Title: CCOPE-2015 Curanilahue post-processed MRR profiling radar data

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1.0 Data Set Overview:

This dataset contains data from two vertically profiling K-band METEK Micro Rain Radars (MRRs) deployed during CCOPE. Information on the overall goals of CCOPE, deployment strategy, and some results are found in Massmann et al. (2017). All data were collected at Curanilahue, Chile (CRL). During most of the winter storms, CRL is located upstream of the Nahuelbuta Mountains, in coastal southern Chile. The location of the site is provided in Table 1 and Figure 1 below.

Time period covered: 21 May 2015 – 14 August 2015

Table 1: Summary of location of MRR deployment

Abbreviated name	Full name	Latitude [deg.]	Longitude [deg.]	Elevation [m, MSL]
CRL	Curanilahue	-37.4753	-73.3423	137

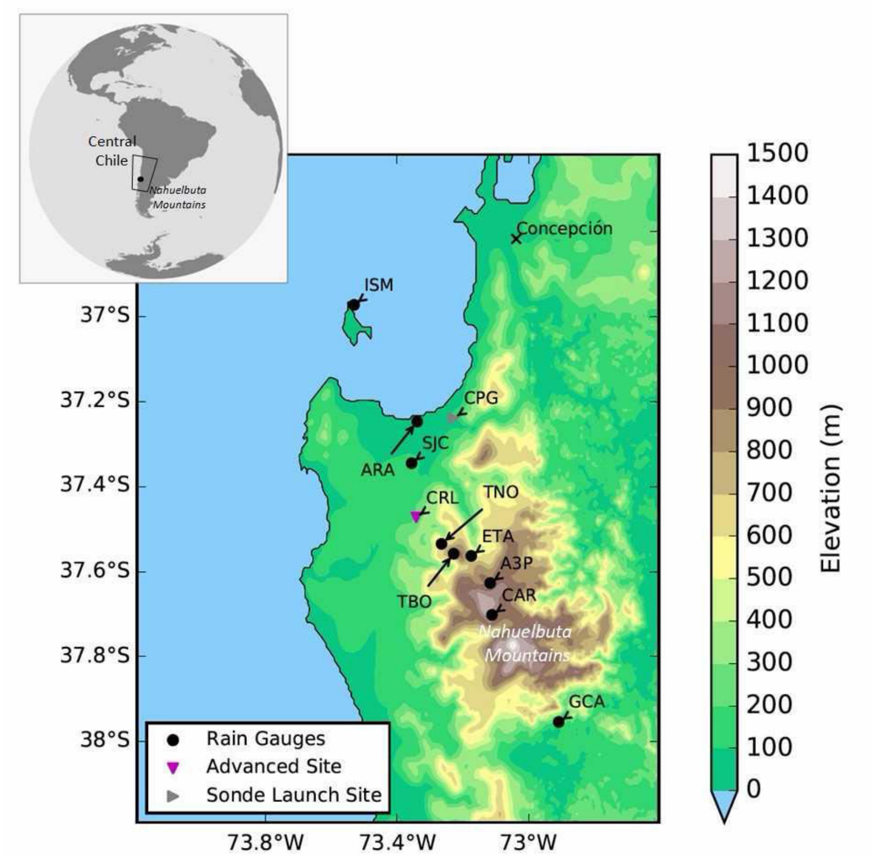

Figure 1: Locations of Curanilahue (CRL) MRR deployment location as well as other CCOPE observations sites. Figure adapted from Massmann et al. (2017).

2.0 Instrument Description:

Two METEK K-band FM-CW Micro Rain Radar-2s (MRRs, http://metek.de/product/mrr-2/) were deployed at CRL, making measurements with different range resolutions. The attributes of the MRRs are summarized in Table 2. More detailed technical information on the MRR2 is available in METEK (2012). Table 3 summarizes the identifying information and range-resolution settings for the two radars. Figure 2 shows photos of the MRRs as deployed as CRL.

Table 2: Sensor attributes for METEK MRR2

Frequency	24 GHz
Number of range gates (evenly spaced)	32
Transmit power (nominal)	50 mW
Beam-width	2 degrees

Table 3: identifying information and range resolutions of CCOPE MRRs deployed at CRL.

Identifier	Institution	Make-model	Range resolution	Maximum range	Operating dates
JRM	UAlbany	METEK-MRR2	200 m	6000 m	21 May 2015 – 14 August 2015
RDG	U. de Chile	*METEK-MRR2*	50 m	1550 m	22 May 2015 – 14 August 2015

Figure 2: MRRs at CRL

3.0 Data Collection and Processing:

Data are collected by logging onto a Windows PC using the METEK software as described in METEK (2012,2013).

Post-processing of the data is accomplished using version 0.99 of the IMProToo software (https://github.com/maahn/IMProToo/), with METEK ".raw" files as input. The goals, basis, and methods of this post-processing procedure are described in Maahn and Kollias (2012). The original ".raw" data files are archived separately in a companion dataset: "CCOPE-2015 Curanilahue raw MRR profiling radar data"

Prior to deployment at CRL, the JRM MRR was deployed at Cazadero, California for comparison with an S-Band profiling radar. Results of this comparison are described in Appendices A-B of Massmann et al. (2017).

4.0 Data Format:

The files are named with the following format:

MRR_postproc_CRL_NNN_YYYYMMDD.nc

where “postproc” denotes that these are post-processed data, “CRL” is the abbreviated site name (as in Table 1), “NNN” is the identifier for the specific MRR (as in Table 3), and “YYYYMMDD” denotes the date (UTC). Each file contains the data for one day.

Data are stored as self-describing netCDF files, as generated by the IMProToo software.

5.0 Data Remarks:

Missing data

Both MRRs had periods of downtime and missing data due to power outages on:

- 7 July 2015
- 9 August 2015

Instrument problems and potential biases

MRR reflectivity is subject to attenuation at high rain rates, which affects the vertical reflectivity structure during heavily precipitating storms. For more discussion of this, and comparison with a minimally attenuating radar, see Massmann et al. (2017).

During non-precipitating periods low-amplitude artifacts were found in some MRR profiles near 800m AGL. An example is shown below in Figure 3. These artifacts may be due to ground clutter from side-lobes, interference between the two MRRs, or some other local RF source. They do not appear in all data and do not appear to appreciably affect measurements during precipitation.

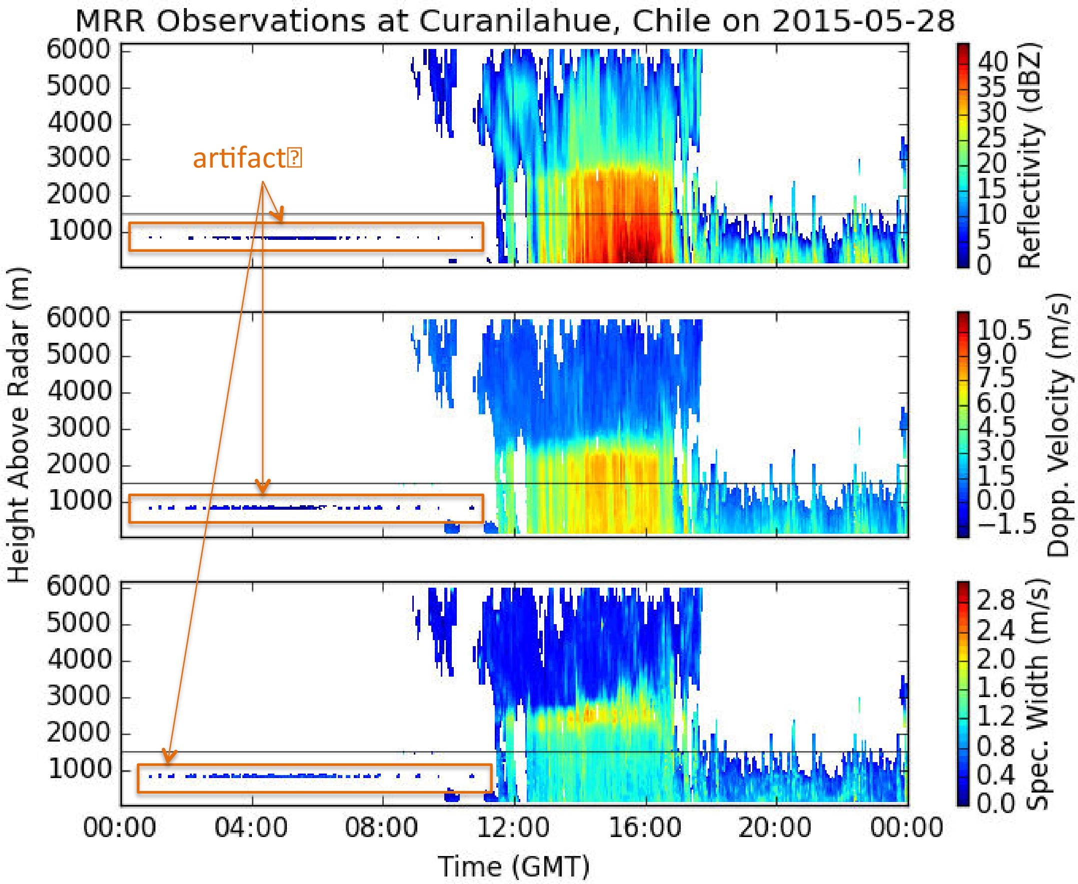

Figure 3: Example of MRR artifacts near 800 m AGL in clear air.

6.0 References*:*

Maahn, M. and Kollias, P., 2012: Improved Micro Rain Radar snow measurements using Doppler spectra post-processing. *Atmospheric Measurement Techniques*, 5(11), 2661-2673, https://doi.org/10.5194/amt-5-2661-2012.

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METEK GmbH, 2012: MRR physical basis. 13 March 2012 version, Elmshorn, 20 pp.

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