Dugway Proving Grounds Frequency-Modulated Continuous-Wave (FM/CW) Boundary Layer RADAR Measurement Data

FMCW

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1.0 Data Set Overview

1.1 Time period covered by the data

September of 2012

October of 2012

May of 2013

1.2 Physical location (latitude, longitude, elevation)

40.196902, -113.16776299999999, 1313

1.3 Instrument type

FMCW

1.4 Data provider

Dugway Proving Ground

1.5 Web address references

http://www3.nd.edu/~dynamics/materhorn/

https://www.eol.ucar.edu/field_projects/materhorn-x

2.0 Instrument Description

The FMCW radar is a portable system consisting of two trailers, one for the data processing and radio frequency electronics equipment, and the other for the two antennas. Two identical 10-foot-diameter parabolic antennas, one for transmitting and one for receiving, are positioned on a fully steerable mount. The antennas are typically directed vertically (approximately 4 degrees of vertical to shed rain or snowmelt) for high-resolution backscatter'profiling. The radar uses a phased-locked-loop digital frequency synthesizer to obtain a highly linear, very low noise 200-MHz bandwidth sawtooth 50-ms sweep centered at 2.9 GHz. The final amplifier is a solid state amplifier with a continuous output of approximately 250 W. The received signal is homodyned, amplified and filtered, and then sampled with a 16-bit analog-to-digital converter. The digitized data is then sent to an array processor for integration and fast Fourier transform (FFT). A true real-time computer controls the hardware and data acquisition cycle as well as the data flow. High resolution color images are created and stored on the local hard drive. Live visualization of the data is shown as a continuous time-height display of the relative amplitude of the returned signal. (Text found at https://govtribe.com/project/fmcw-radar-upgrade)

2.1 Instrument website

https://govtribe.com/project/fmcw-radar-upgrade

2.2 Table of specifications

Accuracy	Range	Frequency	Resolution
	Spatial resolution Typically 4-6 m but varies with height coverage Height coverage Typically 4-6 km	2.9 GHz ± 100 MHz	Temporal resolution 6 to 12 s per profile Number of range gates 1024

3.0 Data Collection and Processing

3.1 Description of data collection

3.2 Description of derived parameters and processing techniques used

Original data files are provided.

3.3 Description of quality assurance and control procedures

This dataset was not subject to any quality control or processing it has been provided in its original form.

3.4 Data intercomparisons

4.0 Data Format

4.1 Data file structure

JPEG images.

4.2 File naming convention

dataProvider_instrument_instrumentType_startDateAndTime_endDateAndTime.extension

4.3 Data format

JPEG images

4.4 Data layout

4.5 List of parameters with units, sampling intervals, frequency, range

Consult instrument description at https://www.fbo.gov/utils/view?id=8d5efdfdf2eb825a4f987ef38a15b430.

4.6 Data version number and date

raw, v1.0, October 2016

4.7 Description of flags, codes used in the data, and definitions

4.8 Data sample

```
Sample dataset is not suitable for display in this document. For
dataset examples consult instrument description at
https://www.fbo.gov/utils/view?id=8d5efdfdf2eb825a4f987ef38a15b430.
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5.0 Data Remarks

5.1 PI's assessment of the data

5.2 Missing data periods

5.3 Software compatibility

6.0 References

[1] https://govtribe.com/project/fmcw-radar-upgrade

[2] https://www.fbo.gov/utils/view?id=8d5efdfdf2eb825a4f987ef38a15b430

[3] Fernando, H. J. S., E. R. Pardyjak, S. Di Sabatino, F. K. Chow, S. F. J. DeWekker, S. W. Hoch, J. Hacker, J. C. Pace, T. Pratt, Z. Pu, J. W. Steenburgh, C. D. Whiteman, Y. Wang, D. Zajic, B. Balsley, R. Dimitrova, G. D. Emmitt, C. W. Higgins, J. C. R. Hunt, J. G. Knievel, D. Lawrence, Y. Liu, D. F. Nadeau, E. Kit, B. W. Blomquist, P. Conry, R. S. Coppersmith, E. Creegan, M. Felton, A. Grachev, N. Gunawardena, C. Hang, C. M. Hocut, G. Huynh, M. E. Jeglum, D. Jensen, V. Kulandaivelu , M. Lehner, L. S. Leo, D. Liberzon, J. D. Massey, K. McEnerney, S. Pal, T. Price, M. Sghiatti, Z. Silver, M. Thompson, H. Zhang, T. Zsedrovits, 2015: The MATERHORN – Unraveling the Intricacies of Mountain Weather, BAMS, doi: http://dx.doi.org/10.1175/BAMS-D-13-00131.1.