Research summary of RWES Laboratory (Kyoto University, Japan) in Kyrgyzstan.
(rwes.dpri.kyoto-u.ac.jp)

Contacts: Tanaka Kenji   _tanaka.kenji.6u@kyoto-u.ac.jp_
Sadyrov Sanjar _sadyrov.kalinurovich.82m@st.kyoto-u.ac.jp_

Regional Water Environment Systems Laboratory, which belongs to the Water Resources Research Center (WRRC) in the Disaster Prevention Research Institute (DPRI, Kyoto University), has been doing water related research in Central Asia, primarily focusing on Aral Sea Basin for the past 15 years.

We introduce the hydro-meteorological activities that our research group is currently conducting or planning to conduct in Central Asia, specifically for the high mountainous regions of the Kyrgyz Republic.

Glaciers act as "natural water towers", supplying water to downstream areas, storing water in cold periods, and gradually releasing it as meltwater in warm periods. Therefore, for the people of Central Asia who depend on glacier meltwater, especially in the summer, it is crucial to evaluate the amount of available water. In order to deepen our understanding of snowmelt and glacier melting processes and answer the above questions correctly, we have collaborated with local researchers to establish an integrated meteorological observation system (MES) for the KaraBatkak and Bordu glaciers (observation started in July 2017 and August 2018, respectively) in eastern Kyrgyzstan.

KaraBatkak glacier and downstream Chon-Kyzyl-Suu River Basin is one of the most studied watersheds in the region (since 1948), so by combining previous studies, historical records and modern observation systems we expect to enhance our understanding of natural processes in the region. In addition to the meteorological elements such as rainfall, temperature, humidity, wind speed, and air pressure, we installed a rain gauge with a heater in August 2019 to enable snowfall observations on the glacier.

Besides general meteorological observations, the station observes many other parameters such as four components of radiation, ice temperature, heat flux, snow depth, and snow water content.

After the collapse of the Soviet Union, due to reduced budget for hydrological and meteorological observations, there is a gap in historical data, especially in Central Asian countries. Kyrgyzstan, where alpine areas account for more than 60% of the land area, is one of the major water sources in the Central Asian region, and these data play an essential role not only for Kyrgyzstan but also for Central Asia as a whole.

We are also working to fill such data gaps by combining reanalysis data, satellite observation data, historical records and dynamical downscaling using numerical weather models.
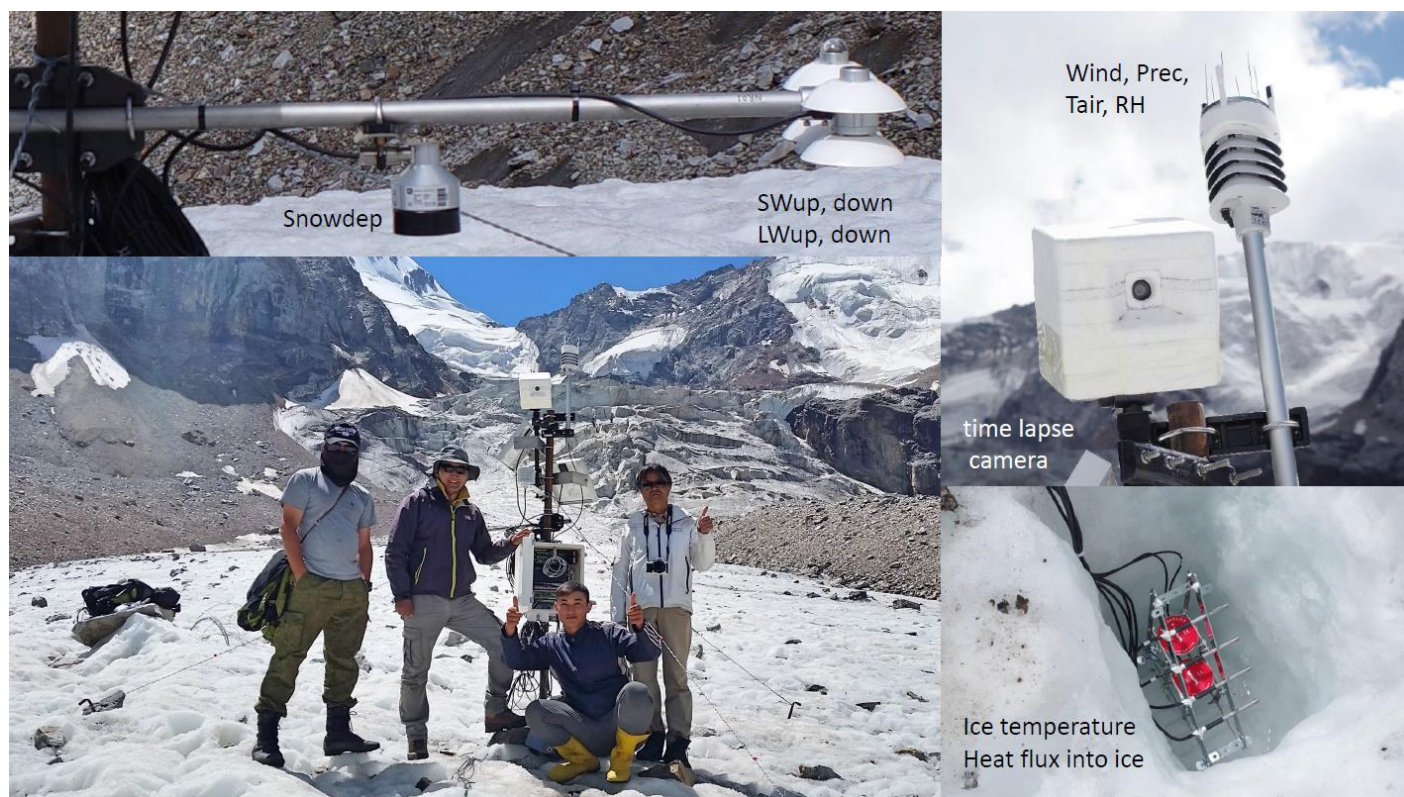
Observation system on Karabatkak glacier

Sensor List

1. Weather sensor (Psfc, Tair, RH, Prec, Wind)   Vaisala   WXT536
2. Radiation (SW_{up}, SW_{down}, LW_{up}, LW_{down})   Hukseflux   NR01
3. Snow depth & Glacier surface height   Campbell   SR50A
4. Snow water equivalent   Hydroinnova Snowfox
5. Soil (Ice) heat flux x 2   Hukseflux   HFP01
6. Soil (Ice) temperature x 4   Pt100 (JIS A grade)

Comparison of SWE sensor (Snowfox) & Snow depth sensor (SR50A)

SV Snowdep x 0.2

SV SWE (Snowfox)

2017/10/14～2018/5/27