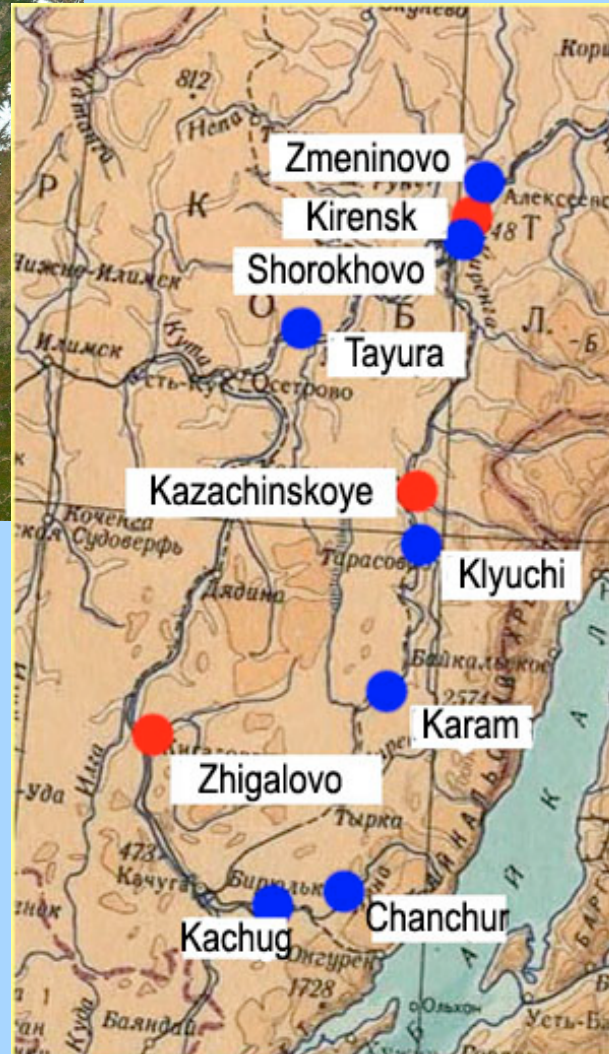
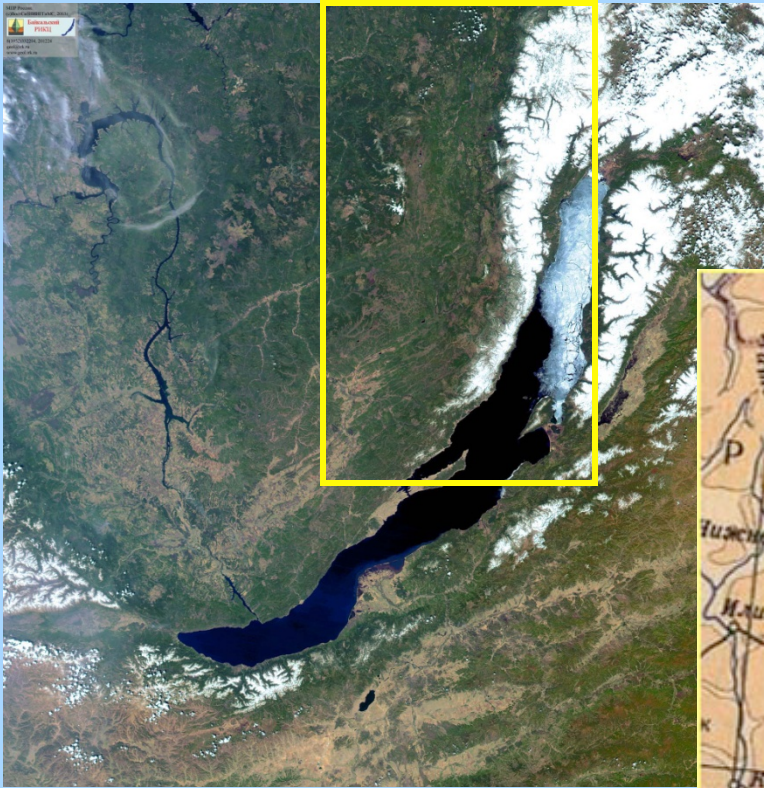


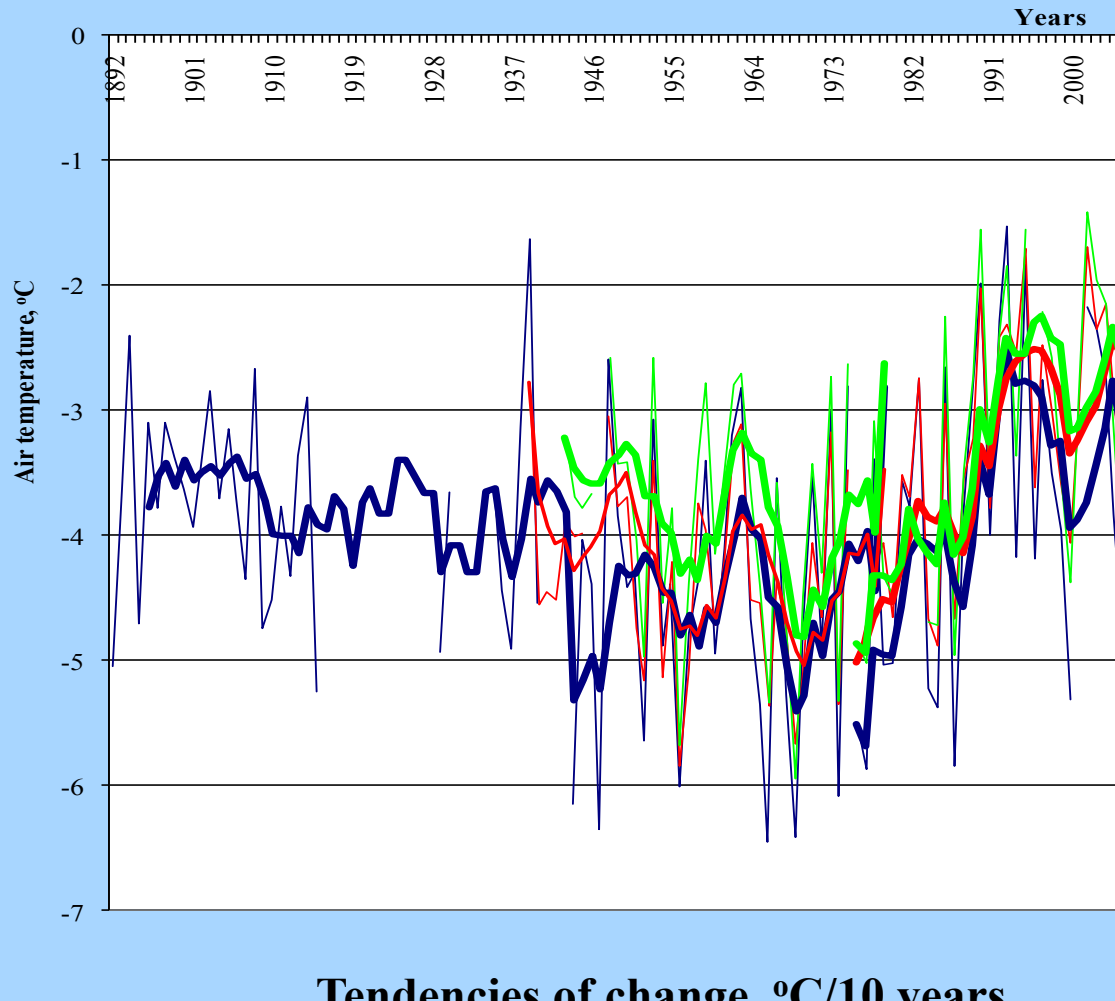
Tendencies of Hydroclimatic Changes in the Upper Lena Watershed

N.N. Gustokashina, N.V. Kichigina

V.B.Sochava Institute of Geography SB RAS
Russia, 664033, Irkutsk, Ulan-Batorskaya,1,
e-mail: nadya@irigs.irk.ru; kichigina@irigs.irk.ru
Tel.: 8 (3952) 42 26 93, fax: 8 (3952) 42 27 17

Location of meteorological stations ● and gauging stations ●





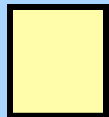
Long-term changes of yearly mean air temperature

Tendencies of change, °C/10 years

	Kirensk	Zhigalovo	Kazachinskoye
till 1975	-0.13	-0.16	-0.19
1976-2006	0.51	0.64	0.61

Tendencies of air temperature change (°C/10 years) in separate months (1976-2006)

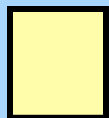
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Kirensk	0.8	1.8	1.3	0.5	0.8	0.5	0.9	0.5	0.02	0.8	-0.8	-1.1
Zhigalovo	1.1	1.2	1.2	0.7	0.9	0.6	0.8	0.8	0.2	0.7	-0.4	-0.5
Kazachinskoye	1.1	1.7	1.1	0.4	0.7	0.5	0.7	0.6	0.1	0.1	-0.7	-0.8



Statistically significant trends

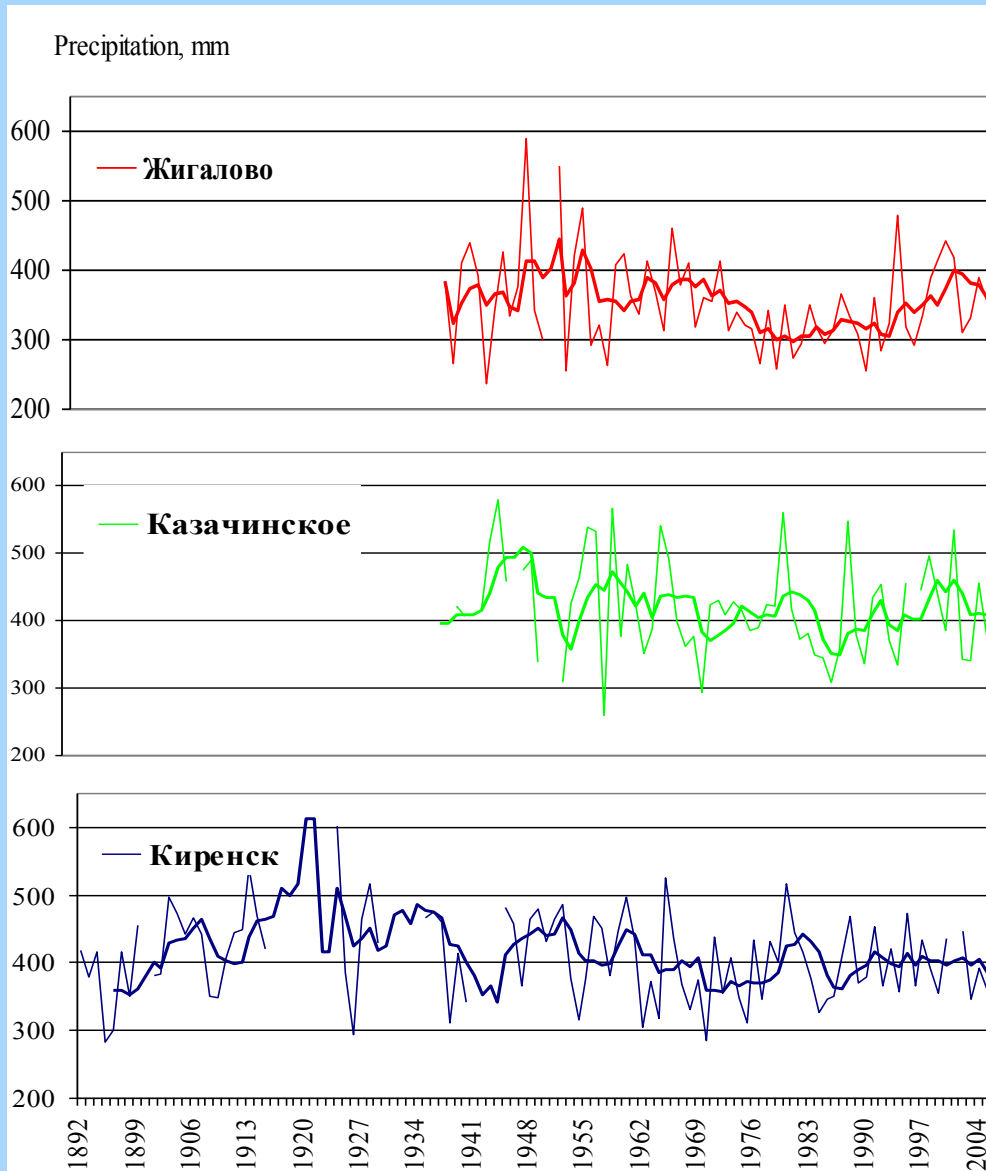
Tendencies of total precipitation change (mm/10 years) in separate months (1976-2006)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Kirensk	0.7	0.9	1.2	0.0	-4.1	-1.5	-3.8	-1.3	-0.8	3.4	-1.7	-1.4
Zhigalovo	1.5	0.8	0.9	0.9	0.4	3.3	6.3	11.7	6.0	3.2	0.3	0.4
Kazachinskoye	-0.4	0.5	1.6	0.9	-2.5	7.5	-2.9	-1.5	2.6	2.5	-1.1	-3.2



Statistically significant trends

Long-term changes of yearly total precipitation



Tendencies of changes (mm/10 years) 1976-2006

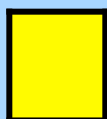
year	35.6
November-March	4.4
April-October	31.7

year	3.4
November-March	-3.5
April-October	6.4

year	-7.0
November-March	-0.8
April-October	-6.8

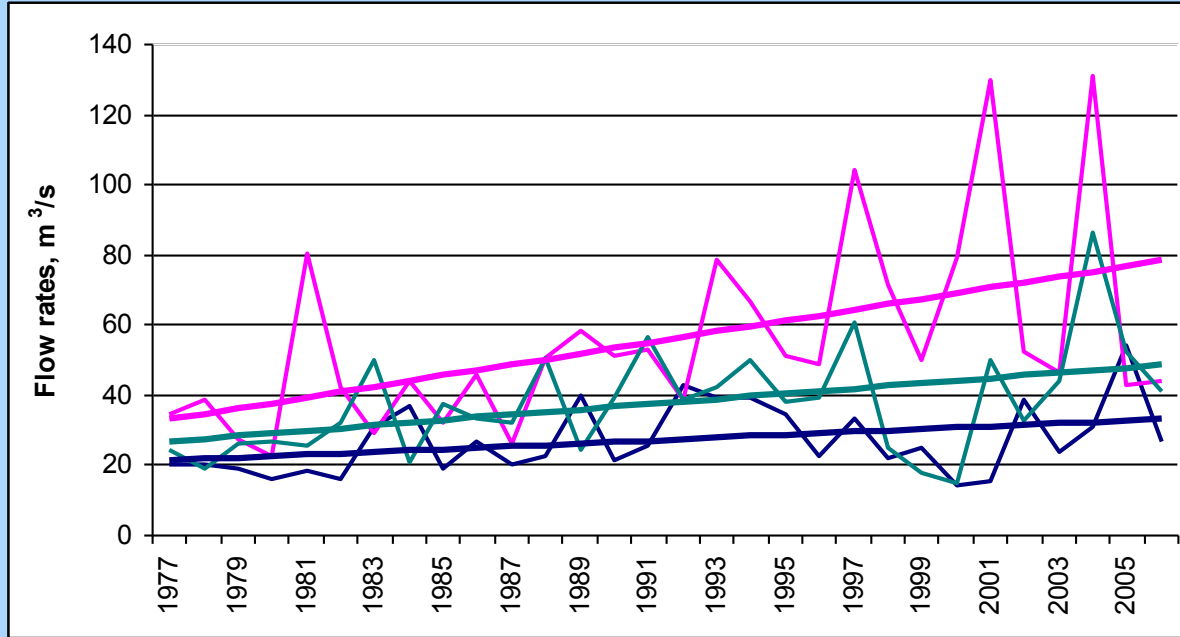
Tendencies of change of monthly, yearly mean and the smallest summer and winter water flow rates for the period 1976-2006

River-station	Months												Year	The largest per year	The smallest of	
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII			winter	summer
Lena-Chanchur	0.16	0.15	0.14	0.38	0.16	-0.05	0.24	-0.09	-0.02	-0.03	0.18	0.15	0.07	0.1	-0.32	0.16
Lena-Kachug	0.40	0.45	0.56	1.56	0.64	0.62	0.1	1.8	0.39	0.76	0.75	0.466	0.72	-0.71	1.03	-0.42
Lena-Tayura	0.02	0.22	1.08	1.54	-0.5	-1.04	1.06	5.42	3.24	3.74	2.65	0.92	1.3	-3.07	5.23	-3.14
Lena-Zmeninovo	3.12	1.96	1.53	2.98	14.8	-6.03	-1.72	11.4	16.7	15.6	8.12	5.73	6.22	-18.6	18.9	-6.8
Kirenga-Shorokhova	1.24	0.38	0.1	-0.16	10.2	-7.11	-11.5	-1.77	1.71	0.003	2.55	2.59	2.00	3.71	0.25	0.66
Kirenga-Karam	0.26	0.29	0.25	0.24	2.62	2.75	1.11	1.57	0.31	0.77	0.59	0.28	0.94	5.84	0.38	0.48
Kirenga-Klyuchi	0.97	1.64	1.98	1.27	2.01	-4.56	-3.11	0.53	2.09	3.77	-0.99	-0.29	0.24	-2.12	5.72	-2.36



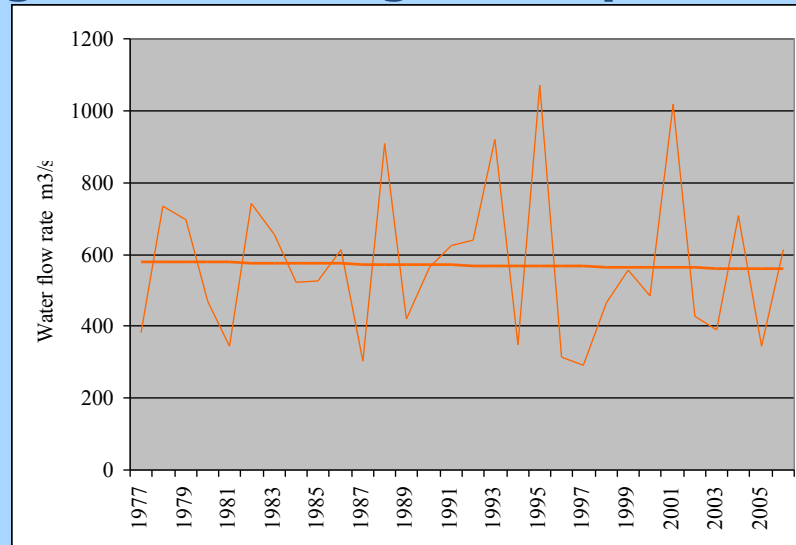
Statistically significant trends

Change of monthly mean water flow rates of the Lena river – gauging station Kachug for the period 1976-2006

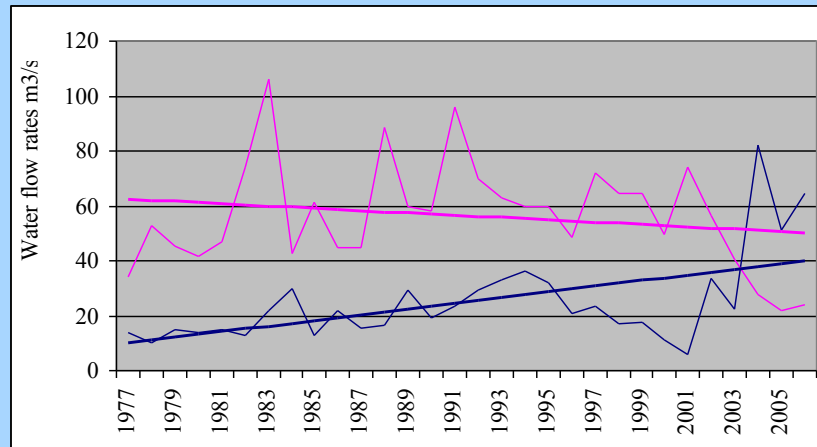


- Monthly mean flow rate for January
- Monthly mean flow rate for April
- Monthly mean flow rate for November

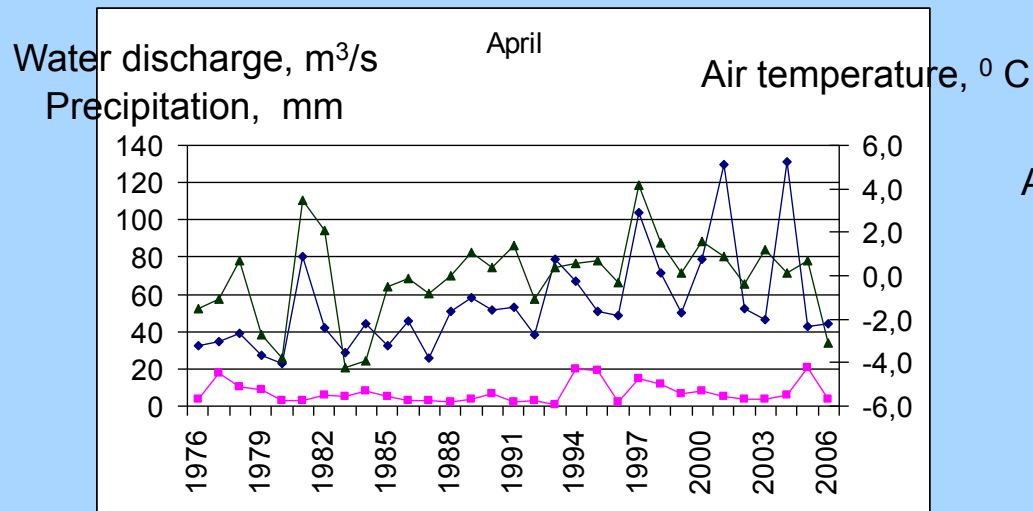
Change of the largest per year water flow rates of the Lena river – gauging station Kachug for the period 1976-2006



Change of the smallest for the open channel period (pink line) and the smallest for winter season (blue line) water flow rates of the Lena river – gauging station Kachug for the period 1976-2006



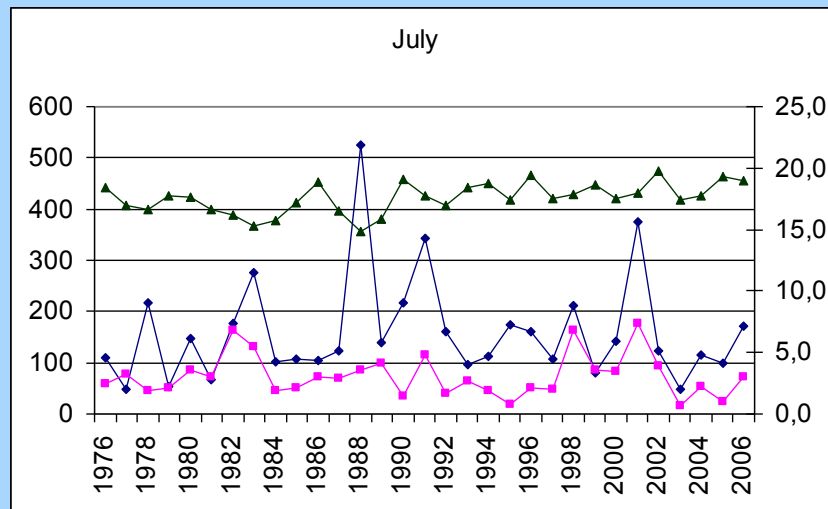
Change of hydroclimatic characteristics in April and July for the period 1976-2006



Correlation

Air temperature / Water discharge

0,55



Precipitation / Water discharge

0,46

— Air temperature, °C
— Water discharge, m³/s
— Precipitation, mm