



KMA CLIMATE CHARACTERISTICS BRIEFING

(6 pages total)

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August and Summer (Jun.-Aug.) 2010 Climate

- ◇ The mean (26.8°C) and mean minimum temperatures (23.8°C) of August were the highest value on record since 1973, and the number of rainfall days (18.7 days) for August was the highest for the same period.
- ◇ The mean minimum temperatures (21.1°C) for summer 2010 were the highest values on record since 1973, and the rainfall days (44.2 days) for summer 2010 were the fourth highest for the same period.

- The climate characteristics of August and summer (June through August) 2010 and their long-term trends are analyzed based on data from 60 meteorological stations in Korea for the period of 1973-2010 (1908-2010 for Seoul).
- **The climatological characteristics of August 2010 were as follows:**
 - For Korea (nationwide):
 - The mean (26.8°C) and mean minimum temperatures (23.8°C) were 1.8°C and 2.5°C higher than normal, respectively, making August 2010 the warmest on record since 1973, and the mean maximum (31.0°C) was 1.4°C higher than normal (tied for highest value with 1994).
 - The precipitation amount (374.5 mm) was 109.5 mm higher than normal. The average number of rainfall days (18.7 days) increased by 6.1 days compared to normal, and is the highest on record since 1973.
 - For Seoul:
 - The mean minimum temperature (23.8°C) was 1.7°C higher than normal, the fourth highest value on record since 1908 (1st : 24.4°C in 1994; 2nd : 24.1°C in 1967; 3rd: 23.9°C in 2006; 4th: 2007 and 2010), and the mean (26.5°C) and mean maximum temperatures (30.0°C) were 1.1°C and 0.5°C higher than normal, respectively.
 - The precipitation amount (598.7 mm) was 250.7 mm higher than normal. The average number of rainfall days (24.0 days) increased by 10.2 days compared to normal, and is the highest value on record since 1908.

□ **The climatological characteristics of summer 2010 (June-August) were as follows:**

○ For Korea (nationwide):

- The mean (24.8°C) and maximum temperatures (29.4°C) were 1.3°C and 1.2°C higher than normal, respectively, making summer 2010 the second warmest on record since 1973 (mean temp. 1st: 25.3°C in 1994; max. temp. 1st: 30.5°C in 1994, 2nd: 1978 and 2010), and the mean minimum (21.1°C) was 1.5°C higher than normal, the highest value for the same period.
- The precipitation amount (710.0 mm) was 10.3 mm higher than normal. The average number of rainfall days (44.2 days) increased by 7.4 days compared to normal and is the fourth highest value on record since 1973 (1st: 47.8 days in 1998; 2nd: 47.2 days in 2003; 3rd: 46.2 days in 1980).

○ For Seoul:

- The mean (25.2°C) and minimum temperatures (22.1°C) were 1.1°C and 1.5°C higher than normal, the fifth (1st: 26.3°C in 1994; 2nd: 25.6°C in 2000; 3rd: 25.5°C in 1997; 4th: 25.3°C in 1939) and second (1st: 22.7°C in 1994) highest values on record since 1908, respectively. The mean minimum temperature (29.2°C) was 0.8°C higher than normal.
- The precipitation amount (965.5 mm) was 156.3 mm higher than normal. The average number of rainfall days (51 days) increased by 11.7 days compared to normal, and is the fifth highest value on record since 1908 (1st: 54 days in 1961; 2nd: 53 days in 1990; 3rd: 52 days in 1934 and 2003).

□ **Long-term August and summertime climate trends**

- The mean temperatures for August and summer 2010 in Korea were 0.4°C and 0.2°C higher compared with the 1970's, respectively. The minimum temperatures for the 2000's were 0.7°C (August) and 0.5°C (summer) higher compared with the corresponding values for the 1970's, exhibiting an upward trend.
- The precipitation amounts for August and summer 2010 in Korea were 26.5% and 24.1% higher than the corresponding values for the 1970's.

※ Normal: 30-year (1971-2000) average.

※ National average: Average of values collected from 60 meteorological stations since 1973.

※ The analyzed data for Seoul date back to 1908.

※ 1920's: Average from 1921 to 1930

※ 1970's: Average from 1973 (1971 for Seoul) to 1980

※ 2000's: Average from 2001 to 2010

Appendix 1. August Climate Trends

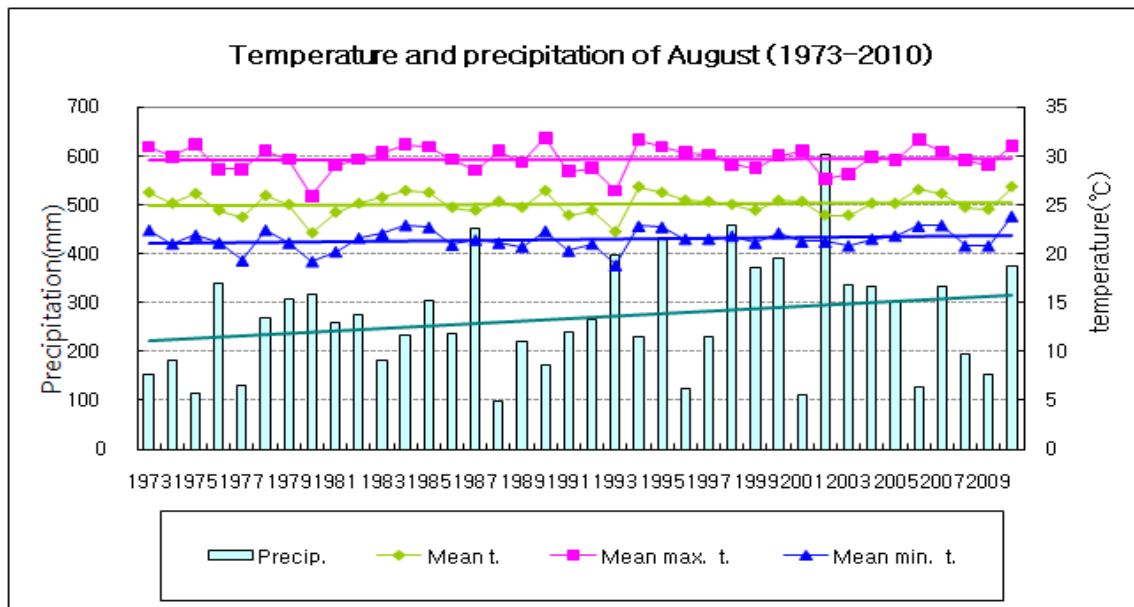


Fig. 1. Temperatures (mean, mean maximum, and mean minimum) and precipitation for the Republic of Korea (1973-2010)

□ August averages of meteorological elements for Korea (1973~2010)

Elements	August 2010 (a)	Normals for August (1971-2000) (b)	a - b	Rank since 1973 (up to 5th)
Mean temperature (°C)	26.8	25.0	1.8	1st
Mean max. temp. (°C)	31.0	29.6	1.4	-
Mean min. temp. (°C)	23.8	21.3	2.5	1st
Precipitation amount (mm)	374.5	265.0	109.5(141.3%)	-
Rainfall days	18.7	12.6	6.1	1st
Days with precip. greater than 30mm/hour	1.5	0.7	0.8	2nd
Days with precip. greater than 80mm/day	0.9	0.7	0.2	-
Days with max. temp. $\geq 30^{\circ}\text{C}$	21.2	15.7	5.5	-
Days with min. temp. $\geq 25^{\circ}\text{C}$	7.7	2.0	5.7	1st
Sunshine duration (hr)	145.4	185.6	-40.2 (78.3%)	-

□ August averages of meteorological elements for Korea by decade (1973-2010)

Decade	Mean temp. (°C)	Mean max temp (°C)	Mean min. temp (°C)	Precip. (mm)	Rainfall days	Days with precip. $\geq 30\text{mm/h}$	Days with precip. $\geq 80\text{mm/d}$	Days with max. temp. $\geq 30^{\circ}\text{C}$	Days with min. temp. $\geq 25^{\circ}\text{C}$	Sunshine duration (hr)
1973-1980 (a)	24.8	29.4	21.1	225.9	11.8	0.5	0.6	15.1	1.6	193.7
1981-1990 (b)	25.3	30.1	21.6	243.1	12.2	0.6	0.6	17.0	1.8	192.9
1991-2000 (c)	24.9	29.4	21.4	313.4	13.5	0.9	0.9	14.9	2.5	171.8
2001-2010 (d)	25.2	29.7	21.8	285.7	14.3	0.8	0.7	16.2	3.0	159.4
d - a	0.4	0.3	0.7	59.8	2.5	0.3	0.1	1.1	1.4	-34.3
d - b	-0.1	-0.4	0.2	42.6	2.1	0.2	0.1	-0.8	1.2	-33.5
d - c	0.3	0.3	0.4	-27.7	0.8	-0.1	-0.2	1.3	0.5	-12.4

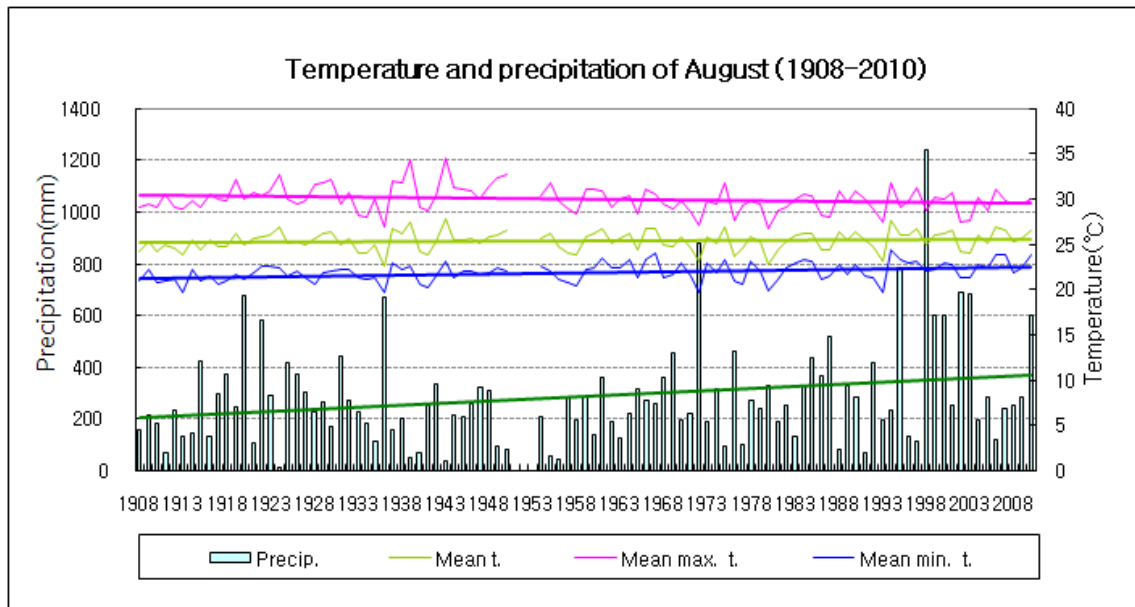


Fig. 2. Temperatures (mean, mean maximum, and mean minimum) and precipitation for Seoul (1908-2010)

□ August averages of meteorological elements for Seoul (1908-2010)

Elements	August 2010 (a)	Normals for August (1971-2000)(b)	a - b	Rank since 1973 (up to 5th)
Mean temperature (°C)	26.5	25.4	1.1	-
Mean max. temp. (°C)	30.0	29.5	0.5	-
Mean min. temp. (°C)	23.8	22.1	1.7	4th
Precipitation amount (mm)	598.7	348.0	250.7(172.0%)	-
Rainfall days	24	13.8	10.2	1st
Days with precip. greater than 30mm/hour	4	1.1	2.9	2nd
Days with precip. greater than 80mm/day	3	1.1	1.9	4th
Days with max. temp. $\geq 30^{\circ}\text{C}$	17	14.9	2.1	-
Days with min. temp. $\geq 25^{\circ}\text{C}$	10	3.2	6.8	4th
Sunshine duration (hr)	96.5	155.3	-58.8(62.1%)	-

□ August averages of meteorological elements for Seoul by decade (1973-2010)

Decade	Mean temp. (°C)	Mean max temp (°C)	Mean min. temp (°C)	Precip. (mm)	Rainfall days	Days with precip. $\geq 30\text{mm/h}$	Days with precip. $\geq 80\text{mm/d}$	Days with max. temp. $\geq 30^{\circ}\text{C}$	Days with min. temp. $\geq 25^{\circ}\text{C}$	Sunshine duration (hr)
1911-1920	25.0	30.0	21.1	274.5	12.4	-	0.9	17.0	0.3	227.5
1921-1930	25.8	31.0	21.9	275.8	13.2	0.1	1.0	19.8	1.8	218.7
1931-1940	25.1	30.1	21.7	239.5	15.0	0.0	0.5	16.0	1.1	186.8
1941-1950	25.7	31.4	21.9	212.4	12.2	0.1	0.6	21.6	1.5	239.7
1954-1960	25.2	30.2	21.7	174.0	11.0	0.3	0.3	17.9	1.1	239.7
1961-1970	25.7	29.9	22.6	276.8	14.9	0.7	0.5	16.9	2.7	145.0
1971-1980 (a)	24.8	29.0	21.6	311.2	13.4	0.6	1.0	12.9	1.5	136.7
1981-1990	25.6	29.7	22.3	293.7	14.2	0.9	0.7	15.9	3.3	167.0
1991-2000	25.7	29.8	22.4	439.1	13.9	1.7	1.7	15.8	4.9	162.3
2001-2010 (b)	25.7	29.5	22.6	359.7	15.8	1.3	1.1	14.9	5.8	128.2
b - a	0.9	0.5	1.0	48.5	2.4	0.7	0.1	2.0	4.3	-8.5

Appendix 2. Summer Climate Trends

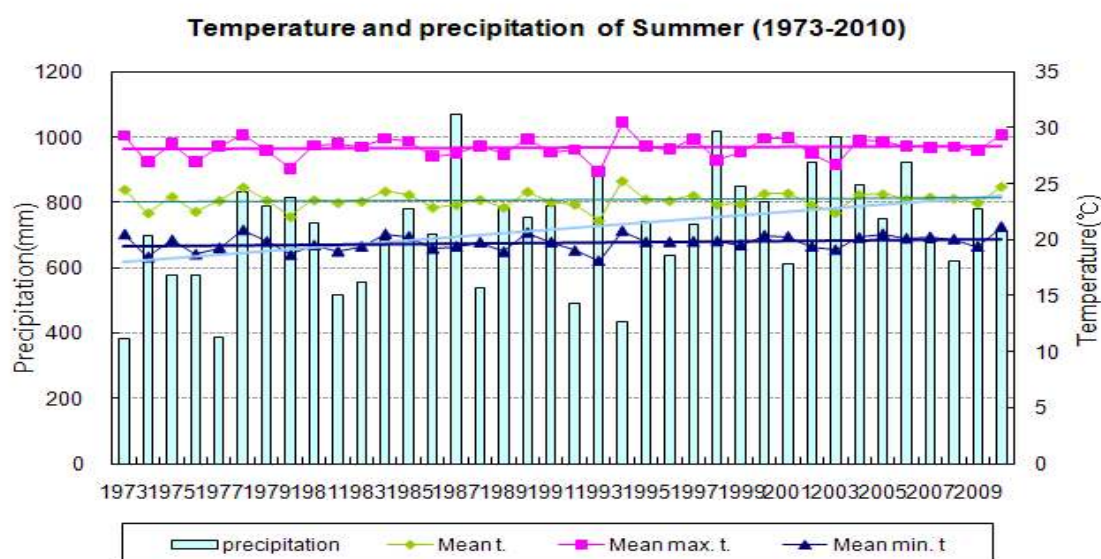


Fig. 1. Summer temperatures (mean, mean maximum, and mean minimum) and precipitation for the Republic of Korea (1973-2010)

□ Summer average values of meteorological elements for Korea (1973-2010)

Elements	August 2010 (a)	Normals for August (1971-2000) (b)	a - b	Rank since 1973 (up to 5th)
Mean temperature (°C)	24.8	23.5	1.3	2nd
Mean max. temp. (°C)	29.4	28.2	1.2	2nd
Mean min. temp. (°C)	21.1	19.6	1.5	1st
Precipitation amount (mm)	710.0	699.7	10.3 (101.5%)	-
Rainfall days	44.2	36.8	7.4	4th
Days with precip. greater than 30mm/hour	2.2	1.4	0.8	3rd
Days with precip. greater than 80mm/day	1.8	1.6	0.2	-
Days with max. temp. $\geq 30^{\circ}\text{C}$	44.3	32.3	12.0	4th
Days with min. temp. $\geq 25^{\circ}\text{C}$	10.0	3.7	6.3	2nd
Sunshine duration (hr)	464.4	533.8	-69.4 (87.0%)	-

□ Summer average values of meteorological elements by decade (1973-2010)

Decade	Mean temp. (°C)	Mean max temp (°C)	Mean min. temp (°C)	Precip. (mm)	Rainfall days	Days with precip. $\geq 30\text{mm/h}$	Days with precip. $\geq 80\text{mm/d}$	Days with max. temp. $\geq 30^{\circ}\text{C}$	Days with min. temp. $\geq 25^{\circ}\text{C}$	Sunshine duration (hr)
1973-1980 (a)	23.4	28.0	19.5	632.1	37.1	1.1	1.3	30.7	2.9	551.6
1981-1990 (b)	23.6	28.3	19.7	712.2	36.5	1.3	1.6	33.7	3.1	544.1
1991-2000 (c)	23.5	28.2	19.7	737.2	36.7	1.6	1.9	32.3	4.8	509.1
2001-2010 (d)	23.6	28.3	20.0	784.7	40.2	1.9	2.0	33.6	4.7	457.4
d - a	0.2	0.3	0.5	152.6	3.1	0.8	0.7	2.9	1.8	-95.9
d - b	0.0	0.0	0.3	72.5	3.7	0.6	0.4	-0.1	1.6	-88.4
d - c	0.1	0.1	0.3	47.5	3.5	0.3	0.1	1.3	-0.1	-53.4

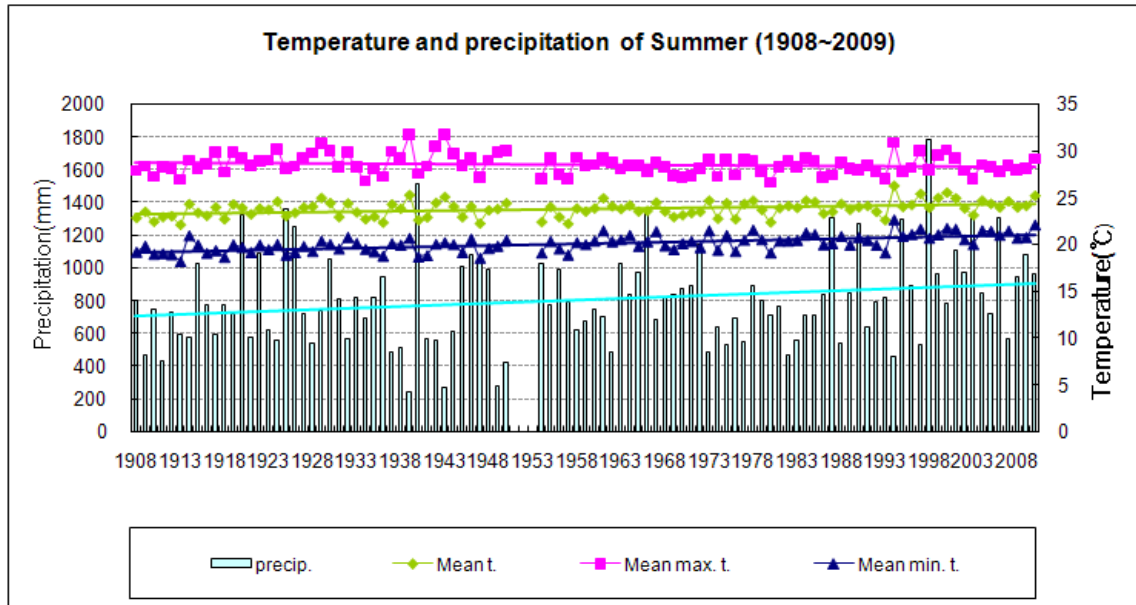


Fig. 2. Summer temperatures (mean, mean maximum, and mean minimum) and precipitation for Seoul (1908-2010)

☐ Summer average values of meteorological elements for Seoul (1908-2010)

Elements	Summer 2010 (a)	Normals for summer (1971-2000)(b)	a - b	Rank since 1973 (up to 5th)
Mean temperature (°C)	25.2	24.1	1.1	5th
Mean max. temp. (°C)	29.2	28.4	0.8	-
Mean min. temp. (°C)	22.1	20.6	1.5	2nd
Precipitation amount (mm)	965.5	809.2	156.3 (119.3%)	-
Rainfall days	51	39.3	11.7	5th
Days with precip. greater than 30mm/hour	4	1.9	2.1	-
Days with precip. greater than 80mm/day	4	2.2	1.8	-
Days with max. temp. $\geq 30^{\circ}\text{C}$	40	30.1	9.9	-
Days with min. temp. $\geq 25^{\circ}\text{C}$	14	6.1	7.9	4th
Sunshine duration (hr)	389.3	473.9	-84.6 (82.1%)	-

☐ Summer averages of met. elements for Seoul by decade (1911-2010)

Decade	Mean temp. (°C)	Mean max. temp (°C)	Mean min. temp (°C)	Precip. (mm)	Rainfall days	Days with precip. ($\geq 30\text{mm/h}$)	Days with precip. ($\geq 80\text{mm/d}$)	Days with max. temp. ($\geq 30^{\circ}\text{C}$)	Days with min. temp. ($\geq 25^{\circ}\text{C}$)	Sunshine duration (hr)
1911-1920	23.4	28.6	19.4	753.4	39.0	0.0	2.0	33.2	0.9	659.4
1921-1930	23.9	29.3	19.6	851.0	38.7	0.1	2.7	40.0	2.3	646.6
1931-1940	23.5	28.7	19.7	739.6	41.3	0.0	1.6	34.1	2.3	590.6
1941-1950	23.8	29.4	19.7	682.1	39.5	0.1	1.4	43.5	2.1	682.0
1954-1960	23.3	28.2	19.8	803.6	42.1	1.4	1.7	32.4	1.7	682.0
1961-1970	23.8	28.2	20.4	857.7	44.1	2.8	2.2	30.9	4.3	452.8
1971-1980 (a)	23.7	28.1	20.3	732.4	39.5	1.2	1.6	26.8	4.3	423.3
1981-1990	24.0	28.3	20.5	800.4	40.3	1.8	2.1	28.9	4.6	507.2
1991-2000	24.5	28.8	20.9	894.8	38.1	2.8	2.8	34.6	9.4	491.1
2001-2010 (b)	24.3	28.3	21.1	981.2	44.0	3.2	3.0	30.0	7.7	365.4
b - a	0.6	0.2	0.8	248.8	4.5	2.0	1.4	3.2	3.4	-57.9