Kailali	1



Layer | Legend | Basemap

- [x] Country Outline
- [ ] Province
- [x] District
- [ ] District Labels
- [ ] Gaunpalika/Nagarpalika
- [ ] Division
- [ ] Sub-Division
- [ ] Ward
- [ ] Airport
- [ ] Settlement
- [ ] Road
- [x] Protected Area
- [ ] Protected Area Label
- [x] MODIS Active Fire
- [ ] Viirs Active Fire

About

ICIMOD, in close collaboration with the Department of Forests & Soil Conservation (DoFSC) and Ministry Forest & Environment (MoFE), Government of Nepal has jointly developed this "Online Web Mapping Application".

The web tool provides

http://nepal.spatialapps.net/NepalForestFire

National Land Cover Monitoring System of Nepal

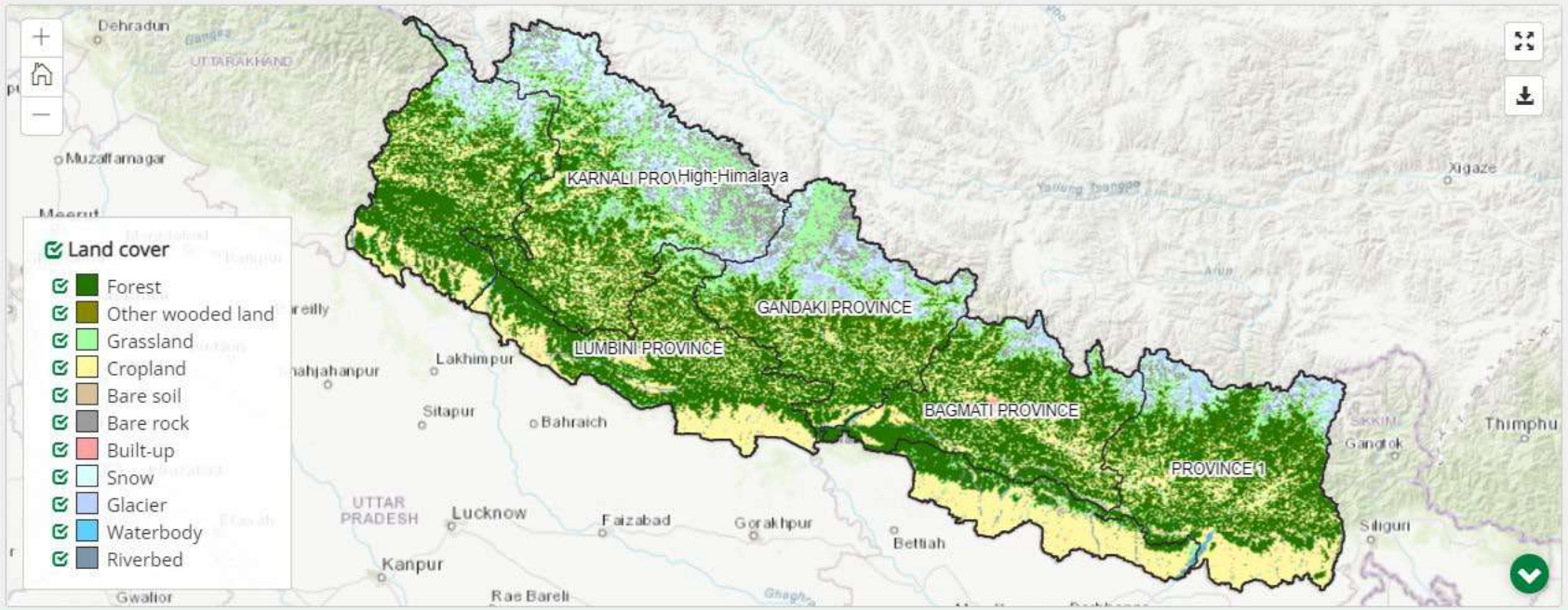
Parameters

- (•) Nepal
- ( ) Province
  - Province 1
- ( ) District
  - Achham
- ( ) Physiographic region
  - High Himalaya

Year

- 2019

( ) Draw AOI



Layers

- [x] Country
- [x] Province
- [ ] District
- [ ] Physiographic region

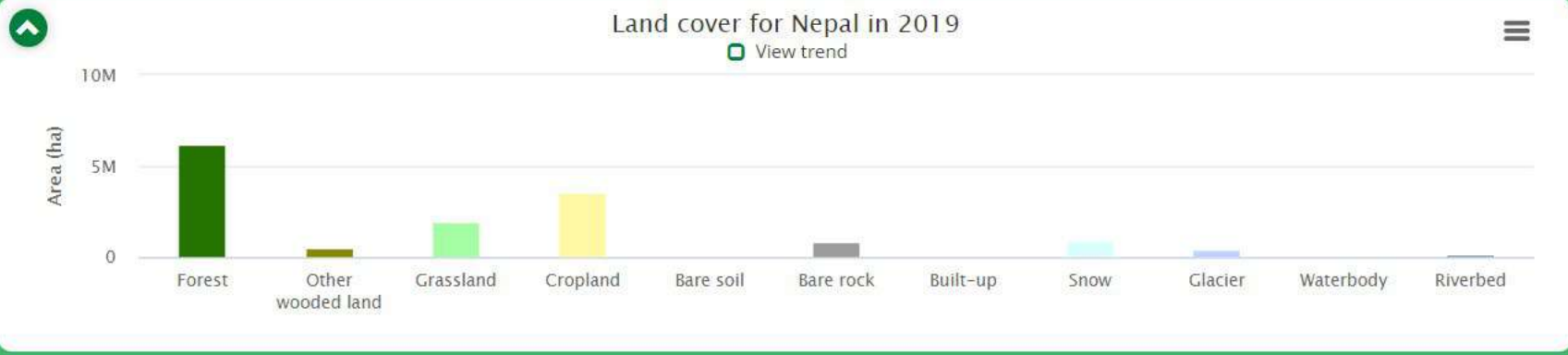
Useful links

Data

Land cover of Nepal

Application guide

User guide



About

The web-based application provides easy access to the harmonized land cover database for Nepal over 2000–2019.

View More...

http://nepal.spatialapps.net/nlcms

Regional Land Cover Monitoring System

ICIMOD

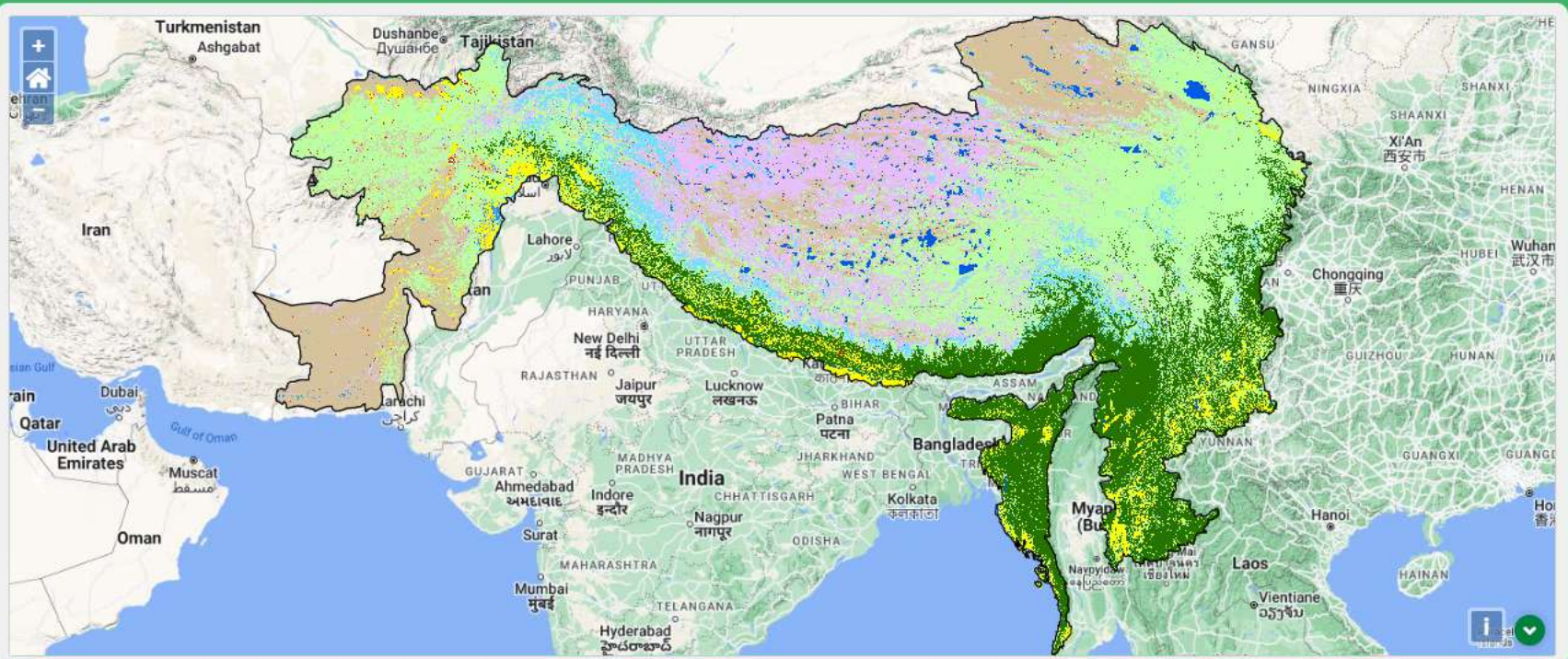
Parameters

- (•) Hindu Kush Himalaya region
- ( ) Ecoregion
  - Eastern Himalayan Alpine Meadows
- ( ) Biodiversity hotspot
  - Himalaya
- ( ) Draw polygon

Year

2018

☐ Show trend



Layers

- [x] HKH boundary
- [ ] Ecoregion
- [ ] Biodiversity hotspot
- [x] Land cover
  - Forest
  - Grassland
  - Cropland
  - Bare soil
  - Bare rock
  - Built-up
  - Snow and glacier
  - Water body
  - Riverbed

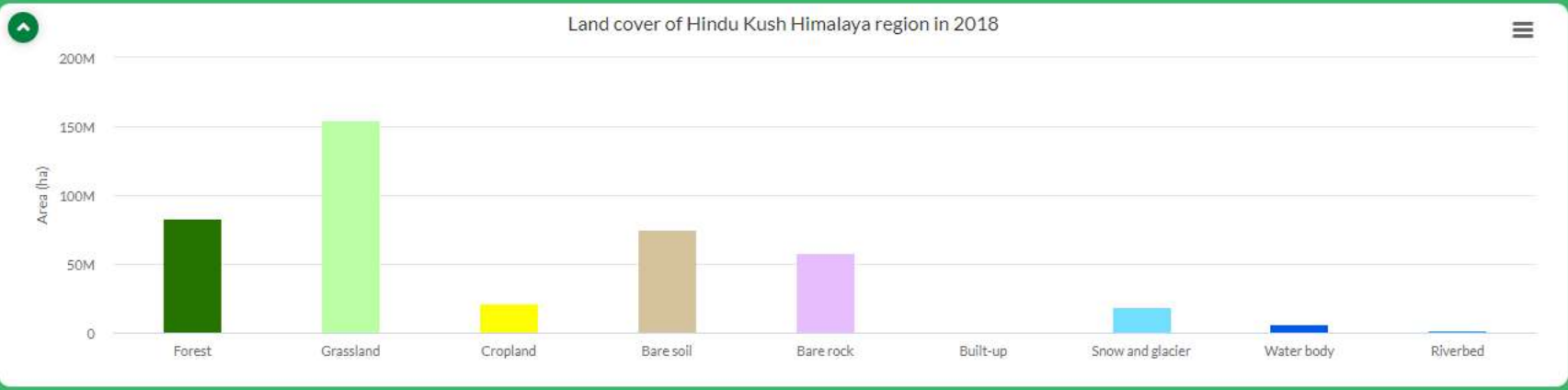
Useful links

Data

Land cover of HKH region

Application guide

RLCMS user guide



About

The web-based application provides easy access to the harmonized land cover database for the entire HKH region over 2000–2018.

View More...

http://geapps.icimod.org/rlcms

National agricultural drought watch - Nepal

Current | Seasonal | Outlook

Map Controls

- Nepal
- Province1
- Jumla

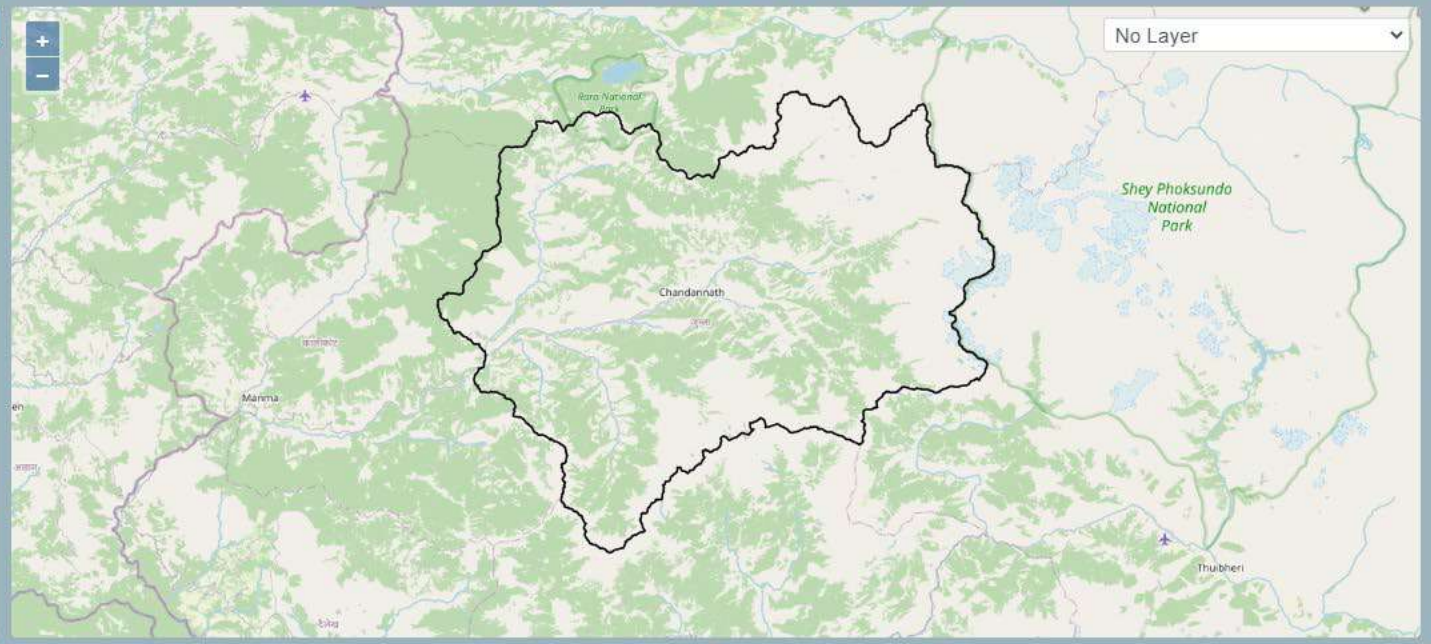
Select Periodicity

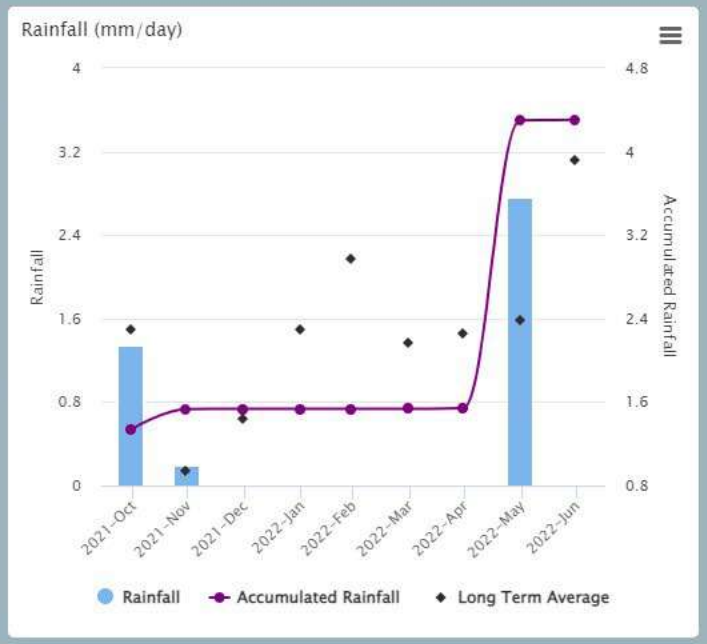
- Dekad (10 Days)
- 1 Month
- 3 Months

Select 4 Indices

- Rainfall
- Total Evapotranspiration
- Soil Moisture
- Temperature (min, max)

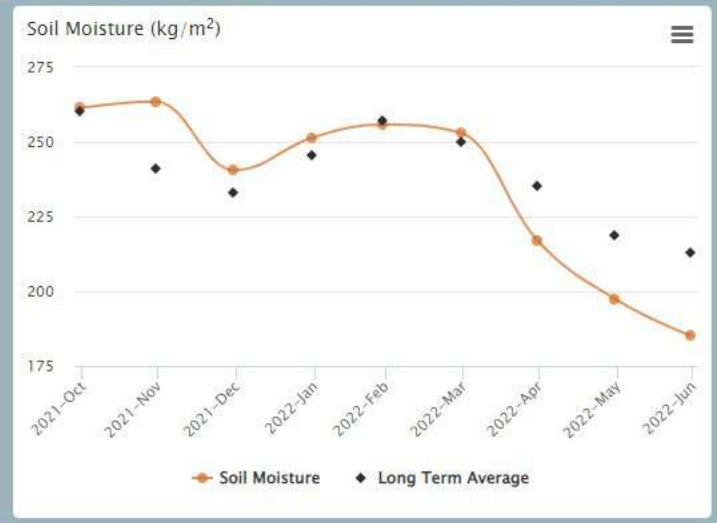
Compute Indices

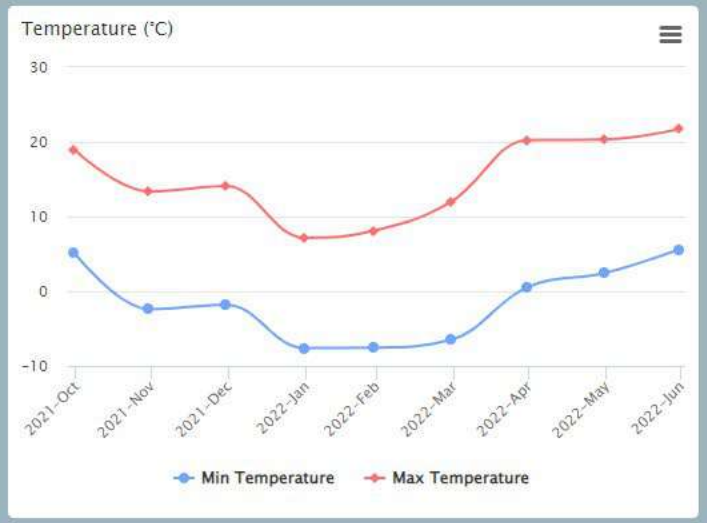




About

ICIMOD is developing an integrated information platform linking weather and climate data with agriculture practices in the region. The platform provides data analysis support to professionals responsible for developing agro-met advisories for government agencies and farmers. The web-based service on the National agricultural drought watch for Nepal has been developed in collaboration with Ministry of Agriculture and Livestock Development and ICIMOD under the SERVIR Hindu Kush Himalaya (SERVIR-HKH) Initiative. It provides information on the in-season drought situation and outlook. It provides baselines on crop type maps and farming practices calendars valid at the district level, and multiple indices evapotranspiration, precipitation rate, standardized precipitation index, soil moisture, and temperature for droughts and seasonal weather outlooks at the national and





http://tethys.icimod.org/apps/droughtnp/

ICIMOD

Air Quality Watch - HKH

Recent | Archive | Forecast | Emission

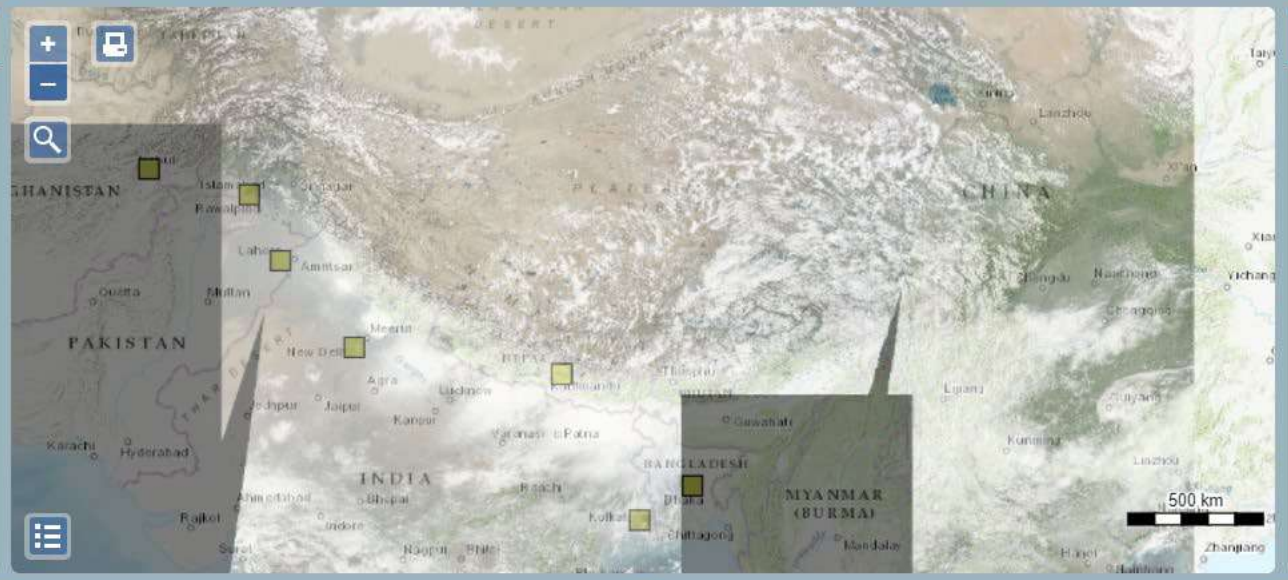
Map Controls

Select By: Parameter

Pollutants: PM / Ground Observation-PM2.5 (AirNow)

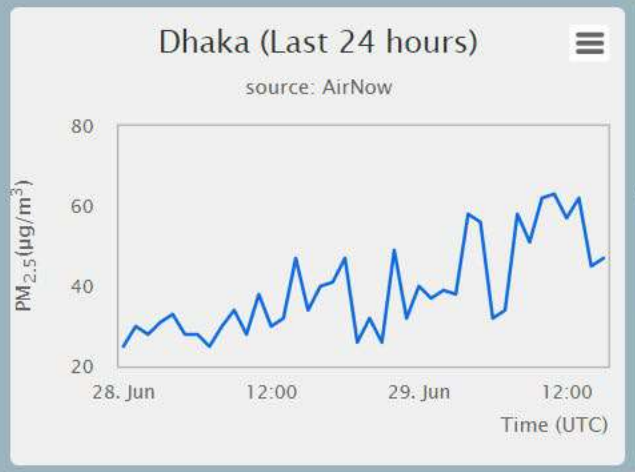
Select Stations:

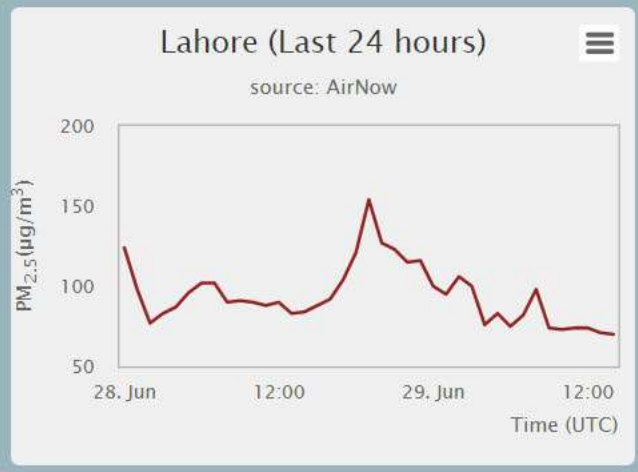
- Dhaka
- Lahore
- New Delhi

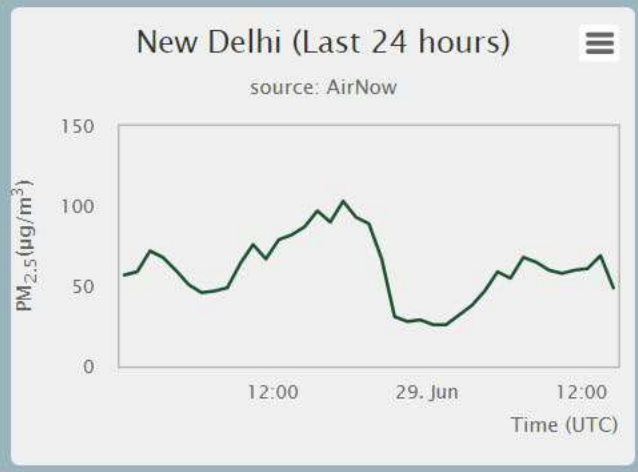


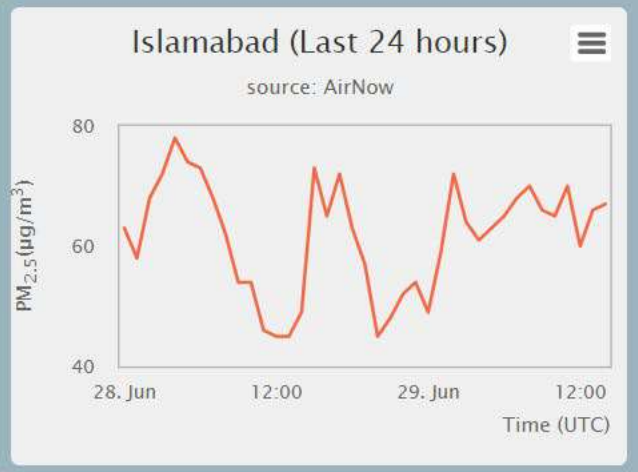
Layer Control

- TerraModis-TrueColor (2022-06-28) — 50 %
- Ground Observation-PM2.5









http://smog.spatialapps.net/apps/airquality/

HKH Climate and Hydrology Visualization and Access Portal (HI–CHAP)

ICIMOD

Climate Change | Hydrology | Compare Map | Chart

Parameters

Geographic Area
- Major Basin
- All

Data Source
- HICAP

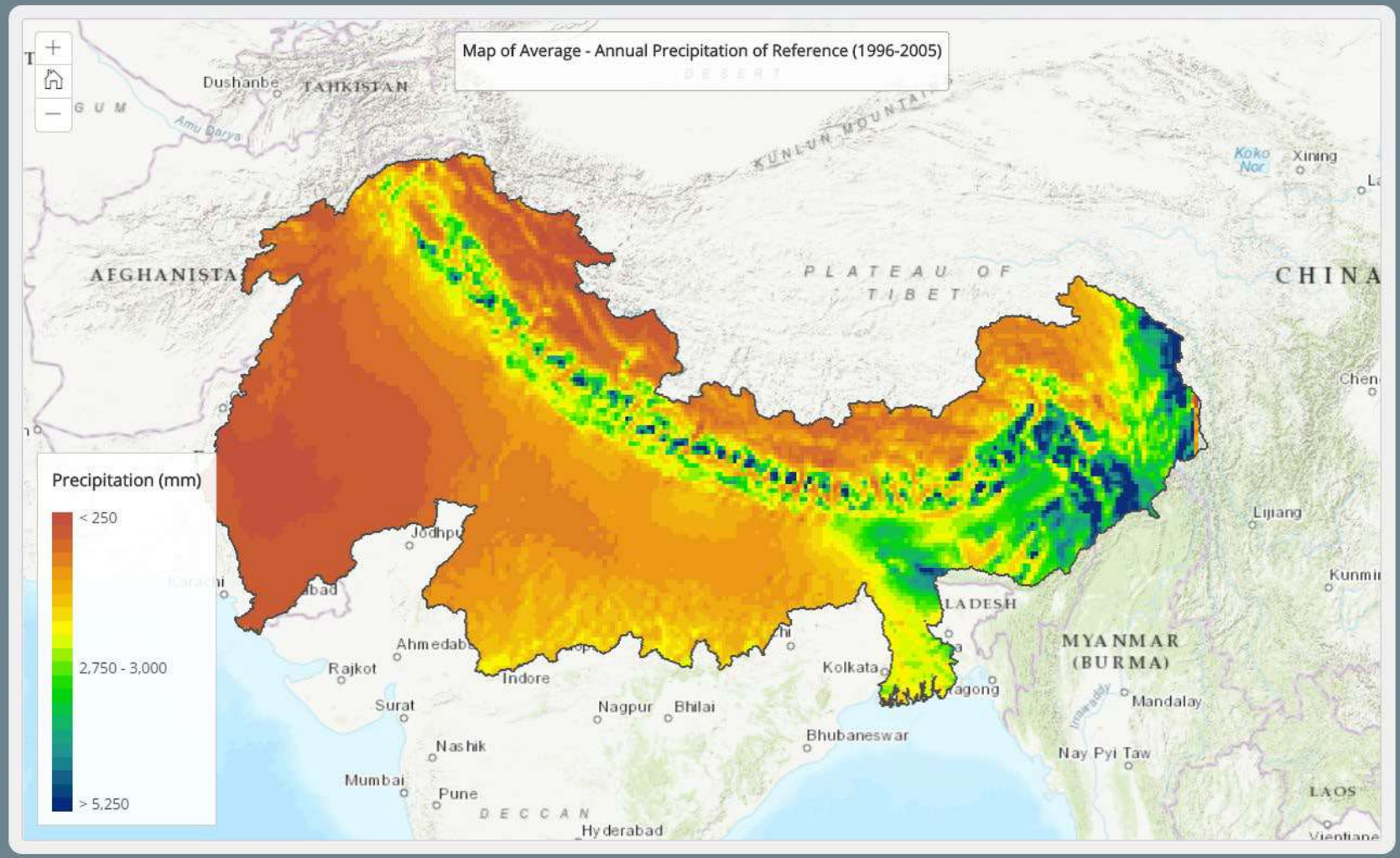
Map Option
- Map of Average

Measurement
- Precipitation

Time Option
- Annual

Time Period
- Reference (1996-2005)

Data Download Tool



Base Layers | **Legend**

- [x] Outline
- [ ] Basin
- [ ] Sub Basin

Metadata | **Useful Links**

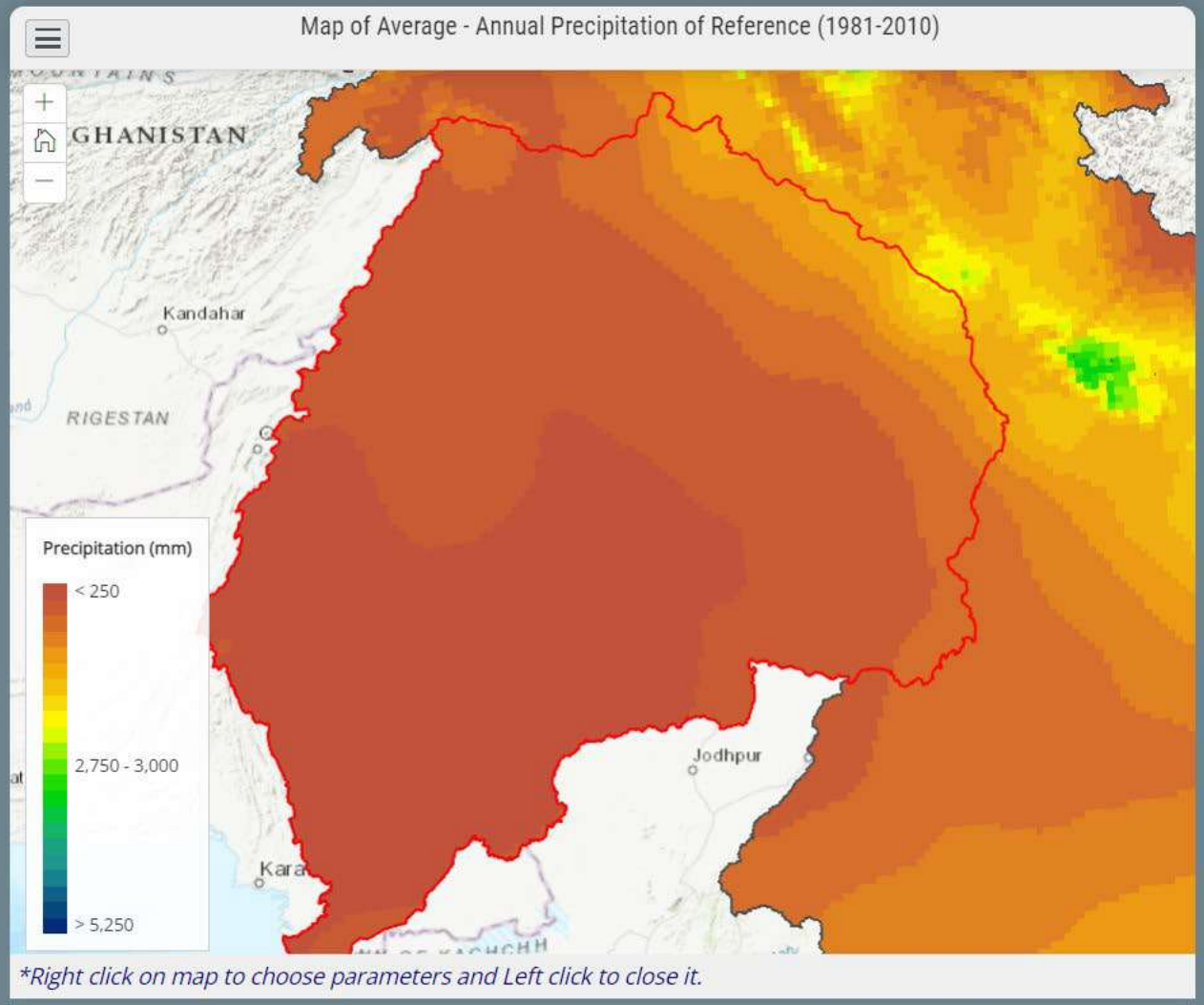
- Climate Scenario data from BCCR Norway (NorESM)
- Average Delta change of temperature and precipitation from CIMP5 database

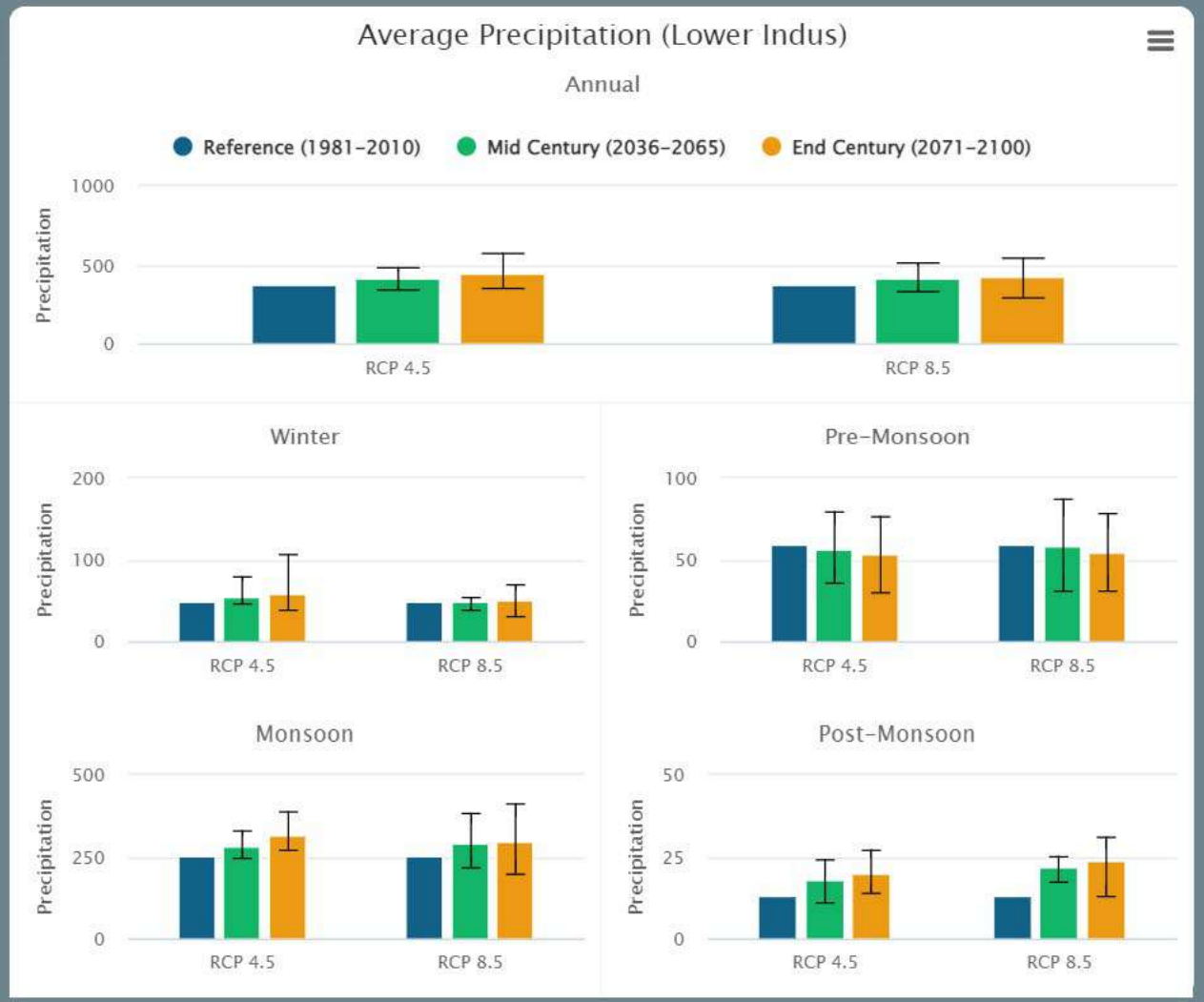
http://geoapps.icimod.org/hichap

HKH Climate and Hydrology Visualization and Access Portal (HI-CHAP)

ICIMOD

Climate Change | Hydrology | Compare Map | Chart





http://geoapps.icimod.org/hichap

Thank you
Protect the pulse

Agenda (CEST)

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Carolina Adler & James Thornton (MRI & GEO Mountains)

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Biodiversity data mobilization from the HKH

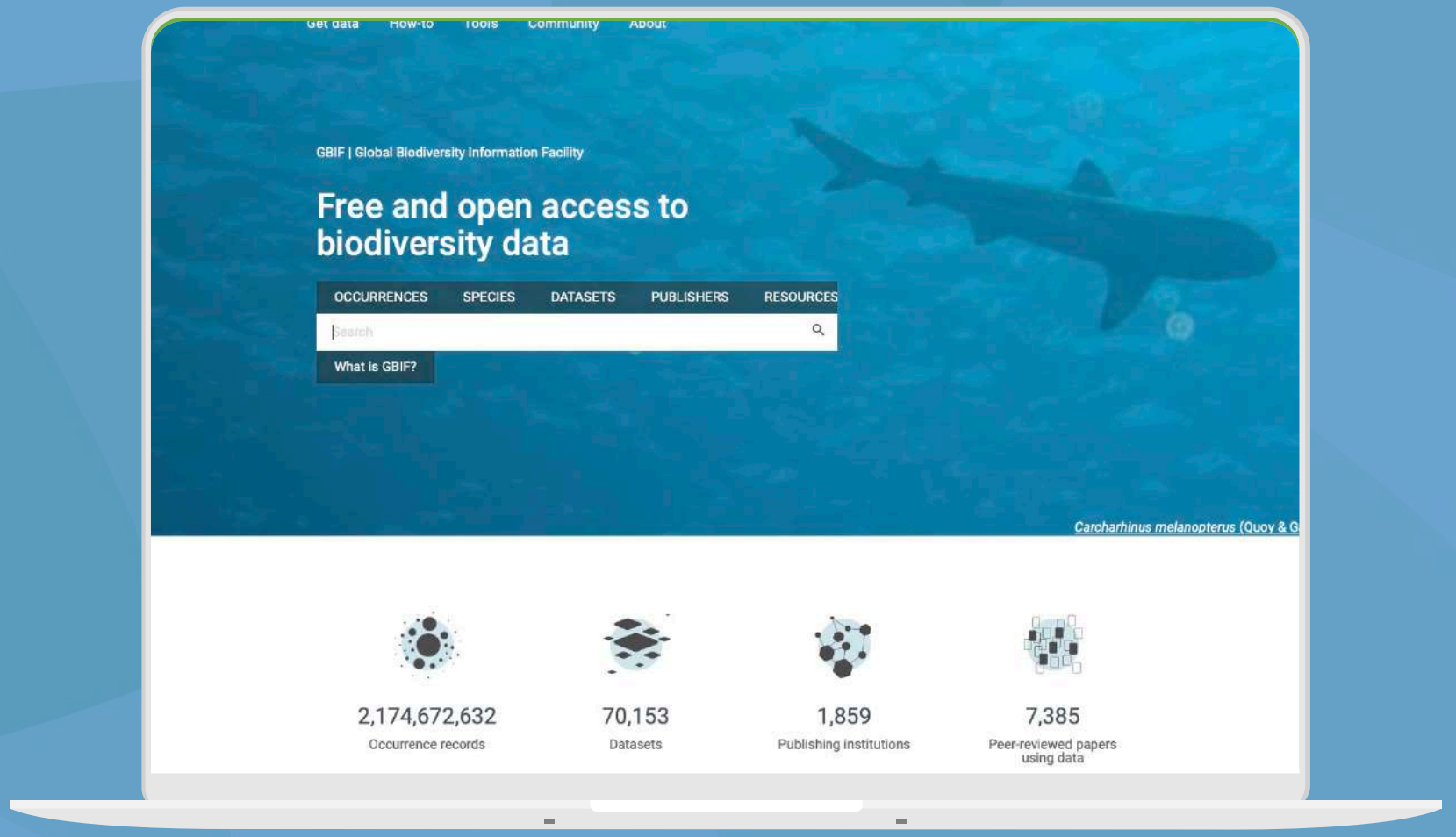
Lily Shrestha, GBIF Asia Regional Support Team

GBIF Global Biodiversity Information Facility

Map Source: ICIMOD

Introduction to gbif

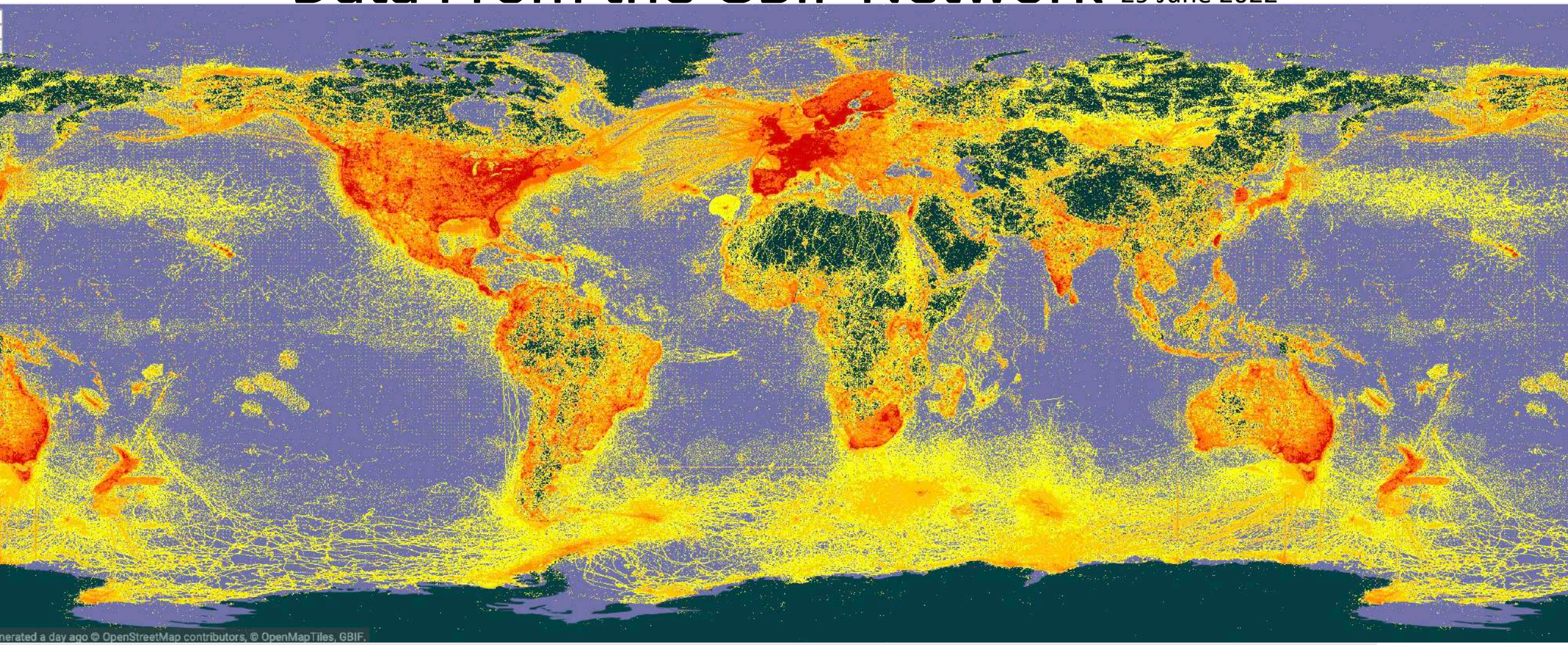
- Intergovernmental network and data infrastructure
- Provides anyone, anywhere, free and open access to data about all types of life on Earth
- Voluntary collaboration through Memorandum of Understanding- 62



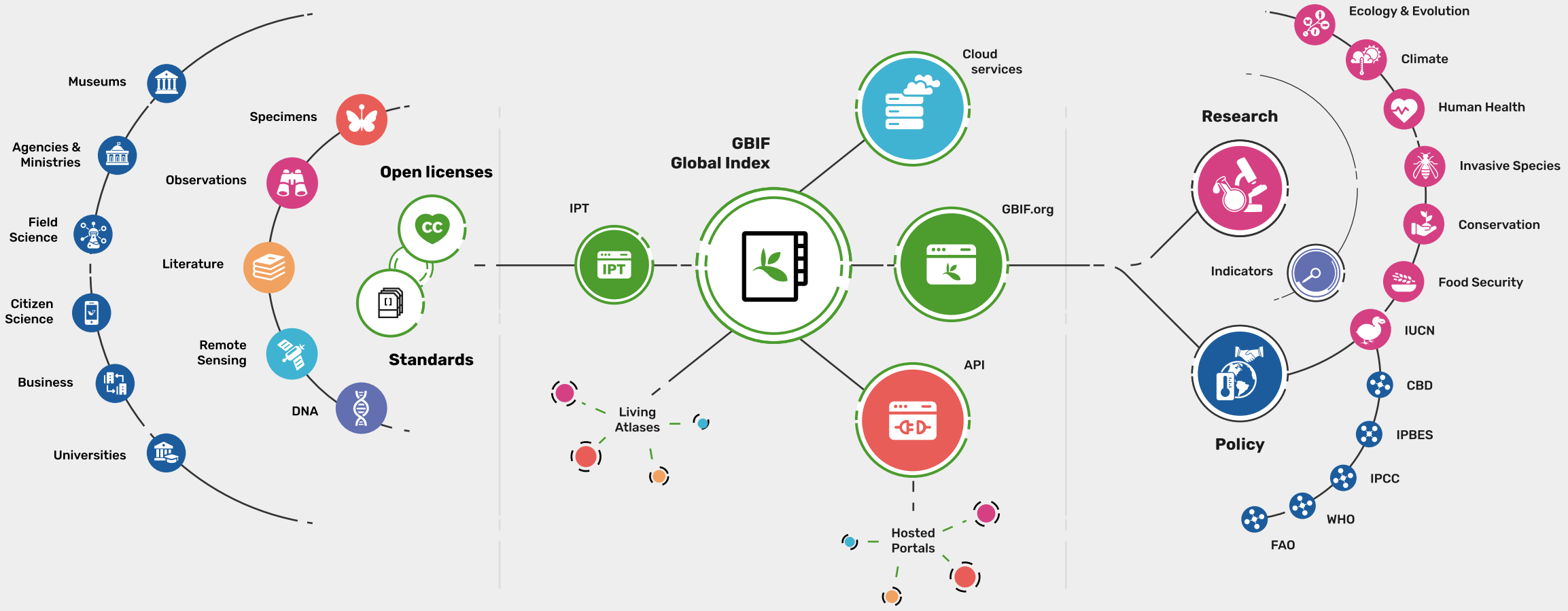
https://www.gbif.org/

GBIF

Data From the GBIF Network 29 June 2022



Data mobilization through GBIf



HKH Biodiversity data in GBIF

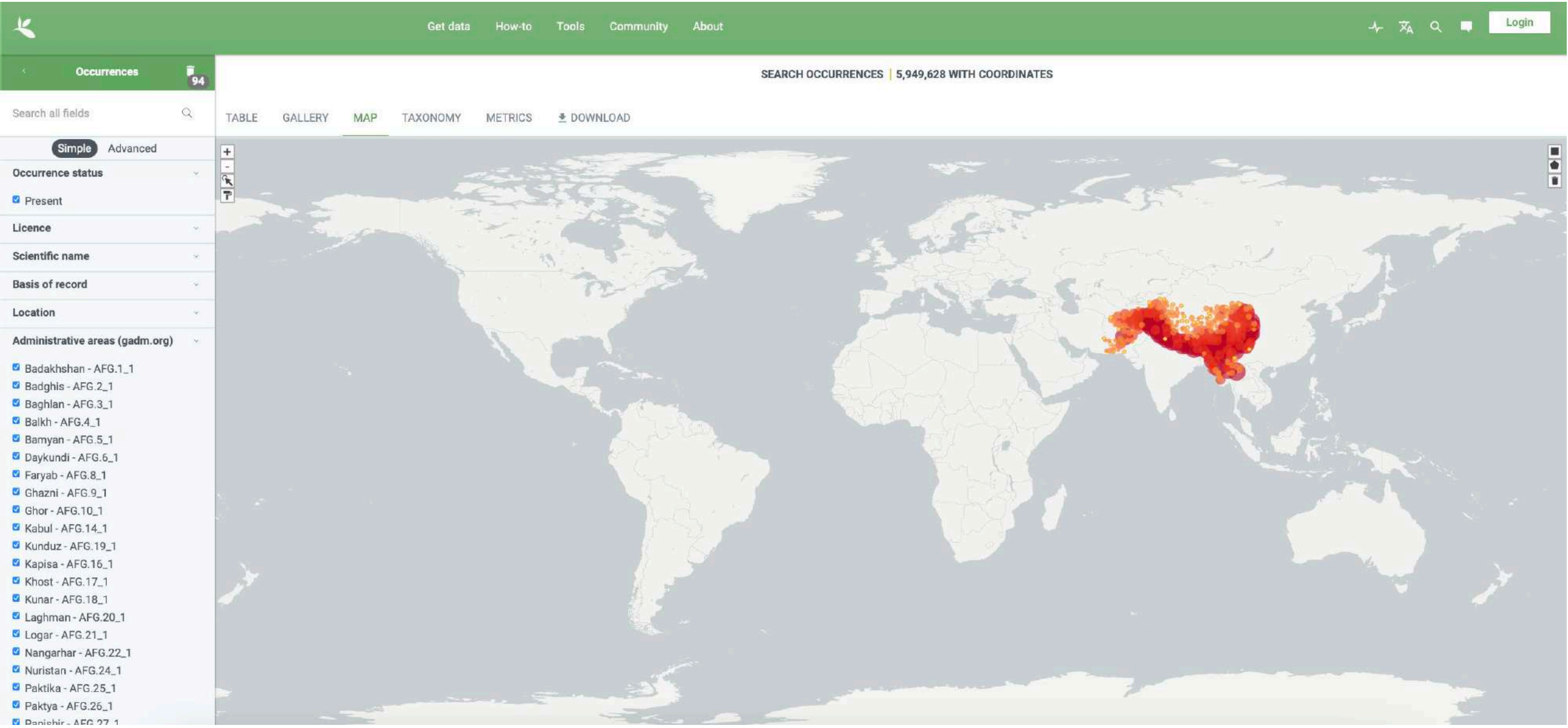
- Occurrence search through GADM filters for HKH countries https://www.gbif.org/occurrence/search?occurrence_status=present&q=

Countries	Areas included in the HKH region
Afghanistan	All provinces except the provinces of Kandahar, Helmand, Nimroz, Farah, and Herat
Bangladesh	Chittagong hills
Bhutan	Entire territory
China	Parts of the provinces of Yunnan (Diqing, Nujiang & Dali prefectures), Sichuan (Ganzi, Aba & Liangshan prefectures), & Gansu (Gannan, Wuwei & Zhangye prefectures); Xinjiang autonomous region (Kashigar, Kezilesu, Hetian & Altai prefectures); Tibet (entire territory), and Qinghai province (entire territory)
India	Entire territory of 11 mountain states (Assam, Uttarakhand, Himachal Pradesh, Manipur, Jammu & Kashmir (Indian administered area), Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Arunachal Pradesh), & Darjeeling district of West Bengal state
Myanmar	Chin, Shan, Rakhine & Kachin states
Nepal	Entire territory
Pakistan	Khyber Pakhtunkhwa province, 24 districts (out of 32) of Balochistan province (excluded districts are Kachhi, Gwadar, Jafarabad, Jhal Magsi, Lasbela & Sohbatpur), Azad Jammu & Kashmir (AJK), Gilgit-Baltistan & Federally administered Tribal Areas (FATA)

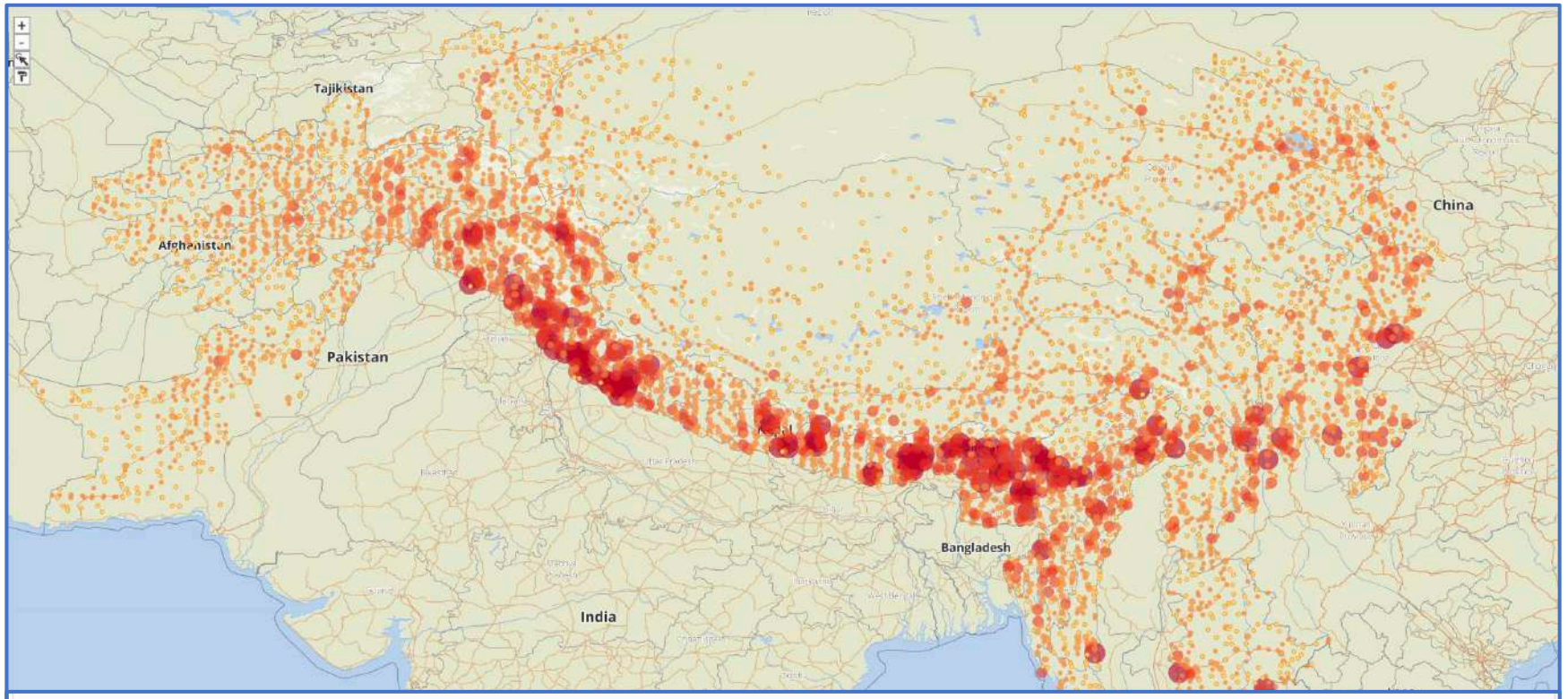
Areas included in the HKH region (Source: https://www.icimod.org/who-we-are/the-pulse-of-the-planet/)

GBIF

Biodiversity Data from the Hindu Kush Himalaya



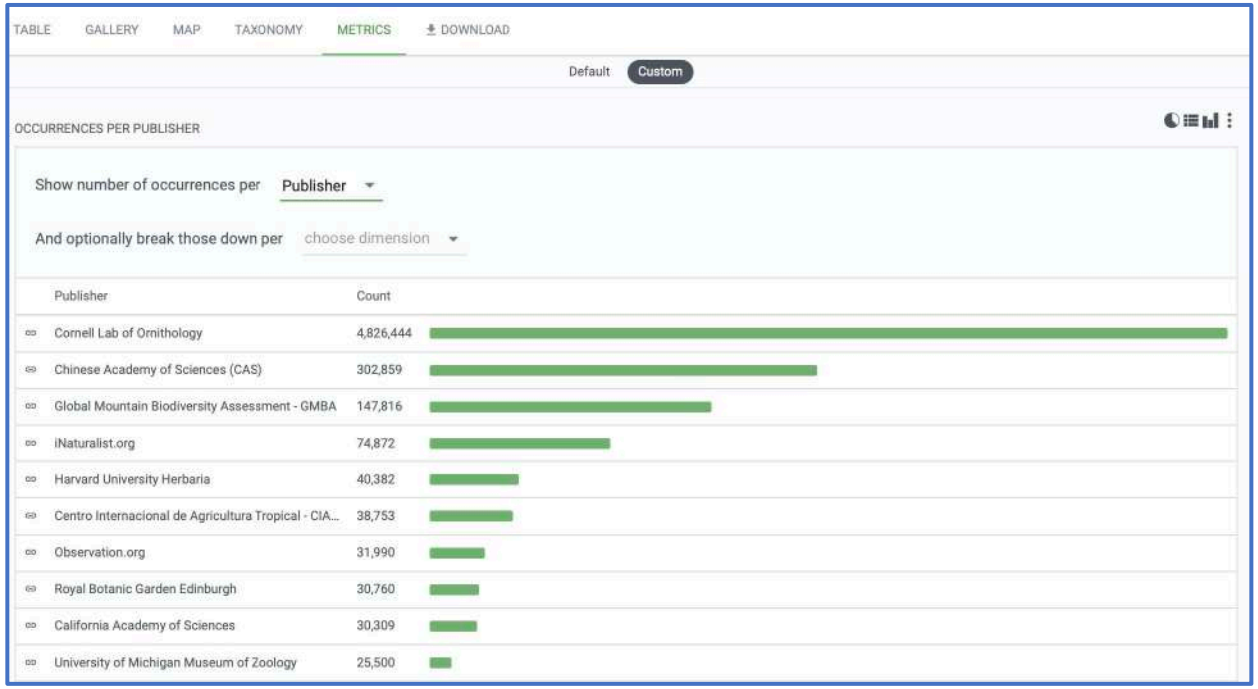
Occurrence distribution across countries



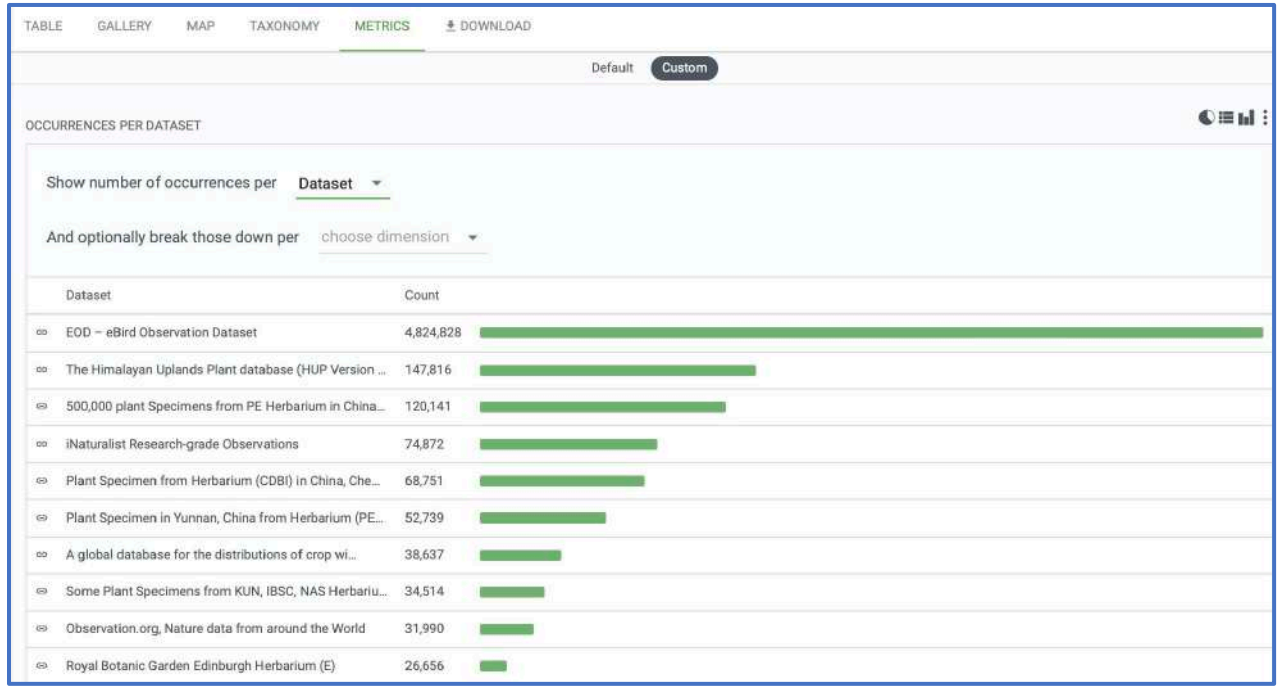
Country or area	Count
India	3,856,665
Nepal	719,813
China	716,949
Bhutan	318,745
Pakistan	131,402
Myanmar	69,609
Afghanistan	49,279
Bangladesh	12,643
Unknown country	430

Occurrence distribution across Publishers and their datasets

Publisher



Dataset



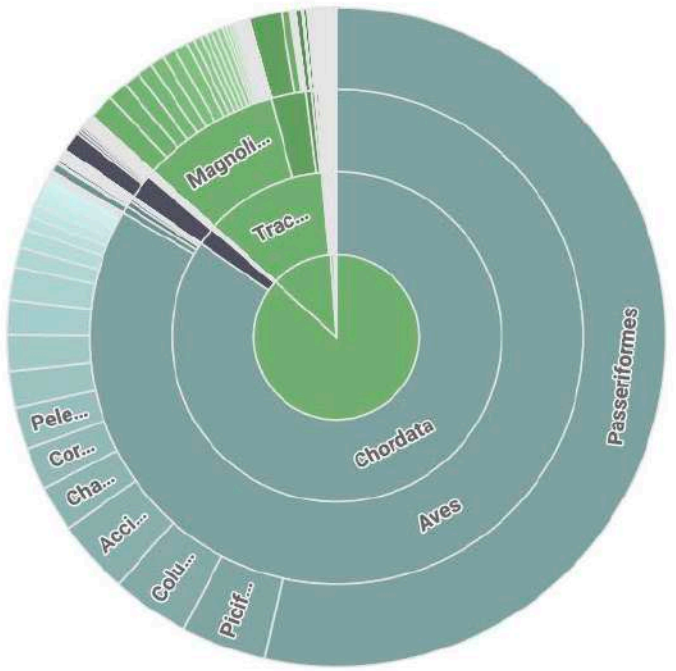
Taxonomic distribution

TAXONOMIC DISTRIBUTION OF OCCURRENCES

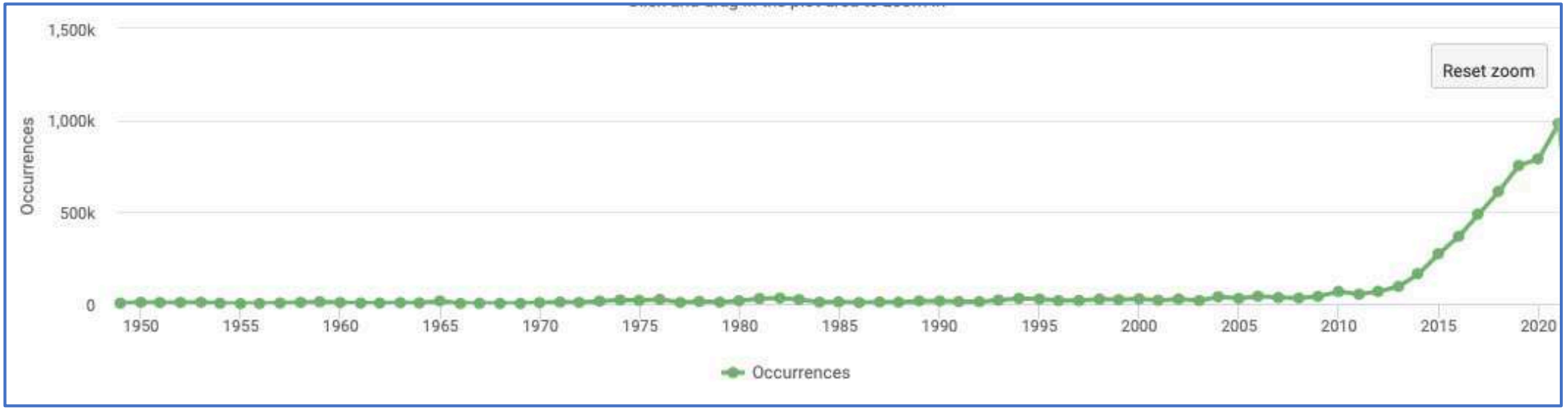
Explore | Major groups

- Animalia 5,157,186
- Plantae 728,484
- Bacteria 37,153
- Fungi 18,344
- incertae sedis 4,552
- Chromista 1,606
- Protozoa 1,004
- Archaea 898
- Viruses 401

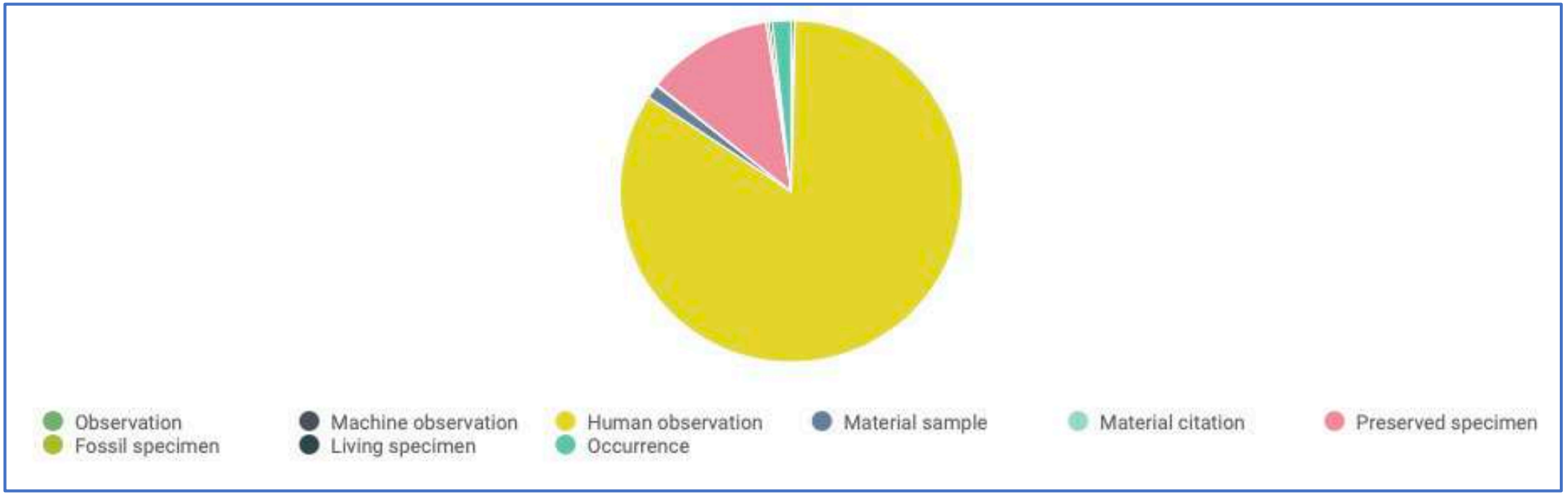
TAXONOMIC DISTRIBUTION OF OCCURRENCES



Occurrences per year



Occurrences per basis of record



Challenges to Data Mobilization

- Lack of awareness about the importance of open access data, existing data networks and infrastructures
- Reluctancy to share data
- Inadequate support for data generation, digitization and publication
- Less participation from the region to GBIF

Efforts to Support data mobilization and use

- Project funding through BIFA

NEWS | 27 SEPTEMBER 2021

Biodiversity Information Fund for Asia funds 13 new projects

Grants through BIFA programme support data mobilization and capacity development activities involving institutions from 11 countries and areas in the region

Project	Country/area of project lead
Sharing vertebrate occurrence data from camera traps in Asia	Nepal
Tending to the neglected diversity of beetles and Darwin wasps in Southwest China's "Lost World"	China
Seeing TIGER for the bees: digitizing apian specimens from Thailand's national parks	Thailand
Improving knowledge of Asian pteridophytes through DNA sampling of specimens in regional collections	Taiwan
Digitization and mobilization of specimen data from Indonesia's Herbarium Bogoriense	Indonesia
Filling data gaps with the natural history collections of the Western Ghats	India
DNA barcoding and taxonomic classification of black flies in Southeast Asia	Malaysia
Sharing eDNA data on sharks to advance conservation	Indonesia
Bats and associated ectoparasites and pathogens from the UPLB Museum of Natural History	Philippines
Small animals, big data: Mobilizing citizen science for data on the spiders of Asia	India
Using microbial metabarcoding to monitor biodiversity and bioindicators in the Mekong River	Thailand
Mobilizing data on ecologically important insects in Malaysia and Singapore	Singapore
A bilingual open-source checklist and digitization of Taiwan's bee fauna	Taiwan

FUNDED BY

Ministry of the Environment

Ministry of the Environment, Government of Japan

Capacity Building

BIODIVERSITY DATA MOBILIZATION WORKSHOP

REPLICATION WORKSHOPS FROM BIFA PROJECTS

REGIONAL WORKSHOP AND HANDS ON TRAINING

https://docs.gbif.org/course-data-mobilization/en/

GBIF

Asia Regional Support contractors

- Support data mobilization from BIFA projects
- Help desk for other institutions or nodes in Asia
- asia_support@gbif.org
- Office Hour- weekly Thursday live in zoom: https://ufl.zoom.us/j/94020649634 at 12:45 GMT+5:45

Four contractors selected to provide project support in Asia

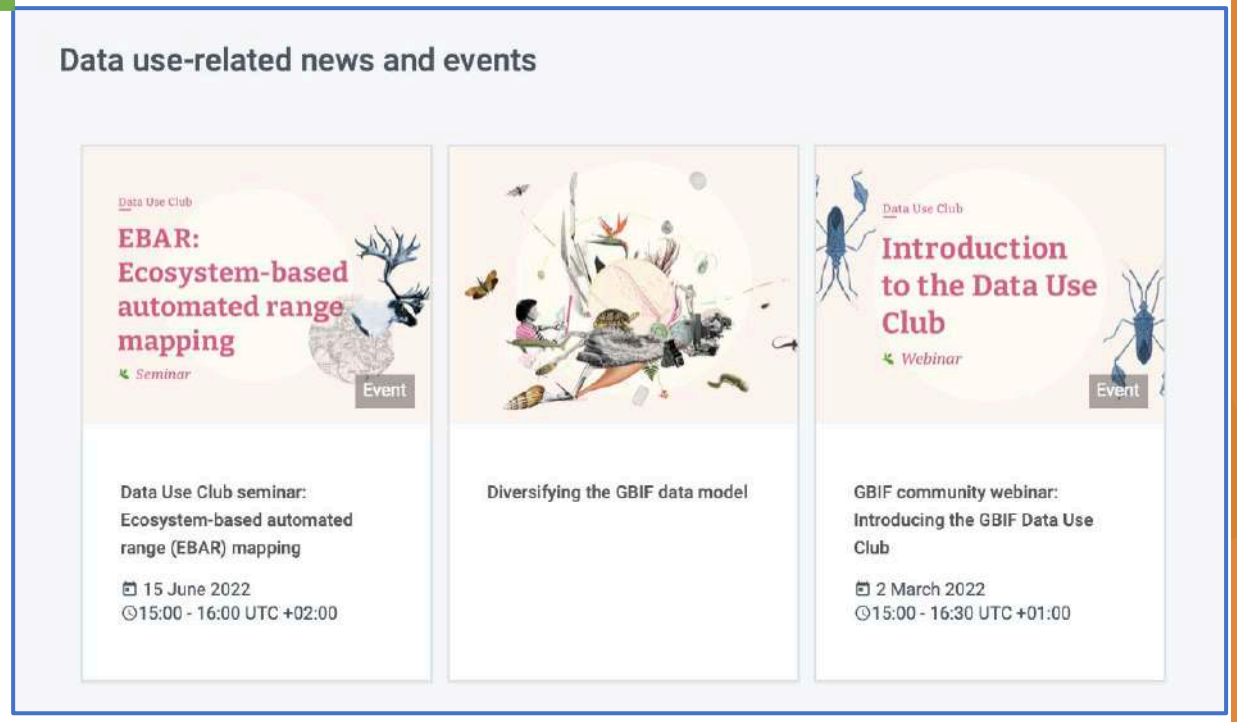
Four biodiversity informatics experts to apply wide-ranging ties and experience in Asia to bolster project teams and the wider community of practice

Asian weaver ant (*Oecophylla smaragdina*), observed in India. Photo 2016 Pavan Ramachandra via India Biodiversity Portal, licensed under CC BY 4.0.

Vijay Barve of India, **Lily Shrestha** of Nepal, and **Chihjen Ko** and **Melissa Liu** from Taiwan have signed one-year contracts to assist the teams responsible for a dozen projects recently funded through the Biodiversity Information for Asia (BIFA). The four consultants will share guidance on best practices, provide help desk services, and mentor project-team members across South-East, South and North-East Asia to help them establish and maintain connections across GBIF's regional network.

DATA use club

- Aims to increase data literacy
- Open forum to share knowledge, access technical support, develop data skills and showcase research powered by GBIF data through:
  - ✓ Training seminar
  - ✓ Knowledge exchange hubs
  - ✓ Datacamp online training
- 150 DataCamp licenses through DataCamp Donates

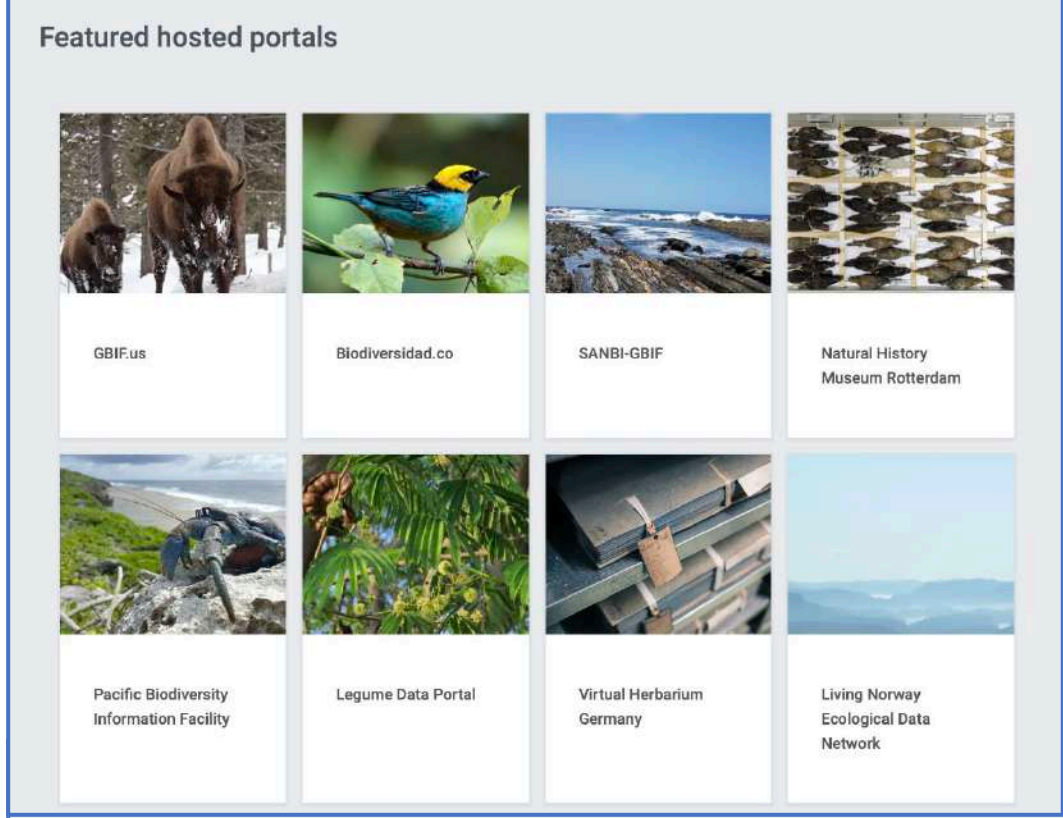


DataCamp License: https://www.gbif.org/data-use-club

https://www.surveygizmo.dk/s3/servlet/com.pls.morpheus.web.pages.CoreRespondentCollectLinkAnonymous

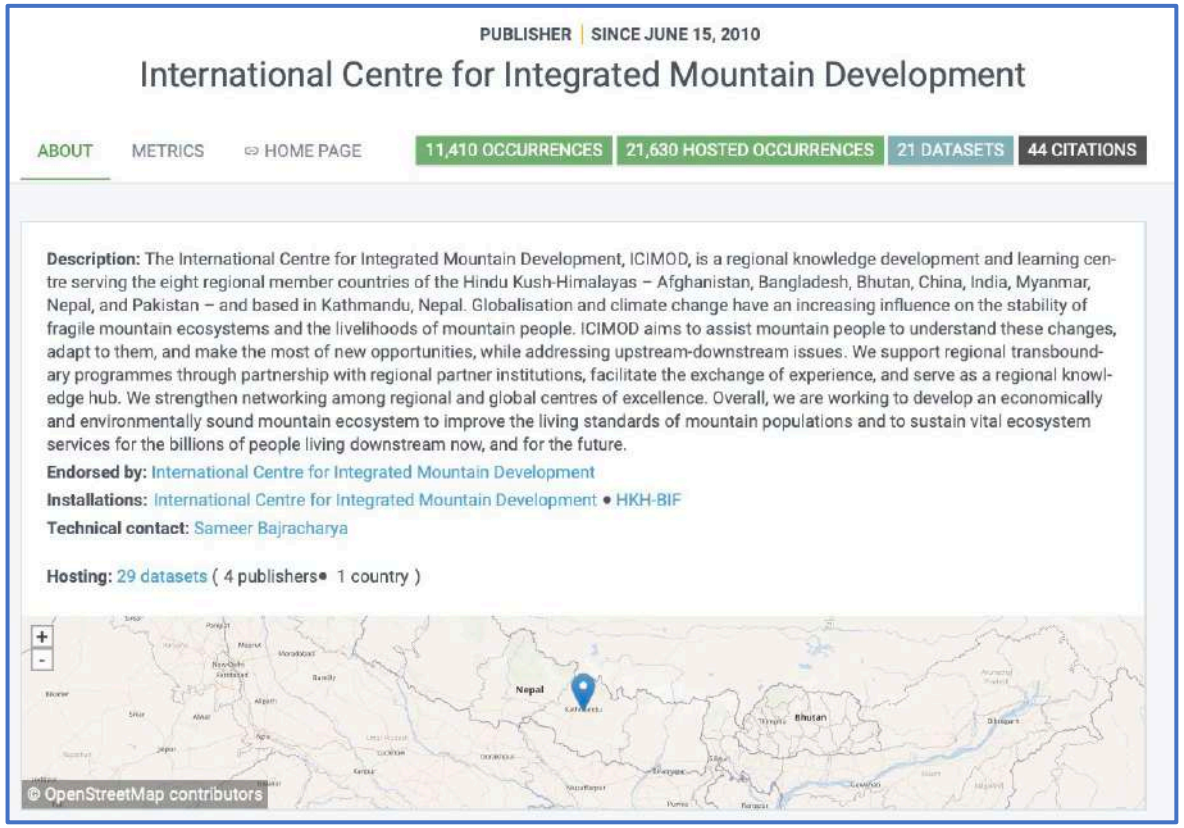
Hosted Portal

- Designed to increase data accessibility and to support biodiversity data use and engagement at national, institutional, regional and thematic scales
- Simple, branded and fully customizable website that displays a targeted subset of GBIF-mediated data to support Participant nodes and their partners.
- Pilot phase in 2021 produced eight websites



https://www.gbif.org/composition/3kQFinjwHbCGZeLb5OhwN2/gbif-hosted-portals

HKHBIF- Regional Ipt Hosted by ICIMOD



Logo	Name	Organisation	Type	Subtype	Records	Last modified	Last publication	Next publication
--	A checklist of Mistletoes of Nepal	International Centre for Integrated Mountain Development (ICIMOD)	Checklist	--	24	2021-03-01	2021-03-01	--
--	A checklist of seed plant of Gaoligongshan National Nature Reserve	International Centre for Integrated Mountain Development (ICIMOD)	Checklist	--	4,284	2021-03-24	2021-03-24	--
--	Alien Flora of Nepal at KATH	Department of Plant Resources, MoFE, Government of Nepal	Occurrence	Specimen	3,513	2020-09-23	2020-09-23	--
--	Amphibia and Reptilia of Yunnan	International Centre for Integrated Mountain Development (ICIMOD)	Checklist	--	284	2021-07-19	2021-07-19	--
--	Amphibians of the Kangchenjunga Landscape	Not registered	Occurrence	--	52	2020-09-21	2019-02-04	--
--	Angiosperms of the	Not registered	Metadata-	--	0	2019-02-	2019-02-04	--

Potential Collaboration

- Build awareness
- Encourage data mobilization
- Promote use of open biodiversity data
- Capacity building
- Increase GBIF participation

Asia Regional Summit in November

Thank you!

lshrestha@gbif.org

thirsch@gbif.org

mraymond@gbif.org

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All

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GEO Mountains' Global Data Inventories

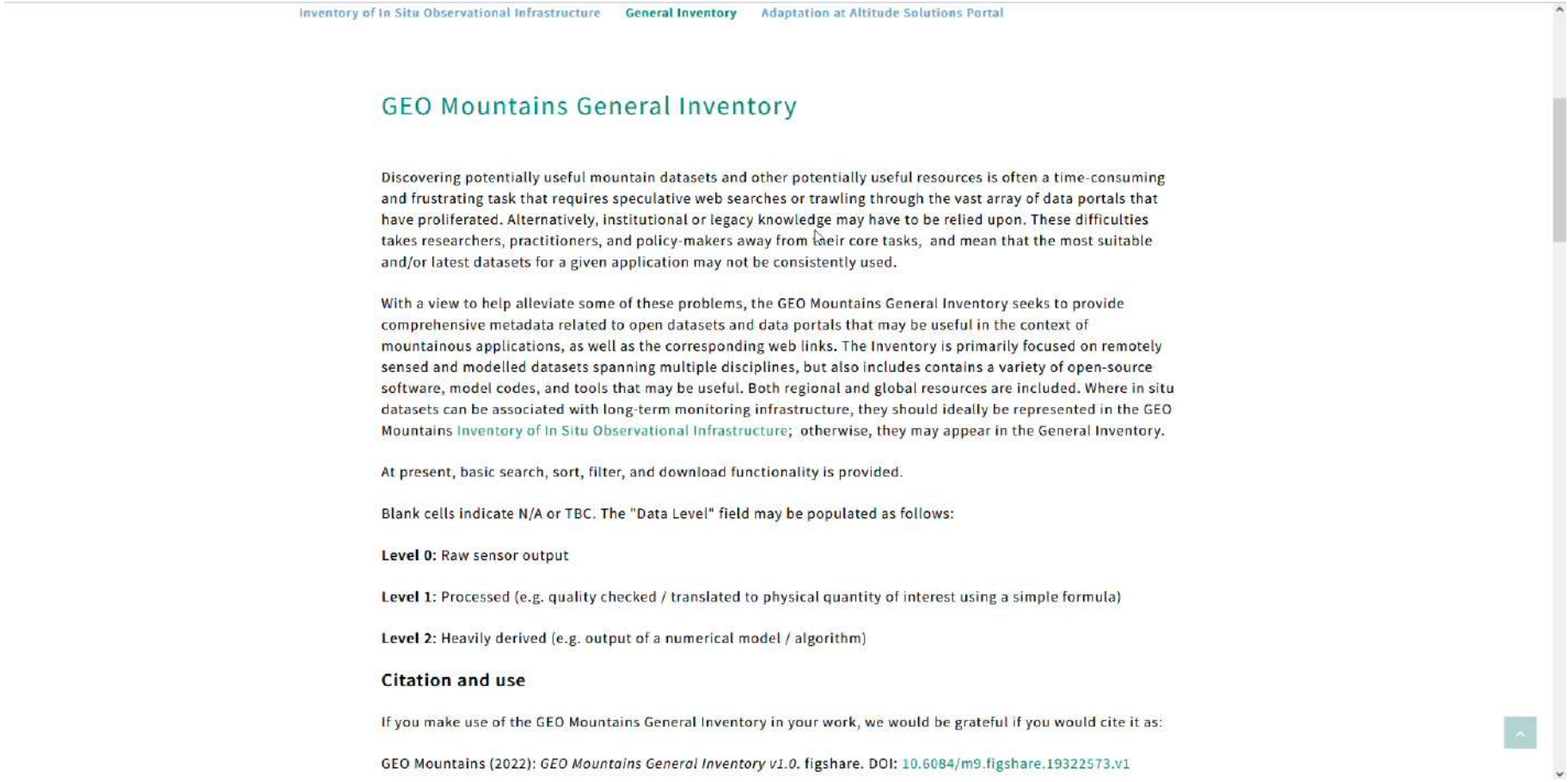
Inventory of In Situ Observational Infrastructure

1. **General Inventory** (remotely sensed & modelled datasets, resources, tools etc.)

https://www.geomountains.org/resources/resources-surveys/inventory-of-in-situ-observational-infrastructure

GEO Mountains' Global Data Inventories

General Inventory (remotely sensed & modelled datasets, resources, tools etc.)



Inventory of In Situ Observational Infrastructure | General Inventory | Adaptation at Altitude Solutions Portal

GEO Mountains General Inventory

Discovering potentially useful mountain datasets and other potentially useful resources is often a time-consuming and frustrating task that requires speculative web searches or trawling through the vast array of data portals that have proliferated. Alternatively, institutional or legacy knowledge may have to be relied upon. These difficulties takes researchers, practitioners, and policy-makers away from their core tasks, and mean that the most suitable and/or latest datasets for a given application may not be consistently used.

With a view to help alleviate some of these problems, the GEO Mountains General Inventory seeks to provide comprehensive metadata related to open datasets and data portals that may be useful in the context of mountainous applications, as well as the corresponding web links. The Inventory is primarily focused on remotely sensed and modelled datasets spanning multiple disciplines, but also includes contains a variety of open-source software, model codes, and tools that may be useful. Both regional and global resources are included. Where in situ datasets can be associated with long-term monitoring infrastructure, they should ideally be represented in the GEO Mountains Inventory of In Situ Observational Infrastructure; otherwise, they may appear in the General Inventory.

At present, basic search, sort, filter, and download functionality is provided.

Blank cells indicate N/A or TBC. The "Data Level" field may be populated as follows:

Level 0: Raw sensor output

Level 1: Processed (e.g. quality checked / translated to physical quantity of interest using a simple formula)

Level 2: Heavily derived (e.g. output of a numerical model / algorithm)

Citation and use

If you make use of the GEO Mountains General Inventory in your work, we would be grateful if you would cite it as:

GEO Mountains (2022): *GEO Mountains General Inventory v1.0*. figshare. DOI: 10.6084/m9.figshare.19322573.v1

https://www.geomountains.org/resources/resources-surveys/general-inventory

GEO Mountains' Global Data Inventories

How to submit:

- *Inventory of In Situ Observational Infrastructure*

  https://form.jotformeu.com/211581876473363

- *General Inventory* (remotely sensed & modelled datasets, resources, tools etc.)

  https://form.jotformeu.com/211392776724361

Papers from 2021

One Earth

Gold Standard for the Global Goals
1 ton of CO_2 offset

CellPress
OPEN ACCESS

Perspective

Toward a definition of Essential Mountain Climate Variables

James M. Thornton,[1,2,*] Elisa Palazzi,[3] Nicolas C. Pepin,[4] Paolo Cristofanelli,[3] Richard Essery,[5] Sven Kotlarski,[6] Gregory Giuliani,[7,8] Yaniss Guigoz,[7,8] Aino Kulonen,[1] David Pritchard,[9] Xiaofeng Li,[10] Hayley J. Fowler,[9] Christophe F. Randin,[11] Maria Shahgedanova,[12] Martin Steinbacher,[13] Marc Zebisch,[14] and Carolina Adler[1]

[1]Mountain Research Initiative, c/o University of Bern, Bern, Switzerland
[2]Centre for Hydrogeology and Geothermics, University of Neuchâtel, Neuchâtel, Switzerland
[3]Institute of Atmospheric Sciences and Climate, National Research Council, Torino, Italy
[4]School of the Environment, Geography and Geosciences, University of Portsmouth, Portsmouth, UK
[5]School of GeoSciences, University of Edinburgh, Edinburgh, UK
[6]Federal Office of Meteorology and Climatology MeteoSwiss, Zurich, Switzerland
[7]enviroSPACE, Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland
[8]GRID-Geneva, Science Division, UN Environment Programme, Geneva, Switzerland
[9]School of Engineering, University of Newcastle, Newcastle upon Tyne, UK
[10]Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), Guangdong Province Key Laboratory for Climate Change and Natural Disaster Studies, School of Atmospheric Sciences, Sun Yat-sen University, Guangzhou, China
[11]Department of Ecology and Evolution, University of Lausanne, Lausanne, Switzerland
[12]Department of Geography and Environmental Science, University of Reading, Reading, UK
[13]Air Pollution/Environmental Technology, EMPA, Dübendorf, Switzerland
[14]Institute for Earth Observation, Eurac Research, Bolzano/Bozen, Italy
*Correspondence: james.thornton@unibe.ch
https://doi.org/10.1016/j.oneear.2021.05.005

Mountain Research and Development (MRD)
An international, peer-reviewed open access journal published by the International Mountain Society (IMS)
www.mrd-journal.org

MountainAgenda
Target knowledge

Mountain Observatories: Status and Prospects for Enhancing and Connecting a Global Community

Maria Shahgedanova[1], Carolina Adler[2], Aster Gebrekirstos[3], H. Ricardo Grau[4], Christian Huggel[5], Robert Marchant[6], Nicholas Pepin[7], Veerle Vanacker[8], Daniel Viviroli[5], and Mathias Vuille[9]*

** Corresponding author: m.shahgedanova@reading.ac.uk*

[1] Department of Geography and Environmental Science, University of Reading, Whiteknights, PO Box 217, Reading, RG6 6AH, Berkshire, UK
[2] Mountain Research Initiative, c/o Centre for Development and Environment (CDE), University of Bern, Mittelstrasse 43, 3012 Bern, Switzerland
[3] World Agroforestry (ICRAF), United Nations Avenue, Gigiri, PO Box 30677, Nairobi, 00100, Kenya
[4] Instituto de Ecología Regional (CONICET-Universidad Nacional de Tucumán), Cc 34–4107, Yerba Buena, Tucumán, Argentina
[5] Department of Geography, University of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland
[6] York Institute for Tropical Ecosystems, Department of Environment and Geography, University of York, Heslington, York, YO10 5DD, UK
[7] School of the Environment, Geography and Geoscience, University of Portsmouth, Winston Churchill Avenue, Portsmouth, PO1 2UP, Hampshire, UK
[8] Earth and Life Institute, University of Louvain, 1348 Louvain-la-Neuve, Belgium
[9] Department of Atmospheric and Environmental Sciences, University at Albany, State University of New York, Albany, NY 12222, USA

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Watch a lecture about the paper here!

Paper under review

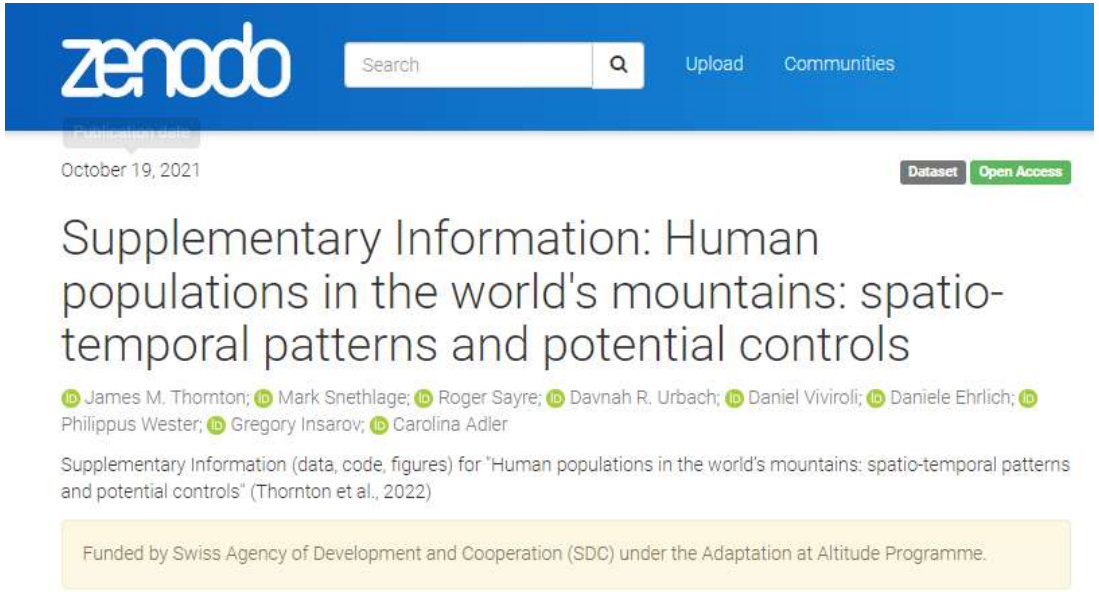
GEO MOUNTAINS
Observing Mountain Environments

Human populations in the world's mountains: spatio-temporal patterns and potential controls

James M. Thornton[1*], Mark A. Snethlage[2], Roger Sayre[3], Davnah R. Urbach [2], Daniel Viviroli[4], Daniele Ehrlich[5], Veruska Muccione[4], Philippus Wester[6], Gregory Insarov[7], Carolina Adler[1]

1 Mountain Research Initiative, University of Bern, Switzerland
2 Global Mountain Biodiversity Assessment, University of Bern, Switzerland
3 U.S. Geological Survey, Reston, USA
4 Department of Geography, University of Zurich, Switzerland
5 Joint Research Center, European Commission, Ispra, Italy
6 International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal
7 Institute of Geography, Russian Academy of Sciences, Russia

* james.thornton@unibe.ch



PLOS ONE

Coverage of *In Situ* Climatological Observations in the World's Mountains

frontiers | Frontiers in Climate

ORIGINAL RESEARCH
published: 26 April 2022
doi: 10.3389/fclim.2022.814181

Coverage of *In Situ* Climatological Observations in the World's Mountains

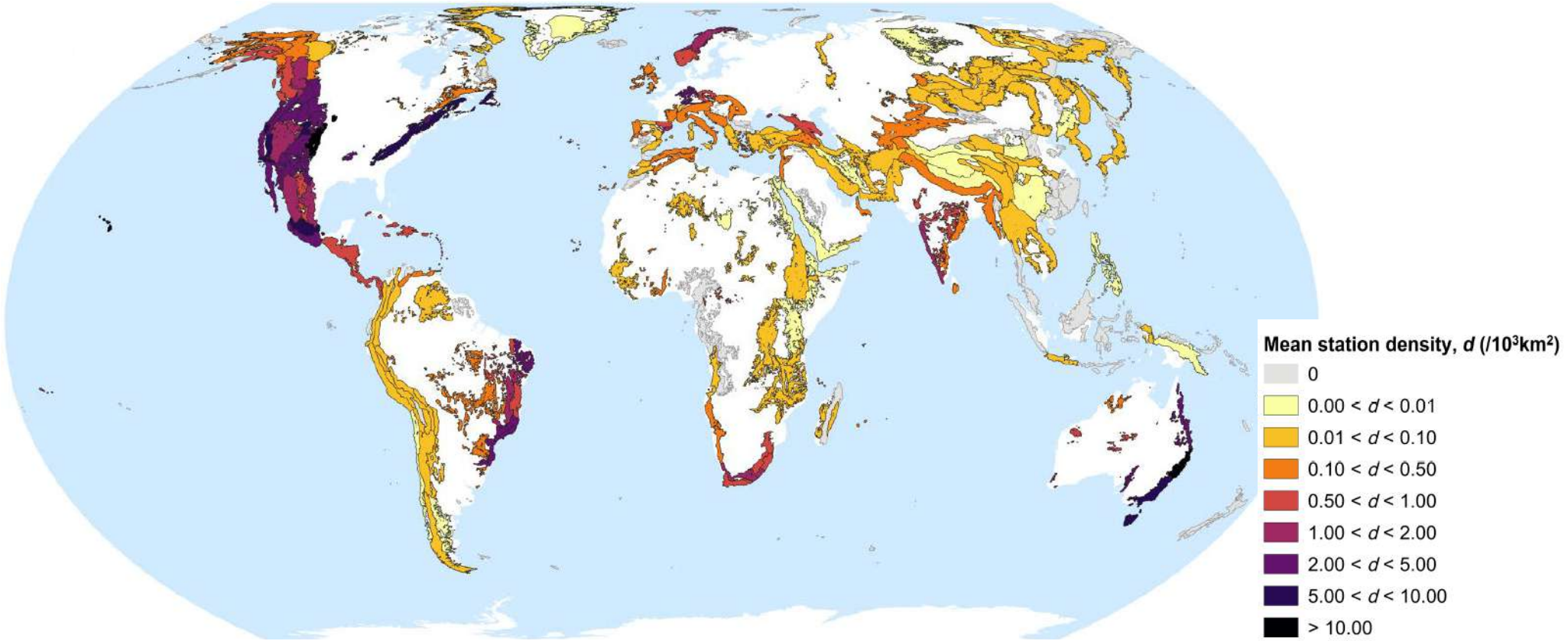
James M. Thornton[1]*, *Nicholas Pepin*[2], *Maria Shahgedanova*[3] and *Carolina Adler*[1]

[1] Mountain Research Initiative, University of Bern, Bern, Switzerland, [2] School of the Environment, Geography and Geosciences, University of Portsmouth, Portsmouth, United Kingdom, [3] Department of Geography and Environmental Science, University of Reading, Reading, United Kingdom

Read the paper here!

Selected results: spatial density

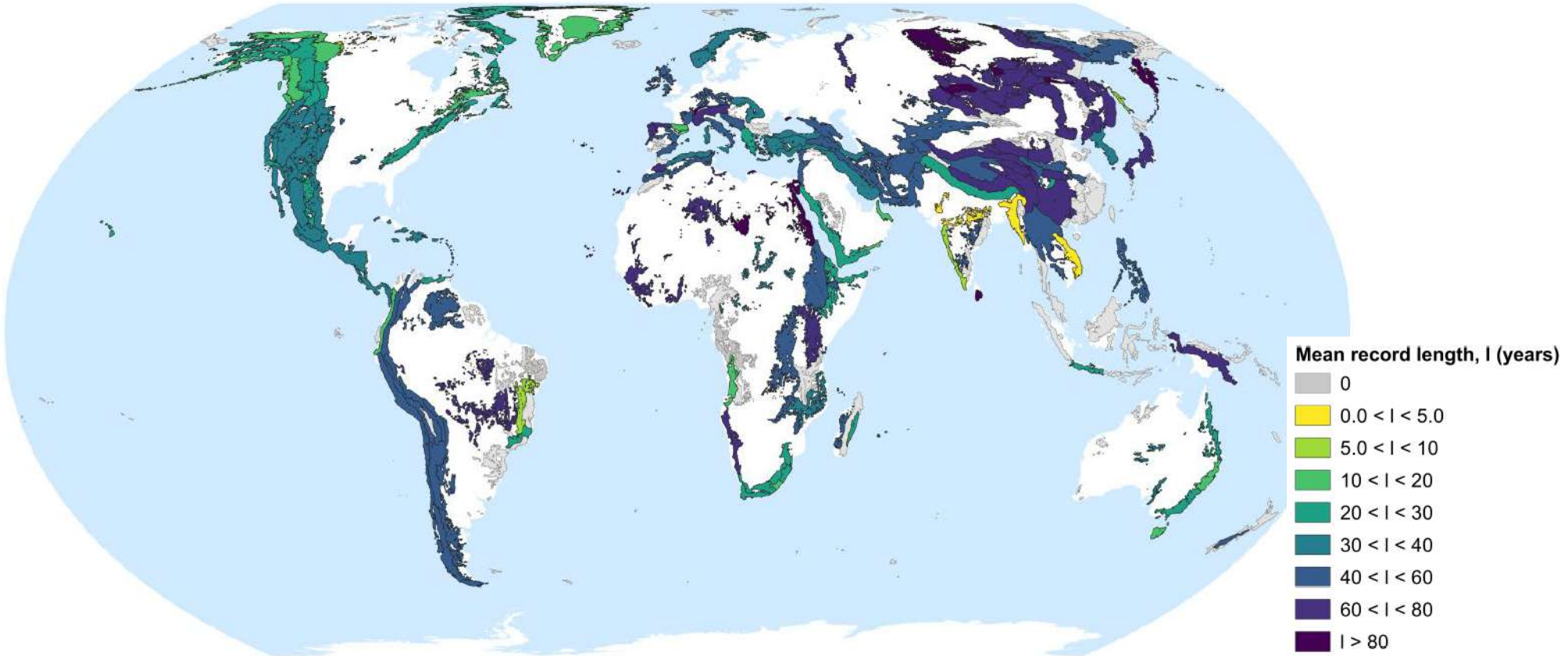
- **Mean spatial density** by mountain range, irrespective of record length, for **precipitation**:



GEO MOUNTAINS
Observing Mountain Environments

Selected results: record length

- **Mean record length** by mountain range for **air temperature** (daily max):



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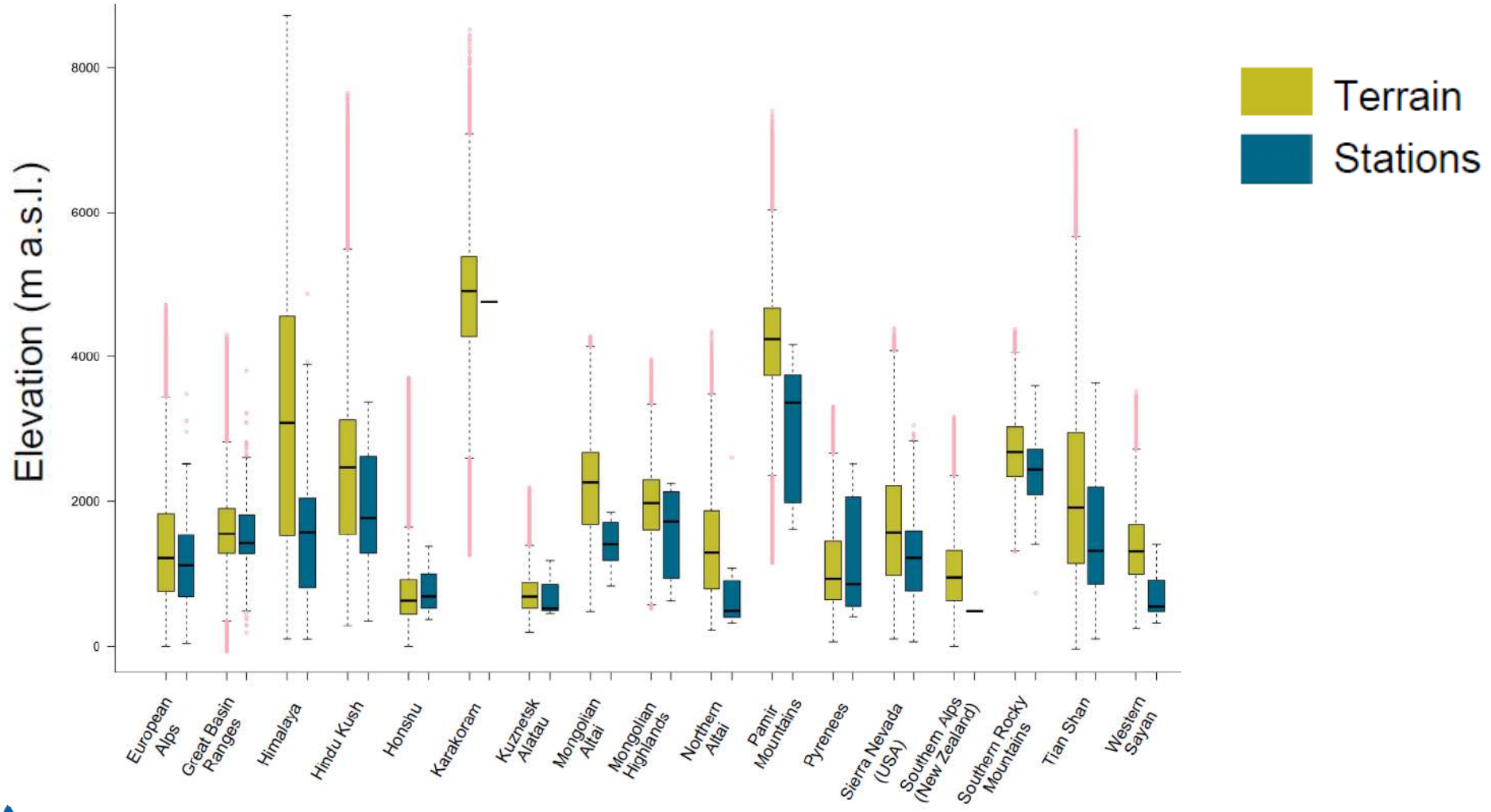
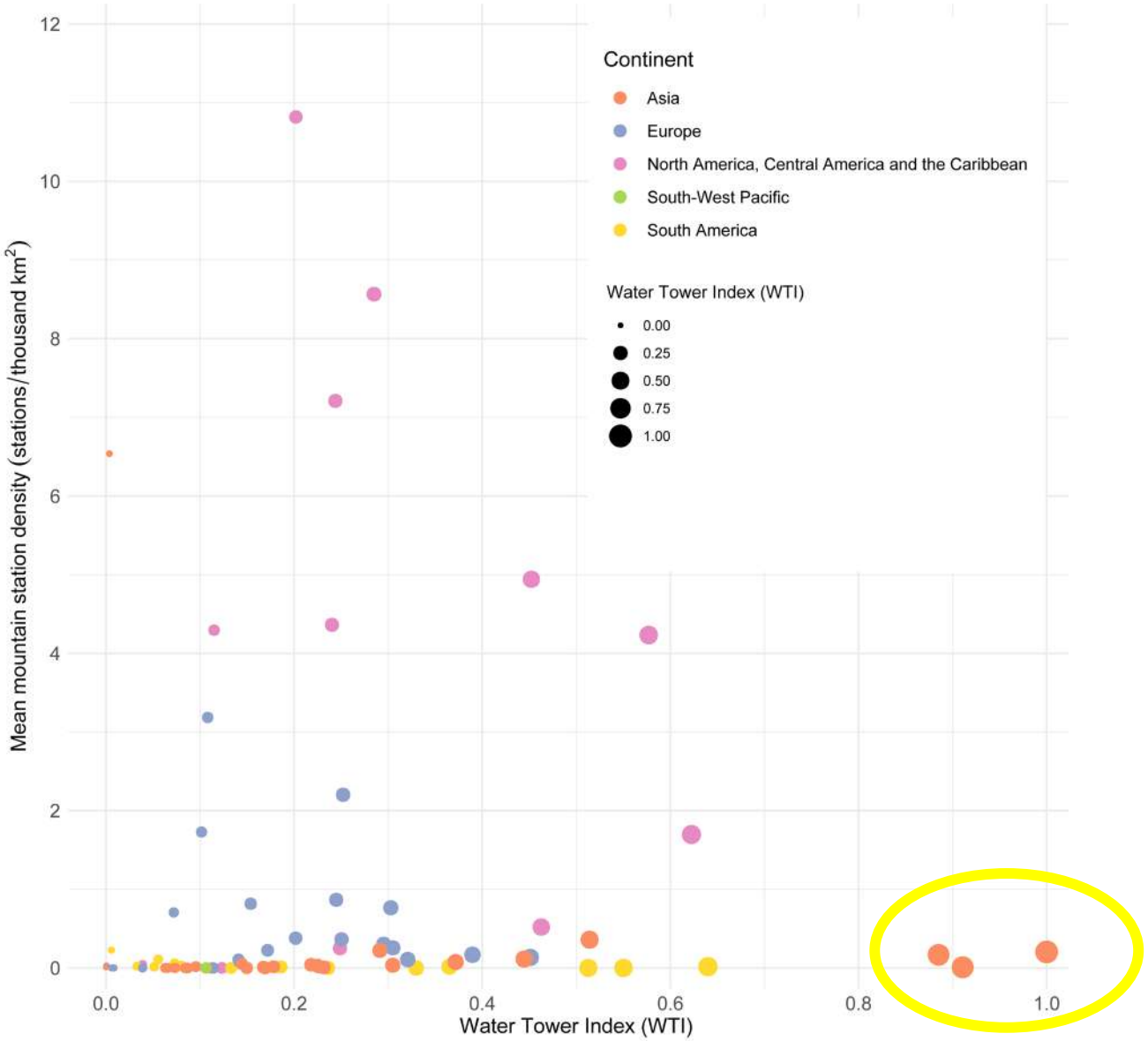
Selected results: elevational coverage



- **Elevational distribution** of **several mountain ranges** seems to be **severely under-sampled**

Water Tower Index vs. mean station density*



*Mean station density per Water Tower Unit (WTU); See Immerzeel et al. (2020) for further details

GEO MOUNTAINS
Observing Mountain Environments

Agenda (CEST)

10:00 – 10:10: *Welcome, introductions & workshop aims*
Carolina Adler & James Thornton (MRI & GEO Mountains)

10:10 – 10:30: *Access to scientific data to facilitate mountain specific research*
Sudip Pradhan, ICIMOD

10:30 – 10:50: *Biodiversity data mobilization from the HKH*
Lily Shrestha, GBIF Asia Regional Support Team

10:50 – 11:20: *The GEO Mountains data inventories & other relevant work*
Dr. James Thornton, MRI and GEO Mountains

11:20 – 11:30: ***Tea Break***
All

11:30 – 12:30: *Open discussion of several key questions*
All

12:30 – 12:45: *Continue (or begin) the survey*
All

12:45 – 13:00: *Summary and identification of next steps*
Invited speakers & Co-convenors

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Discussion of the questions (Part I):

Based on your experience / in your field of work, in which respects is the "data situation" currently good, or is progress being made?

Which organizations and institutions are major providers of relevant data in the region?

Which key data and other resources do you use / rely on / know exist?

Discussion of the questions (Part II):

What are the major gaps, barriers, or challenges in terms of data discoverability, accessibility, and usability currently experienced by data users across science, policy, and practice (again by discipline / sub-region, if applicable)?

Discussion of the questions (Part III):

How could these barriers / challenges be overcome?

What is your "vision" in relation to environmental and societal data in the region?

How could we continue to work together / distribute tasks in future to meet our respective and combined goals?

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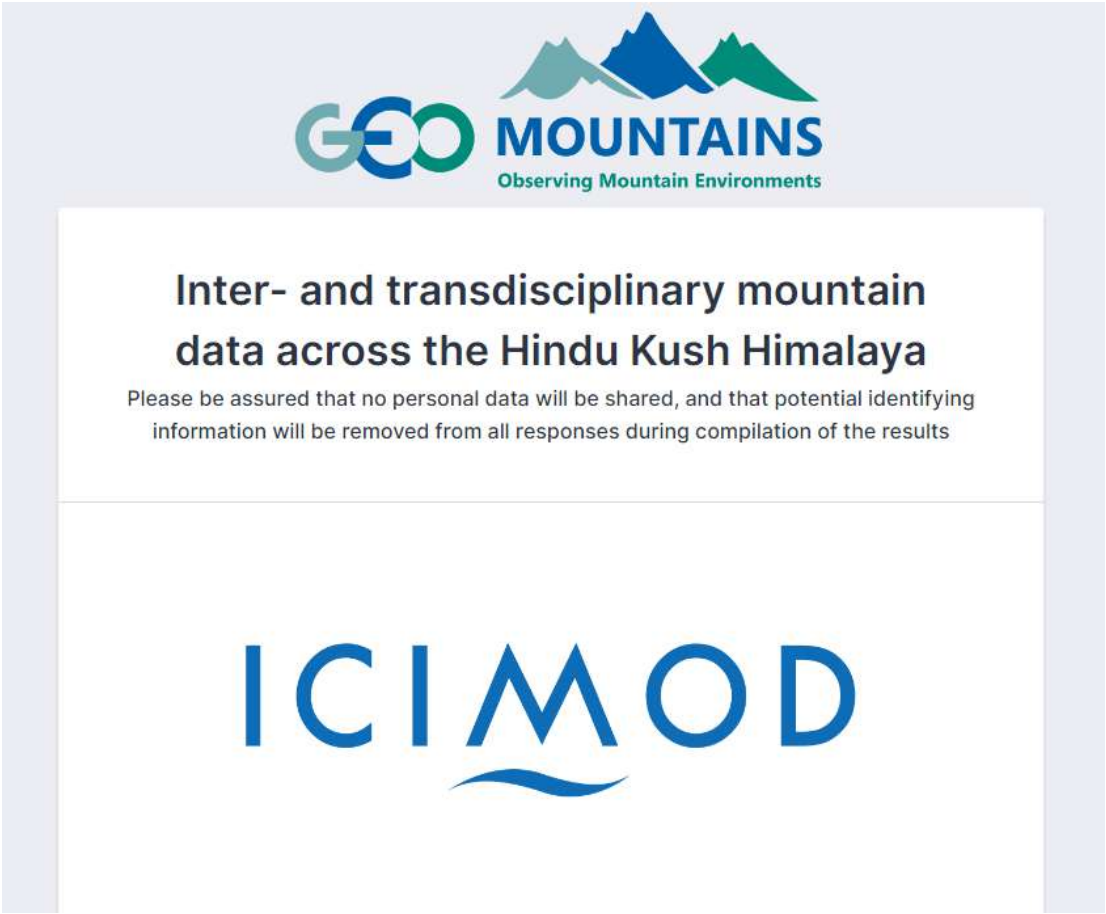
Continue / begin the survey

- To capture your information / responses more systematically

  https://form.jotform.com/221313679763360



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Summary and conclusions

Thank you!

james.thornton@unibe.ch

MOUNTAIN RESEARCH INITIATIVE

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC