Earth Syst. Sci. Data Discuss., 6, C190–C194, 2013
www.earth-syst-sci-data-discuss.net/6/C190/2013/

Open Access Earth System Science Data Discussions

Interactive comment on "Global gridded precipitation over land: a description of the new GPCC First Guess Daily product" *by* K. Schamm et al.

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Received and published: 21 November 2013

Dear Reviewer,

Thanks for reading our paper and for your comments. Your comments helped to improve the paper! We changed the manuscript accordingly. Below we answer your comments step by step.

With kind regards, Markus Ziese (corresponding author)

Comment: The GPCC provides global monthly precipitation fields based on the most comprehensive data collection. Now the first daily precipitation fields, provided in near

real-time, are available and described in this paper. The scientific community was waiting for a long time for such data needed for many applications. Due to the lack of other operational daily precipitation products it will be used frequently. Nevertheless, it should be noted that the relatively low number of observations available in real-time results in a relatively low accuracy of the daily precipitation product. The authors account for this by using the term "first guess", originally introduced by Cressman (1959) for atmospheric data analysis. Thus, the precipitation fields may be improved using further information (observations) when available. This improvements described by the authors comprise a full data product and a satellite-gauge product under development. I recommend the paper for publication after some minor improvements of the text, which should be generally revised.

Here some suggestions for the abstract and the introduction:

Page 436, line 13: The formulation of the abstract section "However, the purely GTSbased data ..." should be improved. For example: "However, the purely GTS-based data processing lacks an intensive quality control as well as a high data density and is therefore denoted as "First Guess" referenced under doi:10.5676/DWD_GPCC/FG_D_100. Two further products, the "Full Data Daily" and a merged satellite-gauge product, are currently under development at GPCC. These additional products will not be available in near real-time, but based on significantly more, strictly quality controlled, observations. All GPCC products will be provided free of charge via the GPCC webpage: ftp://ftp-anon.dwd.de/pub/data/gpcc/html/downloadgate.html."

Answer: We replaced the old section by the suggested one with some small changes:

"Therefore, the purely GTS-based data processing lacks an intensive quality control as well as a high data density and is denoted as "First Guess". The daily data set is referenced under doi: 10.5676/DWD_GPCC/FG_D_100. Two further products, the "Full Data Daily" and a merged satellite-gauge product, are currently under develop-

ment at Deutscher Wetterdienst (DWD). These additional products will not be available in near real-time, but based on significantly more and strictly quality controlled observations. All GPCC products are provided free of charge via the GPCC webpage: ftp://ftp-anon.dwd.de/pub/data/gpcc/html/download_gate.html."

Comment: Page 436, line 1: The first section of the introduction "Besides evaporation ..." is too general and should be cancelled. The introduction may start with "The Global Precipitation Climatology Centre (GPCC) was founded ...".

Answer: We removed the mentioned paragraph.

Comment: Page 437, line 21: A better formulation of "However, for many applications such as ..." may be: "However, for many applications such as the statistics of extremes, the monitoring of heavy precipitation events and the evaluation of numerical weather predictions or satellite estimates a time resolution higher than one month is required."

Answer: We replaced the mentioned section with the suggested text.

Comment: Page 438, line 17: The statement "Gridded products of rain gauge measurements also have their disadvantages, namely a coarse distribution that results in an underestimation of the true precipitation amount by about 5% (Legates and DeLiberty, 1993)." should be clarified. What is a "coarse distribution"? Do the authors mean that some grid areas are under-sampled (covered by no or few observations)?

Answer: We replaced the mentioned section by a new paragraph:

"Gridded products of rain gauge measurements also have their disadvantages. The reliability of the analysis depends on the station density (Arkin et al. (1985), Rudolf et al. (1994), Schneider et al. (1993), see also Sect. 4.4). As the station density decreases, the uncertainty of the calculated area mean increases. Also individual large precipitation totals at a station are smoothed. Depending on the station density and grid cell size, grid cells including no stations are likely. In this case precipitation totals outside the grid cell are applied to calculate the precipitation amount in this cell. Some interpo-

lation schemes use a minimum number of stations as input data (Shepard (1968), Krige (1966)). Therefore stations from other grid cells influence the computed precipitation total at a cell, whenever less than the minimum number of stations are found within this cell. Furthermore orographic characteristics are smoothed if the grid cell size is not small enough or there are no measurements within it. The users have to keep in mind that a high resolution gridded data set does include small scale characteristics of precipitation fields only if the precipitation field is sufficiently sampled by rain gauges."

Comment: Page 438, line 28: Improve the formulation: "This paper describes the new product which has been released in April 2013 providing daily precipitation fields for the period 1 January 2009 to present."

Answer: This comment and the next two ones are in the same paragraph; therefore we give the answer after the last comment.

Comment: Page 439, line 2: cancel: "In addition to the precipitation estimation of the "First Guess Daily" product an estimation of the uncertainty is provided."

Improve Line 7: "Therefore, only SYNOP data reported via Global Telecommunication System (GTS) are used." cancel "and undergo ..."),

Answer: The mentioned paragraph was redrafted to be more precise and to remove double information. Now the section is as follows:

"With its new "First Guess Daily" product the GPCC addresses the need of a global precipitation product with a daily resolution as well as information on the uncertainty. An update is provided three to five days after the end of each month. The spatial resolution is 1° latitude by longitude and covers the entire land surface except the Antarctic. This analysis is available back to January 2009. As the name implies, it is a quick analysis of the daily precipitation amounts that is designed to be released in near real-time for applications being up-to-date. The advantage of this approach is the high timeliness, but this leads to a lower number of input stations and a lower

level of quality control. Therefore, data from SYNOP messages, which are reported via Global Telecommunication System (GTS), are used after an automatic-only quality control (see Sect. 3).

Comment: Line 12: “The calculation of the “First Guess Daily” precipitation fields comprising also an uncertainty measure is depicted ....”

Answer: We restated the noted sentence:

“The calculation procedure for the "First Guess Daily" is described in Sect. 4 and the data access is described in Sect. 5.”

Comment: Page 452, line 11: Cancel “13th International Symposium on Acoustic Remote Sensing of the Atmosphere and Oceans, Garmisch-Partenkirchen, GERMANY, 11–20 July 2006,”.

Answer: Thank you, we removed this part from the mentioned citation.

Interactive comment on Earth Syst. Sci. Data Discuss., 6, 435, 2013.