Transregio SFB 32
Subproject D2
Precipitation data from Micro Rain Radar (MRR) at Selhausen

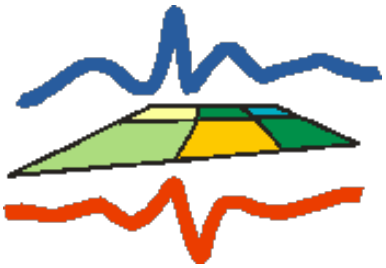

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Figure 1: Setup of the MRR at site Selhausen.

1 Instrument

The METEK Micor rain radar (MRR see www.metek.de) measures vertical profiles of radar echo and doppler speed spectra. It is mainly sensitive for raindrops with sizes between 0.1 and 5mm, the doppler speed is assumed to be the fall speed of raindrops. As there is a direct relation between fall speed and dropsize it is possible to derive the size distribution from the fall speed. In a further step it is possible do determine the rain rate which is the integral over size of the product of fall speed, voulume and size distribution. Figure 2 shows an example plot for one day.

The instrument was installed at the TR32 site Selhausen between April 4, 2008 and October 7, 2011. Afterwards its configuration was changed and it moved in March 2012 to the JOYCE observatory in Juelich. Processed data from Selhausen is availlable for the time from April 2008 till May 2009. It is given as netcdf files for the days when rain occured. Below is given the netcdf header with all the meta information about the data.

```
netcdf 20090528_gop3_mrr_selh_rdsd {
dimensions:
time = UNLIMITED ; // (563 currently)
```

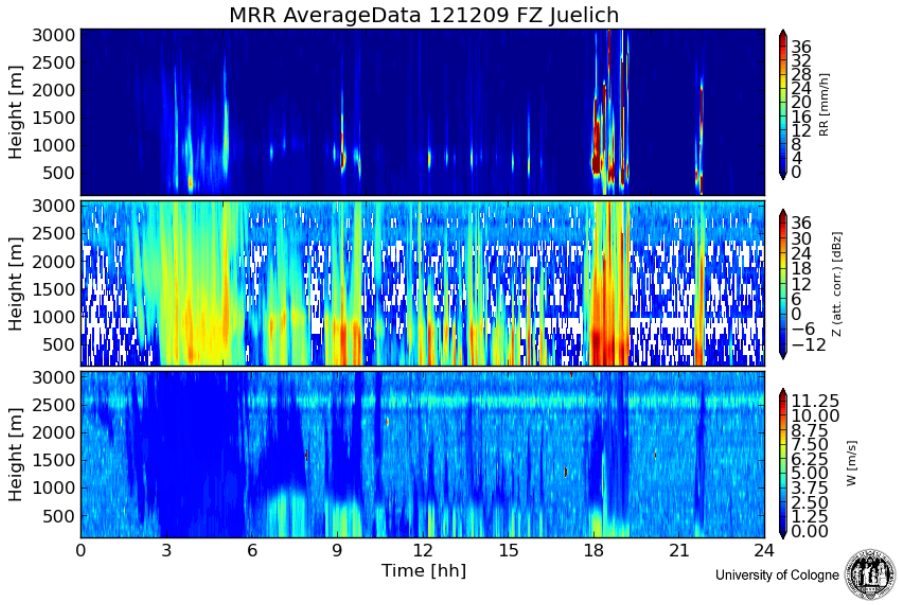

Figure 2: Examplary time hieght-sections of data from 9.12.2012 with rain-rate (top), range corrected radar backscatter (middle) and doppler speed (bottom).

```
heights = 31 ;
dropspec = 51 ;

variables:
long Time(time) ;
Time:standard_name = "time" ;
Time:units = "seconds since 1970-01-01 00:00:00 UTC" ;
float Heights(heights) ;
Heights:standard_name = "height" ;
Heights:units = "m" ;
Heights:_FillValue = nanf ;
float MeltingLayerHeight(time) ;
MeltingLayerHeight:long_name = "height of melting layer" ;
MeltingLayerHeight:units = "m" ;
MeltingLayerHeight:_FillValue = nanf ;
float DropDiameters(heights, dropspec) ;
DropDiameters:long_name = "raindrop diameter class" ;
DropDiameters:units = "mm" ;
DropDiameters:_FillValue = nanf ;
```

```
float DropSpectra(time, heights, dropspec) ;
DropSpectra:long_name = "drop number concentration of raindrop diameter class" ;
DropSpectra:units = "m^-4" ;
DropSpectra:_FillValue = nanf ;
float RainRate(time, heights) ;
RainRate:standard_name = "rainfall_rate" ;
RainRate:units = "mm/h" ;
RainRate:_FillValue = nanf ;
float LiquidWaterContent(time, heights) ;
LiquidWaterContent:long_name = "liquid water content of rain" ;
LiquidWaterContent:units = "gram/m^3" ;
LiquidWaterContent:_FillValue = nanf ;
float CharacteristicVelocity(time, heights) ;
CharacteristicVelocity:long_name = "characteristic velocity in reflectivity spec
CharacteristicVelocity:units = "m/s" ;
CharacteristicVelocity:_FillValue = nanf ;
float EquivalentReflectivity(time, heights) ;
EquivalentReflectivity:long_name = "equivalent radar reflectivity factor" ;
EquivalentReflectivity:units = "dBZ" ;
EquivalentReflectivity:_FillValue = nanf ;
float Reflectivity(time, heights) ;
Reflectivity:long_name = "radar reflectivity factor" ;
Reflectivity:units = "dBZ" ;
Reflectivity:_FillValue = nanf ;
float FirstSpectralMoment(time, heights) ;
FirstSpectralMoment:long_name = "first moment of reflectivity spectrum" ;
FirstSpectralMoment:units = "m/s" ;
FirstSpectralMoment:_FillValue = nanf ;
float SecondSpectralMoment(time, heights) ;
SecondSpectralMoment:long_name = "second moment of reflectivity spectrum" ;
SecondSpectralMoment:units = "m/s" ;
SecondSpectralMoment:_FillValue = nanf ;
float Extinction(time, heights) ;
Extinction:long_name = "extinction of radar signal by rain" ;
Extinction:units = "dB" ;
Extinction:_FillValue = nanf ;

// global attributes:
:Conventions = "CF-1.0" ;
:title = "MRR data" ;
:institution = "Meteorological Institute, Hamburg, Germany" ;
```

```
:references = "Micro Rain Radar MRR-2 - Physical Basis" ;
:history = "2009-07-02 09:34 generated from original data" ;
:location = "50.8694N 6.4512E" ;
}
```