

SUPPLEMENT

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The Influence of Climatic Factors on Tree-Ring Width of Siberian Larch in the Upper Basin of the Irtysh River

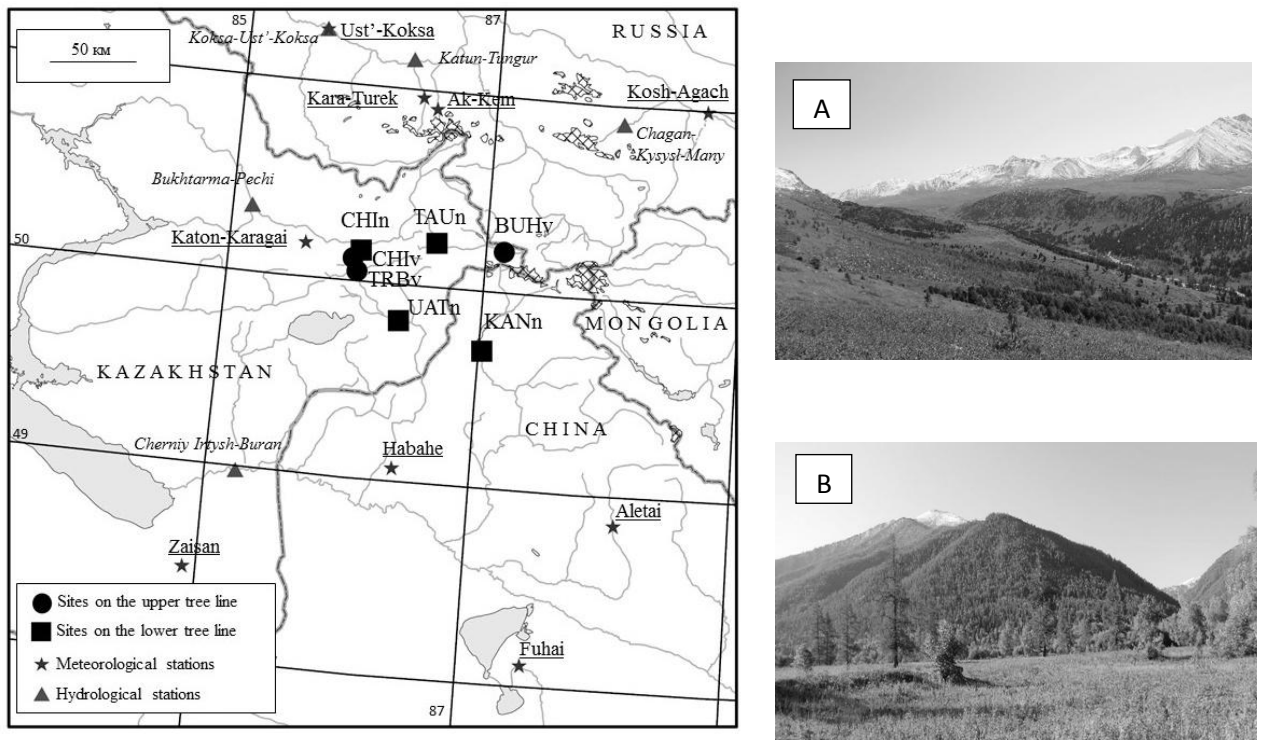


Fig. 1. Sampling sites. Photo: A – The valley of the Bukhtarma river, B – The valley of the Tautekeli river.

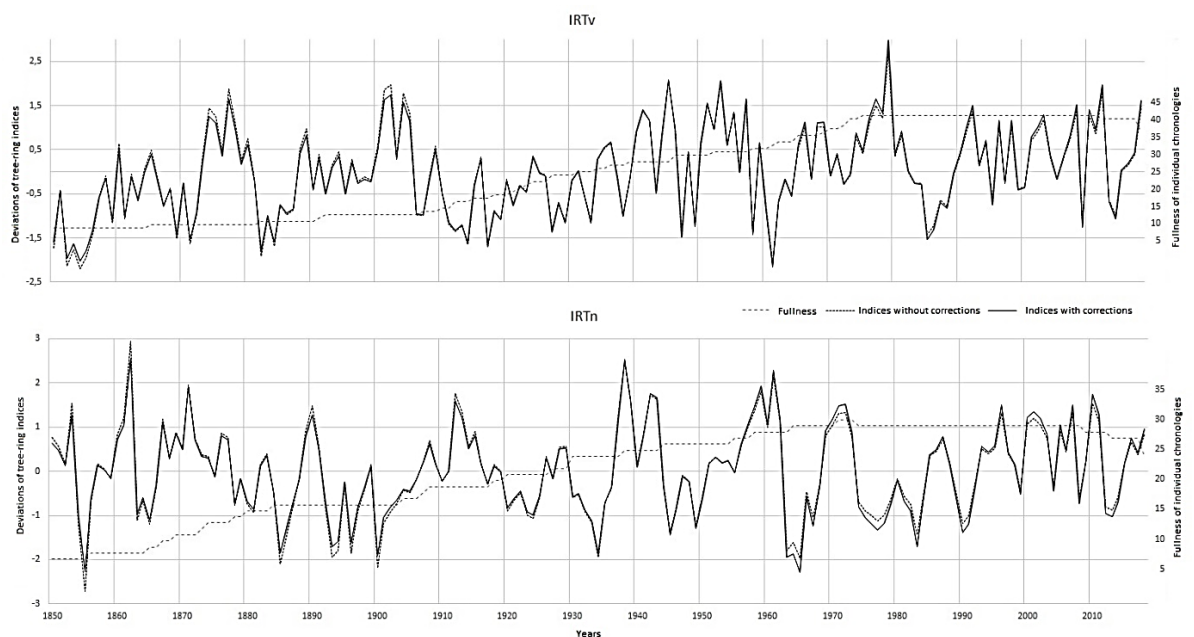


Fig. 2. Tree-ring chronologies IRTv и IRTn.

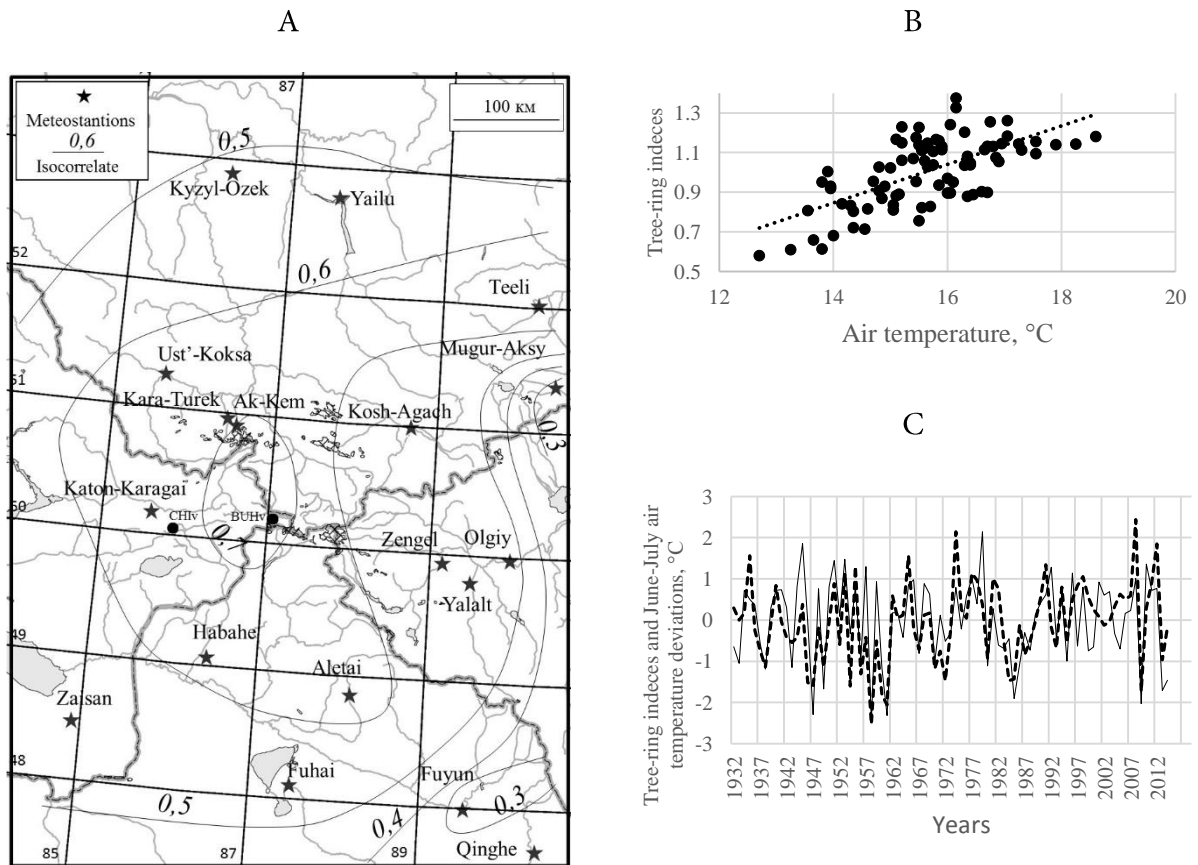


Fig. 3. A – Spatial distribution of correlation coefficients between the June-July air temperature according to the meteorological stations data of the study region and the tree-ring indices of IRTv chronology (res); B – Linear dependence between June – July air temperature according to the data of Katon-Karagai meteorological station and tree-ring indices of IRTv chronology; C – The deviations of June-July air temperature according to the data of the Katon-Karagai meteorological station (dotted line), the deviations of the tree-ring indices of IRTv chronology (the solid line).

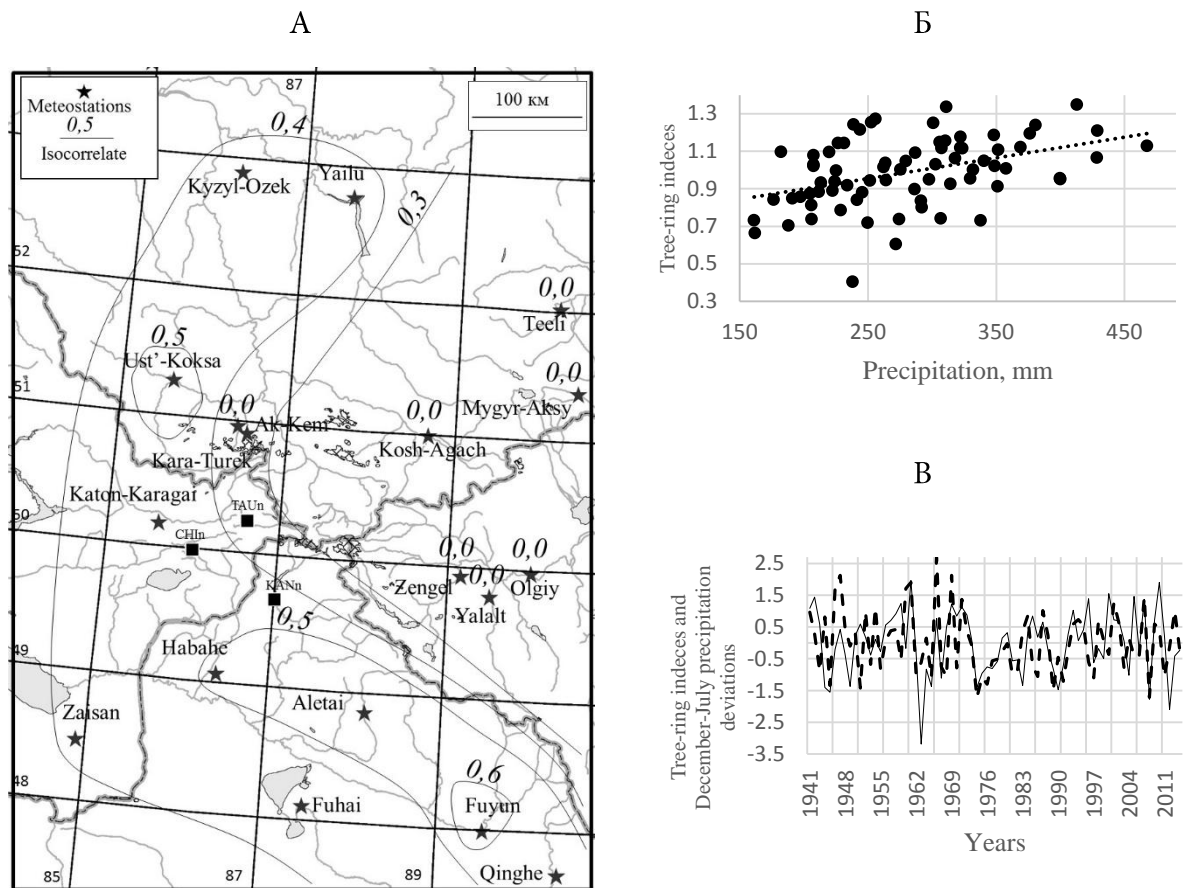


Fig. 4. A – Spatial distribution of correlation coefficients between December-July precipitation according to the meteorological stations data of the study region and the tree-ring indices of IRTn chronology (res); B – Linear dependence between December-July precipitation according to the data of Katon-Karagai meteorological station and tree-ring indices of IRTn chronology; C – The deviations of December-July precipitation according to the data of the Katon-Karagai meteorological station (dotted line), the deviations of the tree-ring indices of IRTn chronology (the solid line).

Table 1. Basic characteristics of meteorological stations.

Name of meteorological stations	Period of observation over air temperature	Period of observation over precipitation	Coordinates	Altitude a.s.l. (m)
Russia				
Ak-Kem	1949–2004	1966–2004	49°55'n.l.,86°32'e.l.	2056
Kara-Turek	1940–2017	1940–2017	50°02'n.l.,86°27'e.l.	2601
Kosh-Agach	1934–2017	1936–2017	50°00'n.l.,88°40'e.l.	1692
Kyzyl-Ozek	1934–2017	1934–2017	51°53'n.l.,86°00'e.l.	324
Mugur-Aksy	1963–2017	1966–2017	50°23'n.l.,90°26'e.l.	1850
Teeli	1961–2004	1961–2004	50°95'n.l.,90°03'e.l.	981
Ust'-Koksa	1940–2017	1936–2017	50°16'n.l.,85°37'e.l.	978
Yailu	1939–2017	1936–2017	51°47'n.l.,87°36'e.l.	697
Khazakstan				
Zaisan	1937–2017	1937–2017	47°28'n.l.,84°52'e.l.	603
Katon-Karagai	1932–2018	1936–2018	49°18'n.l.,85°62'e.l.	1081
China				
Aletai	1954–2017	1954–2017	47°50'n.l.,88°08'e.l.	737
Fuhai	1958–2017	1958–2017	47°12'n.l.,87°30'e.l.	496
Fuyun	1962–2017	1962–2017	47°00'n.l.,89°30'e.l.	827
Habahe	1958–2017	1958–2017	48°04'n.l.,86°25'e.l.	534
Qinghe	1958–2017	1958–2017	46°40'n.l.,90°25'e.l.	1220
Mongolia				
Zengel	1965–2014	1965–2014	48°56'n.l.,89°10'e.l.	1905
Olgii	1961–2016	1961–2016	48°58'n.l.,89°59'e.l.	1715
Yalalt	1970–2014	1970–2014	48°48'n.l.,89°30'e.l.	2148

Table 2. Basic characteristics of hydrological stations.

Name of river and station	Period of observation	Coordinates	Altitude a.s.l. (m)
The Ob river basin			
Katun-Srostki	1937 – 2000	52°25'n.l.,85°42'e.l.	218
Katun-Tungur	1938 – 2000	50°13'n.l.,86°32'e.l.	846
Koksa-Ust'-Koksa	1937 – 2000	50°16'n.l.,85°37'e.l.	971
Chagan-Kysysl-Many	1951 – 1995	49°55'n.l.,88°00'e.l.	372
Chulyshman At Balukhcha	1930 – 2000	51°28'n.l.,87°72'e.l.	435
The Irtysh river basin			
Bukhtarma-Pechi	1937 – 1988	49°20'n.l.,85°10'e.l.	645
Cherniy Irtysh-Buran	1938 – 1987	48°00'n.l.,85°22'e.l.	630

Table 3. Characteristics of generalized tree-ring chronologies for the period 1850–2018.

Generalized tree-ring chronologies	IRT_v	IRT_n
Included local tree-ring chronologies	BUH _v , CHI _v	CHI _n , TAU _n , KAN _n
SD (Std/Res)	0.2/0.2	0.3/0.2
MS (Std/Res)	0.2/0.2	0.2/0.2
EPS (Std/Res)	0.94/0.95	0.91/0.92
First order auto-correlation (Std/Res)	0.453/0.001	0.559/0.065
PC1 (Std/Res), %	58/70	42/62
Years of maximum tree-ring growth	1877, 1901-02, 1904, 1941, 1945, 1951, 1953, 1957, 1977, 1979, 1992, 2008, 2010, 2012	1853, 1862, 1867, 1871, 1890, 1912, 1938, 1942–43, 1959, 1961, 1971–72, 1996, 2001, 2005, 2007, 2010
Years of minimum tree-ring growth	1851, 1854, 1859, 1861, 1869, 1871, 1882, 1884, 1907, 1912, 1914, 1917, 1919, 1927, 1929, 1933, 1938, 1947, 1949, 1958, 1961, 1985, 2009, 2014	1855, 1863, 1865, 1881, 1885, 1893–94, 1896, 1900, 1923–24, 1934, 1945, 1949, 1963, 1965, 1967, 1977, 1983, 1990-91, 2012–13