Application Note

MaxiMet GMX531/551 – Meteorological Station for Farms

Reference: AN0040



Introduction

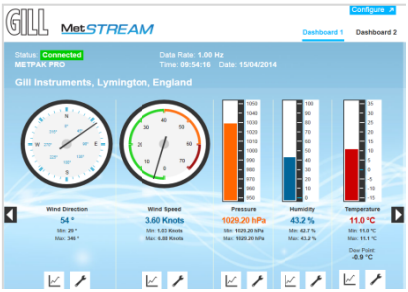
Farmers use weather data directly in many areas during the cycle of any crop they are growing and solar radiation, temperature, and precipitation are the main drivers of crop growth.



Therefore agriculture has always been highly dependent on climate patterns and variations and since the industrial revolution, humans have been changing the global climate by emitting high amounts of greenhouse gases into the atmosphere, resulting in higher global temperatures, affecting hydrological regimes and increasing climatic variability.

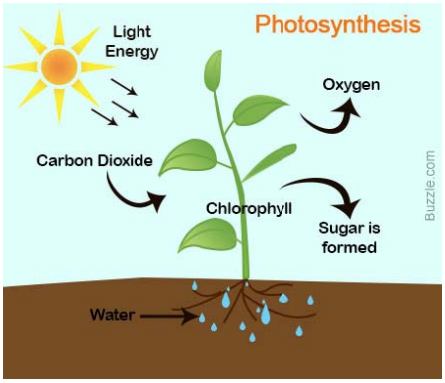
Farmers require a variety of weather data to run their operations, which are directly available from MaxiMet GMX531 with its aerodynamic tipping bucket rain gauge, or the GMX551 which allows users to attach their own 0.2mm tip rain gauge.

MaxiMet GMX531 and GMX551 can also be connected to MetStream (or other web based systems) to provide farmers / growers with direct, real-time data whilst they attend the crops.



Applications

One of the most important factors that influence a plants development is the solar radiation absorbed by crops. The solar radiation brings energy to the metabolic process of the plants with the process of photosynthesis. Farmers can monitor the amount of "sunshine" hours the crops receive and use this data to help with the understanding of the crop growth. Also one of the main factors determining the amount of water in the soil is the rate of evaporation from the soil, which is directly affected by solar radiation. Irrigation solves part of the issue, however, farmers still need to understand the effect of solar radiation in order to fine-tune the amount of irrigation needed, so as not to under or over water their crops.



Relative Humidity is an important factor. The lower the relative humidity, the greater the influence of solar radiation. If the air is very dry, then the soil and plant will lose more water to the air than they would on a more humid day.

Temperature affects the growth of crops, however, crops often have different requirements for effective growth. Warmer temperatures may make many crops grow more quickly, but warmer temperatures could also reduce yields of other crop types. For any particular crop, the effect of increased temperature will depend on the crop's optimal temperature for growth and reproduction. In some areas, warming may benefit the types of crops that are typically planted there. However, if warming exceeds a crop's optimum temperature, yields can decline. Monitoring of temperature is also important for pest control as cold winters tend to kill pests off, however, mild winters can assist pest breeding.

Precipitation is a critical meteorological parameter in farming as all crop growth needs water and the measurement of precipitation aids to assist the farmer along with the irrigation in making sure that the crop receives the minimum amount of water required to enable growth as this helps control the costs for the farmer. Precipitation and specifically the intensity are also of interest for the transfer of diseases from the soil to the plant and transfer to other areas of the plant during heavy precipitation.

Wind data is often used to assist farmers with the efficiency of spraying crops. By monitoring the wind speed farmers can make the decision that high wind speeds would reduce the effectiveness of the spraying as it's difficult to control the application of the pesticides and so spraying can be aborted for a period with lower wind speeds. Wind direction allows the farmer to make sure that the farmer is spraying with the wind allowing control during the application of the pesticides i.e. not leaving any areas unprotected by the pesticides or areas saturated with pesticides.



Installations

MaxiMet GMX531 and GMX551 both provide wind, temperature, relative humidity, pressure, solar and rain data from a single output, compact system and can be installed worldwide with virtually no maintenance as part of weather stations where the data fulfils agricultural needs.