



International Symposium on Water and Land Resources in Central Asia

9 – 11 October 2018
Almaty, Kazakhstan

Proceedings Paper



Federal Foreign Office





International Symposium on Water and Land Resources In Central Asia

9-11 October 2018, Almaty, Kazakhstan

Contents

Objectives.....	3
Program.....	4
Keynote Speakers:.....	9
<i>Prof. Dr. Wilfried Haeberli</i>	9
<i>Prof. Dr. Viktor A. Dukhovniy</i>	10
Side Event.....	11
Session Overview	12
Session 1: Climate Variability and Change	13
<i>Oral Presentations</i>	13
<i>Poster Presentations.....</i>	19
Session 2: Monitoring and modeling the cryosphere	26
<i>Oral Presentations</i>	26
<i>Poster Presentations.....</i>	32
Session 3: Hydrology: Observations, Processes and Forecasting	37
<i>Oral Presentations</i>	38
<i>Poster Presentations.....</i>	44
Session 4: Using water and land resources: Challenges and sustainable solutions	56
<i>Oral Presentations</i>	56
<i>Poster Presentations.....</i>	63
Session 5: Natural hazards and risk	79
<i>Oral Presentations</i>	79
<i>Poster Presentations.....</i>	85
Session 6: Agricultural transition and natural resource management	90
<i>Oral Presentations</i>	90
<i>Poster Presentations.....</i>	97
Session 7: Practical implementation of scientific results and capacity building: Towards sustainable development in Central Asia	108
<i>Oral Presentations</i>	108
<i>Poster Presentations.....</i>	115
List of Participants.....	123



International Symposium on Water and Land Resources in Central Asia

9-11 October 2018, Almaty, Kazakhstan

Dynamics of changing air temperature and precipitation in Almaty city

(Poster Presentation)

Saniya Akhmetova, Kassym Duskaev

(Al-Farabi Kazakh National University, Kazakhstan)

Email: saniya.akhmetova20689@gmail.com

To date, one of the serious problems of humanity is global climate change. Therefore, the study of multi-year deviations of temperature and precipitation is one of the current global problems. Long-term temperature fluctuations and rainfall directly affect the river stock and the hydrological model in general. In recent decades, the warming was shown as in a global scale, and throughout Kazakhstan. An increase in surface air temperature is also noticed in Almaty. Climate change influences many natural processes, including the hydrological model of rivers. Therefore, it is important to identify these changes and evaluate regarding such characteristics of climate as air temperature and precipitation. Uneven distribution of precipitation and variability of temperature in Kazakhstan depend on a large extent of latitude and physical and geographic heterogeneity of the Republic of Kazakhstan. For the past decade in the world, scientific literature widely discussed the problem of climate change for some areas and for the world. The article considers the features of the temporal distribution of main climatic characteristics (air temperature and atmospheric precipitation) in the city of Almaty for 1915-2014. Average air temperature in the winter season was observed in the 1925-1934 years and the greatest value in the 1995-2004 years. The number of precipitation depends on temperature. If the winter temperature rises, precipitation will increase. Precipitation fluctuated within 29,2 and 42,1 mm. In recent years, air temperature and precipitation significantly increased. In the springtime, there was an increase in the temperature and precipitation. The average temperature in spring was evenly distributed to the 6th decades (9,5-9,9 °C), then increased a little in the 7th decade (10,2 °C). Maximum values were 11,8 °C in 2005-2014 years, and the minimum value was 9,3 °C in the period 1985-1994 years. In this decade was observed the low average temperature in March, April and May. Maximum of precipitation in the springtime was 104,2 mm (1955-1964 years.). Minimum values were 77,3 mm in 1925-1934 years. As a result of comparison of the average of the first decade with the averages of the following years, a significant increase in temperature is noticeable. Based on the mean values, the summer temperature increased. In the course of air temperature and atmospheric sediments were observed deviations. For the past decade rainfall sharply reduced. During the summer, the average temperature did not change significantly over a decade (21,7 - 22,8 °C), but only in the past decade, 2005-2014's maximum temperature was 23,7 °C. Average air temperature during the summer in the period 1945-1954 years was 21,7 °C. The number of precipitation was uneven. In the 1915-1924 years, minimum value was 37,3 mm, and the maximum value in the 1995-2004 years was 50,7 mm. Because of the high-temperature in the 2005-2014 years, the number of precipitation decreased. In many years were observed fluctuations. In the 1945-1954 and 1955-1965 years of the ratio between the temperature and precipitation was the opposite. During autumn, there were no significant differences in the time course of averages air temperature and precipitation. The average temperature changed from 8,7 °C (in the 4th decade) to 11,2 °C (for the past decade). Average



International Symposium on Water and Land Resources in Central Asia

9-11 October 2018, Almaty, Kazakhstan

rainfall ranges from 36,8 mm to 50,4 mm. After 1975-1984's rainfall decreased. Assessment of the distribution of air temperature and precipitation for Almaty is a very important task. Relying on average long-term value and their analysis, we can provide a reliable weather forecast in the future. Study of multi-year oscillations temperature and precipitation now is one of the key global problems. Despite the fact that this question considered for decades, it continues to actively discuss. Designation reasons for many years of changes in temperature and precipitation have a huge scientific and practical value. As it is known, temperature and precipitation are those climate parameters, on which depends the river stock.