

## WORKSHOP: Reading Rain Radars

### Scenario

If you've watched weather forecasters in action on the TV recently, you'll know that they no longer have to rely on tiny drawings of raindrops to tell us that bad weather is coming. Daily forecasts are a multimedia extravaganza of satellite photographs, animated graphics and computer predictions. The latest weapon in a meteorologist's interactive armoury is the radar picture, brightly hued swirls of colour that sweep across the screen, heralding rain, sleet or even snow. Where do these intriguing images come from? Across the country, a network of weather radars painstakingly tracks clouds and rain as they approach and follows their progress overhead. These radars beam electromagnetic waves towards their targets, and measure the strength and type of signal that bounces back. From this information, they build up detailed colour-coded images showing everything from a light drizzle to a torrential downpour.



At the Chilbolton Observatory in Hampshire stands the biggest weather radar of them all - with a dish measuring 25 metres across, it is the world's largest fully steerable meteorological radar. This radar (pictured on the left) can pick out individual raindrops as far away as Wales and the South Coast. Researchers use this radar and others on the same site to hone the techniques that bring the latest weather pictures to our screens.

In this workshop, you will learn to read images from one of Chilbolton's most sophisticated radars, the 94GHz cloud radar. This radar fires high frequency electromagnetic waves, oscillating 94 billion times a second, towards rain and ice drifting kilometres above the ground. From the signals that are reflected back, the radar builds up incredibly detailed images of everything that passes overhead, from ice to rainstorms and even clouds of insects.

### The Equipment

Each group will need:

- A set of information about weather radars.
- A set of information about different types of clouds.
- A set of descriptions of features identified by the radar, for example, stratocumulus cloud, frontal rain, insects.
- A set of images from the radar showing these features.
- A set of 24-hour radar scans showing the weather at Chilbolton in February 2002.

## The Task

The aim of this workshop is to learn to read some real images taken by the cloud radar at Chilbolton in Hampshire. The first part of the task involves matching up radar images of features such as clouds, rain and insects with their description. Once you have 'got your eye in', you can move on to looking at the real 24 hour radar scans used by scientists to investigate the weather over Chilbolton.

1. Read the information about weather radars. This will give you an idea of what the different colours on the images mean, and what sort of features in the sky send strong signals back to the radar. For example, large particles return a stronger signal than small particles and rain returns a more powerful signal than ice.

2. Look at the information about clouds. This gives you some background information about what different types of cloud are called and how they form.

3. Choose one of the radar images and try to match it to the description of a weather feature. Look for clues on how to pick out more obvious features, such as rain, and then move on to the more difficult ones, such as insects. You might like to bear some of these points in mind:

- Radar pictures of rain reach right down to the ground; images of clouds will finish at a certain height characteristic of that variety of cloud eg cirrus clouds occur high up, stratocumulus much lower down. So first pick out all the images that you think might show rain, then read the descriptions to choose which type of rain each one represents eg frontal rain, convective rain, stratocumulus with drizzle.
- For cloud images, check to see what height the cloud should appear and look for features around that height. Is the cloud made of small or large particles? Large particles return a stronger signal than small particles. Is the cloud made of ice or water? Water returns a stronger signal than ice.
- Ignore the faint blue section right at the bottom of each image - this is a feature of the radar, not the sky!

4. Once you've matched all the weather features with their descriptions, see if you can spot any of them in the 24-hour scans. Try choosing a scan for a particular day and working out a weather forecast for that 24-hour period, describing what happened. For example, did it rain, how long for and what sort of clouds passed overhead?