

Astronomy Talk 16th January 2024

Monitoring the Environment from Space

This was another Zoom only talk, given by Dr Robin Wilson. 52 attended.

Robin started by showing what using the RGB colour palette we can identify many things from their “spectral signatures.” Landsat records from the early 1970s use many bands and we can look at change over time.

The Normalized difference vegetation index (NDVI), which is $(\text{near infra-red} - \text{red}) / (\text{near I-R} + \text{red})$, gives us detailed information about how healthy plants are. The greening of seasons clearly shows the effects of global warming: spring has come 20 days earlier in 20 years.

Aerial surveys have hundreds of wavelength sensors, and this can identify soil and rock types: useful for geologists. It can also tell us various things in the air, e.g. the constituents of aerosols such as PM2.5 pollution – a significant problem and with very different constituents depending whether it’s from cities and is man-made or if it’s natural from deserts. Gases can also be identified.

Very accurate maps including elevation can be made using a satellite imaging from different positions, giving a stereo view. This can also be done with aircraft.

Other things that are useful include measuring sea surface temperature, night-time lighting, cloud cover in rain forests and in monsoons, which can be enhanced with radar to see through the clouds.

Robin is a deeply knowledgeable speaker and the considerable number of varied questions showed how much the audience was engaged by the topic.