Country report and contributions to AWCI
Mongolia, 2013-2014

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Content of presentation:

Brief on 2013 results of the Selbe river basin water balance studies as **Demonstration site** of the AWCI in Mongolia
Future plan in the Selbe river basin studies
Other related activities such as

- Hydroclimatic variations in Mongolia: Water balance studies in the upper Tuul river basin (Terelj-Shijir) by Institute of Observational Research for Global Change, JAMSTEC and IMHE and IG (Dr.Iijima Yoshihiro, 2003-2013)
- MAVEX: Mongol AMSR/AMSR-E/ALOS Validation Experiment (PI: Prof. Ichirow Kaihotsu, University of Hiroshima and IMHE (2000-2013), will be continued by Prof.J.Asanuma, Tsukuba University)
- National science and technological project and automatic network extension policy and still need of capacity building improvement

Water balance studies in the Selbe river basin which started since 1998 have continued upto 2013 (during the warm period from April to October)

he water balance studies are included following components of water balance:

Water level and discharge at upstream and downstream stations as Selbe-Sanzai, Selbe-Dambadarjaa

Rainfall gauges at 4 sites: Bagabayan, Bayanbulag, Yargait, Dambadarjaa

Soil moisture sampling from above 4 sites

Meteorological elements by AWS at Sanzai sites

Estimation of evapotranspiration by different methods

Water quality sampling and basin cover changes

Mew measurements since 2013 water level by the autonatic sensors at Selbe-Bagabayan sit

Stream basin characteristics:

The selected Selbe stream basin is located in center of Mongolia, in the north of Ulaanbaatar, between the latitudes of 47o 55' - 48o 15' N and the longitudes 106o 50'-107o 00'.

The Selbe with 26.2 km length is draining an area of nearly 303 km2, Land use types are described as urban, pasture and forest (forest area 177.94 sq.km). Geomorphology: floodplain, hilly slope, mountain.

Selbe stream basin
Hydrol. gauge
rain gauge
stream network
Relief
Forest area
Urban area
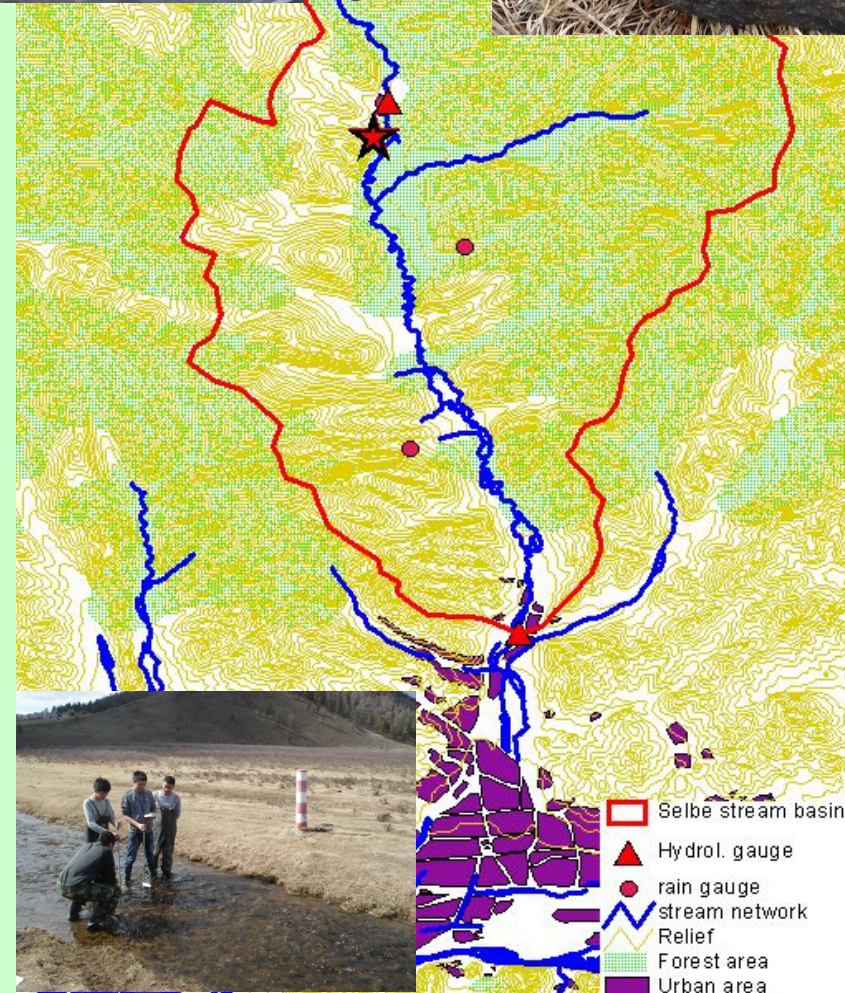
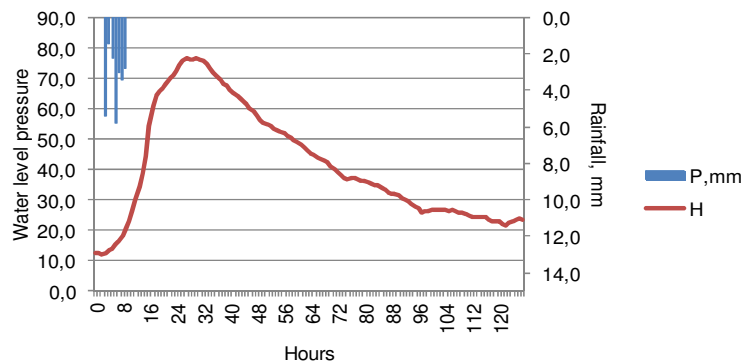### Daily basin mean rainfall in the Selbe river basin in 2013
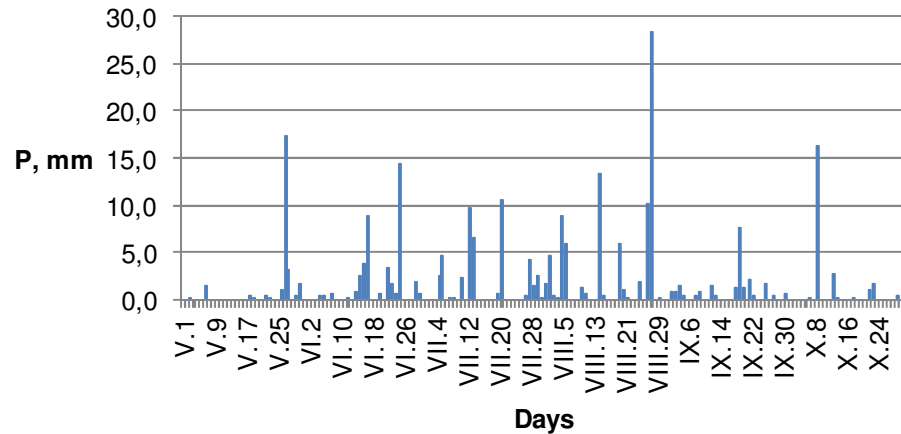
Daily water level by automatic sensor, Selbe-Bagabayan, 2013
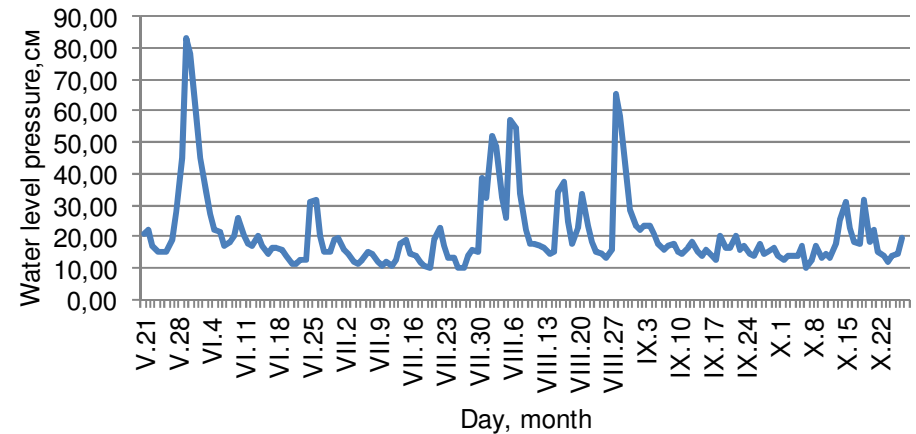
Warm period sun of rainfall varies in the Selbe river in 2013 from 240 to 430 mm (15 percent higher), daily maximum 24,8-42.6 mm and water level amplitude 30-60 cm, brief climate of 2013:


Rainfall and water level relationship, Selbe-Bagabayan, 2013

Selbe water balance studies data series – inputs to hydrological models, parameter calibration and main lack –Evapotranspiration measurement and observation

No	Raingauge sites	V	VI	VII	VIII	IX	X	Warm season sum (IV-IX)
1	Bagabayan	26.3	52.9	123.0	168.2	46.4	16.6	433.4
2	Bayanbulag	18.7	30.4	43.0	88.6	42.6	25.3	248.6
3	Yargait	26.3	40.5	69.4	106.2	21.2	17.0	280.6
4	Dambadarjaa	30.4	50.8	53.0	89.6	16.0	0.0	239.8
5	University	29.3	44.4	51.3	83.3	12.3	31.7	252.3
6	Mean of 2013	26.3	42.6	62.9	102.3	25.4	20.9	280.3
7	Regional long term mean	14.7	54.6	57.9	75.9	23.4	9.7	236.2
8	Takhilt	26.8	36.8	37.7	77.8	13.8	34.5	227.4

HBV application in the Selbe river basin, 2012
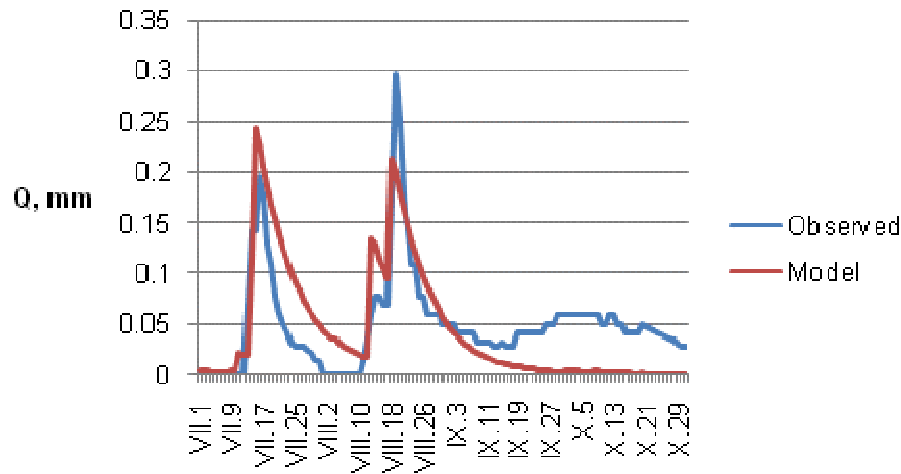
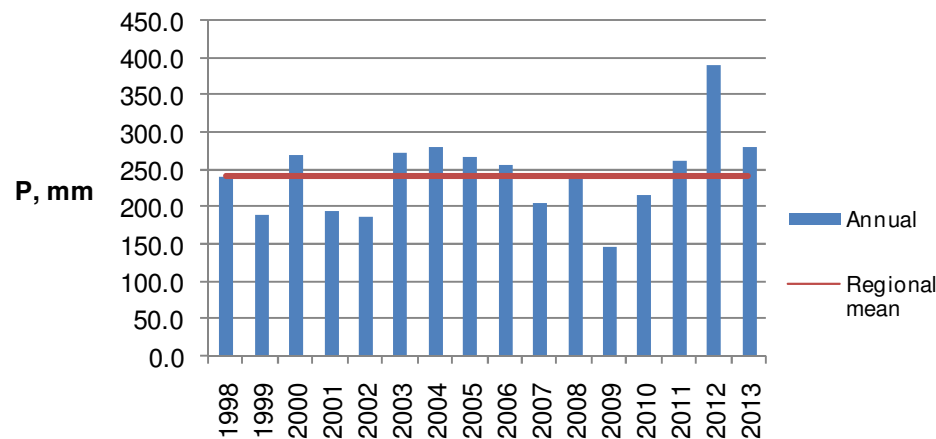HBV application in the Selbe river basin, 2011
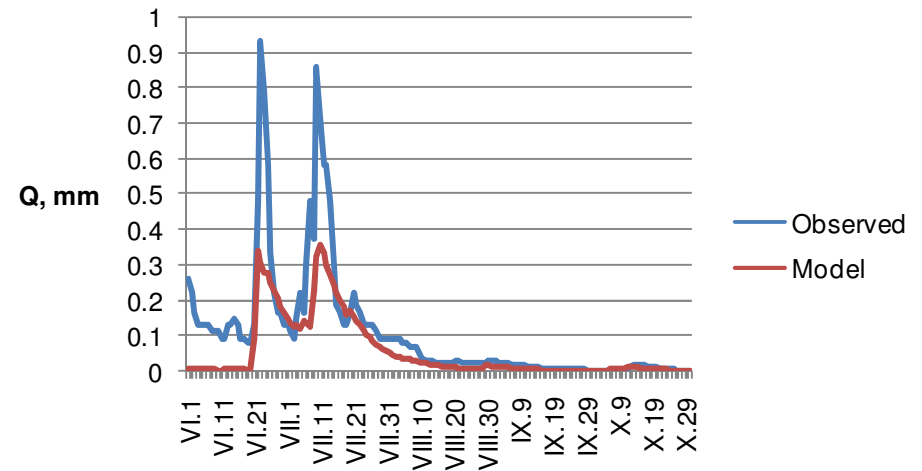
HBV model application (need of parameter calibration by physical measurement to improve performance)

Variation of warm period sum of rainfall in the Selbe river basin (V-IX)

War period sum of rainfall series in the Selbe river basin show some increasing trend in recent years

Future Plan for studies in the demonstration basin:

▪ **Selbe river basin studies will continue till 2015 within national project**
▪ **Compiling of 15 years studies results and data record**
▪ **Rainfall intensity analysis (derivation of maximum rainfall with different duration and different return period)**
▪ **Model parameter calibration**
▪ **Inter relationship studies between SW and GW**
▪ **Consider urbanization or land use change effect, urban pollution issues water end soil pollution**
▪ **Lacking and missing observation and studies:**
evapotranspiration, soil moisture, infiltration, snow melting contribution and groundwater level and urban area data

Other water balance studies and possible contributions:

1. New ARGOS-ACOS system installed **at 3 stations** by Institute of Observational Research for Global Change, JAMSTEC and IMHE (Dr.Iijima Yoshihiro)
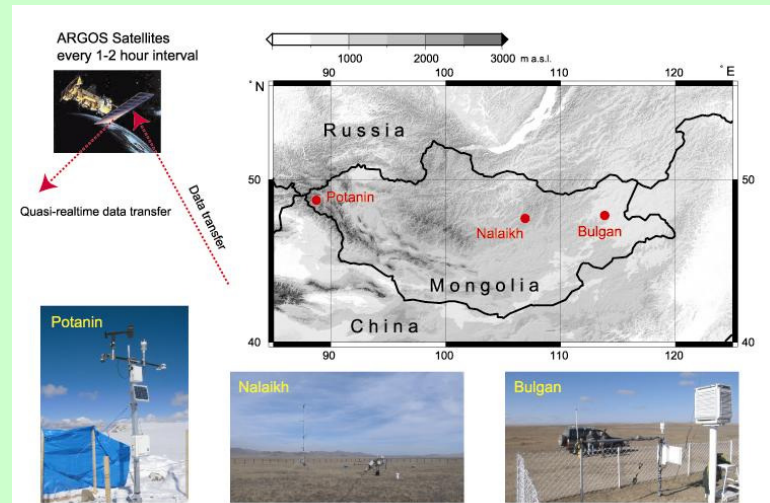
2. **Hydroclimatic variations in Mongolia:** Water balance studies in the upper Tuul river basin (Terelj-Shijir) by Institute of Observational Research for Global Change, JAMSTEC and IMHE and IG (Dr.Iijima Yoshihiro)
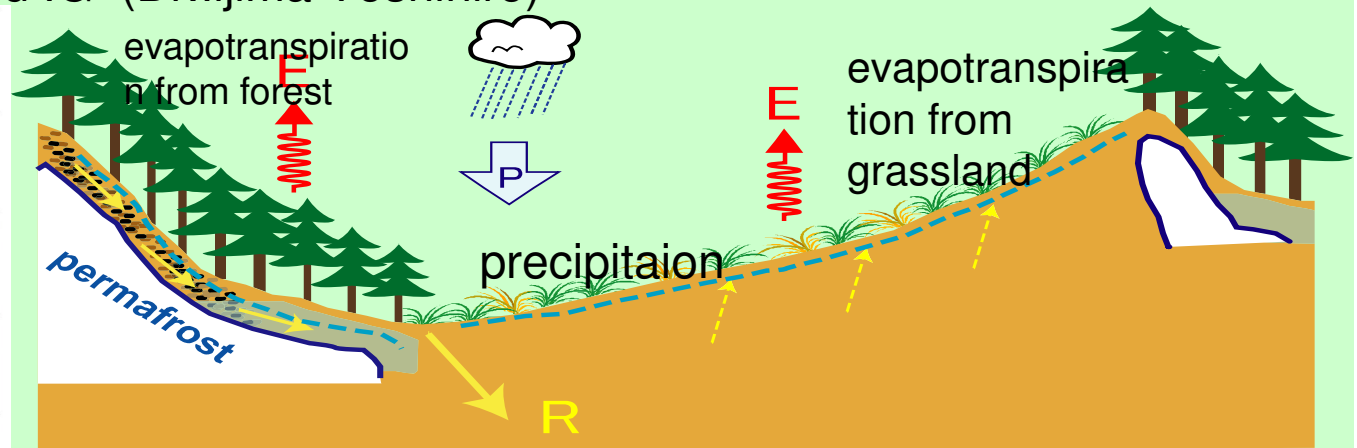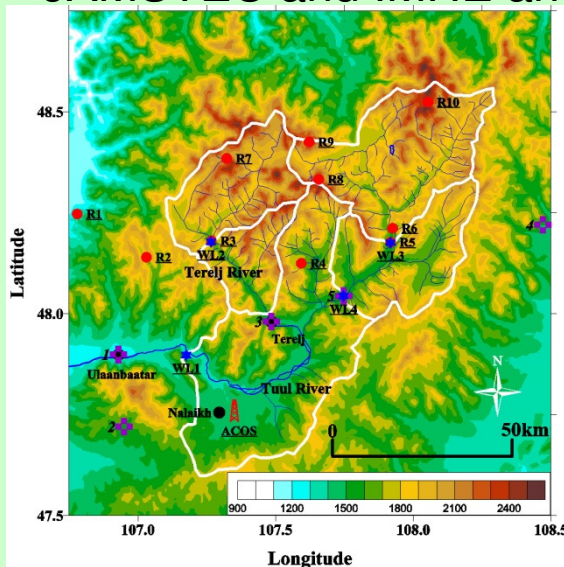
forest: $R(74) \fallingdotseq P(151) - E(127) + dS(51) = (75)$

grassland: $R(0) \fallingdotseq P(151) - E(204) + dS(52) = (-1)$

Other water balance studies and possible contributions:

▪**MAVEX: Mongol AMSR/AMSR-E/ALOS Validation Experiment** (PI: Prof. Ichirow Kaihotsu, University of Hiroshima and IMHE (2000-2013), **soil hydrology and development of algorithm for estimation of soil moisture from satellite** and supporting Water balance in the Selbe (AWS)
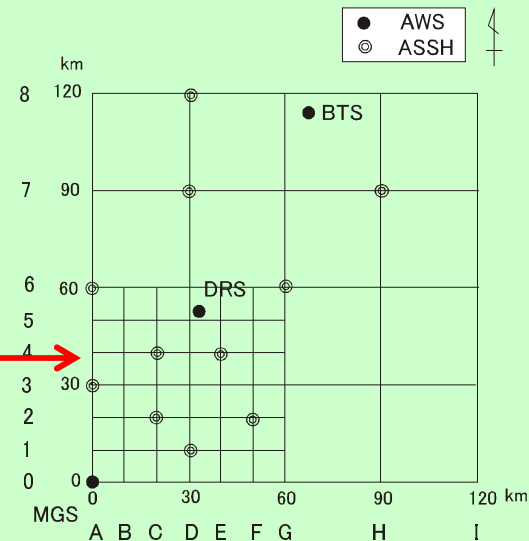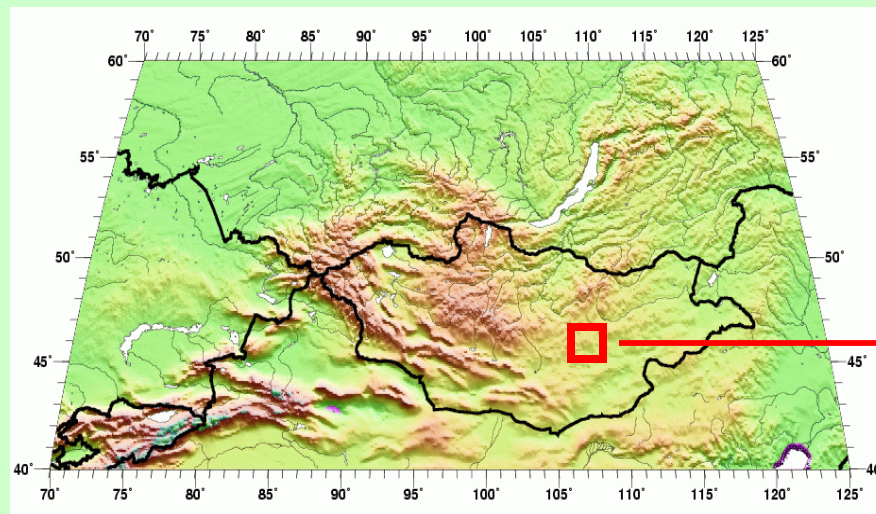
MAVEX: Mongol AMSR/AMSR-E/ALOS Validation Experiment **will be continued by** Dr.J.Asanuma, Tsukuba University and IMHE

▪**Glacier studies in western Mongolia** by JAMSTEC and IHME (Ts.Kadato, G.Davaa)

Hydro4M

HydroMeteorological studies with Multi-satellite sensors and Multidimensional approaches at Mongolian Grassland
(Proposal with Prof.J.Asanuma, Tsukuba University)

Hydro4M

Soil moisture observations & satellite validation (U. Tsukuba & IMH, Mongolia)

- Multi-satellite sensors (passive & active)
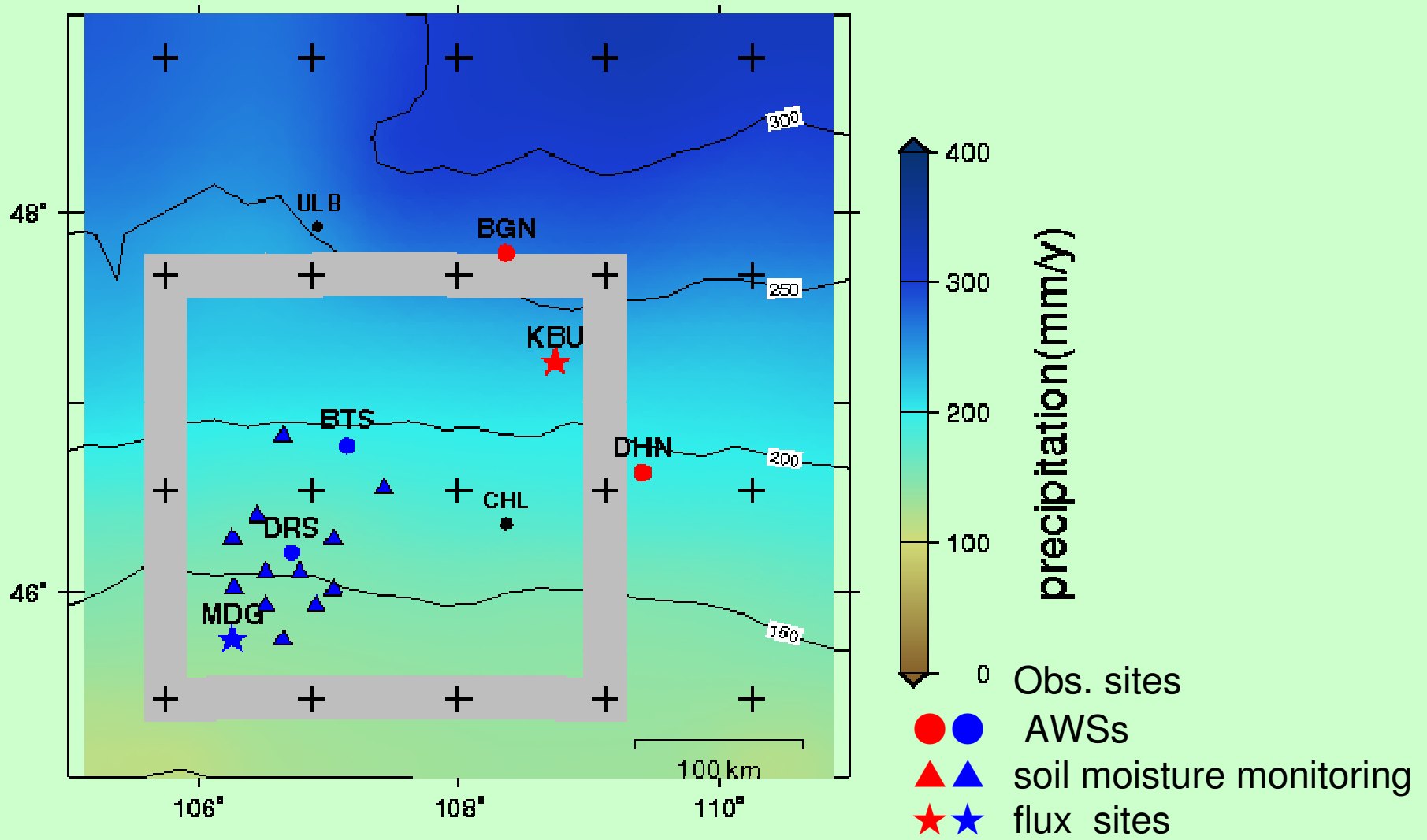- Upscaling techniques (using model outputs)

model outputs to be used in satellite validation

obs. data to be used in assimilation

Landsurface models and satellite data assimilation (U. Tsukuba, U Kyoto & CIT)

Target Areas and Obs. sites

Future perspective…

▪ **Water balance studies** within National Science and technological Project on selected river lake basin studies **(2013-2015)**

▪ **In 2014-2015,** the national hydrometeorological network is expected to extend **with 10 automatic raingauges and 20 automactiv water level sensors sites** (especially in small river basins or head water of big river basins)

▪ **Capacity development needs:** in distributed hydrological modeling and remote sensing data application in water balance, glacier and climate change impact studies.

Thank you for your attention and kind support

Estimated evapotranspiration from the Selbe river basin, 2007
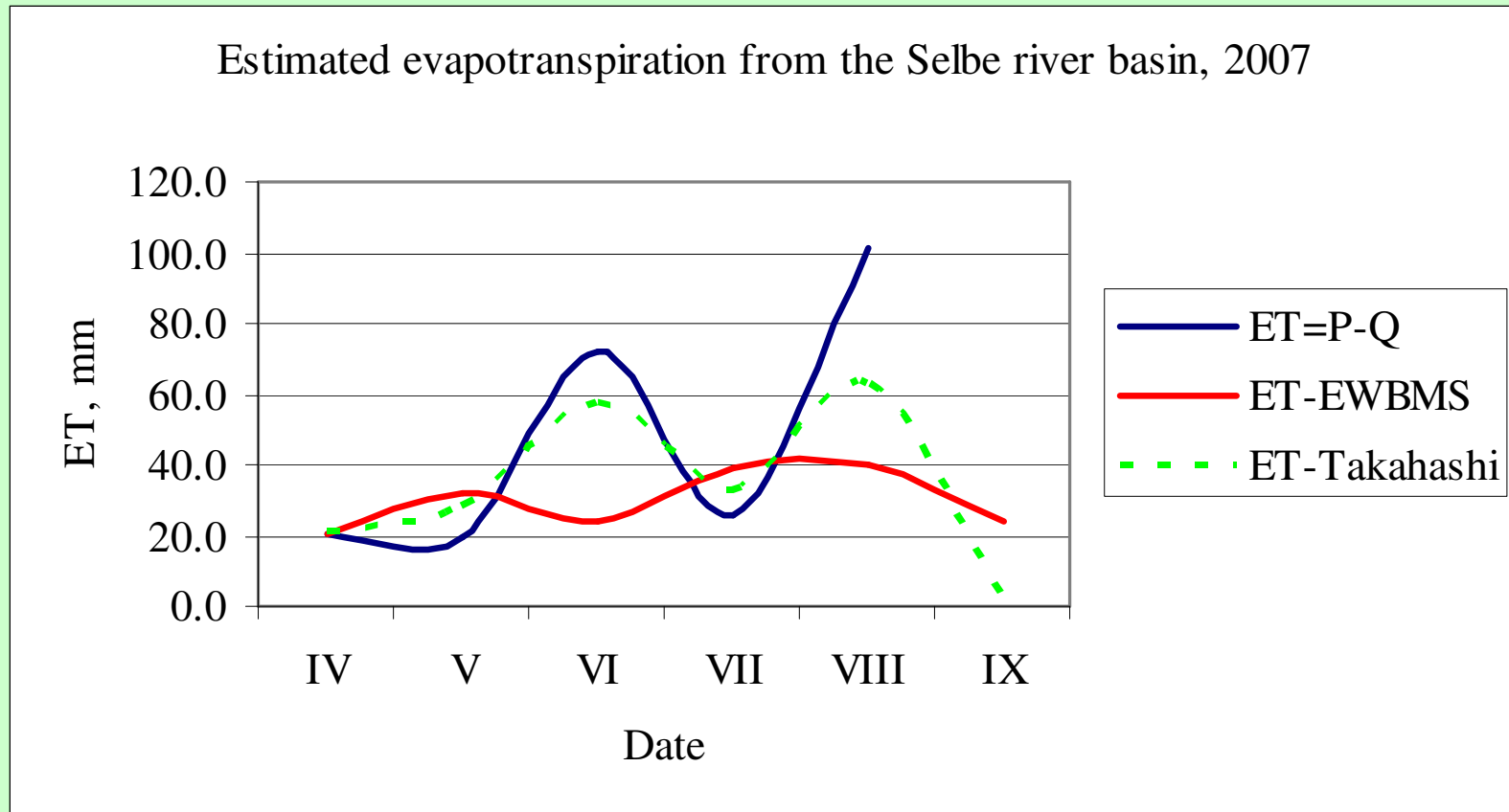
Basin cover changes in the Selbe river basin