

## Radiometrics Profiling Microwave Radiometer

The Radiometrics MP-1516A profiling microwave radiometer operating at Chilbolton is a self-calibrating passive instrument that measures the sky brightness temperature at 21 frequencies. A number of level 2 data products relating to liquid water and water vapour in the atmosphere can be deduced from these measurements.



The microwave radiometer consists of 21 narrow bandwidth receivers that can measure thermal noise emitted by the atmosphere. In the region of the electromagnetic spectrum between 22 and 30 GHz there are contributions to thermal emission from oxygen, water vapour molecules and liquid water. The significantly different frequency dependence of emission by water vapour and liquid water enables the contribution from the two water phases to be separated by the application of an inversion algorithm to brightness temperature measurements made at the selected frequencies.

The specification of the Radiometrics MP-1516A Profiling Microwave Radiometer is as follows:

Parameter	Value and comments
<b>Receiver</b>	
Measurement frequencies (GHz)	22.000, 22.235, 22.500, 23.000, 23.034, 23.500, 23.834, 24.000, 24.500, 25.000, 25.500, 26.000, 26.234, 26.500, 27.000, 27.500, 28.000, 28.500, 29.000, 29.500, 30.000
Bandwidth of each channel	300 MHz (i.e. +/-10-160 MHz)
Width of measurement beam	6.3° at 22 GHz, decreasing to 4.9° at 30 GHz
Level 1 data products	Brightness temperatures
Brightness temperature accuracy	0.5K - 1K
Level 2 data products	Integrated water vapour along path Integrated liquid water along path Water vapour profile along path
Elevation angle	Normally 90° but can be scanned in elevation
Height resolution of water vapour profiles	50 m for 0 - 1000 m range, 100 m for 1000 – 2000 m range, 250 m for 2000 - 10000 m range
Time resolution	Typically 120 s but can be reduced to 30 s

<b>Data Archive</b>	
Sampling rate	Approx. 120 s time interval
Data storage	Continuous recording in daily files
Archive data format	netCDF
Archived to British Atmospheric Data Centre	<a href="http://badc.nerc.ac.uk/">http://badc.nerc.ac.uk/</a>
BADC datafile	radiometer-radiometrics_chilbolton

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