

INFLUENCE OF NORTHERN PACIFIC CENTRES OF ATMOSPHERIC ACTION ON THERMAL REGIME OF NORTH-WESTERN COAST OF THE BERING SEA

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The purpose of this work was to study the influence of the centers of atmospheric action in the northern hemisphere on the thermal regime of the Bering Sea coast of Russia for 1961–2012.

Data: average monthly temperature of meteorological stations on the coasts of the Bering sea (<http://www.meteo.ru/>) and the pressure anomalies at the surface of the earth (P_0) and geopotential (H_{500}) in the Aleutian low and P_0 in the North-American high in the period 1961 – 2012.

Research methodology:

The correlation analysis between air temperature and the pressure anomalies was carried out in 6 coastal meteorological stations to achieve the set goal.

Correlation of air temperature with the pressure anomalies at the surface of the earth (P_0) in the Aleutian low

Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Year
JAN	-0.15	0.00	0.05	0.21	0.15	0.16	0.18	0.13	0.03	0.19	0.24	0.15	0.20
FEB	-0.13	0.03	0.32	0.34	0.20	0.20	0.27	0.23	0.17	0.35	0.05	-0.04	0.28
MAR	-0.25	-0.02	0.04	0.27	0.06	0.24	0.31	0.30	0.26	0.35	0.10	0.10	0.19
APR	-0.01	0.12	0.26	0.25	0.27	0.28	0.34	0.26	0.36	0.42	0.05	0.00	0.37
MAY	-0.13	0.11	0.24	0.16	0.12	0.22	0.24	0.28	0.20	0.37	0.04	0.04	0.27
JUN	-0.10	0.12	0.26	0.19	0.29	0.15	0.28	0.30	0.29	0.30	0.07	0.18	0.36
JUL	-0.24	0.04	0.24	0.12	0.12	0.24	0.27	0.24	0.17	0.33	0.08	0.09	0.22
AUG	-0.26	0.03	0.14	0.24	0.18	0.18	0.23	0.28	0.20	0.29	0.10	0.13	0.22
SEP	-0.15	0.07	0.17	0.12	0.07	0.14	0.21	0.29	0.16	0.29	0.10	-0.02	0.19
OCT	0.04	0.16	0.14	0.19	0.16	0.19	0.23	0.27	0.12	0.23	0.03	0.00	0.27
NOV	0.00	0.05	0.06	0.23	-0.01	0.06	0.16	0.14	0.04	0.08	-0.06	-0.03	0.10
DEC	-0.12	0.23	0.11	0.36	0.06	0.08	0.07	0.17	-0.01	0.13	-0.12	-0.16	0.13
Year	-0.17	0.10	0.22	0.29	0.18	0.24	0.31	0.32	0.22	0.37	0.08	0.05	0.31

Note: red colour- significant coefficients

Aleutian low. The dynamics of air temperature (except January and March), atmospheric pressure and geopotential are positive – linear trends are statistically significant (the coefficients of determination are 0.5-0.7). In the first half of the year asynchronous relations of air temperature with P_0 were revealed in previous 1–4 months (the correlation coefficient reaches 0.4).

Correlation of air temperature with the pressure anomalies at the geopotential (H_{500}) in the Aleutian low

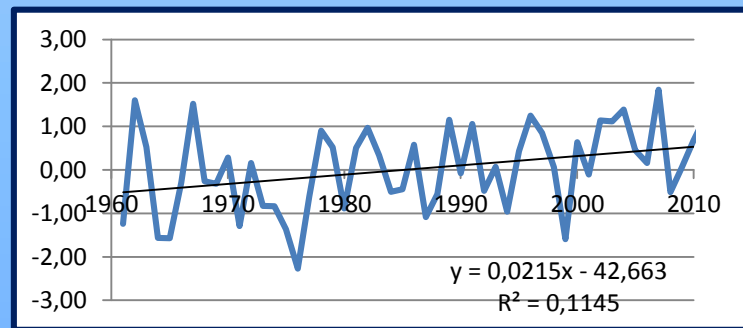
Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Year
JAN	-0.28	0.14	0.02	0.22	0.21	0.29	0.28	0.15	0.24	0.37	0.17	0.22	0.29
FEB	-0.21	0.01	0.10	0.17	0.27	0.33	0.32	0.19	0.34	0.47	0.17	0.07	0.26
MAR	-0.08	-0.17	0.27	0.03	0.21	0.41	0.48	0.43	0.50	0.49	0.13	0.20	0.18
APR	-0.14	-0.04	0.07	0.12	0.17	0.35	0.36	0.17	0.40	0.50	0.07	0.05	0.22
MAY	-0.24	0.10	0.16	0.18	0.24	0.33	0.32	0.17	0.34	0.51	0.15	0.18	0.34
JUN	-0.10	0.10	0.18	0.21	0.32	0.29	0.36	0.28	0.38	0.46	0.12	0.20	0.40
JUL	-0.22	0.06	0.20	0.19	0.28	0.33	0.34	0.26	0.31	0.49	0.07	0.13	0.31
AUG	-0.26	0.01	0.15	0.25	0.33	0.35	0.33	0.23	0.30	0.48	0.09	0.19	0.32
SEP	-0.25	0.01	0.18	0.21	0.29	0.27	0.34	0.36	0.31	0.51	0.07	0.10	0.28
OCT	-0.21	0.06	0.14	0.14	0.16	0.23	0.26	0.26	0.35	0.39	0.12	0.15	0.27
NOV	-0.21	-0.01	0.08	0.20	0.19	0.25	0.33	0.34	0.31	0.36	0.04	0.10	0.22
DEC	-0.18	0.05	0.19	0.20	0.12	0.17	0.24	0.24	0.18	0.34	0.14	0.07	0.24
Year	-0.23	0.03	0.12	0.20	0.27	0.34	0.38	0.31	0.38	0.51	0.12	0.16	0.33

Aleutian low. The average geopotential value (H_{500}) directly determines the temperature regime on the Bering Sea west coast the in June–October ($r = 0.29–0.39$) and the reverse in January and March. Asynchronous direct connections are significant from May to September with a shift of 1–4 months ($r = 0.42$).

Map of the study area



The long-term course of annual air temperature anomalies of Bering sea coast



North-American high. There is a negative relationship between air temperature and pressure P_0 . The closest dependence is manifested in December–January, in April–May and in August ($r = 0.27 - 0.32$). Pressure decrease in the North-American high leads to temperature increase on the west coast in these months.

Conclusions: The increase of air temperature anomalies of the Bering Sea coast of Russia for 1961–2012 is associated with an increase of atmospheric pressure (P_0) and geopotential (H_{500}) in the Aleutian low and decrease of atmospheric pressure (P_0) in the North-American high.