

Cold Region Hydrological Cycle studies at  
Institute of Observational Research for Global Change (IORGC),  
of  
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)  
in relation to NEESPI

<http://www.jamstec.go.jp>

Data up to 2004 are  
available at the web-site

Tetsuo Ohata  
Program Director  
(ohatat@jamstec.go.jp)

# Main study topics

## Objectives of Hydrological Program

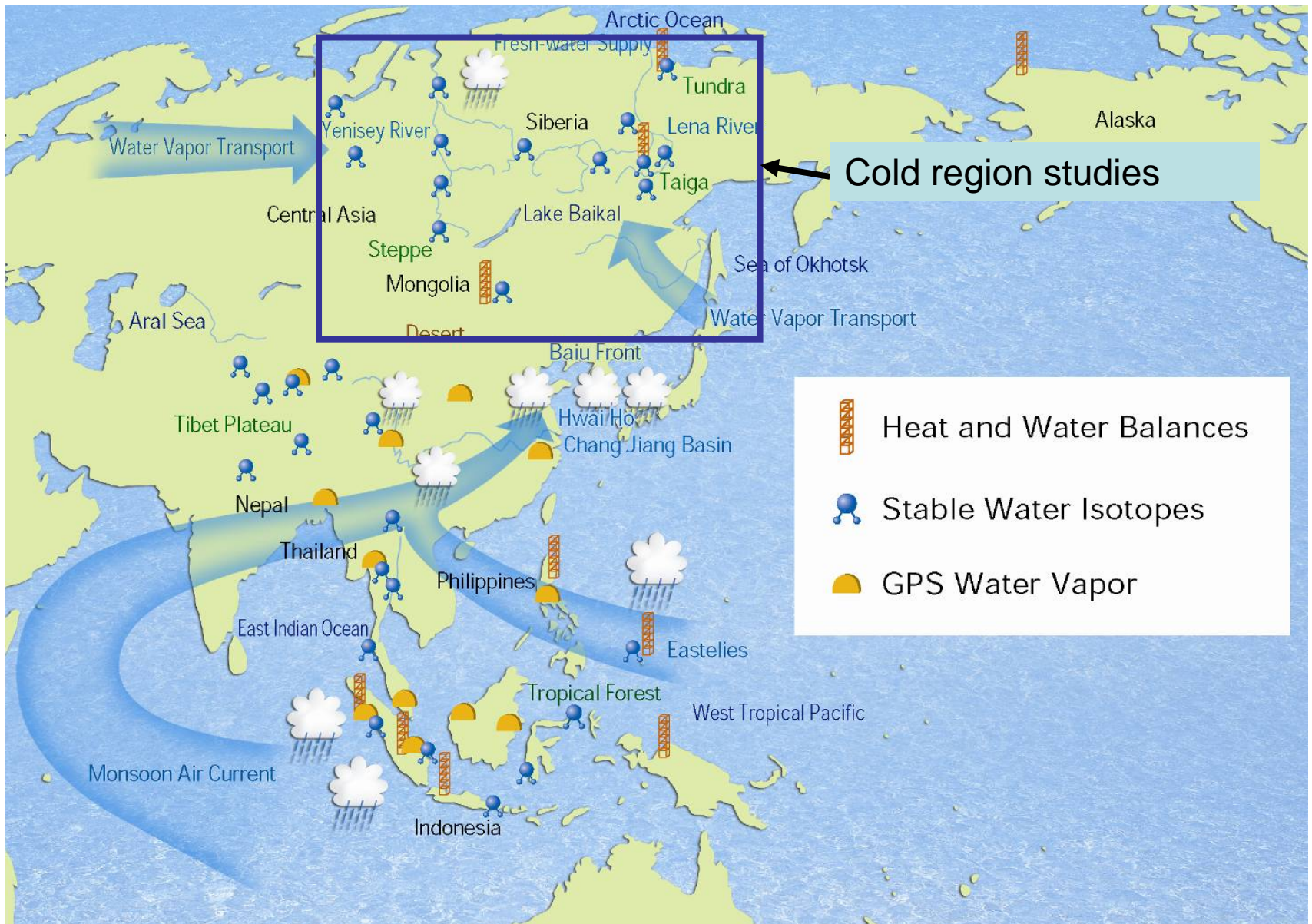
To reveal and understand hydro-meteorological processes in the eastern part of Eurasian and west pacific region (including the western Pacific warm pool, the maritime continent, and the cold region of Eurasia), which regulate climate formation including the Asian monsoon system and its variability, **through large-scale intensive process studies and long-term monitoring.**

To contribute to the climate modeling and prediction, **by improving the physical model and model parameterization of hydro-meteorological processes.**

## <Objectives of Cold Region Studies>

- (1) Investigate the characteristics and variation of surface components such as snow cover/ frozen ground, vegetations and atmospheric processes in cold continental regions, and clarify the interaction with the climate systems, characteristics of runoff of large Arctic draining rivers, and influence of cold regions to atmospheric circulations such as monsoon system. (Cold region hydrological cycle Group; Ohata;11 members)**

# Observation systems of HCP

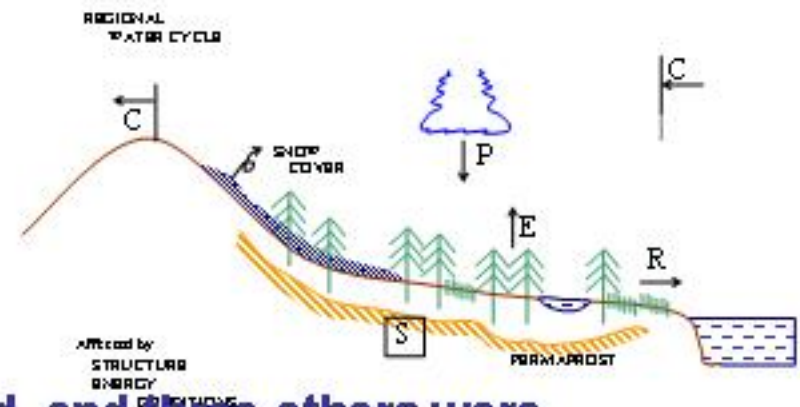


# Land surface process group

## Five objectives and strategy

- (1) Surface hydrological processes and detection of changes at special observation area
- (2) Atmosphere-land surface interaction in cold regions
- (3) Glacier and permafrost variation study
- (4) Development of better hydrological data-sets for cold regions
- (5) Validation and development of one-dimensional, regional hydrological and meteorological models

\_\_\_\_\_ will be presented here.



### Strategy

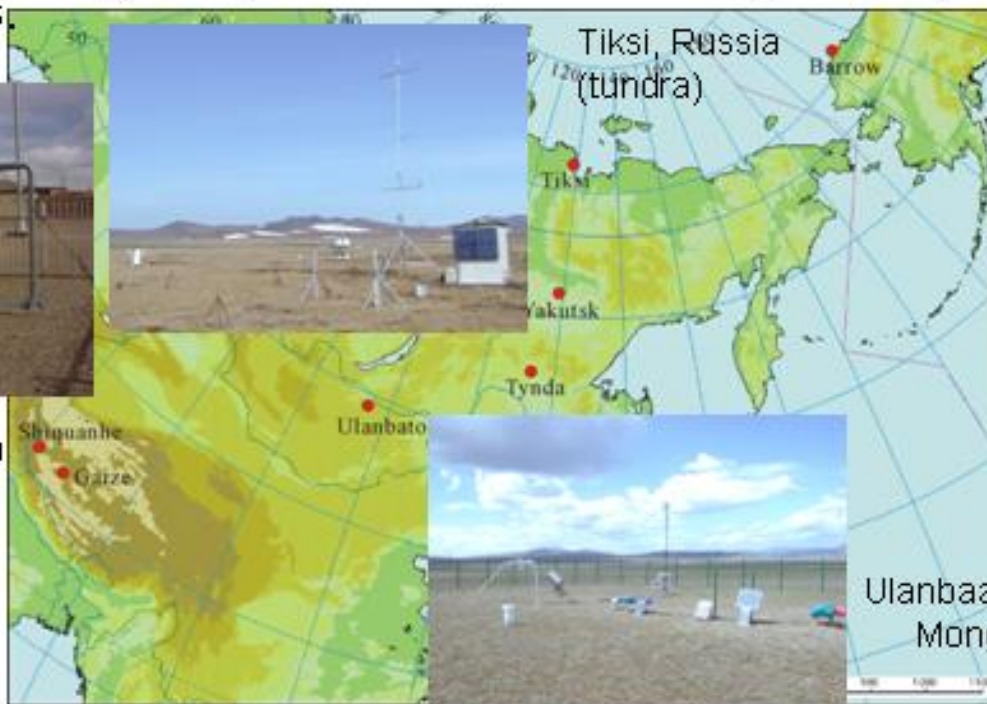
- (1) **Four sites were newly established, and three others were succeeded from other projects so that longer hydrological variability study can be made.**
- (2) **The main region of study was eastern Siberia in the Lena River Basin which has influence to the global circulation and Arctic hydrological budget.**



**1. Surface hydrological processes and detection of changes at special observation area.** Surface process considering the snow cover and frozen ground is still not known well yet. The target of the this study is to clarify the role of snow cover, frozen ground and related surface conditions to the heat/water exchange at patch-scale and drainage scale, and supply data for model studies.



Gerze, Tibet, China Plateau



Yakutsk, Russia, taiga

Ulanbaataar, Mongolia



Schematic figure of the cross section from Tiksi to Ulanbaataar, the main study area.

## Additional study topics started to implement recently.

- (1) Initiate **monitoring** of cryosphere components such as **frozen ground and glaciers**. (Started measurement of frozen ground at Northern Mongolia in 2004, and at **Tiksi in 2006 down to 60m below surface**)
- (2) Extend network of **stable isotope** sampling and water vapor measurement in order to get better understanding of hydrological cycle in Northern Eurasia. (Presently 9 Monitoring station in Siberia and 4 station in Mongolia)
- (3) Investigate and clarify the **winter hydrological process** (solid precipitation, drifting snow, sublimation) in forested and non-forested region. (Improvement of forecast models and GCM models can be expected)

## Time schedule of the Cold Region Studies in northern Eurasia IORGC/JAMSTEC

- (1) 2004-2009 is the first five-year program of the new Agency. \$400,000 on average (per year) of research fund is put into the study.**
- (2) New five year will start in 2009, and presently the direction is being discussed. Although the re-organization of topic will be made, we are expecting that observation network will be maintained or even enlarged at the new five year program.
- (3) The expected direction:
  - \* Stress will be laid on the terrestrial/atmospheric process studies to understand the past changes and predict the future changes.
  - \* **Arctic/Sub-Arctic Integrated study may be the umbrella for the Cold region Studies.**
  - \* Studies based on data integration (integration of data of various discipline) may be focused in order to understand the behavior of the Complex Terrestrial System.
- (4) We would like to have new contact with Russian/ Mongolian/ Chinese Institutes which are interested in our work. (ohatat@jamstec.go.jp)**