



Aerosol Ground Station Network (AGSNet)



The CSIRO Earth Observation Centre in Canberra established the AGSNet in 1998 in affiliation with AERONET, a global network of aerosol ground stations coordinated by NASA.

The purpose of the network is to increase our understanding of the effects and behaviour of airborne particles, or aerosols. These particles interact with sunlight, reflecting some of it back to space and absorbing some. While these effects provide us with beautiful sunsets, they have a significant influence on the climate and need to be measured for accurate climate change predictions. The most prominent aerosols in Australia come from the smoke of dry season fires in the tropics and from wind-blown dust in the arid zone, and both usually peak around September/October.

Characterisation of wind-blown dust is the focus of the installation at Tinga Tingana, named after the westerly pastoral lease of Lindon Station, in the Strzelecki Desert of South Australia. This arid region consists of low, light-coloured sand dunes which have minimal vegetation in dry periods and hence constitute a significant dust source.

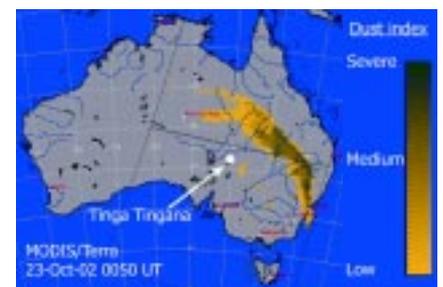
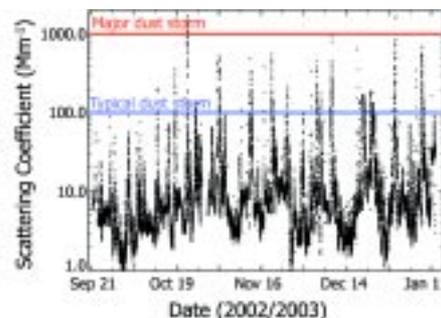
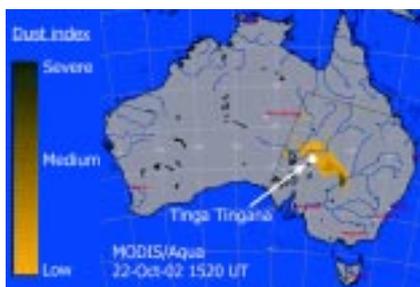


Tinga Tingana on a clear day



A dust storm in 1999

The primary instrument at the ground station is a sun photometer, mounted on top of the instrument enclosure, which periodically points to the sun and measures the intensity of incoming solar radiation (sunlight) at eight specific wavelengths. From this, both the amount of aerosol in the atmosphere and the range of particle sizes can be determined. An additional instrument, a nephelometer, measures the amount of aerosol in the air at ground level. The central diagram below represents nephelometer data collected during the recent drought. Almost two dust storms per week were recorded.



A major dust storm on October 22, 2002 was captured in the satellite images above. The image on the left shows dust concentrated near the source regions while the image on the right, obtained 13 hours later, shows a crescent of dust extending from the Northern Territory to Southern NSW. During the storm, wind speeds of up to 60 km/h were measured at Tinga Tingana. Dust storms of this magnitude result in significant soil loss and consequent environmental degradation.

Data from this station will be used in conjunction with satellite images to map the distribution of aerosol and improve the prediction accuracy of climate models.