DDC Report 2016 of WDCC

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Version history

Date	Version	Comment
2017-03-17	0.1	initial report with preliminary figures; number of user requests not yet available; preliminary link to online statistics
2017-03-28	1.0	first version

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1. Summary

The total AR5 data volume provided by IPCC DDC is 1.7 PBytes, 1.6 PBytes in the DDC AR5 Reference Archive and 100 TBytes in the IPCC AR5 WG1 Archive, compared to about 1 TBytes for AR4, and less than 10 GBytes each for the preceding ARs: FAR, SAR, and TAR.

In 2016 IPCC DDC users downloaded ca. 1 PBytes of data in over 1 million individual downloads, which is about 53 % of the downloaded files and 40 % of the downloaded volume in 2015. However, the download volume in 2016 was still 10 times that in 2014. The download rates and user requests in 2016 from the IPCC DDC reference archive were dominated by AR5 downloads. AR4 data download decreased more significantly than AR5 data download.

728 WDCC users plus an unknown number of ESGF users accessed IPCC DDC data in 2016. This number of active users increased slightly from 702 in 2015. More than half of these active users were located in developing and economy-in-transition countries in Africa, Asia and South America. Most of them are Asian users, who make up 1/3 of the active users. The average number of downloads for an individual IPCC DCC user was ca. 1 500, which is about half of the average download per user in 2015.

The offer to send data for selected areas on storage media was requested by only 5 users. Only 3 were located in developing or economy-in-transition countries.

2. Evolution of data access

In the user downloads from the DDC reference archive, the download rates peaking in 09/2015 due to the unavailability of the ESGF (Earth System Grid Federation) decreased over the first quarter of 2016. Afterwards monthly download rates stabilized on a high level of ca. 56 TBytes/month over the second half of 2016 (**Figure 1**). The total download volume for 2016 was 1 PBytes in 1 070 000 individual file downloads.

Download rates of 2016 were about 53 % those of 2015 in download numbers and about 40 % in download volume. These are 6 times the download numbers and 10 times the download volume in 2014. The average monthly download volume in 2016 was ca. 86 TBytes.

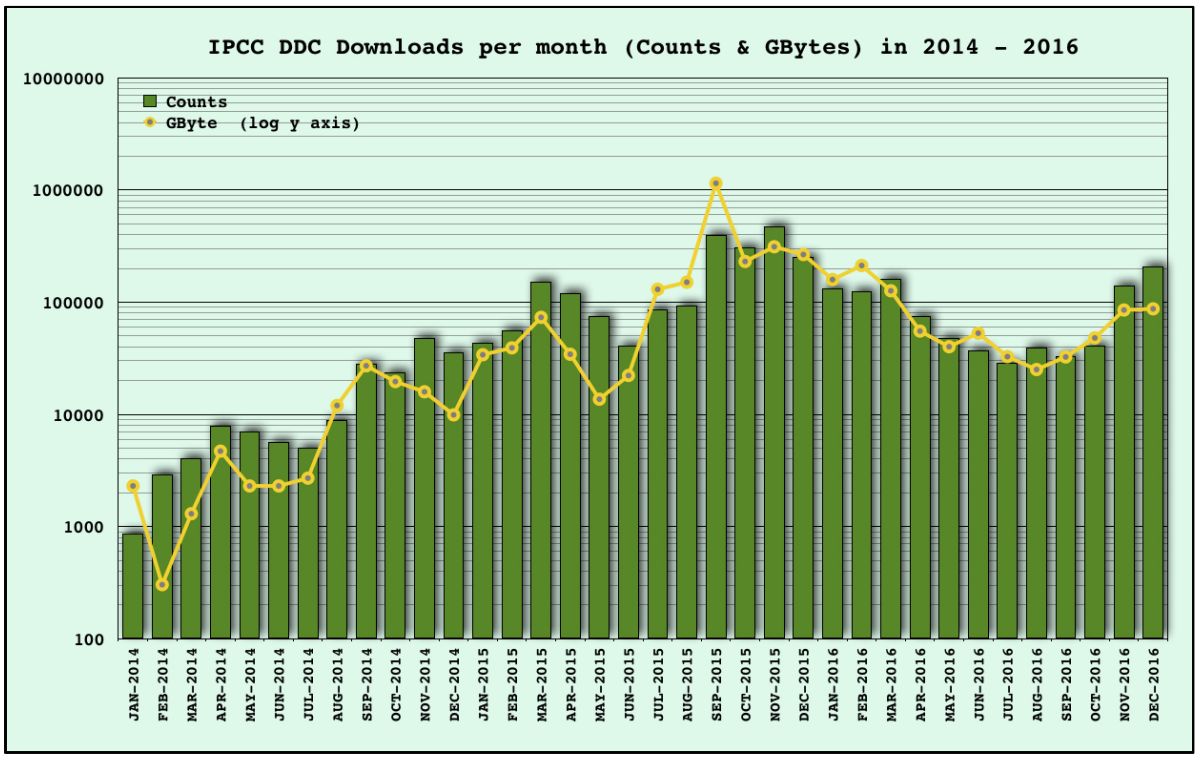

Figure 1: *Total data download counts and volumes per months over the last three years in GBytes from the IPCC DDC reference archive.*

3. Geographical distribution of data access

For the IPCC DDC AR5 data, direct data access at the WDCC and data access via ESGF (Earth System Grid Federation) is supported. For the ESGF data access share, no information about user locations is available.

About 1/3 of the registered active users were located in Asia and 1/3 in Europe. The share of users located in developing or economy-in-transition countries (Asia, South America, and Africa) was more than 50 % (**Figure 2,** left).

Data downloads via ESGF increased from 8 % in 2015 to 17 % in 2016 due to the end of the ESGF overhaul (**Figure 2,** right). The majority of user downloads were processed by Asian users with ca. 58 % plus an unknown number of ESGF users. This is the same percentage as in 2015. Assuming the same percentage of Asian users among the ESGF users as among the WDCC users would result in 70 %. Thus at least 58 % of the files were downloaded to Asia and least 10 % to Europe. The percentage of file downloads to developing and economy-in-transition countries (Asia, Africa, and South America) was at

least 60 %.

The average download number per user in 2016 was 1531 files. The most active users were the Asian users with 1 900 downloads per user on average. This is two times the average download number for North American or Australian users, three times the average download number for European users and more than four times the average download number of African or South American users.

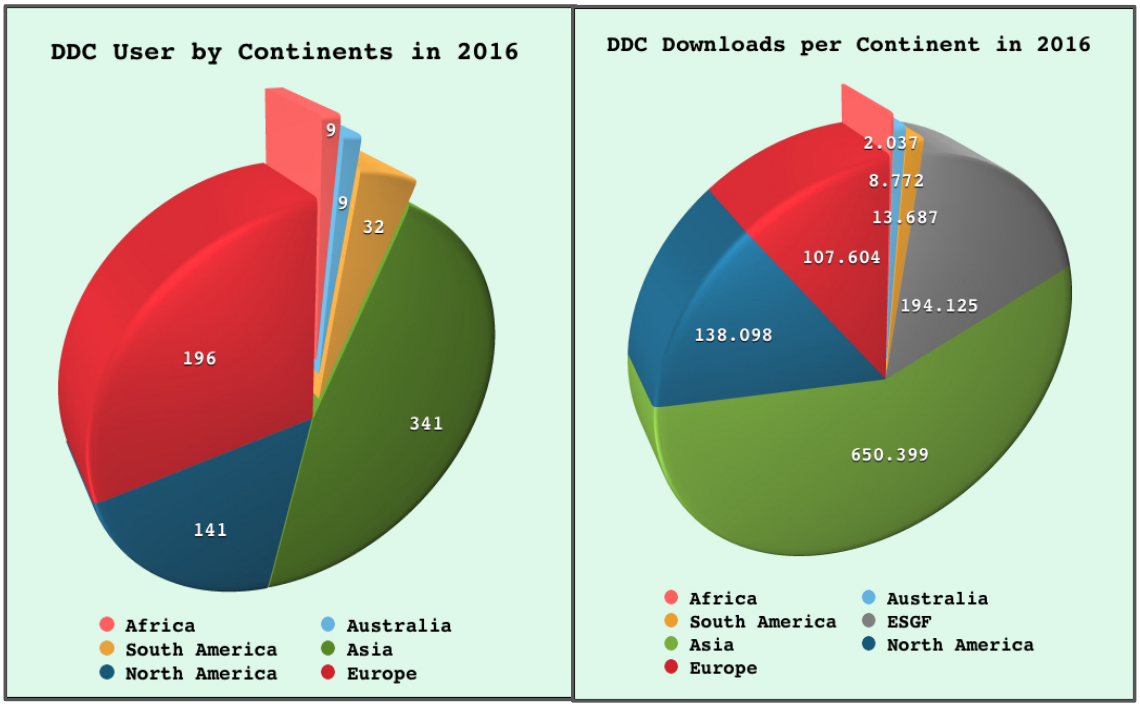

***Figure 2**: Number of active DDC users in 2016 (left) and downloads counts of users per continent (right).*

3.1 Data on storage media

There was not much interest in the service to send a data subset for area on storage device by mail. Only 12 USB devices were sent to 5 users in 2016. All requested only AR5 data. Three users were originated in Asia and two in North America (see **Table 1** and **Table 2**).

In addition to these numbers a request from an Asian user was received and positively answered if he could share the data received on USB devices with colleagues. Another mail of USB devices to South America was avoided by a colleague of the requestor downloading the data from our cloud devices during his stay in Europe.

***Table 1:** Number of storage media requests per data area for AR4 and AR5 in 2016.*

Area of Data	No of storage media	Africa	Asia	Australia / Central Pacific	Europe	North America	South America	North Pole	South Pole
AR4	-	-	-	-	-	-	-	-	-
AR5	12	1	4	1	1	2	1	1	1
DDC total	**12**	**1**	**4**	**1**	**1**	**1**	**1**	**1**	**1**

Table 2: *Number of user requests for AR4/AR5 data on storage media per user origin (continent) in 2016.*

User origin	No of users	African users	Asian users	South American users	North American users
AR4	-	-	-	-	-
AR5	5	0	3	0	2
DDC total	**5**	**0**	**3**	**0**	**2**

4. Data access by category AR

The monthly download rates in 2016 from the IPCC DDC reference archive were dominated by AR5 downloads. AR4 data download decreased significantly to 3 % of the download of 2015 in file numbers as well as in data volume (**Figure 3**; online monthly download statistics[1]). Downloads of TAR data in 2016 remain in the same order as for 2015.

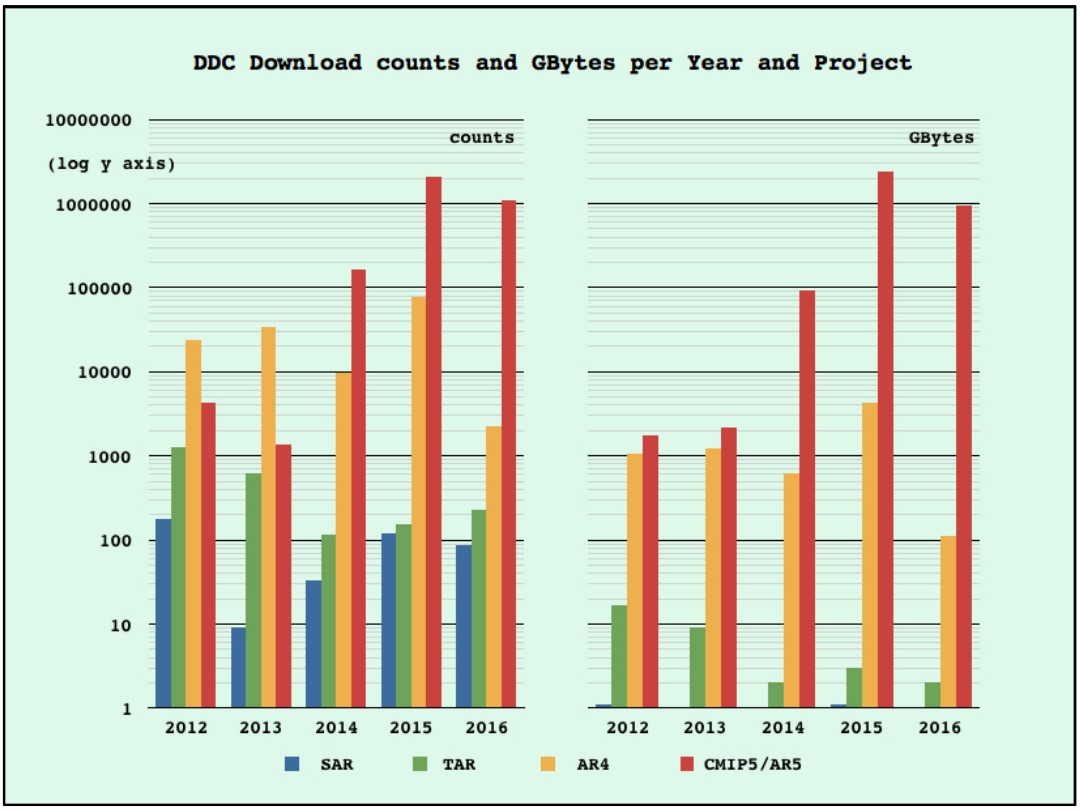

Figure 3: Total annual data download counts (left) and volumes in GBytes (right) over the last five years for the different DDC reference archives (without FAR).

[1] Online monthly download statistics are available at:
https://cera-www.dkrz.de/WDCC/ui/cerasearch/statistics?type=downloads_by_domain&domain=IPCC-DDC
https://cera-www.dkrz.de/WDCC/ui/cerasearch/statistics?type=downloads_by_domain&domain=IPCC-DDC_AR5
https://cera-www.dkrz.de/WDCC/ui/cerasearch/statistics?type=downloads_by_domain&domain=IPCC-DDC_AR4

5. Review of user queries

There are no numbers for the handled user requests by WDCC/DKRZ staff available for 2016. It can be assumed that the support effort developed similar to the download numbers and volume, which leads to about 2 000 requests (half of the requests handled in 2015). A separation of user requests on IPCC DDC issues is not possible.

As part of the IS-ENES support activity, DKRZ provides first level user support for ESGF. Within ESGF 45 requests related to CMIP5/AR5 were handled, which is about the same number of requests as in the previous two years. Additionally, and 2 requests about CMIP3/AR4 and 10 requests about the regional climate data of CORDEX were answered.

In parallel to the regular user support channels, additional requests were directed to individuals at the modelling centres or at the data centres (within ESGF or to WDCC/DKRZ).