

Supplementary Tab. 1. Climate change data over the past 50 years recorded in Jinghe meteorological station.

Time (AD)	Precipitation (0.1 mm)	Station pressure (0.1 hPa)	Wind direction (0.1 m s ⁻¹)	Air temperature (0.1°C)	Water vapor pressure (0.1 hPa)	Relative humidity (1%)	Percentage of sunshine (1%)	Sunshine duration (0.1 hour)
1955	626	9825	11	66	70	57	58	25,844
1956	964	9828	19	67	74	60	59	26,253
1957	285	9827	21	77	70	56	67	29,639
1958	1639	9830	20	77	82	66	59	25,950
1959	955	9828	18	69	80	65	63	28,121
1960	1159	9837	18	61	78	67	57	25,551
1961	905	9826	25	79	75	60	66	29,445
1962	686	9833	25	80	76	60	64	28,298
1963	763	9825	24	91	76	59	63	27,954
1964	1173	9832	21	65	76	65	59	26,452
1965	725	9828	26	81	71	58	61	27,082
1966	1063	9829	27	76	77	61	61	27,150
1967	620	9833	28	67	67	57	65	29,085
1968	448	9826	28	74	66	55	64	28,458
1969	1423	9844	23	58	76	64	57	25,347
1970	1170	9834	24	70	74	61	62	27,715
1971	844	9827	21	77	72	60	61	26,996
1972	889	9836	22	67	76	64	61	26,957
1973	1017	9831	19	83	79	63	60	26,708
1974	811	9838	17	69	72	60	63	28,042
1975	542	9831	15	72	71	60	59	26,120
1976	830	9835	16	68	71	62	58	25,757
1977	814	9836	15	77	74	62	58	25,545
1978	1018	9829	13	78	78	62	59	26,341
1979	821	9840	18	73	72	61	54	24,175
1980	1125	9834	15	81	76	61	57	25,252
1981	1134	9835	17	76	77	61	59	26,136
1982	1033	9826	21	91	76	58	58	25,888
1983	1564	9824	20	93	77	59	59	26,326
1984	854	9836	18	65	73	61	57	25,168
1985	911	9831	21	70	70	60	58	25,754
1986	1149	9838	19	69	74	62	57	25,352
1987	1639	9837	18	75	81	66	52	22,907
1988	1400	9838	17	73	81	65	53	23,773
1989	779	9832	15	80	78	64	55	24,223
1990	985	9831	14	89	83	63	58	25,706
1991	697	9830	12	83	76	60	58	25,538
1992	1134	9841	12	74	78	65	50	22,194
1993	1491	9854	9	68	79	65	52	23,082
1994	1300	9843	8	76	81	64	56	24,941
1995	746	9840	9	80	81	63	61	26,999
1996	1030	9842	9	75	77	62	61	27,102
1997	608	9826	11	93	76	57	61	27,063
1998	1206	9833	10	84	81	62	54	23,902

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1999	1221	9830	11	87	84	64	58	25,862
2000	1012	9830	13	86	77	62	59	26,401
2001	1644	9828	12	88	82	63	60	26,818
2002	1426	9826	13	87	87	66	55	24,406
2003	1378	9831	14	80	78	63	52	22,970
2004	1219	9834	14	89	79	62	54	24,265
2005	979	9829	14	78	76	59	57	25,176
2006	1003	9822	15	95	75	59	56	24,895
2007	1368	9823	14	94	79	60	55	24,429
2008	681	9823	14	94	74	57	59	26,240
2009	967	9820	14	92	73	59	56	25,050
2010	1056	9828	15	84	72	59	57	25,103

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Supplementary Tab. 2. Economic statistical database of Jinghe County from the yearbooks database of Xinjiang.

Time (AD)	Population ($\times 10^4$)	Gross domestic product (10^4 RMB)	Primary industry (10^4 RMB)	Secondary industry (10^4 RMB)	Tertiary industry (10^4 RMB)	Investment in fixed assets (10^4 RMB)	Total sown area of farm crops (10^3 hm ²)	Total sown area food crops (10^3 hm ²)	Food production (10^3 kg)	Cotton production (10^3 kg)	Oil crops production (10^3 kg)
1955	1.18	276	229	7	40	11	5.72	5.07	10,054	10	123
1956	1.42	324	256	16	52	23	6.28	5.57	10,153	10	120
1957	1.67	372	283	25	63	34	6.84	6.07	10,251	10	117
1958	1.91	419	310	35	75	46	7.39	6.57	10,350	10	114
1959	2.16	467	337	44	86	57	7.95	7.07	10,448	10	111
1960	2.4	515	365	53	98	69	8.51	7.58	10,547	10	109
1961	2.64	563	392	62	109	81	9.07	8.08	10,646	10	106
1962	2.89	611	419	71	121	92	9.63	8.58	10,744	10	103
1963	3.13	658	446	81	132	104	10.18	9.08	10,843	10	100
1964	3.38	706	473	90	144	115	10.74	9.58	10,941	10	97
1965	3.62	754	500	99	155	127	11.3	10.08	11,040	10	94
1966	4	794	535	97	162	109	11.43	10.21	12,541	8	98
1967	4.37	834	570	96	169	90	11.55	10.34	14,042	6	101
1968	4.75	875	604	94	176	72	11.68	10.47	15,542	4	105
1969	5.12	915	639	93	183	53	11.8	10.6	17,043	2	108
1970	5.5	955	674	91	190	35	11.93	10.73	18,544	0	112
1971	5.82	1094	780	110	205	53	12.31	11.09	20,909	1	210
1972	6.15	1234	886	128	219	70	12.69	11.44	23,275	2	308
1973	6.47	1373	993	147	234	88	13.07	11.8	25,640	2	405
1974	6.8	1513	1099	165	248	105	13.45	12.15	28,006	3	503

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1975	7.12	1652	1205	184	263	123	13.83	12.51	30,371	4	601
1976	7.44	2011	1371	290	350	188	14.18	12.53	32,675	6	774
1977	7.75	2370	1536	397	437	254	14.52	12.56	34,979	8	946
1978	8.07	2729	1702	503	524	319	14.87	12.58	37,283	10	1119
1979	8.29	3052	1846	574	632	245	15.04	12.3	36,316	6	1421
1980	8.51	3375	1990	645	740	170	15.21	12.01	35,349	1	1723
1981	8.66	4195	2511	774	909	339	15.21	10.92	33,068	120	1675
1982	8.82	5015	3033	903	1079	508	15.2	9.83	30,787	239	1627
1983	8.97	5835	3554	1033	1248	677	15.2	8.74	28,507	359	1578
1984	9.13	6655	4076	1162	1418	846	15.19	7.65	26,226	478	1530
1985	9.28	7475	4597	1291	1587	1015	15.19	6.56	23,945	597	1482
1986	9.44	10,133	6365	1737	2031	1005	15.51	6.97	28,046	2124	1352
1987	9.59	12,792	8133	2183	2476	995	15.82	7.39	32,147	3651	1222
1988	9.75	15,450	9902	2628	2920	986	16.14	7.8	36,249	5178	1091
1989	9.9	18,109	1,1670	3074	3365	976	16.45	8.22	40,350	6705	961
1990	10.06	20,767	13,438	3520	3809	966	16.77	8.63	44,451	8232	831
1991	10.31	26,471	16,598	4412	5460	2860	17.81	8.03	43,588	9443	758
1992	10.56	32,175	19,758	5304	7112	4754	18.85	7.44	42,725	10,654	685
1993	10.81	37,878	22,919	6197	8763	6649	19.88	6.84	41,861	11,864	613
1994	11.06	43,582	26,079	7089	10,415	8543	20.92	6.25	40,998	13,075	540
1995	11.31	49,286	29,239	7981	12,066	10,437	21.96	5.65	40,135	14,286	467
1996	11.92	55,713	30,253	9553	15,907	13,061	21.57	5.8	44,500	15,727	442
1997	11.68	60,224	34,661	8624	16,939	8641	22.25	5.61	46,484	18,683	249
1998	11.8	62,434	35,546	9598	17,290	10,852	22.79	4.6	44,514	21,560	813

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1999	11.9	57192	27,269	9824	20,099	9752	22.91	3.6	38,002	22,268	1101
2000	12.09	65,987	32,885	10,934	22,168	8565	23.48	3.29	36,056	23,905	782
2001	12.27	68,462	31,234	11,634	25,594	12,993	23.66	2.64	33473	24,457	693
2002	12.46	76,394	34,771	12,934	28,689	15,290	23.09	3.22	35824	25,262	219
2003	12.88	91,050	45,321	12,484	33,245	17,717	22.38	1.75	21462	28,114	226
2004	13.3	101,064	49,035	14,303	37,726	16,761	22.16	1.65	19927	31,259	148
2005	13.41	121,970	57,533	11,763	52,674	29,620	24	1	17011	33,235	0
2006	14	129,799	56,697	13,926	59,176	37,603	24	0	11,334	38,531	26
2007	13.96	162,090	73,419	18,518	70,153	53,323	25.54	0.4	5295	42,005	0
2008	14.04	176,955	75,567	25,630	75,758	61,264	32.37	0.71	5092	54,243	0
2009	14.25	211,060	89,363	39,277	82,420	63,212	43	8	6970	51,626	0
2010	14.3	348,511	195,823	55,151	97,537	95,241	44.35	7.43	6308	57,616	0

Supplementary Tab. 3. Seven latent variables as independent ones standing for regional climate change and human activity, and the dependent variable of surface area of Ebinur Lake in the linear model.

Time (AD)	Independent variables							Dependent variable Y
	Climatic factors				Human activities			
	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	
1955	-0.77	-0.03	-2.13	0.46	-0.67	-1.57	-0.97	1107.0
1956	-0.45	0.47	-0.25	-0.60	-0.67	-1.54	-0.83	1089.0
1957	-2.38	0.07	-0.06	1.31	-0.66	-1.50	-0.69	1070.0
1958	0.85	0.13	2.26	-0.95	-0.66	-1.47	-0.55	946.5
1959	-0.27	0.58	1.93	1.01	-0.66	-1.43	-0.40	823.0
1960	0.80	1.64	0.65	-0.07	-0.65	-1.40	-0.26	802.7
1961	-1.51	0.07	1.86	-0.02	-0.65	-1.36	-0.12	782.5
1962	-1.19	0.37	1.09	0.36	-0.65	-1.33	0.02	762.2
1963	-1.23	-0.93	1.05	-0.25	-0.64	-1.29	0.16	741.9
1964	0.14	1.19	0.94	-0.66	-0.64	-1.25	0.30	721.6
1965	-1.33	-0.03	-0.16	-1.16	-0.64	-1.22	0.44	701.4
1966	-0.64	0.33	1.32	-1.28	-0.63	-1.13	0.45	681.1
1967	-2.13	1.41	-0.03	-0.54	-0.62	-1.04	0.46	660.8
1968	-2.43	0.41	-0.67	-1.03	-0.62	-0.95	0.47	640.5
1969	0.67	2.30	0.44	-1.17	-0.61	-0.86	0.47	620.3
1970	-0.65	1.03	1.03	-0.68	-0.61	-0.78	0.48	600.0
1971	-0.92	0.04	0.01	-0.51	-0.61	-0.58	0.59	583.6
1972	-0.26	1.37	0.83	0.16	-0.62	-0.39	0.70	567.2
1973	-0.02	-0.21	1.08	0.24	-0.62	-0.19	0.81	550.8
1974	-0.86	1.15	-0.06	1.25	-0.63	0.00	0.92	534.4
1975	-0.66	0.36	-1.37	0.68	-0.63	0.20	1.03	518.0
1976	-0.17	0.98	-1.03	0.17	-0.63	0.45	1.08	518.4
1977	0.04	0.37	-0.76	0.62	-0.63	0.69	1.13	518.8
1978	0.11	-0.33	0.27	0.76	-0.63	0.94	1.18	519.2
1979	0.29	0.87	-1.82	-0.54	-0.63	1.15	1.22	519.6
1980	0.33	-0.18	-0.40	-0.03	-0.64	1.37	1.27	520.0
1981	0.09	0.28	0.22	0.14	-0.59	1.25	0.97	528.0
1982	-0.44	-1.22	-0.03	-1.14	-0.55	1.13	0.66	536.0
1983	-0.10	-1.47	1.05	-1.63	-0.50	1.01	0.36	544.0
1984	-0.04	1.12	-1.08	-0.27	-0.46	0.90	0.06	552.0
1985	-0.54	0.68	-0.92	-1.13	-0.41	0.78	-0.25	560.0
1986	0.26	1.07	-0.40	-0.61	-0.38	0.84	-0.21	555.2
1987	1.84	0.44	0.34	-1.69	-0.34	0.91	-0.18	550.4
1988	1.48	0.58	0.17	-0.84	-0.31	0.97	-0.15	545.6
1989	0.63	-0.17	-0.65	0.19	-0.27	1.04	-0.11	540.8
1990	0.56	-0.95	0.78	0.97	-0.24	1.11	-0.08	536.0
1991	-0.11	-0.68	-0.94	1.03	-0.13	1.04	-0.20	524.0
1992	1.78	0.55	-1.56	-0.31	-0.02	0.97	-0.31	512.0
1993	2.16	1.64	-1.06	0.84	0.09	0.91	-0.42	500.0
1994	1.38	0.42	-0.06	1.61	0.20	0.84	-0.54	488.0
1995	0.28	0.15	0.38	3.10	0.31	0.77	-0.65	476.0

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1996	0.23	0.64	0.07	2.46	0.40	0.93	-0.62	510.4
1997	-0.82	-1.66	-0.61	1.68	0.43	0.86	-0.82	544.8
1998	1.18	-0.82	-0.53	0.37	0.49	1.23	-0.82	579.2
1999	0.88	-0.99	1.16	1.15	0.48	1.22	-1.00	613.6
2000	0.08	-0.69	0.21	0.81	0.60	0.92	-1.14	648.0
2001	0.67	-1.10	1.86	0.45	0.69	0.75	-1.28	591.0
2002	1.53	-1.26	1.50	-0.09	0.79	0.46	-1.25	805.0
2003	1.31	-0.47	-0.76	-1.27	0.98	-0.07	-1.46	915.0
2004	0.95	-0.81	-0.39	-0.27	1.10	-0.17	-1.48	872.0
2005	0.02	-0.50	-0.84	-0.04	1.39	-0.43	-1.49	821.0
2006	-0.07	-1.90	-0.77	-0.82	1.61	-0.62	-1.62	706.0
2007	0.60	-1.94	-0.07	-1.07	2.01	-0.93	-0.96	636.0
2008	-0.78	-1.79	-0.94	0.38	2.43	-0.84	-0.53	602.0
2009	-0.22	-1.81	-1.05	-0.84	2.75	-0.53	2.30	515.0
2010	-0.15	-0.74	-1.10	-0.65	4.01	-0.76	3.87	428.0

Non commercial use only

Supplementary Tab. 4. Five latent variables as independent ones standing for regional climate change and human activity, and the dependent variable of surface area of Ebinur Lake in the linear model.

Time (AD)	Independent variables						Dependent variable Y
	Climatic factors			Human activities			
	X ₁	X ₂	X ₃	X ₅	X ₆	X ₇	
1955	-0.77	-0.03	-2.13	-0.67	-1.57	-0.97	1107.0
1956	-0.45	0.47	-0.25	-0.67	-1.54	-0.83	1089.0
1957	-2.38	0.07	-0.06	-0.66	-1.50	-0.69	1070.0
1958	0.85	0.13	2.26	-0.66	-1.47	-0.55	946.5
1959	-0.27	0.58	1.93	-0.66	-1.43	-0.40	823.0
1960	0.80	1.64	0.65	-0.65	-1.40	-0.26	802.7
1961	-1.51	0.07	1.86	-0.65	-1.36	-0.12	782.5
1962	-1.19	0.37	1.09	-0.65	-1.33	0.02	762.2
1963	-1.23	-0.93	1.05	-0.64	-1.29	0.16	741.9
1964	0.14	1.19	0.94	-0.64	-1.25	0.30	721.6
1965	-1.33	-0.03	-0.16	-0.64	-1.22	0.44	701.4
1966	-0.64	0.33	1.32	-0.63	-1.13	0.45	681.1
1967	-2.13	1.41	-0.03	-0.62	-1.04	0.46	660.8
1968	-2.43	0.41	-0.67	-0.62	-0.95	0.47	640.5
1969	0.67	2.30	0.44	-0.61	-0.86	0.47	620.3
1970	-0.65	1.03	1.03	-0.61	-0.78	0.48	600.0
1971	-0.92	0.04	0.01	-0.61	-0.58	0.59	583.6
1972	-0.26	1.37	0.83	-0.62	-0.39	0.70	567.2
1973	-0.02	-0.21	1.08	-0.62	-0.19	0.81	550.8
1974	-0.86	1.15	-0.06	-0.63	0.00	0.92	534.4
1975	-0.66	0.36	-1.37	-0.63	0.20	1.03	518.0
1976	-0.17	0.98	-1.03	-0.63	0.45	1.08	518.4
1977	0.04	0.37	-0.76	-0.63	0.69	1.13	518.8
1978	0.11	-0.33	0.27	-0.63	0.94	1.18	519.2
1979	0.29	0.87	-1.82	-0.63	1.15	1.22	519.6
1980	0.33	-0.18	-0.40	-0.64	1.37	1.27	520.0
1981	0.09	0.28	0.22	-0.59	1.25	0.97	528.0
1982	-0.44	-1.22	-0.03	-0.55	1.13	0.66	536.0
1983	-0.10	-1.47	1.05	-0.50	1.01	0.36	544.0
1984	-0.04	1.12	-1.08	-0.46	0.90	0.06	552.0
1985	-0.54	0.68	-0.92	-0.41	0.78	-0.25	560.0
1986	0.26	1.07	-0.40	-0.38	0.84	-0.21	555.2
1987	1.84	0.44	0.34	-0.34	0.91	-0.18	550.4
1988	1.48	0.58	0.17	-0.31	0.97	-0.15	545.6
1989	0.63	-0.17	-0.65	-0.27	1.04	-0.11	540.8
1990	0.56	-0.95	0.78	-0.24	1.11	-0.08	536.0
1991	-0.11	-0.68	-0.94	-0.13	1.04	-0.20	524.0
1992	1.78	0.55	-1.56	-0.02	0.97	-0.31	512.0
1993	2.16	1.64	-1.06	0.09	0.91	-0.42	500.0
1994	1.38	0.42	-0.06	0.20	0.84	-0.54	488.0
1995	0.28	0.15	0.38	0.31	0.77	-0.65	476.0

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1996	0.23	0.64	0.07	0.40	0.93	-0.62	510.4
1997	-0.82	-1.66	-0.61	0.43	0.86	-0.82	544.8
1998	1.18	-0.82	-0.53	0.49	1.23	-0.82	579.2
1999	0.88	-0.99	1.16	0.48	1.22	-1.00	613.6
2000	0.08	-0.69	0.21	0.60	0.92	-1.14	648.0
2001	0.67	-1.10	1.86	0.69	0.75	-1.28	591.0
2002	1.53	-1.26	1.50	0.79	0.46	-1.25	805.0
2003	1.31	-0.47	-0.76	0.98	-0.07	-1.46	915.0
2004	0.95	-0.81	-0.39	1.10	-0.17	-1.48	872.0
2005	0.02	-0.50	-0.84	1.39	-0.43	-1.49	821.0
2006	-0.07	-1.90	-0.77	1.61	-0.62	-1.62	706.0
2007	0.60	-1.94	-0.07	2.01	-0.93	-0.96	636.0
2008	-0.78	-1.79	-0.94	2.43	-0.84	-0.53	602.0
2009	-0.22	-1.81	-1.05	2.75	-0.53	2.30	515.0
2010	-0.15	-0.74	-1.10	4.01	-0.76	3.87	428.0

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