



# The features of the summer atmospheric circulation and precipitation anomaly in the Selenge River basin

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# 1. Study Motivation

The most part of the Selenge River basin (63%) are in Mongolia and remaining 27% are in Russia. The Selenge River and its confluents are the main water supply source for Mongolia. The water inflow of the Selenge River forms about half of the Baikal Lake's inflow. The low inflow is threat of hydropower potential in Angara HPPs cascade. The reasons of the extreme stream flow of the Selenge River are excess or deficiency of the summer precipitation determined by variations of the general atmospheric circulation.

The catchment is located in the north of the arid zone of the Asian continent. Despite of this fact, the most part of catchment receives a significant amount of rainfall. Most of it falls in a short period in summer, while June-August months contain 60% of total annual rainfall. It could be 90-100 mm of rainfall in each of these months.

Rainfall has significant inter-annual variability in this location. Droughts can follow by abnormally high rainfall and vice versa.

The rainfall anomalies have large-scale pattern in the most part of Selenge River catchment.

## 2. Methodology

The role of the different air masses and the different air particle trajectories in the formation of extreme precipitation is estimated in our work. The calculations of trajectories was applied for analysis of the different rainfall periods in the Selenge River basin. The precipitable water (PW) data from archive NCEP/NCAR Reanalysis was used for the estimation of moisture content.



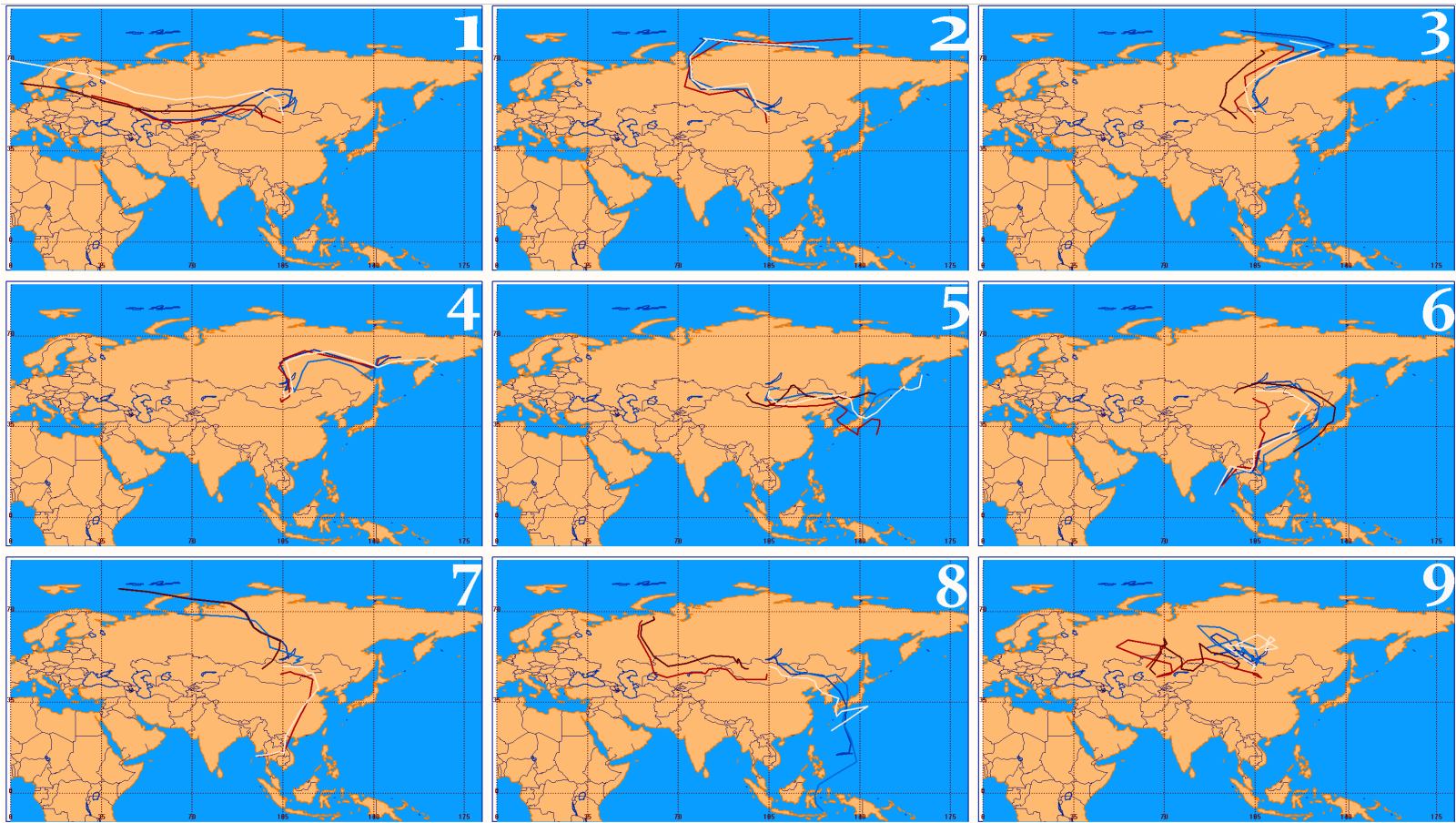
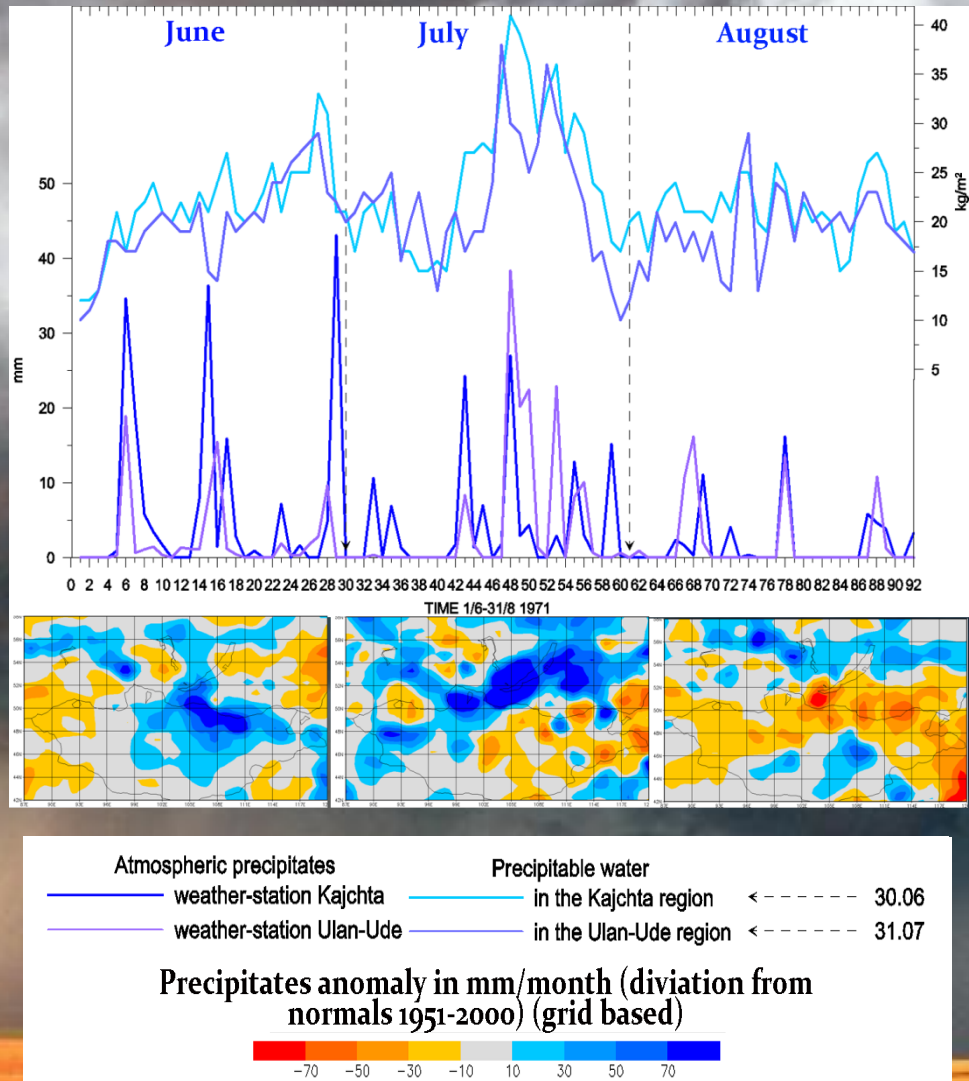


Fig. 1 The trajectories of the air masses at the 850 hPa height.

1 – west (06.2005), 2 – north-west (08.1985), 3 – north (08.2003), 4 – north-east (07.2005), 5 – east (08.1980), 6 – south-east (07.1962), 7 – north-west/ south-east (Indian ocean) (06.1960), 8 – west/ south-east (Pacific ocean) (08.1993), 9 – type of trajectories can not be determined (out of type – Ot) (07.1977).





**Fig. 2. The variations of the rainfall and air moisture content from June 1 to August 31 weather station Kyakhta and weather station**

# Conclusions:

1. The air masses arrive from different directions on the territory of the Selenge River basin. Rainfall is associated mainly with air masses SE, W and NW directions.
2. The moisture fall conditions play important role because sometimes precipitation may fall at low moisture content and sometimes can not fall at high moisture content.
3. Extreme events are observed in the coincidence of several conditions: very high rainfall drops at high moisture and favorable conditions of the air circulation; the severe droughts are observed at low moisture content and the adverse air circulation conditions.





**Thank you for  
your  
attention!**