CAWa Regional Research Network «Central Asian Water»

Federal Foreign Office GFZ Helmholtz Centre Potsdam DLR CAIAG

Cooperation on hydrology and water management in Central Asian transboundary river basins

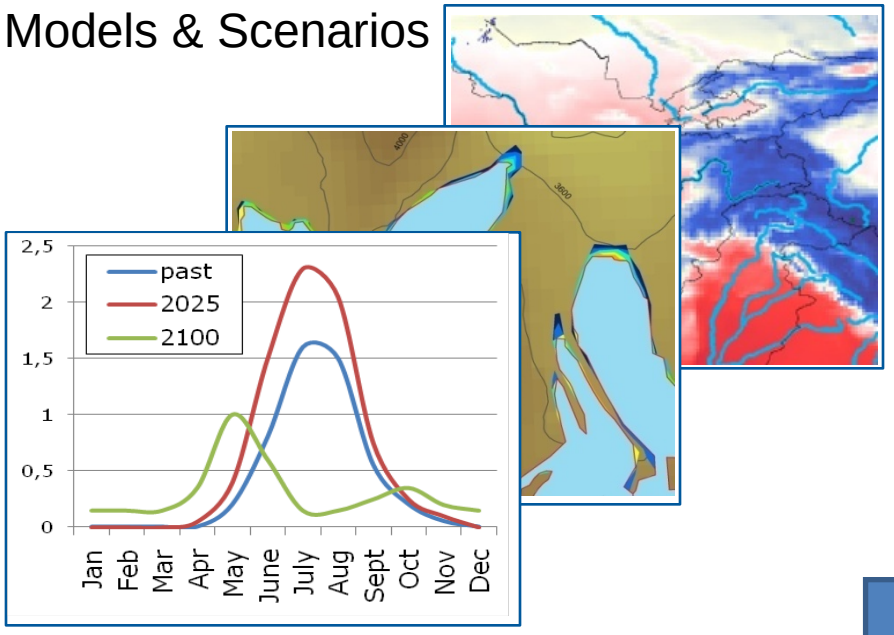
Contributions by the CAWa Project

Katy Unger-Shayesteh

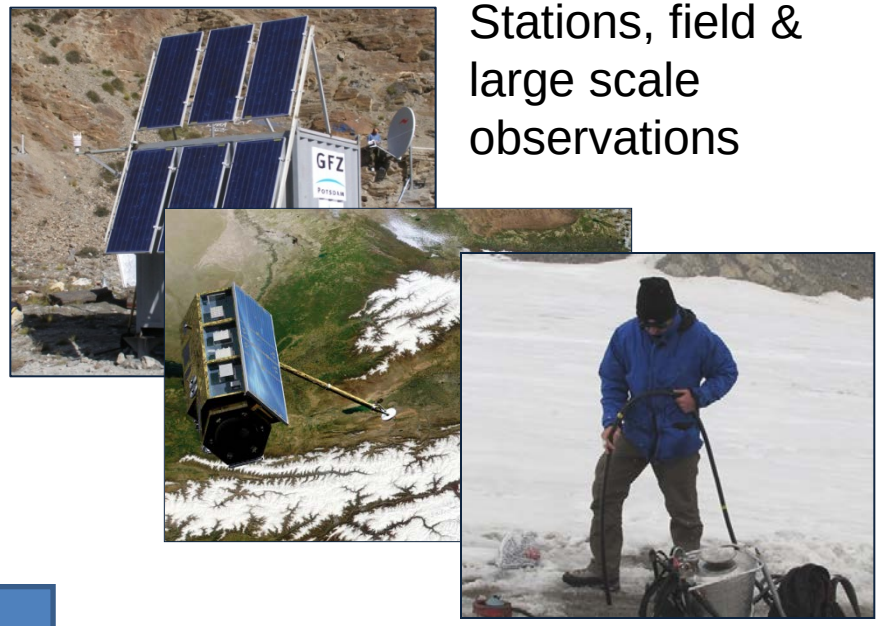
CAWa project coordination

The project „Water in Central Asia“

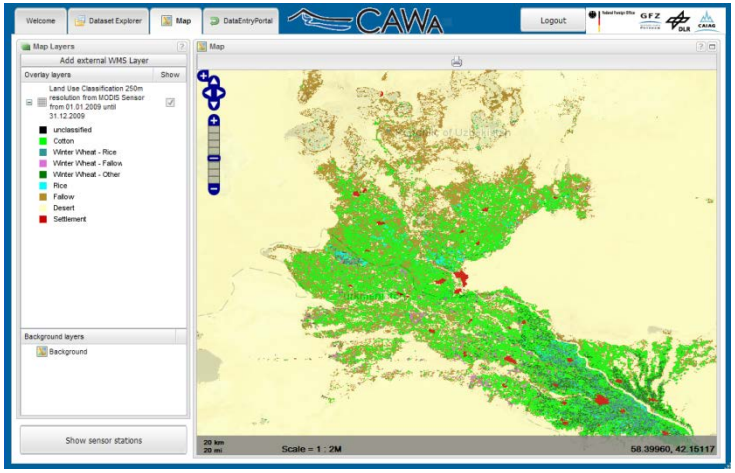
Models & Scenarios



Stations, field & large scale observations



Information & Products



Training & Education

CAWa Project Partners

Funded by the German Federal Foreign Office as part of the „Berlin Process“
2008-2014

Work Package 1

MONITORING NETWORK AND DATA MANAGEMENT

Station Design

- **Designed for operation in remote areas**
- **Good performance even in high altitudes and under extreme climatic conditions**

- ✓ Automated
- ✓ High-tech low-maintenance components
- ✓ Independent power supply
- ✓ Power management
- ✓ Real-time data transmission
- ✓ Remote control
- ✓ Multi-sensor stations
- ✓ Complying with WMO recommendations

Ayvaj

Abramov Glacier

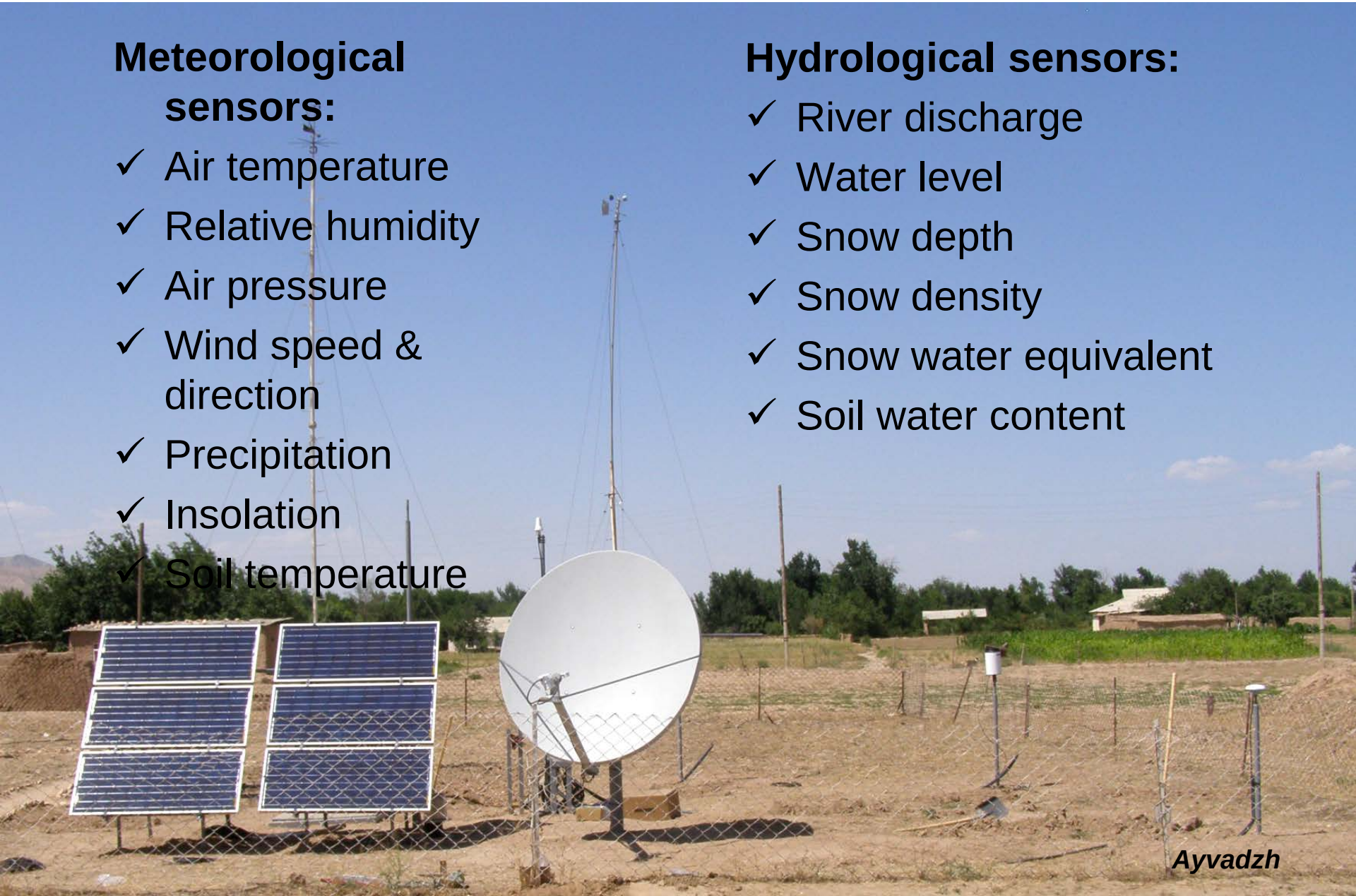
Hydrometeorological Sensors

Meteorological sensors:

- ✓ Air temperature
- ✓ Relative humidity
- ✓ Air pressure
- ✓ Wind speed & direction
- ✓ Precipitation
- ✓ Insolation
- ✓ Soil temperature

Hydrological sensors:

- ✓ River discharge
- ✓ Water level
- ✓ Snow depth
- ✓ Snow density
- ✓ Snow water equivalent
- ✓ Soil water content



Ayvadzh

Additional Sensors

High precision GPS

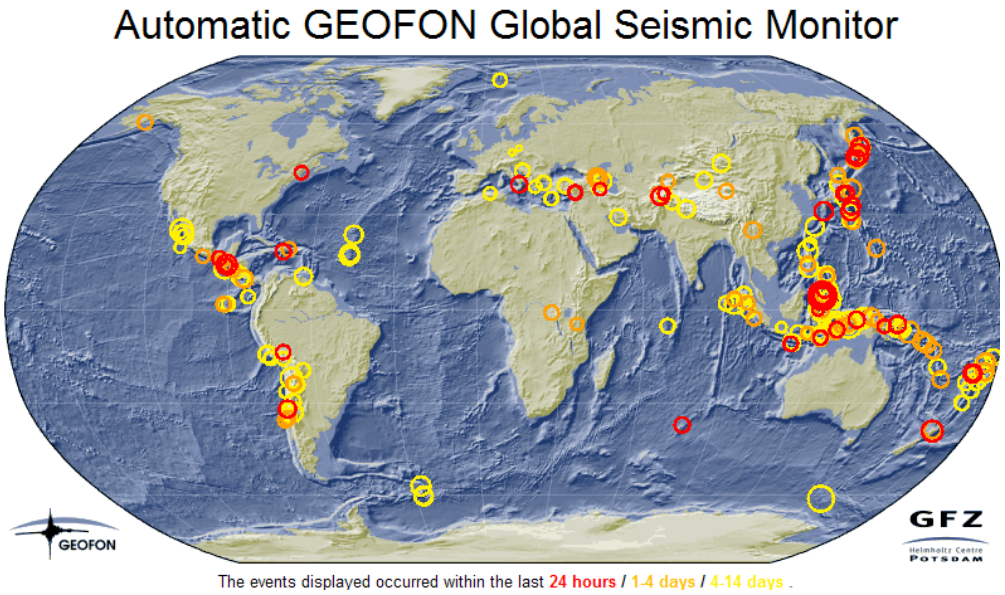
- ✓ Continuous 1Hz data
- ✓ In near real time
- ✓ estimation of water vapor in the atmosphere for improved precipitation forecast

Time-lapse photography

- ✓ 2 pictures per day
- ✓ snow line monitoring on the glacier
- ✓ estimation of glacier mass balance

Integration of Seismometers

- ✓ STS-2 broad band seismometers integrated at 3 stations
- ✓ connected via CAIAG to the global GEOFON network



Merzbacher

Taragay

Aksai

Potential applications

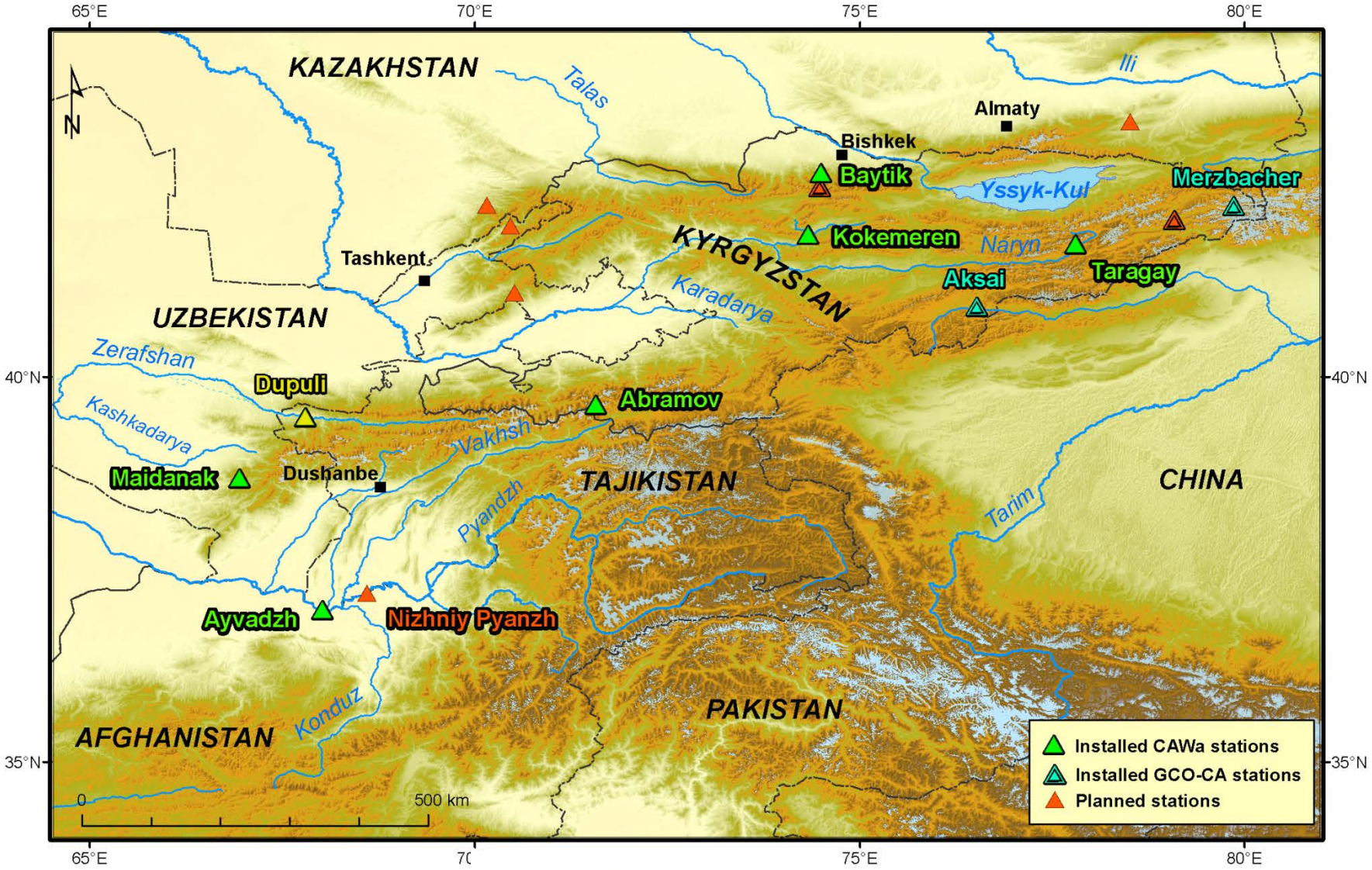
Data used for:

- weather forecast
- seasonal runoff forecast
- long-term monitoring
  - climate change impact assessment
  - glacier dynamics
  - geodynamics

Potential future applications:

- ground-based observations for validation of remote-sensing methods
- estimation of water vapour content in the atmosphere from GPS signals
- components of Early Warning Systems

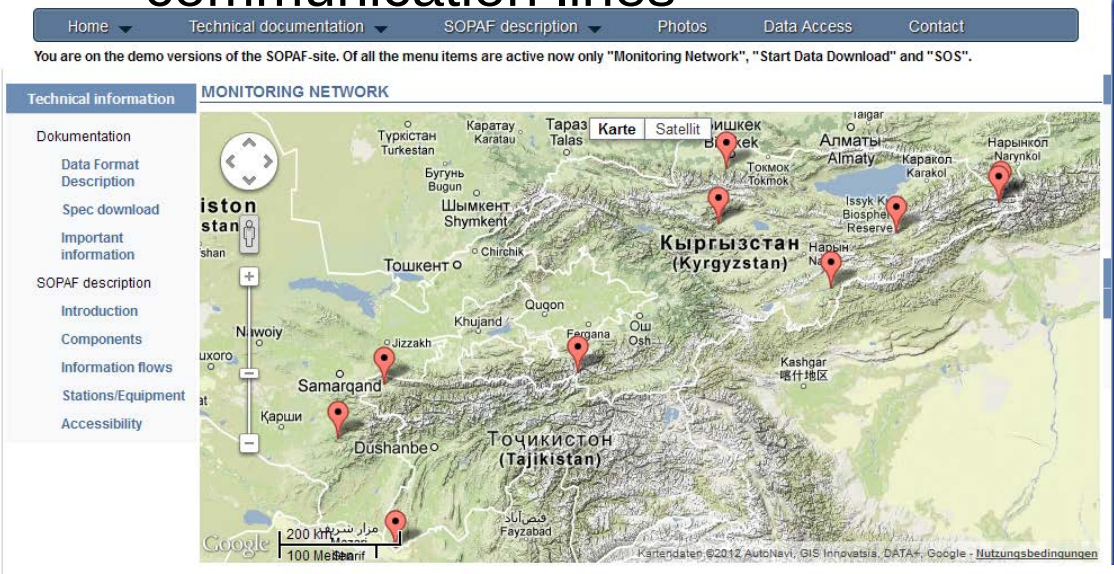
Monitoring network

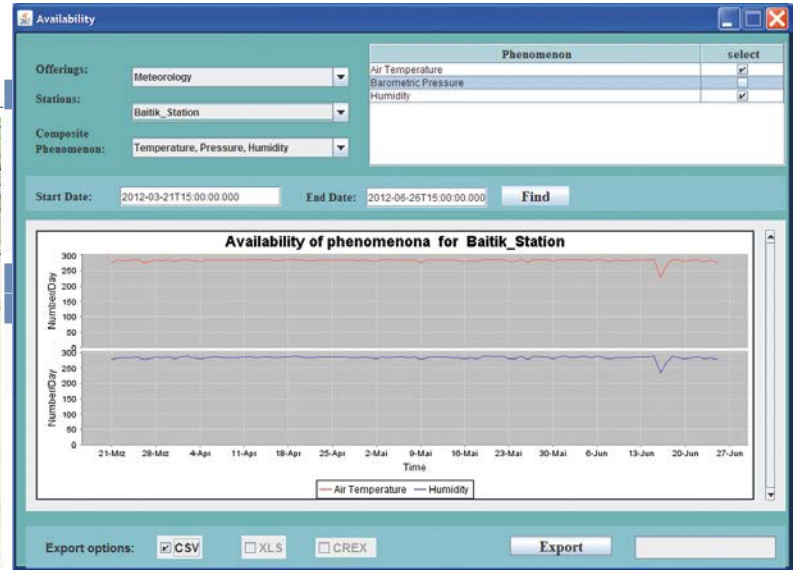


As of May 2013

Data access

- Sharing data according to existing obligations and agreements
- operational data (limited quality control) accessible to the public via webportal http://cawa.gfz-potsdam.de:8080/SOPAF/SOPAF.html
- Data transmission planned to be linked to Hydromet communication lines

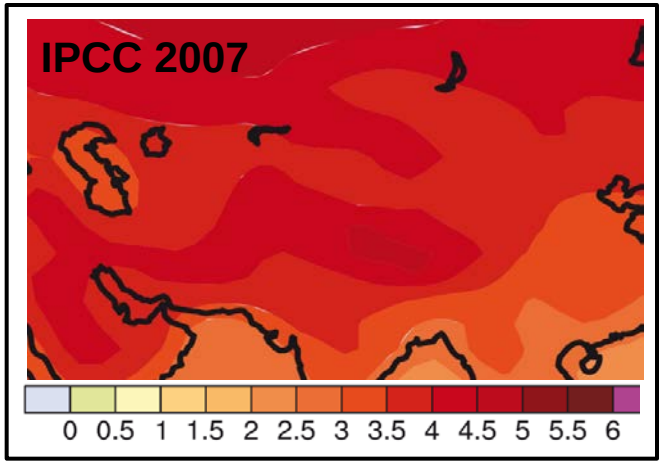




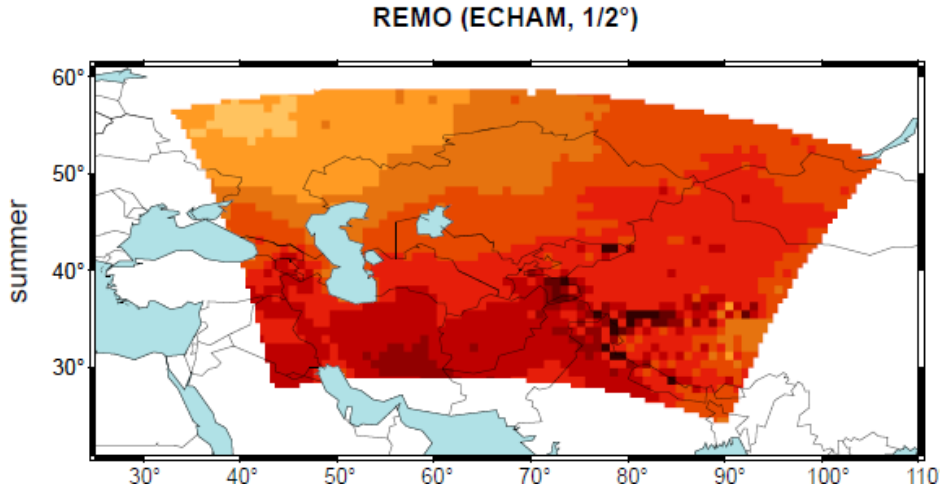
Pilot version: http://cawa.gfz-potsdam.de:8080/SOPAF/SOPAF.html

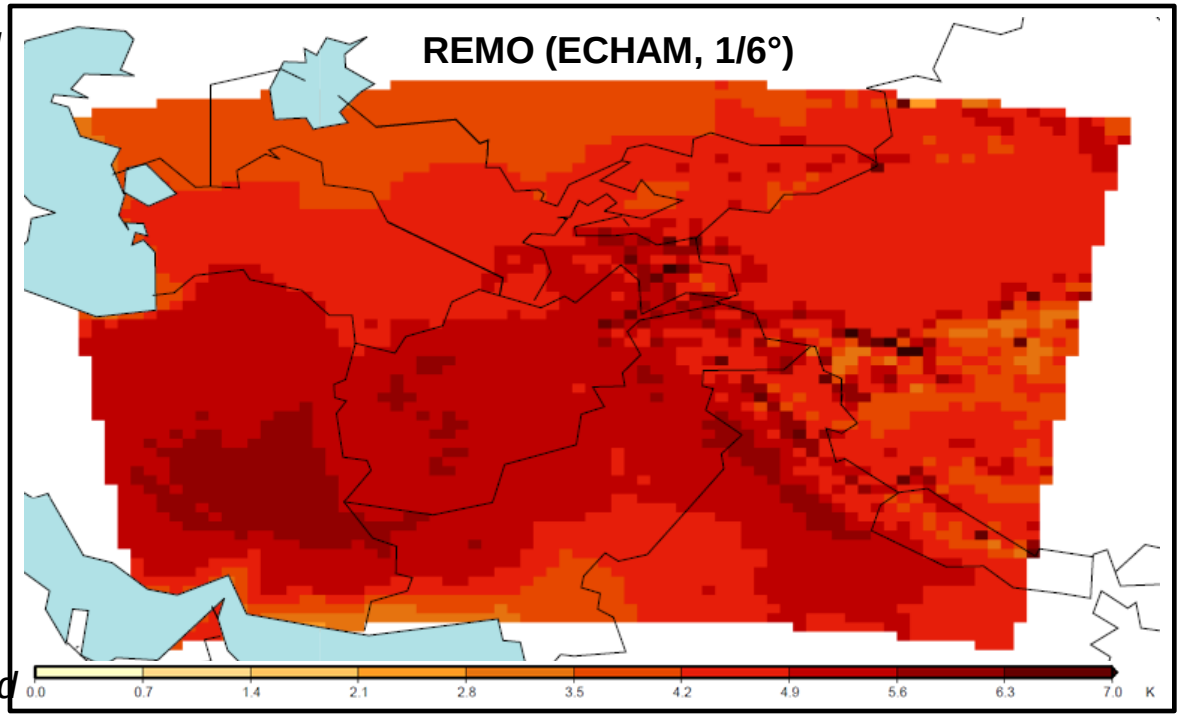
SELECTED PRODUCTS OF THE CAWA PROJECT

Regional climate change



Changes in mean annual temperature averaged from several global climate models for the A1B scenario

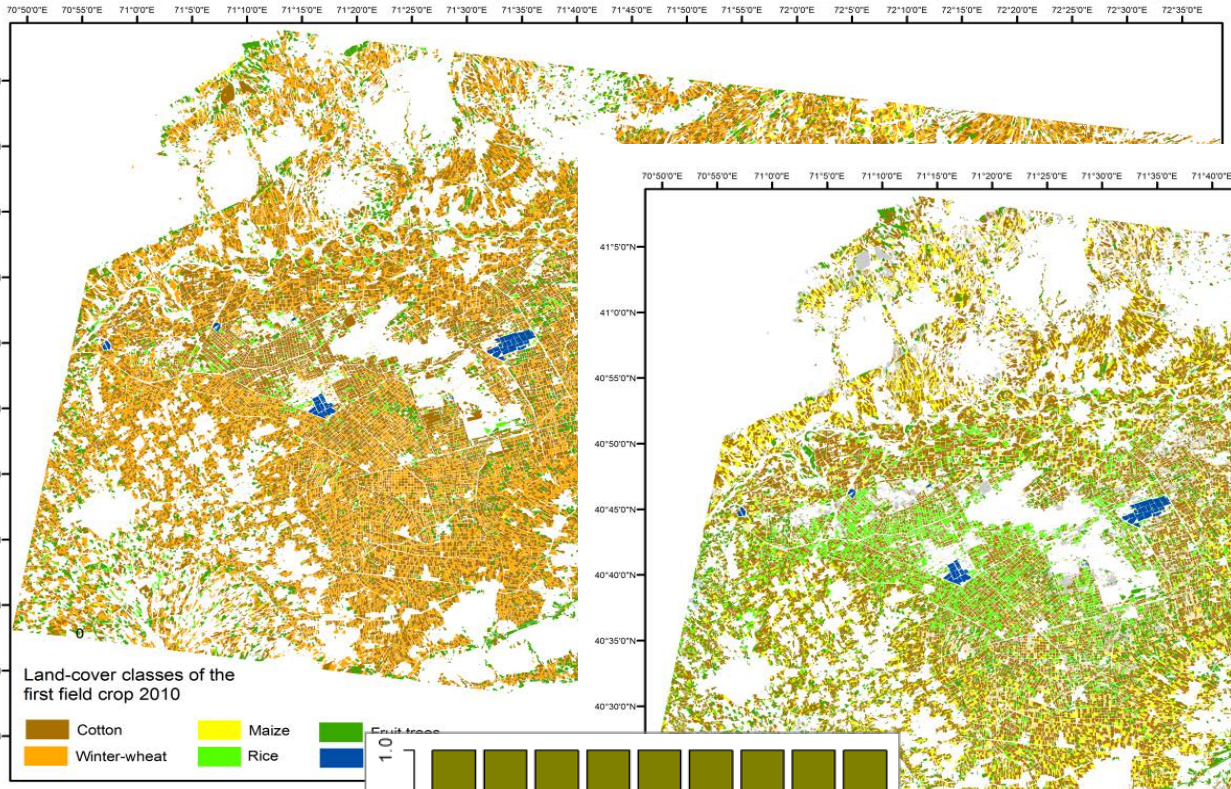




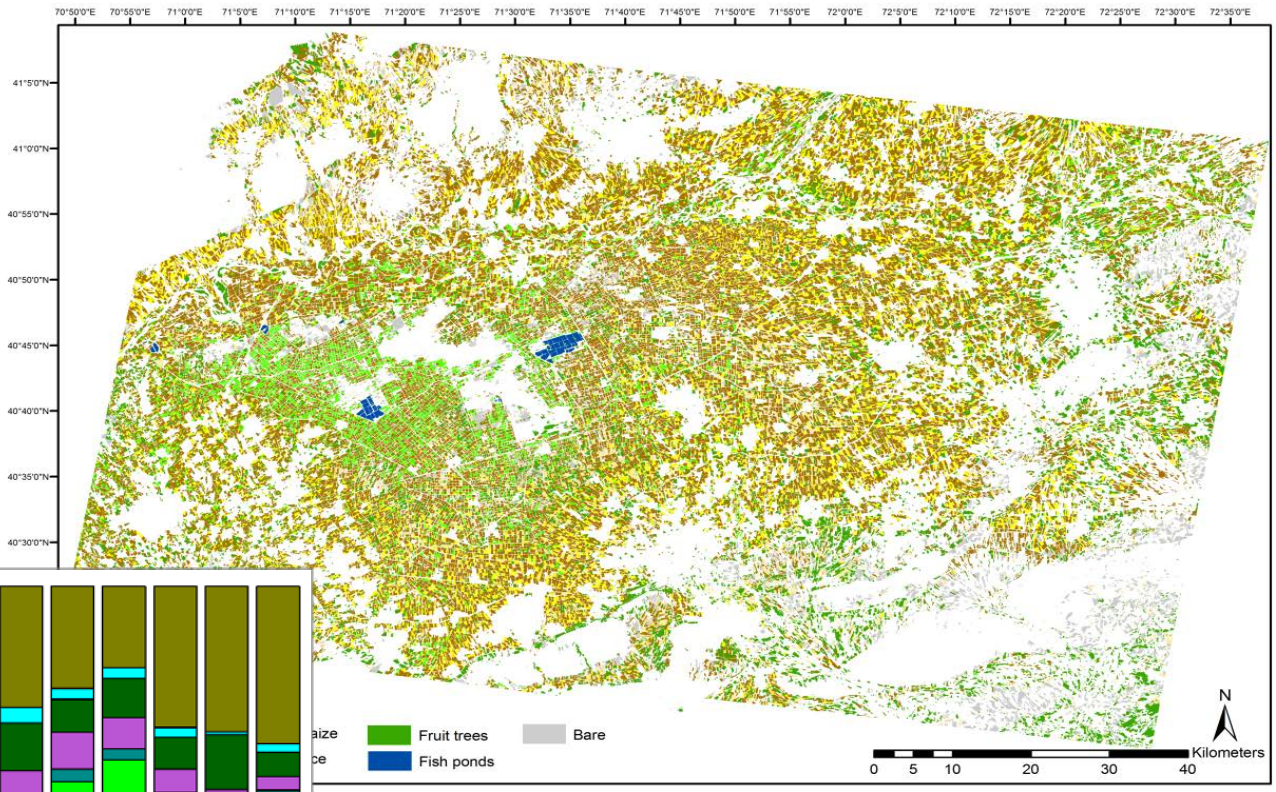
Changes in summer temperature for the period 2071-2100 compared to the period 1971-2000, A1B scenario, REMO model

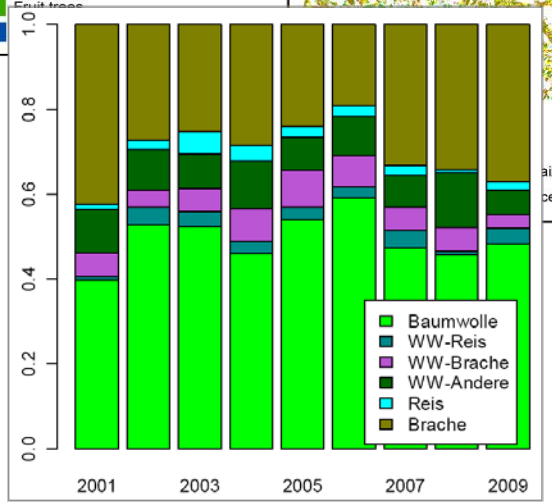
Mannig et al., submitted

Detailed Land Use Maps



First and second field crops in the Ferghana valley 2010





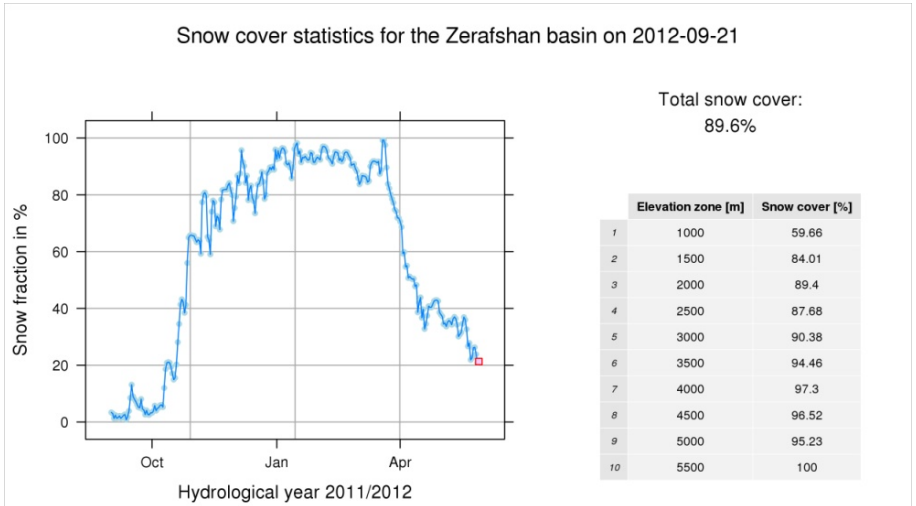
Varying cropping patterns in the Amudarya delta

Snow cover monitoring

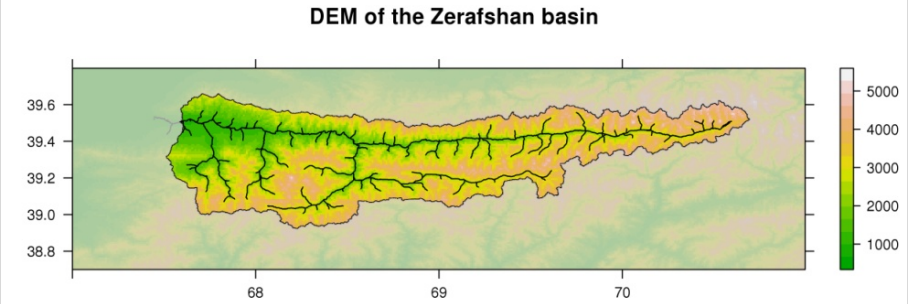
Near real time snow cover monitoring

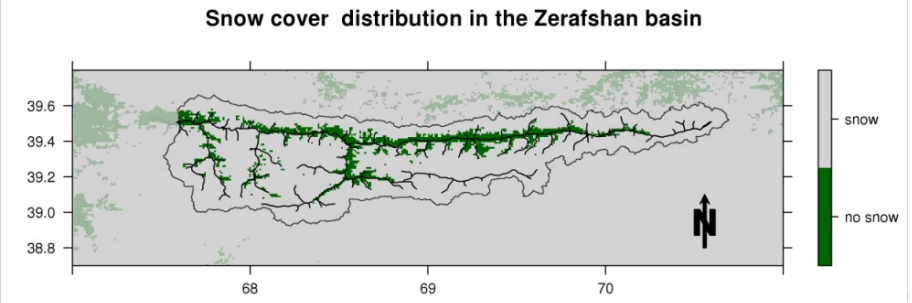
- ✓using freely available MODIS snow data
- ✓automatic processing of satellite data
- ✓elimination of cloud cover
- ✓snow cover statistics for defined river basins
- ✓daily updates of snow cover maps
- ✓installation at CA Hydromet services in progress

Gafurov, 2013



	Elevation zone [m]	Snow cover [%]
1	1000	59.66
2	1500	84.01
3	2000	89.4
4	2500	87.68
5	3000	90.38
6	3500	94.46
7	4000	97.3
8	4500	96.52
9	5000	95.23
10	5500	100





UPCOMING ACTIVITIES 2013/2014

Upcoming trainings and workshops in 2013/2014

Regional Training on Technical Equipment for River Runoff Monitoring: Sensors, handling and applications, 22-26 April 2013, Potsdam

Regional Training on Remote Sensing Methods and GIS, August 2013, at CAIAG in Bishkek

Regional Summer School on scientific methods in earth sciences, May 2014, at German-Kazakh University in Almaty

Regional Training on CAWa Hymet Station Operation and Maintenance, Autumn 2014

CAWa Project

Katy Unger-Shayesteh

Project coordination

GFZ German Research Centre for Geosciences

kunger@gfz-potsdam.de