

WeSRI 1.1

West Sumatra Radar-Raingauge Integrated Data Version 1.1

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August 21, 2009 (revised on May 24, 2010)

1 Summary

This is a gridded data set of precipitation over West Sumatra in Indonesia which is based on an integration technique of weather radar and ground-based raingauge data. We first derived an empirical relationship between radar and raingauge measurements. By using the relationship, we converted radar measurements into precipitation at each grid point. As pre-processing radar data, the effect of mountain shadow was taken account of. For evaluation of the effect, we developed a tool for analysing visibility of targets from radar using gridded terrain data. The effect of rain attenuation due to short wavelength of the radar was not considered.

The data set of current version 1.1 has same specification as the version 1.0 which was released previously. But it is based on a different relationship between radar and raingauge measurements from the previous version 1.0. For derivation of the new relationship for the version 1.1, we used data of precipitation which was measured with raingauges at 5 points; but it was only 1 point for the version 1.0.

2 Data specification

Table 1 shows data specification.

Table 1 Data specification.

Name of data	WeSRI 1.1 (West Sumatra Radar-Raingauge Integrated Data Version 1.1)
Variable	precipitation (rainfall rate, mm h^{-1}), missing value is -9999.0
Data format	grid-point data, simple binary files (single-precision floating-point (IEEE 754), little endian) with separate GrADS control files
Organization of data	one file for each 30 minutes
Coordinates	longitude and latitude
Geodetic reference	WGS 84
Spatial extent	99.55–101.05 degrees East, 0.05–1.55 degrees South (approximately 170 by 170 km)
Spatial resolution	0.025 degrees longitude and latitude (approximately 2.8 by 2.8 km)
Time standard	UTC+7 (local time in western Indonesia)
Time period	October 28 to November 27, 2006 (31 days)
Time resolution	30 minutes
Size of data	approximately 20 MB

3 Data sources

3.1 Radar data

We used data of reflectivity as radar measurements at 2 km height above sea level. It was measured with X-band Doppler radar near the Minangkabau International Airport in West Sumatra which was installed and has been maintained by HARIMAU (Hydro-meteorological ARray for ISV-Monsoon AUto-monitoring) project (Yamanaka et al., 2008 [1])¹.

3.2 Raingauge data

We used data of precipitation at 5 points in the coverage of the radar. It was measured with ground-based tipping-bucket type raingauges which were deployed and have been maintained by RIGC (Research Institute for Global Change) of JAMSTEC (Japan Agency for Marine-Earth Science and Technology) and HARIMAU project.

3.3 Terrain data

We also used a gridded terrain data set for analysing visibility of targets from radar. It was produced under the SRTM (Shuttle Radar Topography Mission, Farr et al., 2007 [2]) of U.S. NASA (National Aeronautics and Space Administration).

4 Directory Structure

The data set consists of data files, image files, sample source codes and data documents. These files are in respective directory as follows:

```
wesri_v1.1/  
  data/           (data files)  
  img/           (image files)  
  src/           (sample source codes)  
  wesri_v1.1_en.pdf (data document in English)  
  wesri_v1.1_ja.pdf (data document in Japanese)
```

4.1 Data files

Data files are in the directory `data` as follows:

```
data/  
  061028/  
  061029/  
  ...  
  061127/  
  wesri_v1.1.ct1
```

The directory `data` has one GrADS control file for all data files (`wesri_v1.1.ct1`) and 31 sub-directories for each one day. Each sub-directory has respective name. For example, the sub-directory `061028` is for the day of 28 October 2006. All of data files for this day are in `061028` as follows:

```
061028/  
  wesri_v1.1_061028.ct1  
  wesri_v1.1_061028_0000.bin  
  wesri_v1.1_061028_0030.bin  
  ...  
  wesri_v1.1_061028_2330.bin
```

¹<http://www.jamstec.go.jp/iorgc/harimau/>

The sub-directory 061028 has one GrADS control file for the day of 28 October 2006 (`wesri_v1.1_061028.ct1`) and 48 data files for each 30 minutes. Each data file has respective name. For example, the file `wesri_v1.1_061028_1430.bin` is for 30 minutes after 2 o'clock in the afternoon of 28 October 2006.

4.2 Image files

Image files are in the directory `img` as follows:

```
img/  
  wesri_v1.1_061028.gif  
  wesri_v1.1_061029.gif  
  ...  
  wesri_v1.1_061127.gif
```

4.3 Sample source codes

Sample source codes for data handling are in the directory `src` as follows:

```
src/  
  read.c  
  read.f
```

`read.c` is in C (ANSI C) and `read.f` in Fortran (FORTRAN 77).

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References

- [1] M. D. Yamanaka, H. Hashiguchi, S. Mori, P.-M. Wu, F. Syamsudin, T. Manik, J.-I. Hamada, M. K. Yamamoto, M. Kawashima, Y. Fujiyoshi, N. Sakurai, M. Ohi, R. Shirooka, M. Katsumata, Y. Shibagaki, T. Shimomai, Erlansyah, W. Setiawan, B. Tejasukmana, Y. S. Djajadihardja and J. T. Anggadiredja, 2008: HARIMAU radar-profiler network over the Indonesian maritime continent: A GEOSS early achievement for hydrological cycle and disaster prevention. *Journal of Disaster Research*, **3** (1), 78–88.
- [2] T. G. Farr, P. A. Rosen, E. Caro, R. Crippen, R. Duren, S. Hensley, M. Kobrick, M. Paller, E. Rodriguez, L. Roth, D. Seal, S. Shaffer, J. Shimada, J. Umland, M. Werner, M. Oskin, D. Burbank and D. Alsdorf, 2007: The Shuttle Radar Topography Mission. *Reviews of Geophysics*, **45** (2), RG2004.