

Hawai'i Mesonet Weather Station Network

A University of Hawai'i (UH) program supported by the National Science Foundation, the Hawai'i Commission on Water Resource Management, and the Honolulu Board of Water Supply. **Principal Investigator: Tom Giambelluca**
Website: <https://www.hawaii.edu/climate-data-portal/hawaii-mesonet/>, Direct inquiries to: rainfall@hawaii.edu

Why these stations are important and how they will help our community

The stations will provide near-real-time data on weather conditions, including rainfall rates, solar radiation, air temperature, humidity, wind speed, soil moisture conditions and other variables that are needed to estimate the rate of evapotranspiration (ET), the amount of water going from the soil and vegetation into the air.

How they work

The stations will record on at 5-minute time interval and provide data to a telemetry module for transmission to our data management portal. The enclosure, most above ground sensors, solar panel, and antenna will be mounted on an 8' tall, 12" triangular base aluminum tower. The rain gauge will be mounted on a separate pole at most stations.

What it takes to install them

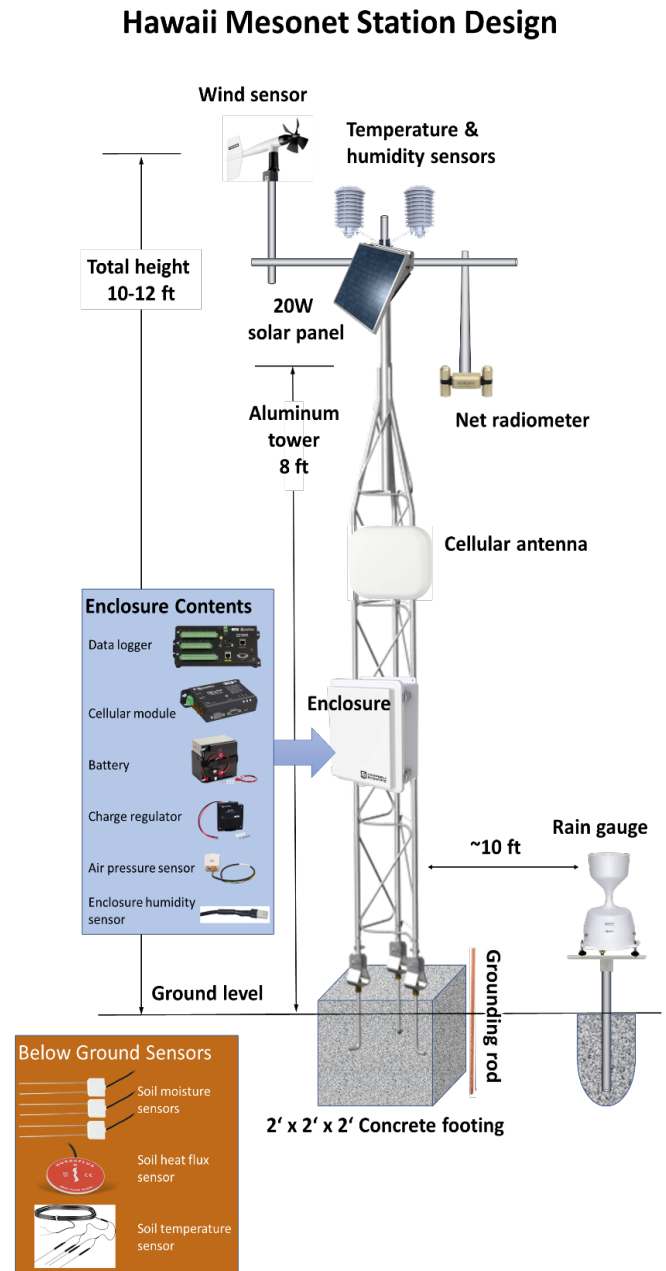
To install each station, we will (1) identify representative sites in areas where no high quality stations exist on each island, (2) obtain community and land owner permission to visit the site, (3) examine each site in person and test cellular signal strength for data telemetry, (4) identify station stewards willing to assist with long-term station maintenance, (5) obtain permission including formal permits, (6) install concrete footing, (8) install tower, sensors, enclosure, solar panel, and antenna; (9) test and troubleshoot any problems.

Long term maintenance plans

To keep stations in good working order, we plan to work in partnership with community members. The UH team will provide technical expertise, training, and guidance to local station stewards, who will conduct routine station maintenance approximately once every 3 months and manage encroaching vegetation to avoid impact to readings. Routine maintenance takes less than an hour and entail cleaning and leveling the rain gauge and the radiometer. If a simple sensor replacement is needed, we will provide detailed instructions and necessary supplies. When more technical issues arise, we will also have on-call technicians to guide station stewards and to attend to more complex tasks, such as diagnosing station malfunctions.

Data dissemination

Providing access to station data and guidance in data interpretation is a major goal of the Hawai'i Mesonet project. We are developing a Hawai'i Mesonet web page to provide public access to near-real-time data from all Mesonet stations. The Hawaii Mesonet web page will be part of the Hawai'i Climate Data Portal (HCDP, <https://www.hawaii.edu/climate-data-portal/>), a state-of-the-art data management system launched in March 2022. The HCDP will take in data from the Hawaii Mesonet stations and all other stations in Hawai'i, automatically check for errors and use the data to produce digital maps of weather patterns. Data will also be pushed to NOAA's National Mesonet program (<https://nationalmesonet.us/>)



Q&A for potential station stewards

Q: Would there be any official easements or other agreements that could encumber the property, or is it something simple (i.e. good will or a simple agreement that we could terminate with advance notice, if needed)?

A: A simple agreement is fine as long as it is understood that we are investing for long-term monitoring. We are not seeking a legally-binding agreement, but we would like to have a good-faith understanding that the site is expected to remain viable for decades. If it is not possible to provide assurances that the station will remain unobstructed and will not have to be moved, then we might have to consider other sites.

Q: Who will be responsible for accessing and maintaining the system and what would be the expectations in terms of frequency of visits, etc.?

A: We will remain the responsible party for the maintenance and operation of the station. However, having help from local station site hosts that are willing to provide assistance with very basic maintenance tasks about 4 times per year as explained in the description, will also be essential to keep these stations viable for decades.

Q: What type of site are you looking for? What are the considerations when you pick a location to set up the station?

A: We look for sites primarily based on the locations that will help fill the gaps on the map of existing weather stations to improve the coverage of our monitoring network (see below). Because we are investing for long-term monitoring, we would like the site to remain viable for decades. In a perfect world, the stations would be located in a flat, open grassy area with good cell phone coverage to make sure measurements are accurate. This is, of course, not possible most of the time. The main concerns would be obstructions to our measurements. We don't want large buildings or tall trees too close that would interfere with the wind sensor and the rain gauge or cast shadows on the solar radiation sensor. We also want to stay away from large paved areas like parking lots, which may affect air temperature and humidity measurements. Large water bodies (lakes, lo's, etc.) can also affect temperature and humidity but are acceptable if they are typical features in that region. We will also need to figure out which type of data transmission works best for the station. This will require us to visit the potential sites to test cell signals and figure out which carrier works best and what type of equipment we need to purchase. If cell phone coverage turns out unreliable, we may use radio or satellite instead. Balancing accessibility, which promotes more frequent ease of maintenance, and security from vandalism and theft of expensive station components is also an important siting concern.

