

Chapter 1. Monitoring the Weather

Part A

1. By international convention, average values of most climatic elements such as temperature and precipitation are computed from a 30-year period of observation beginning with the first year of a decade. For the first decade of the 21st century, 1971-2000 is the official averaging period. From the mean January temperatures listed by year below for Madison, WI, compute the 30-year mean January temperature (to the nearest tenth of a degree).

Year	Temp. (°F)	Year	Temp. (°F)	Year	Temp. (°F)
1971	9.6	1981	20.5	1991	15.1
1972	12.7	1982	8.0	1992	25.5
1973	23.4	1983	21.4	1993	21.8
1974	19.2	1984	14.8	1994	8.8
1975	21.9	1985	12.2	1995	20.4
1976	15.7	1986	18.2	1996	15.2
1977	3.7	1987	22.6	1997	15.7
1978	10.5	1988	13.8	1998	23.7
1979	6.9	1989	27.6	1999	16.5
1980	17.3	1990	28.6	2000	20.6

2. Isobars are lines plotted on a map joining locations reporting the same air pressure. By convention, isobars are drawn at intervals of 4 mb on a surface weather map. Suppose that in a high (anticyclone), the innermost isobar is labeled 1024 mb. The next outer isobar would be labeled [1020 mb] [1028 mb].

3. The mean daily temperature is the arithmetic average of the day's 24-hr maximum temperature and 24-hr minimum temperature. Compute the daily mean temperature if today's high temperature is 75 °F and the low temperature was 39 °F.

4. On average, 10 inches of freshly fallen snow melt down to 1 inch of liquid water. Using this 10 to 1 ratio, the water equivalent depth of 30 cm of fresh snow is about _____ cm.

5. In the portion of the atmosphere where most clouds occur (the lower 10 km or 6 mi), the air temperature decreases with increasing altitude. Arrange the following clouds by increasing altitude based upon cloud-top temperature: cirrus ($-41\text{ }^{\circ}\text{C}$), stratus ($10\text{ }^{\circ}\text{C}$), altocumulus ($-28\text{ }^{\circ}\text{C}$), cumulus ($6\text{ }^{\circ}\text{C}$).

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