

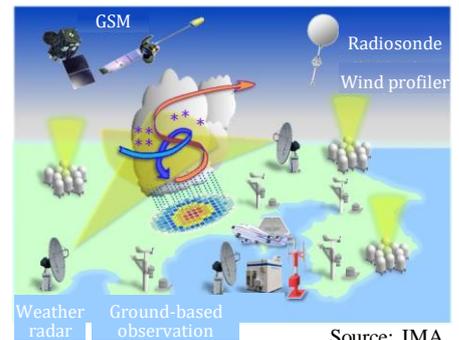


Meteorological Observation

Japan Weather Association has more than seven decades of experience in observing meteorological conditions around the globe. The association supports not only infrastructure projects and research activities by public organizations but also business investments by private entities. We provide the proper observation method for the client requirements.

Meteorological observation

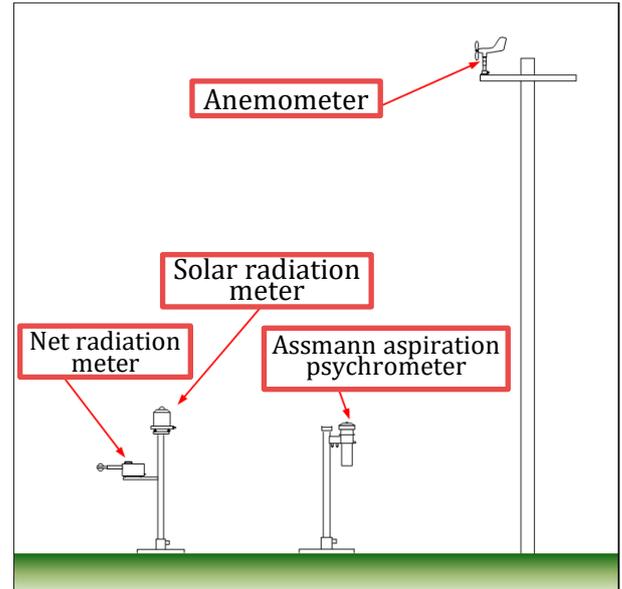
Due to climate change, severe weather phenomena have been observed in many areas including those that never experienced such before. Therefore, the current weather conditions should be evaluated with the proper methods in order to make informed investment decisions. Recently, the advances in meteorological observation methods have made it easy to choose between direct and the remote sensing methods or both. Since meteorological conditions depend on the topographic and climate situation of the project site, appropriate methods should be identified accordingly.



▲ Meteorological observation methods (Image)

Ground-based observation

Any investment or development project requires appropriate Environmental and Social Impact Assessment (ESIA) under the national and international regulations. Ground-based observation is a basic observation method for the forecast and evaluation in ESIA. If meteorological information like wind parameters at the project site is available, the diffusion of air pollutants from stationary or mobile sources can be estimated with air diffusion models. The meteorological elements under this method include; wind direction and speed, air temperature, humidity, solar radiation, and net radiation. In some cases, the amount of liquid precipitation is included.



▲ Ground meteorological observation (Image)



▲ Solar radiation meter and Net radiation meter



▲ Anemometer (Combined arrow feather and a three-cup anemometer)



▲ Assmann aspiration psychrometer

Remote sensing observation

Wind observation

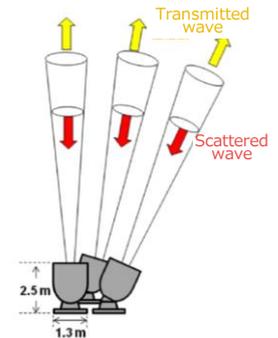
Doppler SODAR, uses sound waves to measure vertical wind speed and direction, is a certificated wind measurement instrument in the meteorological sector through international comparative observation evaluations.

Doppler LiDAR, uses laser with an eye-safe wavelength, is used to obtain wind observation data at a higher level above ground in some construction projects like wind turbines or thermal power plants.

The advantage of using the Doppler SODAR and the Doppler LiDAR is the capability to continuously obtain wind observation data at a higher level above ground with an accuracy comparable to that of the anemometer. Pilot balloon observation for a period of about one week is more cost-effective option than the Doppler LiDAR method.



▲ Doppler SODAR system (Tri-monostatic)



▲ Principle of Doppler SODAR measurement

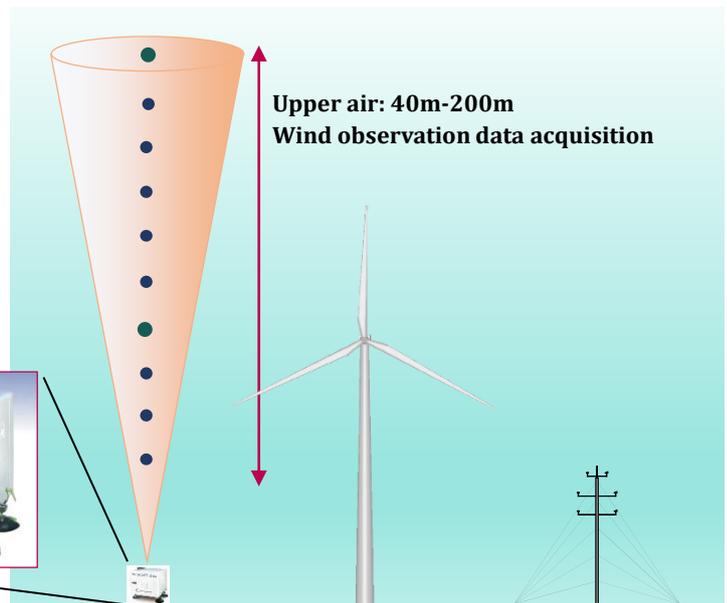


Source: Picture taken by JWA

▲ Pilot balloon observation



Source: Leosphere



Doppler lidar

Windmill

Wind condition observation tower

▲ Doppler LiDAR observation

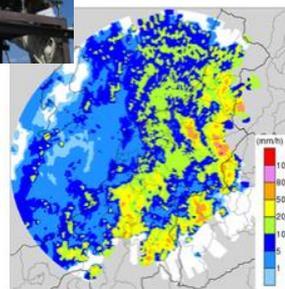
Rain observation

Weather radar is used to obtain rain observation data. Radar should be calibrated by the ground rain information captured by devices like rain gauges. Dual polarization radar can estimate highly accurate precipitation results without calibration using rain gauges.

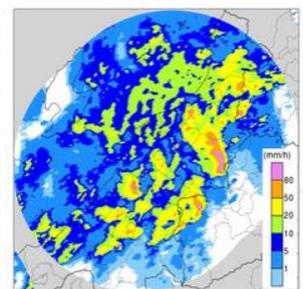
The suitable radar observation sequence for a target phenomenon is essential to monitor with high accuracy. Technical cooperation by Japanese ODA scheme provides such know-how to various countries that are at high risks from tropical cyclone or severe rain.



◀ Doppler Radar (X-band)



Observed by Radar



Forecasted rain 30min ahead

▲ Rain forecasting using Radar data

