Abstract
Climate changes on Siberian territory are spatially inhomogeneous, there are areas, called “hot spots”, where accelerated warming is occurred. For detailed studying of climate dynamics peculiarities in this region it is necessary to enlarge a set of climate characteristics under study and to use meteorological information obtained from both weather stations and meteorological models. The report presents results of investigation of air temperature behavior on Siberian territory over the period from 1958 to 2000 based on ECMWF ERA-40 data and observations of weather stations located in Siberia.

Purpose
To analyze spatial distribution of trends for the following temperature characteristics: annual mean, seasonal mean, monthly mean temperatures, beginning and duration of warm and vegetation periods, number of thaw days during winter.

Data
- ECMWF ERA-40 Reanalysis data with spatial resolution 2.5°×2.5°,

Seasonal mean temperature variability

Air temperature increase in winter season reaches 0.5°C/10 years. In some regions of central Siberia it reaches 0.7°C/10 years (Fig.3). A tendency to weak warming is found on the territory of Far East, while in some regions there is fall of temperature.

Dynamic of monthly mean temperatures shows varied patterns which are smoothed in season averaging. Warming in December and February make the main contribution to winter trend (0.2-0.6°C/10 years). Less temperature increase was found in January (0.2-0.5°C/10 years in West Siberia, 0.1-0.3°C/10 years in East Siberia), and some fall of temperature was noted in several regions.

Temperatures in spring season have weak positive trend equal to 0.1-0.3 °C/10 years, but despite winter season this trend is statistically insignificant (Fig.4.)
Analysis of summer and autumn temperature trends shows insignificant changes and even fall of temperature is found in some Siberian regions (Fig.5. and Fig.6.)

Annual mean temperature dynamics

Statistically significant air temperature increase is observed on the West Siberia territory. It reaches 0.2 – 0.3 °C/10 years based on ECMWF ERA-40 Reanalysis data.

Trends of annual mean temperature calculated from observations of weather stations located in Siberia (mostly in West Siberia) are positive for all stations considered. They are equal to 0.25-0.4 °C/10 years. The results obtained are in a good agreement with data presented in Ref. 5.

Duration of warm and vegetation periods

Analysis of duration of warm and vegetation periods, that confirms the results presented above, shows that number of days with daily mean temperature higher then 0 °C and 5 °C increased in average by 2-3 days/10 years.

Conclusion
- Significant increase of annual mean air temperature on West Siberia territory, which reaches 0.2 – 0.3 °C/10 years.
- Changes of annual mean temperature are mostly resulted from changes in winter and spring seasons.
- Temperature changes in winter and spring seasons make the largest contribution into temperature behavior, while contribution of temperature changes in summer and autumn are much less.
- Temperatures averaged over shorter periods of time (month) present more varied behavior which is smoothed in season averaging.
- Analysis of duration of warm and vegetation periods has shown an increase in number of days with daily mean temperature exceeding 0 °C and 5 °C, respectively, by 2-3 days/10 years in average. An increase of 2-4 days/10 years in number of thaw days on the West Siberia territory was revealed as well.

Plans
Recently, using WRF mesoscale model, we obtained archives of meteorological fields with spatial resolution of 10 km, taking into account influence of surface layer on climate forming and allowing detailed analysis of local climate dynamics. In particular, the results obtained reveal local inhomogeneities with sizes up to 20 km, within which variations of monthly mean temperature are about 1°C.

References

Acknowledgements
The work has been partially supported by SB RAS Program 4.5.2 and integration projects Nos. 4, 50 and 66 and RFBR grant 10-07-00547-a.