

Title: Davis meteor wind detection radar winds

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## 1.0 Data Set Overview

### Introduction

These data are a subset of observations made using the Davis meteor wind radar that are of potential interest to DEEPWAVE investigators. They nominally cover the interval 1 May to 31 August 2014 although data gaps within that interval may be present.

The radar is located in Antarctica at 68.5S, 78.0E

See <http://www.antarctica.gov.au/about-antarctica/environment/atmosphere/studying-the-atmosphere/the-davis-meteor-radar> for further information

### 2.0 Instrument description

The data were obtained using an ATRAD meteor detection wind radar system operating at a frequency of 33.2 MHz. Reflections of all-sky circularly polarized transmissions from meteor trails are detected using a 5-antenna Mills Cross array and their direction of arrival, range and drift velocity are determined.

This radar is operated by staff from the Australian Antarctic Division. Assistance in radar operation and maintenance is provided by Atmospheric radar systems (ATRAD). Radar operation is supported by Australian Antarctic Science project 4025 – ‘Gravity wave drag parameterization in climate models’.

### 3.0 Data collection and processing

Hourly sets of meteor detections and radial velocities are used to determine the wind field above the radar. A best fit wind speed and direction is obtained from the radial velocity field for each hour of operation. Winds are determined for each hour and for each height from 70 to 100 km altitude at 2 km range intervals. These data include zonal and meridional velocities, and the number of meteors contributing to each wind determination.

Times are expressed in UTC and are included in year, month, day, hour, minute form and in ‘Julian seconds’: the number of seconds from 0:00 Jan 1 2000.

Plots of the wind field and the tides using a sliding 4-day fit to the wind data are included. Tidal fits only proceed if more than half the possible times and more than 75% of local times are available.

#### 4.0 Data Format

Data have been stored in NetCDF files with station name, location and unit information included. Time series of the winds against a UT time base are stored.

Variable names are: year\_ut\_av, month\_ut\_av, day\_ut\_av, hour\_ut\_av, minute\_ut\_av, jsec\_ut\_av, zonal\_av, meridional\_av, n\_points.

#### 5.0 Data Remarks

Data quality is optimal in the height ranges where the meteor count rate is highest (near the centre of the available height range) but acceptable at heights and times where a velocity has been provided.

Missing wind values are denoted by 999.0 or 1.e6.

#### 6.0 References