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| OWER KOREA | Contact | LEE，Jae－Won |
| 氣象廳 <br> （total 4 pages） | Phone／email | ＋82－2－2181－0884／ <br> kghyun＠korea．kr |
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## July 2016 Climate Summary

The nationwide mean temperature $\left(25.4^{\circ} \mathrm{C}\right)$ in July 2016 was $0.9^{\circ} \mathrm{C}$ above normal．The nationwide－average of precipitation（ 299.8 mm ）was $104.1 \%$ of normal．
$\square$ Climate features and long－term trends in July 2016 were analyzed 45 meteorological stations throughout Korea（national average）during 1973－2016 （1908－2016 for Seoul）．
※ Normal：Average value of climatic element data collected from 1981 to 2010
$\square$ The climatic characteristics in July 2016
o Korea（as a whole），
－The mean temperature $\left(25.4^{\circ} \mathrm{C}\right)$ ，the mean maximum temperature $\left(29.7^{\circ} \mathrm{C}\right)$ and the mean minimum temperature $\left(22.0^{\circ} \mathrm{C}\right)$ were $0.9^{\circ} \mathrm{C}, 0.9^{\circ} \mathrm{C}, 0.9^{\circ} \mathrm{C}$ above normal，respectively．
－A nationally－averaged precipitation was 299.8 mm ，which was $104.1 \%$ of normal． The number of rainy days was 13.8 ，which was 0.6 days less than normal．
－The total number of hours of sunshine was 178.3 ，which was $120.6 \%$ of normal．
o Seoul，
－The mean temperature $\left(26.2^{\circ} \mathrm{C}\right)$ ，the mean maximum temperature $\left(29.8^{\circ} \mathrm{C}\right)$ and the mean minimum temperature $\left(23.3^{\circ} \mathrm{C}\right)$ were $1.3^{\circ} \mathrm{C}, 1.2^{\circ} \mathrm{C}, 1.4^{\circ} \mathrm{C}$ above normal，respectively．
－The amount of precipitation was 358.2 mm ，which was $90.8 \%$ of normal．
－The number of rainy days was 17.0 ，which was 0.7 days less than normal．
－The total number of hours of sunshine was 160.4 ，which was $133.7 \%$ of normal．

## Long-term1) trend in July 2016 climate

o Korea (as a whole),

- The national mean temperatures in July during the 2000s (2001-2010) was $0.1^{\circ} \mathrm{C}$ less that of in the 1970s (1973-1980).
- The nationwide-average of precipitation in July during the 2000 s was 111.1 mm more than that of in the 1970s.
- The number of rainy days in July during the 2000 s was 2.2 days more than that of in the 1970s.
- The total sunshine hours in July during the 2000 s was 41.5 hours less than that of in the 1970s.
o Seoul,
- The mean temperatures in July during the 2000s (2001-2010) was $0.1^{\circ} \mathrm{C}$ above that of in the 1970s (1971-1980).
- The precipitation in July during the 2000 s was 200.4 mm more than that of in the 1970s.
- The number of rainy days in July during the 2000 s was 2.4 days more than that of in the 1970s.
- The total sunshine hours in July during the 2000s was 31.9 hours less than that of in the 1970s.


## Appendix 1 Climate features of July 2016 (Nationwide)



Fig 1. Temperatures (mean, mean maximum and mean minimum) and precipitation in South Korea during July (1973-2016).
$\square$ The nationwide average value of meteorological element during July (1973-2016)

| Elements <br> (whole country) | July <br> 2016(a) | July <br> 2015(b) | Normals of <br> July <br> $(1981-2010)(\mathrm{c})$ | a-b | a-c | Rank since <br> 1973 <br> (within 5th) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Mean temperature ( ${ }^{\circ} \mathrm{C}$ ) | 25.4 | 24.4 | 24.5 | 1.0 | 0.9 |  |
| Mean maximum temp. $\left({ }^{\circ} \mathrm{C}\right)$ | 29.7 | 28.7 | 28.8 | 1.0 | 0.9 |  |
| Mean minimum temp. ( $\left.{ }^{\circ} \mathrm{C}\right)$ | 22.0 | 20.9 | 21.1 | 1.1 | 0.9 |  |
| Precipitation (mm) | 299.8 | 180.3 | 289.7 | $119.5(190.0 \%)$ | $10.1(104.1 \%)$ |  |
| Days of rain (day) | 13.8 | 14.2 | 14.4 | -0.4 | -0.6 |  |
| Sunshine duration (hour) | 178.3 | 174.0 | 147.9 | $4.3(102.5 \%)$ | $30.4(120.6 \%)$ |  |
| Mean cloud amount (1/10) | 6.8 | 7.0 | 7.1 | -0.2 | -0.3 |  |
| Precipitation more than <br> $80 \mathrm{~mm} /$ day(day) | 0.7 | 0.3 | 0.7 | 0.4 | 0.0 |  |
| Days of maximum <br> temperature more than <br> $33{ }^{\circ} \mathrm{C}($ day) | 5.5 | 3.2 | 3.9 | 2.3 | 1.6 |  |

The nationwide average value of meteorological element during July in each decade (1973-2010)

| Year | Mean <br> temp. <br> $\left({ }^{\circ} \mathrm{C}\right)$ | Mean <br> max. <br> temp. <br> $\left({ }^{\circ} \mathrm{C}\right)$ | Mean <br> min. <br> temp. <br> $\left({ }^{\circ} \mathrm{C}\right)$ | Prep. <br> $(\mathrm{mm})$ | Days of <br> rain <br> (day) | Sunshine <br> duration <br> (hour) | Mean cloud <br> amount <br> $(1 / 10)$ | Precipitation <br> more than <br> 80mm/day <br> (day) | Days of <br> maximum <br> temperature <br> more than <br> $33{ }^{\circ} \mathrm{C}($ day $)$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1973-1980(a) | 24.5 | 28.8 | 21.0 | 228.0 | 13.7 | 165.3 | 7.0 | 0.4 | 4.1 |
| $1981-1990(\mathrm{~b})$ | 24.3 | 28.6 | 20.9 | 287.5 | 14.3 | 157.1 | 7.1 | 0.6 | 3.6 |
| $1991-2000(\mathrm{c})$ | 24.7 | 29.1 | 21.1 | 242.5 | 12.9 | 163.0 | 6.8 | 0.6 | 4.7 |
| $2001-2010(\mathrm{~d})$ | 24.4 | 28.6 | 21.2 | 339.1 | 15.9 | 123.8 | 7.3 | 0.9 | 3.4 |
| $2016(\mathrm{e})$ | 25.4 | 29.7 | 22.0 | 299.8 | 13.8 | 178.3 | 6.8 | 0.7 | 5.5 |
| d-a | -0.1 | -0.2 | 0.2 | 111.1 | 2.2 | -41.5 | 0.3 | 0.5 | -0.7 |
| d-b | 0.1 | 0.0 | 0.3 | 51.6 | 1.6 | -33.3 | 0.2 | 0.3 | -0.2 |
| d-c | -0.3 | -0.5 | 0.1 | 96.6 | 3.0 | -39.2 | 0.5 | 0.3 | -1.3 |
| e-d | 1.0 | 1.1 | 0.8 | -39.3 | -2.1 | 54.5 | -0.5 | -0.2 | 2.1 |

## Appendix 2 Climate features of July 2016 (Seoul)



Fig 2. Temperatures (mean, mean maximum and mean minimum) and precipitation in Seoul during July (1908-2016).
$\square$ The average value of meteorological element during June in Seoul(1908-2016)

| Elements (Seoul) | July <br> 2016(a) | July <br> 2015(b) | Normals of <br> July <br> $(1981-2010)(\mathrm{c})$ | a-b | a-c | Rank since <br> 1908 <br> (within 5th) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Mean temperature ( ${ }^{\circ} \mathrm{C}$ ) | 26.2 | 25.8 | 24.9 | 0.4 | 1.3 |  |
| Mean maximum temp. $\left({ }^{\circ} \mathrm{C}\right)$ | 29.8 | 30.0 | 28.6 | -0.2 | 1.2 |  |
| Mean minimum temp. $\left({ }^{\circ} \mathrm{C}\right)$ | 23.3 | 22.6 | 21.9 | 0.7 | 1.4 | the 4th highest |
| Precipitation (mm) | 358.2 | 226.0 | 394.7 | $132.2(158.5 \%)$ | $-36.5(90.8 \%)$ |  |
| Days of rain (day) | 17.0 | 14.0 | 16.3 | 3.0 | 0.7 |  |
| Sunshine duration (hour) | 160.4 | 176.1 | 120.0 | $-15.7(91.1 \%)$ | $40.4(133.7 \%)$ |  |
| Mean cloud amount (1/10) | 7.2 | 7.0 | 7.4 | 0.2 | -0.2 |  |
| Precipitation more than <br> $80 \mathrm{~mm} /$ day(day) | 2.0 | 1.0 | 1.2 | 1.0 | 0.8 |  |
| Days of maximum <br> temperature more than <br> $33{ }^{\circ} \mathrm{C}($ day) | 4.0 | 4.0 | 2.2 | 0.0 | 1.8 |  |

The average value of meteorological element during July in Seoul in each decade (1911-2010)

| Year | Mean temp. ( ${ }^{\circ} \mathrm{C}$ ) | Mean max. temp. ( ${ }^{\circ} \mathrm{C}$ ) | Mean min. temp. ( ${ }^{\circ} \mathrm{C}$ ) | Prep. <br> (mm) | Days of rain (day) | Sunshine duration (hour) | Mean cloud amount (1/10) | Precipitation more than $80 \mathrm{~mm} /$ day (day) | Days of maximum temperature more than $33^{\circ} \mathrm{C}$ (day) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1911-1920(a) | 24.4 | 29.1 | 20.8 | 326.2 | 14.9 | 203.6 | 7.3 | 0.9 | 3.7 |
| 1921-1930 | 24.7 | 29.2 | 21.2 | 477.0 | 17.4 | 169.0 | 8.0 | 1.5 | 3.3 |
| 1931-1940(b) | 24.6 | 29.4 | 21.2 | 385.0 | 16.3 | 182.2 | 7.8 | 1.1 | 5.0 |
| 1941-1949 | 24.6 | 29.9 | 20.9 | 269.9 | 15.9 | 210.4 | 7.5 | 0.2 | 5.3 |
| 1954-1960 | 24.0 | 28.2 | 21.1 | 422.0 | 19.1 | 138.7 | 7.9 | 1.0 | 1.7 |
| 1961-1970 | 24.6 | 28.4 | 21.7 | 446.3 | 18.1 | 114.0 | 8.2 | 1.4 | 2.6 |
| 1971-1980(c) | 24.7 | 28.8 | 21.7 | 288.2 | 15.2 | 114.7 | 7.5 | 0.5 | 2.8 |
| 1981-1990 | 24.6 | 28.4 | 21.5 | 372.8 | 16.5 | 135.0 | 7.6 | 1.1 | 1.8 |
| 1991-2000 | 25.4 | 29.2 | 22.2 | 322.7 | 14.7 | 142.3 | 7.0 | 0.9 | 3.8 |
| 2001-2010(d) | 24.8 | 28.3 | 22.0 | 488.6 | 17.6 | 82.8 | 7.6 | 1.7 | 1.0 |
| 2016(e) | 26.2 | 29.8 | 23.3 | 358.2 | 17.0 | 160.4 | 7.2 | 2.0 | 4.0 |
| d-a | 0.4 | -0.8 | 1.2 | 162.4 | 2.7 | -120.8 | 0.3 | 0.8 | -2.7 |
| d-b | 0.2 | -1.1 | 0.8 | 103.6 | 1.3 | -99.4 | -0.2 | 0.6 | -4.0 |
| d-c | 0.1 | -0.5 | 0.3 | 200.4 | 2.4 | -31.9 | 0.1 | 1.2 | -1.8 |
| e-d | 1.4 | 1.5 | 1.3 | -130.4 | -0.6 | 77.6 | -0.4 | 0.3 | 3.0 |

