

WHAT CLOUDS DO TO SUNSHINE

The weather determines how much energy you get from solar panels. WUR meteorologist Wouter Mol wants to figure out that interaction.

Clouds cause big fluctuations in the energy produced by solar panels. Those fluctuations are a problem for energy companies. Wageningen meteorologists are trying to get a better understanding of this issue. PhD candidate Wouter Mol recently carried out the first pilot project on radiation measurements in a field next to the Cabauw meteorological mast. In the tall grass, 25 radiation detectors are arranged in a grid 50x50 metres apart. The small grey boxes about the size of a lunch box measure the intensity of the sunlight 10 times a second. What is more, the devices measure the

entire visible spectrum from 350 to 900 nanometres at 18 different wavelengths.

Nothing gets past the sensors. 'Birds, flies, ants – every little disturbance is captured in the measurements,' explains Mol. So when walking close to a device, he is careful to make sure he doesn't cast a shadow on it. After

'We want to figure out the relationship between the weather and radiation'

all, every reading counts. Mol is one of the PhD students working on meteorologist Chiel van Heerwaarden's Vidi project. This measurement session is

the first pilot, which got delayed by the pandemic.

Mol is able to test his equipment for two weeks, in between scheduled mowing. There is a reason for using the Cabauw site for the measurements; radiation measurements are not much use unless you have additional information about the local area, and there is a lot of equipment surrounding the mast. Mol: 'There are cloud radars, an aerosol meter and a camera that takes photos of the sky once a minute.'

Cloud shadow

All the information about the sky is linked to the radiation measurements. The sun tracker is a particularly important device as it distinguishes between direct and indirect sunlight. Mol: 'Those two components are crucial because they show what part of the radiation comes directly from the sun and what comes via the clouds.' The boxes have GPS so shadows cast by clouds can be tracked to the nearest microsecond thanks to the link with the sensors. The devices were developed by fellow meteorologist Bert Heusinkveld. They are made in house, cheap and effective. Mol points to a commercial device further along. 'The material for our 25 radiation detectors cost as much as that one device.' The fieldwork forms the basis but the eventual aim is to get a better understanding. Mol: 'We want to figure out the relationship between the weather and radiation. That information should also help improve our models so that we can make reliable forecasts in practice too.' RK



Wouter Mol checks one of the radiation detectors. Photo Roelof Kleis