



MONITORING OF CLIMATIC CONDITIONS IN FOREST AND SWAMP ECOSYSTEMS OF THE MIDDLE TAIGA IN CENTRAL SIBERIA

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Objective:

Estimation of main meteorological parameters in the middle taiga of Central Siberia in 2012-2014.

The purposes of study:

- **Analysis of the three-year long time-series of instrumental measurements;**
- **Comparative analysis of «EDDY Covariance» measurements with measurements at ZOTTO observatory**

The study area



The micrometeorological towers to measure gas exchange of CO₂ / CH₄ «Eddy Covariance».







Peat bog (ryam)



lichen pine forest

Sensors, measured variables, units, levels and data period

Pictures of sensors	Sensor	Variable	Unit	Level (m)	Data interval
	Ultrasonic-anemometer 3D	Wind speed wind direction	m/s deg	Forest Tower 30 m Bog Tower 10 m	10 minutes, or 144 data periods/day
	Pressure – Transmitter	Air pressure	hPa	Forest Tower 30 m Bog Tower 10 m	10 minutes, or 144 data periods/day
	Temperature and Humidity Sensor	Air temperature Relative humidity	°C %	Forest Tower 30 m Bog Tower 10 m	10 minutes, or 144 data periods/day
	Tipping bucket rain gauge (heated)	Precipitation	mm	1.5 m	10 minutes, or 144 data periods/day

Air temperature

Peat bog (ryam)

Lichen pine forest

Mean annual air temperature values

-2,6 °C

-2,1 °C

Extreme air temperature values

Max: +34,4 (18.07.2013 – 15:40)
Min: -49,6 (30.01.2014 – 04:50)

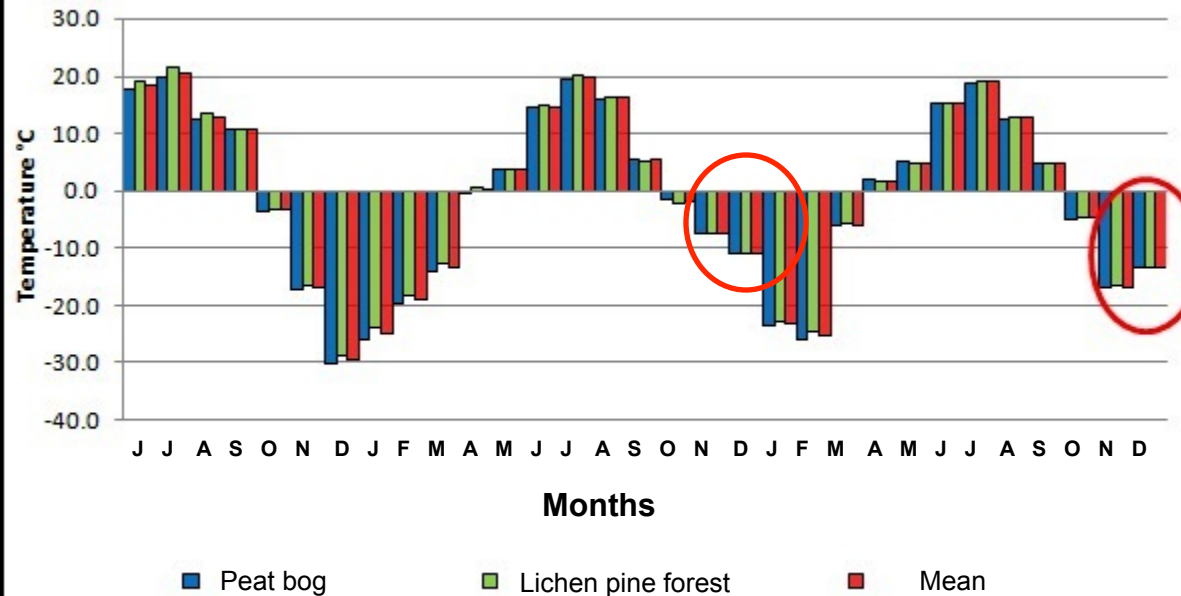
Max: +33,2 (18.07.2013 – 17:10)
Min: -43,8 (31.01.2014 – 09:40)

Mean air temperature for July and January

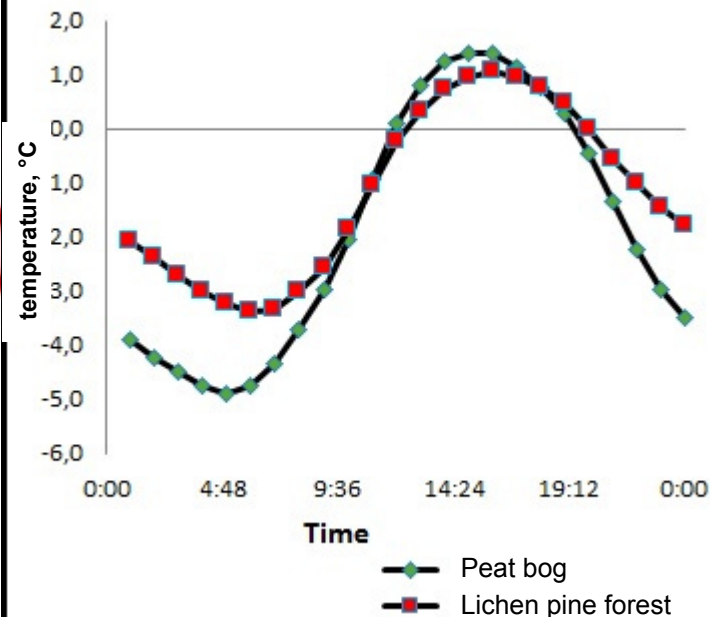
July +19,3
January -24,7

July +20,3
January -23,3

The mean monthly temperatures for every year and 3-year mean of the entire observation period (2012-2014)



Daily variations of air temperature



Air pressure

Mean annual air pressure values

Peat bog (ryam)

1005,8 hPa

Lichen pine forest

996,2 hPa

Extreme of air pressure values

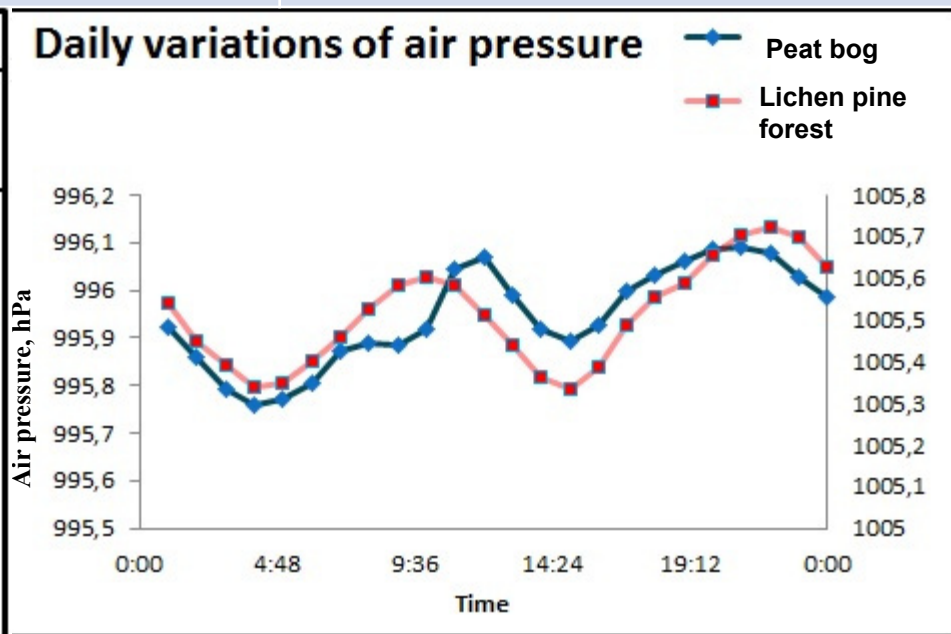
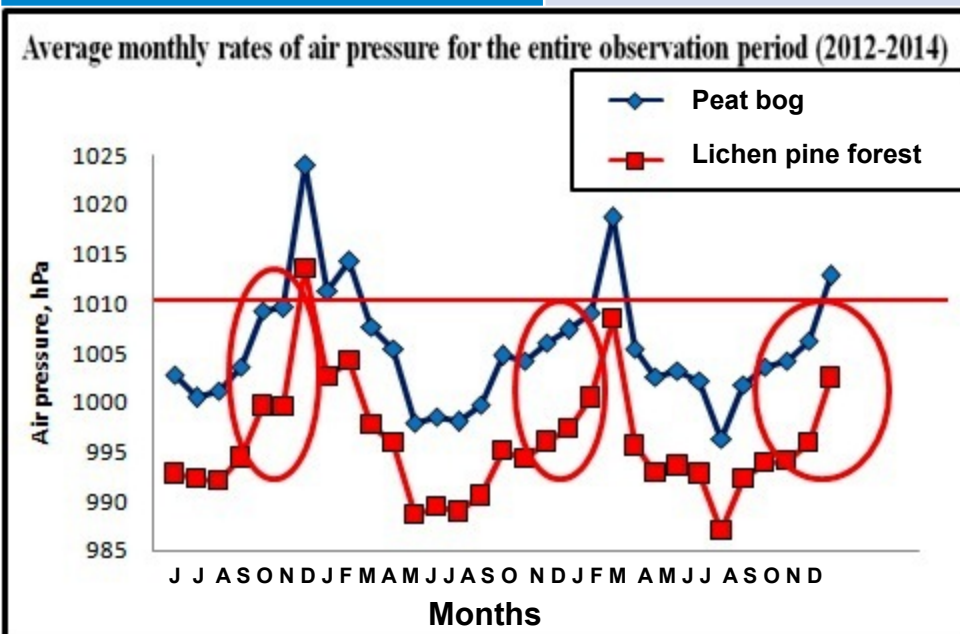
Max:1042,5 hPa (21.12.2012 – 00:20)
Min: 967,7 hPa (30.01.2014 – 04:00)

Max:1031, hPa (21.12.2012 – 00:20)
Min: 964,3 hPa (21.10.2014 – 14:50)

Mean air pressure for July and January

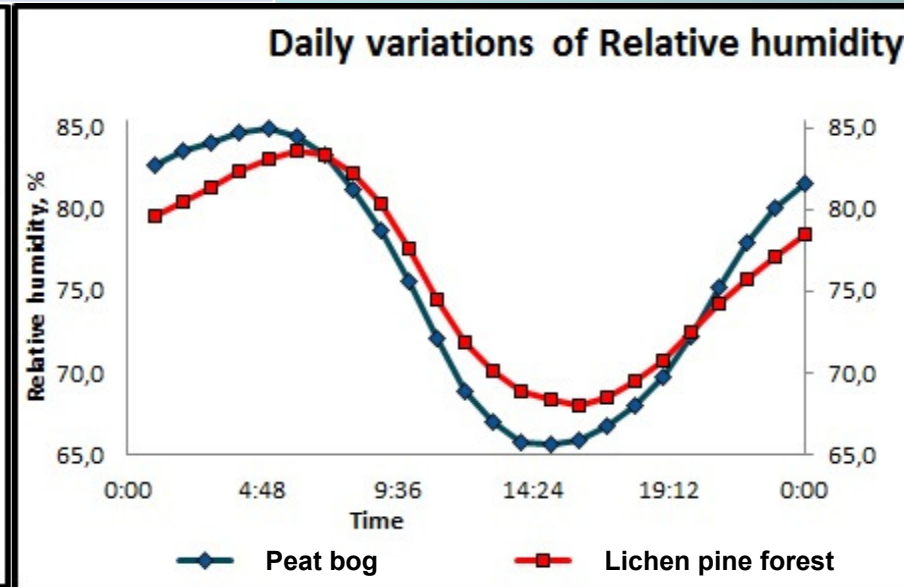
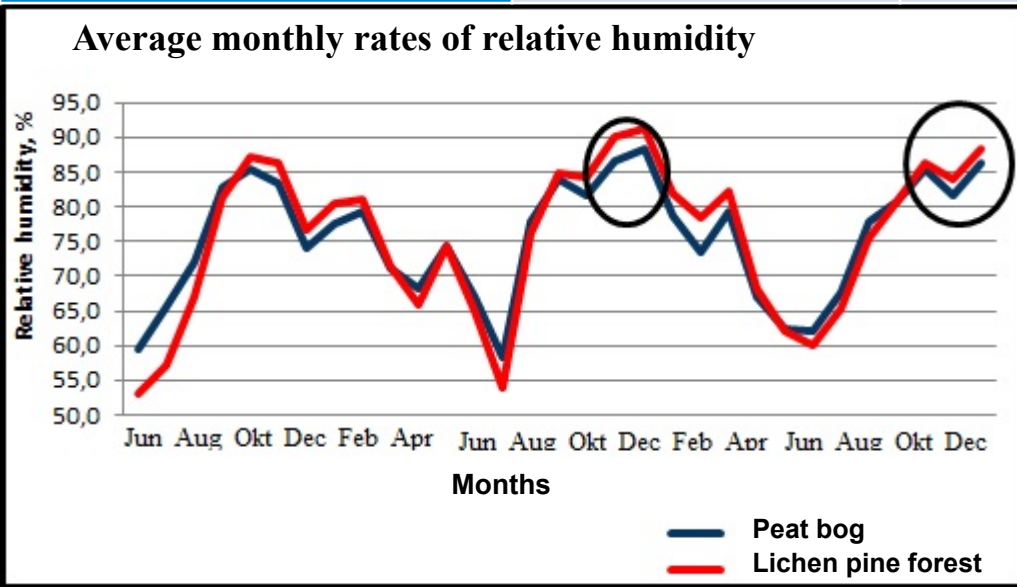
July: 998,3 hPa
January:1011,4 hPa

July: 989,4 hPa
January:1001,5 hPa



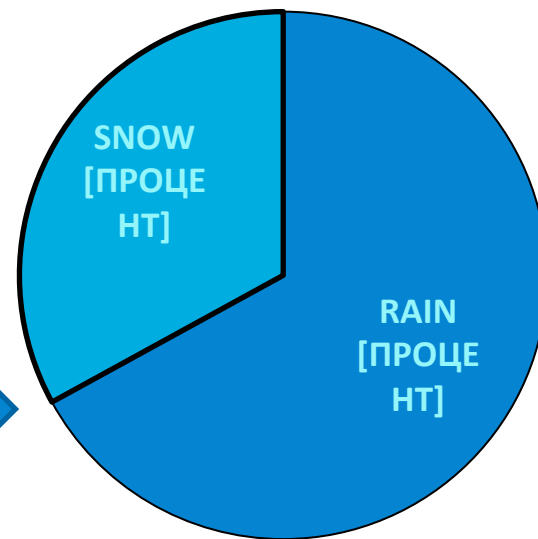
Air relative humidity	Peat bog (ryam)	Lichen pine forest
The mean annual relative humidity values	75,1 %	75,4 %
Extreme of relative humidity values	Max: 102,8 % (25.04.2013 – 07:10) Min: 18,2 % (18.04.2013 – 18:30)	Max: 103 % (02.11.2014 – 13:10) Min: 17,1 % (23.06.2014 – 18:00)
The mean relative for July and January	July: 63,8 % January: 78.1 %	July: 58,8 % January: 81,2 %

At growing season large RH fluctuations and particularly low mid-day RH values (<20%) are important for CO2 exchange between vegetation and atmosphere

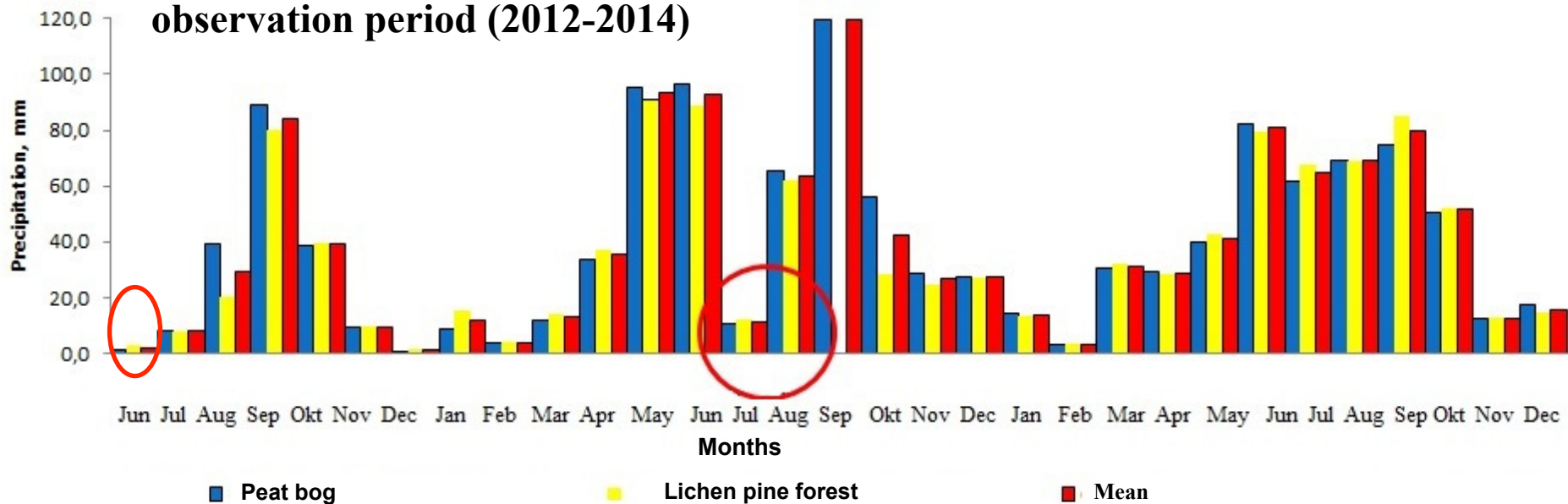


Precipitation

	Peat bog (ryam)	Lichen pine forest
Mean annual precipitation (MAP)	454,5 mm/year	429,2 mm/year
Condition of precipitations mm	rain = 306,6 mm/year snow = 147,4 mm/year	rain = 285,3 mm/year snow = 143,9 mm/year



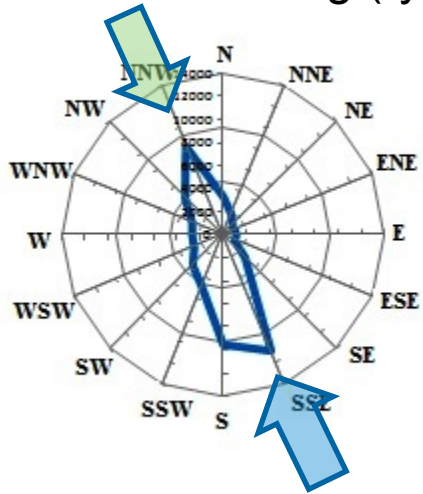
The mean monthly Precipitation for every year and 3-year mean of the entire observation period (2012-2014)



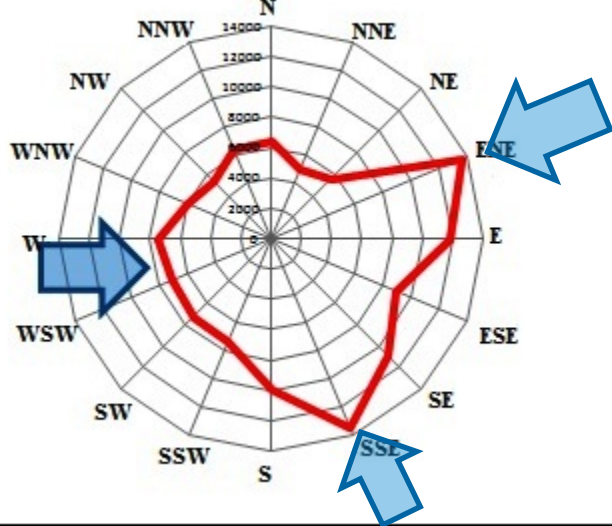
Wind rose (annual)

Wind speed

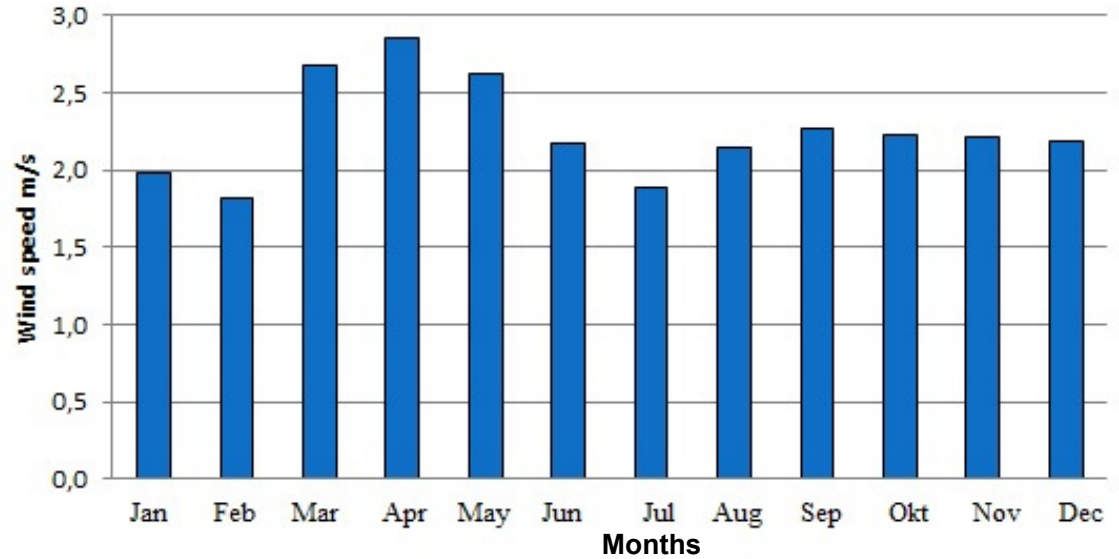
Peat bog (ryam)



Lichen pine forest

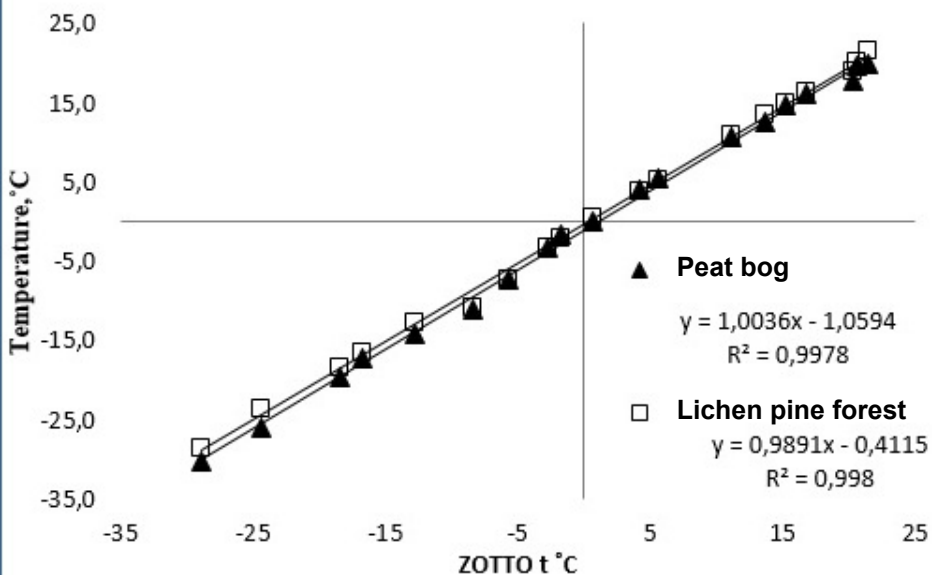


Mean monthly wind speed, m/s

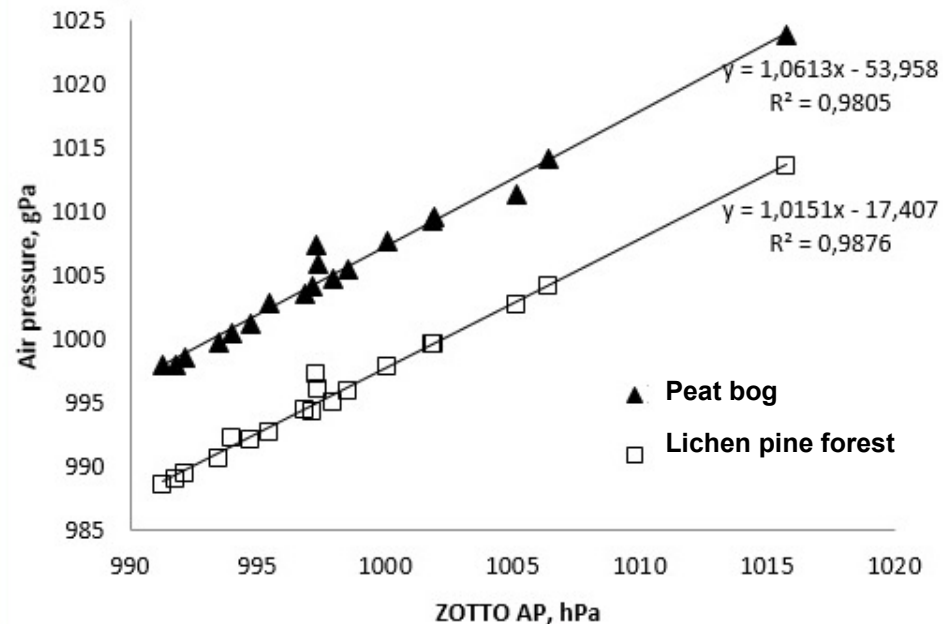


	Peat bog (ryam)	Lichen pine forest
Wind direction	SSE, NNW	ENE, SSE, W
Wind speed	1-3 m/s	2-4 m/s

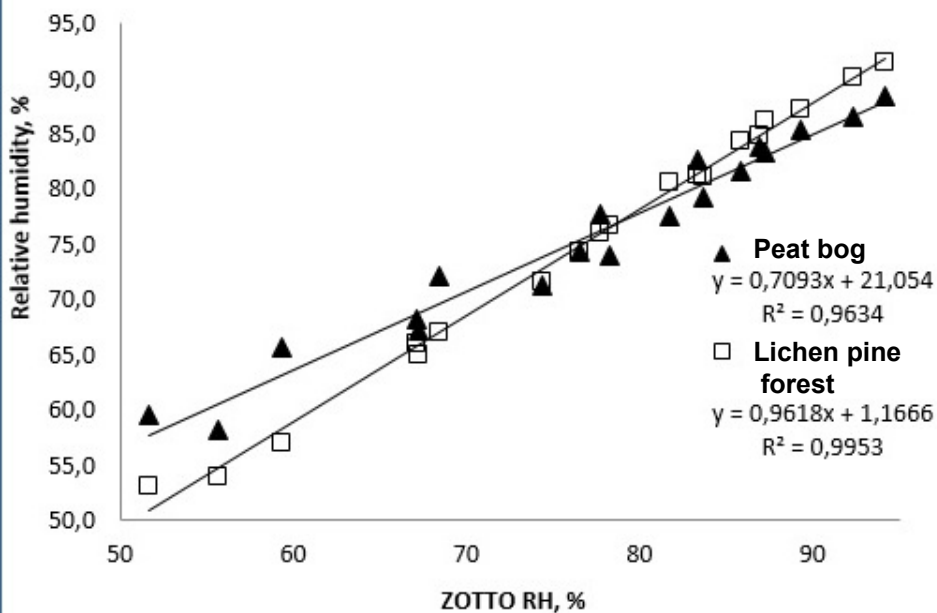
Air temperature



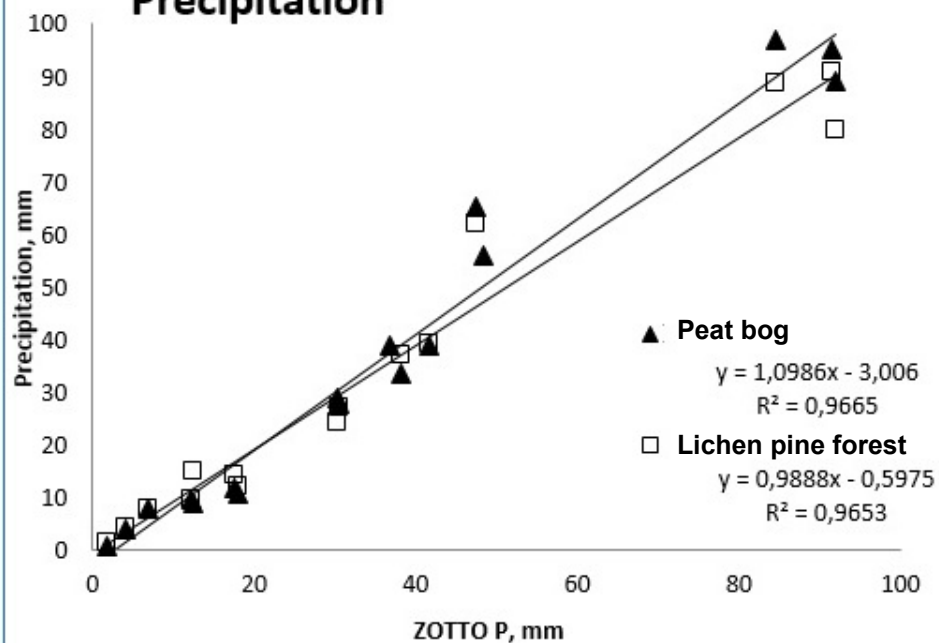
Air pressure



Air relative humidity



Precipitation



Conclusions:

- **Obtained results allowed us to estimate overall and local characteristics and patterns of climatic conditions for the study area.**
- **High precision and frequency of the climatic data will allow to use our results for studying the behavior of greenhouse gases over central Siberian ecosystems.**

Thank you for your attention!

