1. Normal Sea Level Pressure and Wind Roses

Atmospheric pressure is the pressure of the stationary atmosphere and the value gained by multiplying the mass of the air on the unit area by the acceleration of its gravity. Atmospheric pressure is widely used in weather forecasts and forms an important indicator.

Atmospheric pressure constantly changes, depending on the meteorological condition. It also varies, depending on the altitude of the observation point. At these two elements of variations in atmospheric pressure are tied in with one another, it would not be possible to indicate a difference in meteorological condition even if the values of pressure observed at different altitudes were compared. To indicate a meteorological condition with accuracy, the value observed at a given point is converted in terms of pressure on the sea surface for use. This converted value is known as pressure reduced to the mean sea level or base level pressure.

The Japan Meteorological Agency observes pressure at four specified times (0000, 0600, 1200 and 1800 hours) a day and regards the mean of the observed values as mean pressure.

The wind is represented in terms of two elements – the direction in which it blows (true wind direction) and its speed (wind speed). Since the wind direction constantly varies, its changes are observed for about one minute before the direction is determined.

The wind rose represents the frequency of wind direction expressed as 10-degree and the frequency in percentage of cases which suggests a situation in which there is no or little wind with the velocity standing at less than 3 knots/hrs (or the base of the wind direction records observed at eight fixed times) of 0000, 0600, 1200, 1800, and 2400 and 2000 hours/days) in a day.

The wind speed is not uniform. Even if strong winds blow continuously, there are many cases in which the winds, when averaged, are not very strong. To indicate the wind speeds, the expressions, such as maximum peak gust, maximum wind speed and mean wind speed, are used, and the average wind speed for measuring each type of velocity is put to use. The Japan Meteorological Agency uses a wind rose to express the wind speed. Since the wind speed is determined with the amount of air which blows off in a prescribed span of time, it is used to measure the mean wind velocity.

The day in which a maximum wind speed of more than 30 meters is registered is an optimal duration of 10 minutes is generally known as a storm day and its value is indicated in the Wind Rose.

To obtain the mean velocity, the daily mean wind speed is computed from the data obtained at various observation points in Japan. The wind rose is used to indicate the mean wind velocity. The wind rose is used to indicate the wind direction.

The annual change in mean wind speed at 10 selected points is indicated in the graph.

2. Representative Weather Maps

The weather map represents the distribution of atmospheric pressure, weather in various places, wind conditions and other elements. It provides information with which to recognize weather conditions at a given point and forecast subsequent changes in weather.

Winter Time (West high, East low): This is the type in which the northwesterly blow across the city of Japan. The typical weather brought about by this weather type is that the day over the Japan Sea side becomes covered with thick clouds bringing snow, whereas on the Pacific Ocean side, the weather is considerably fine and dry. This type makes its appearance in late October at the earliest and lingers around through January till a little beyond the middle of February. Even in April, it sometimes makes its appearance. In this pattern, the weather, which has been spring-like once again gets cold. This is generally known as a return of the cold easterly winds of winter.

Low Pressure Areas (Over the Eastern China Sea): The extratropical cyclone which has generated over the Eastern China Sea advances to the northeast or southeast in the neighborhood of Japan. This type of cyclone, when generated, gets as strong as a small typhoon and gives an impression that a sudden storm has developed because of its swift movement. This type of cyclone makes its appearance in all seasons with the exception of midsummer, and its appearance is particularly frequent in January through April. When this type of cyclone passes over the north coast of Honshu, it sometimes causes freezing in various parts of the Pacific Ocean side.

In a type of weather similar to the above, a cyclone which has generated either in the Eastern China Sea or in the west of the Japan Sea moves over the north of Japan in a northeastern direction. This is known as the Japan Sea Cyclone Type. This type frequently makes its appearance from early winter through early spring. When this type of cyclone violently intrudes upon the Japan Sea in early spring, it carries with it stormy weather and it intrudes upon the Pacific Ocean along the pacific coast of Japan. In these instances, it is known as "Spring cyclone," or "low pressure area over the sea" in Japan.

In some cases, the daily weather map does not show any of these typical patterns of air pressure distribution. Sometimes represents a transitional pattern or a combination of some of these patterns.

The classification and designation of the patterns of atmospheric distribution and the identification of the types of weather maps differ to some extent, depending on the viewpoint.

3. Forecasting the Next Day's Weather

In Japan, there are various types of weather maps prepared from 0500 to 0700 and arranged in the order of their preparation.

The weather symbols used on these maps are partial revisions of those which are generally used in Japan and carried in the weather maps of newspapers. They are not in accord with the international system.

Sources
NORMAL SEA LEVEL PRESSURE
AND WIND ROSES

Mean wind speed

February

April

June

Annual

December

October

August