

# WDCGG's Activity

Focus on topics of the new WDCGG Website

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# Timeline

Jan. 2018

Jan. 2019

ET-WDC, 2-5, October 2017, Kjeller, Norway

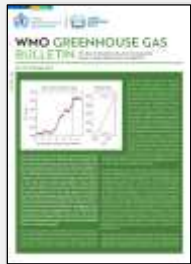
## Event

New updates,  
attending of meeting,  
announcement of activity,  
etc...



Web site renewal

## WMO GHG Bulletin



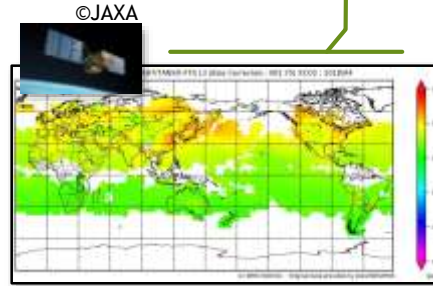
No.13

This Bulletin is distributed at  
UNFCCC/COP, IPCC and so on.

## WDCGG Data Summary

This Summary reports the results of  
global analyses of greenhouse and  
some related gas data

No.42



Start of Satellite  
data provision



IWGGMS



GGMT



No.14



The State and the Variations of  
GHGs in the Atmosphere  
(for UN Climate Summit 2019)

ET-WDC, 1-3, October 2019, Hampton VA, USA

No.15



No.43



# WDCGG Statistics (Data providers/Contributors)

## Contributors (Data providers)

**Total 69**

JMA	HMS	GERC
NOAA	IAFMS	NIES
AEMET	IGP	NILU
AGAGE	IMKIFU	METRI
AICH	INRNE	NIWA
AIST	INSTAAR	INMH
ANSTO	IOEP	ONM
ARSO	INPE	OSAKAU
BAS	ISAC	PolyU
BMKG	ITM	RIVM
CHMI	KMA	RSE
CMA	KMD	SAIPF
CSIRO	KSNU	SAWS
DMC	KUP	SHIZU
IAA	LA	TU
DWD	LAMP	UBAG
ECCC	LSCE	UBAA
EMA	MGO	UNIURB
Empa	MMD	UMLT
ENEA	MRI	UYRK
FMI	NAGOU	UNIVBRIS
FRA	NEDO	JAMSTEC
HKO	VNMHA	IIA

## Station

**Total 205**

GAW Global	32
GAW Regional	112
GAW Contributing networks	1
GAW Other elements	27
Mobile	33
<hr/>	
REGION I	12
REGION II	36
REGION III	7
REGION IV	35
REGION V	15
REGION VI	57
ANTARCTICA	10
MOBILE	33

## Gas species

**Total 56**

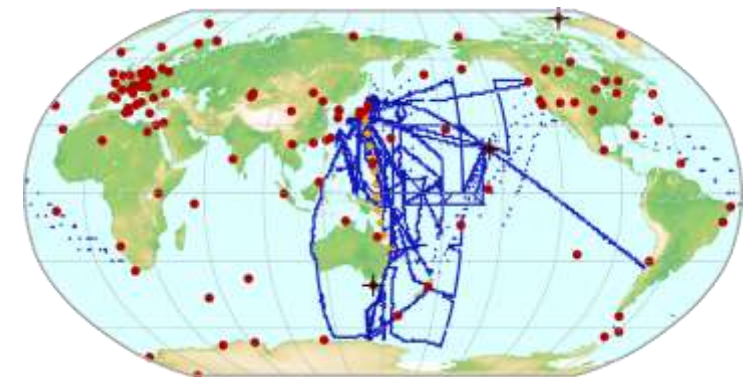
CO <sub>2</sub> , CO <sub>2</sub> [C-13], CO <sub>2</sub> [O-18]	
CH <sub>4</sub> , CH <sub>4</sub> [C-13], CH <sub>3</sub> D	
N <sub>2</sub> O, SF <sub>6</sub> , SO <sub>2</sub> F <sub>2</sub> , NF <sub>3</sub> , COS	
Halocarbons	2
CFCs	6
HCFCs	4
HFCs	11
PFCs	4
Halon	3
Reactive Gas	10
Other Gas	1
Radionuclide	3
TIC	

## Country/Territory

**Total 56**

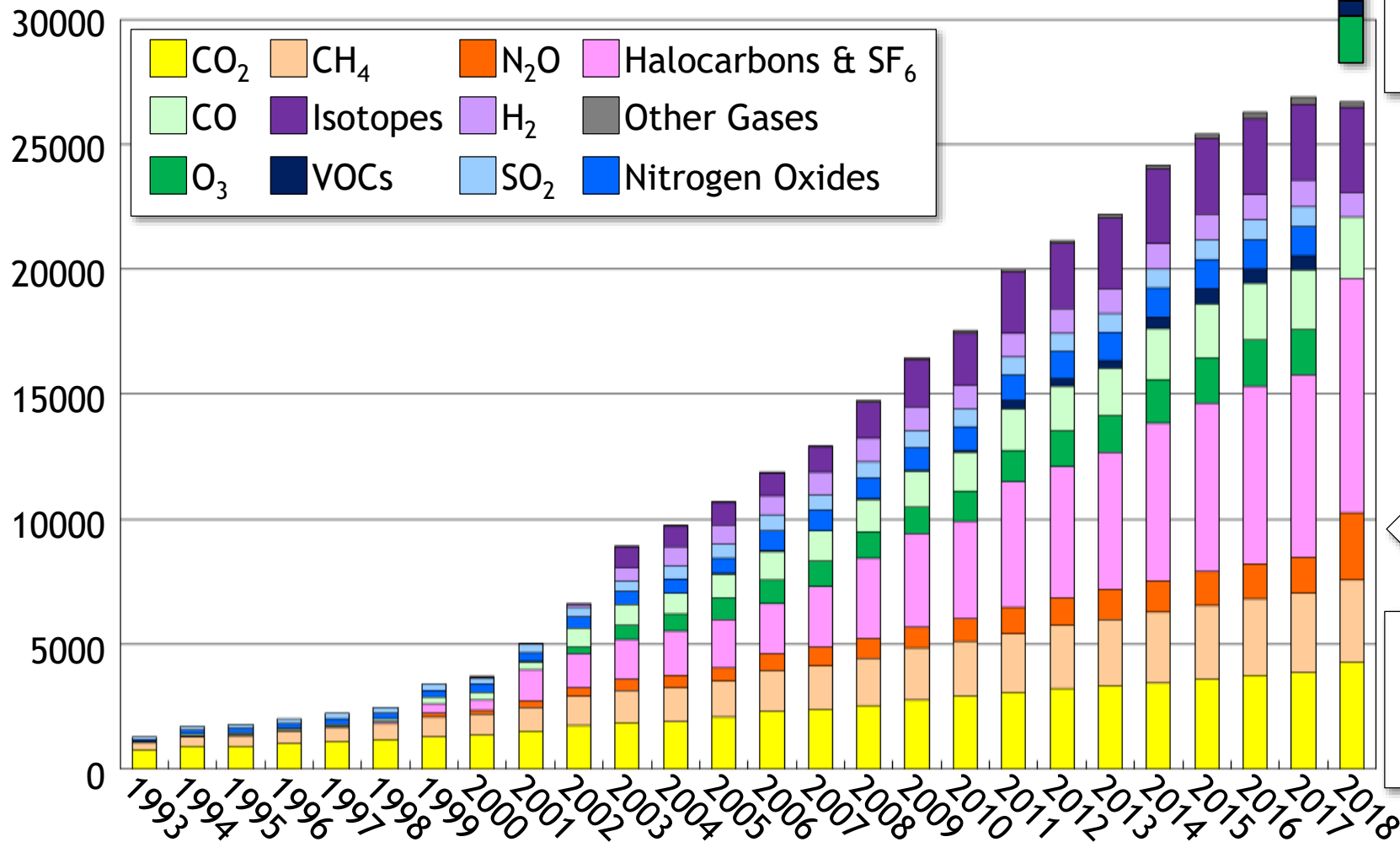
REGION I (Africa)	10
REGION II (Asia)	13
REGION III (South America)	5
REGION IV (North and Central America)	5
REGION V (South-West Pacific)	6
REGION VI (Europe)	25
ANTARCTICA	7
MOBILE	6

Note: There are countries that extend over multiple regions.



ET-WDC meeting, 1 October 2019.

# WDCGG Statistics (Gas species)



Transferred to WDCRG from 2018

O<sub>3</sub> VOCs SO<sub>2</sub> Nitrogen Oxides



Get it here until the migration is complete.

In 2018, NOAA's N<sub>2</sub>O and SF<sub>6</sub> data increased.

N<sub>2</sub>O Halocarbons & SF<sub>6</sub>

# Website renewal

# Website Renewal in August 2018

The screenshot shows the old WDCGG website. It has a green header with the WMO logo and the text "World Data Centre for Greenhouse Gases". A left sidebar contains a vertical menu with links like "Introduction", "Contributors", "Data/Quick Plot", "Publications", "Related Links", "Update Note", and "Home". The main content area features a "Welcome to the WDCGG Web Site" message, a world map with station locations, and a "What's new" section on the right with a list of updates from 2018 and 2019.

Closed on 30 November 2018



The screenshot shows the new WDCGG website. It has a modern, clean layout with a blue header. The main content area is divided into sections: "About WDCGG", "Data Archive", and "Contributors". A prominent "ATTENTION" box highlights that reactive gases measurement data has been migrated. A "Sign up now!" button is visible. The "What's new" section on the right shows updates from August 2018 to September 2019.

Renewal on 31 August 2018



The screenshot shows a notification message on a light green background. It states: "The WDCGG website was renewed on 31 August 2018 and the URL is below <https://gaw.kishou.go.jp/>. You will be redirected to the new page in 10 seconds."

Current old site

## What's New?

- Need **registrations** to download the data
- Changing **metadata** information
- Improved user **interface/data format**

# WDCGG Homepage

## About WDCGG

- Activities
- History
- About GAW
- Statistics

## Data Archive

### -surface/mobile

- Search
- Map
- List

- ### -satellite
- List

## Current State

- Global mean
- etc.

## Publications

- Data Summary
- GHG Bulletin
- etc.

## Manuals

- for Contributor
- for User

ET-WDC meeting, 1 October 2019.

Login to WDCGG as [User](#) [Contributor](#)

[Home](#) [Policy](#) [Link](#) [FAQ](#) [Sitemap](#)

The screenshot shows the WDCGG homepage layout. At the top, there is a navigation bar with a 'Home' link and a 'Login to WDCGG as' section containing 'User' and 'Contributor' buttons. Below this is a secondary navigation bar with links for 'Home', 'Policy', 'Link', 'FAQ', and 'Sitemap'. The main content area is divided into several sections: 'About WDCGG' (with a description of the center's mission and a 'Read more' link), 'Data Archive' (with a description of the archive and a 'Click here for details' link), and 'Contributors' (with a 'Sign up now!' button). A 'What's new' section on the right lists recent updates, including a correction to a data summary and the release of a bulletin. A red dashed box highlights the navigation and main content area, and a red arrow points from the 'Sign up now!' button in the bottom left towards the 'Sign up now!' button in the 'Contributors' section.

The screenshot shows the WDCGG homepage navigation menu. It includes a 'Home' link, a 'Welcome to WDCGG!' message, and a list of menu items: 'About WDCGG', 'Data Archive -surface/mobile', '-satellite', 'Current State of GHGs', 'Publications', 'Manuals', and '日本語版 (Japanese)'. A red border highlights the entire navigation area.

Sign up now!

Sign-up required for downloading data from the new WDCGG website

# How to register your data (for contributors)

Select data catalogue ➤ Input metadata ➤ Upload data files

The screenshot shows the 'Select Data Catalogue' step. It features a sidebar with a step-by-step navigation menu. The main content area has a heading 'Check the relevant gas species.' and a list of checkboxes for various gas species (CO2, CH4, N2O, etc.). Below this, there are several station selection boxes, each containing a list of gas species checkboxes. For example, 'Alligator liberty, M/V (ALL/JMA)' has checkboxes for CO2(ship-insitu-air-sampling), CO2(ship-insitu-sea-sampling), CO2(aircraft-flask-data), CH4(aircraft-flask-data), N2O(aircraft-flask-data), and CO(aircraft-flask-data).

The screenshot shows the 'Edit Metadata' step. It includes a table with columns for 'No.', 'Metadata', 'Required', 'Updated', and 'Edit'. The table lists 17 metadata items, with 'Organization', 'Contact(s)', 'Aim of Observation', 'Data Time zone', and 'Unit' marked as required. An 'Attention' box on the right contains a warning about session timeouts and a form with 'Name' and 'Email' fields and a 'Save' button.

No.	Metadata	Required	Updated	Edit
1	Organization	<input checked="" type="checkbox"/>		Edit
2	Collaborator(s)	<input type="checkbox"/>		Edit
3	Contact(s)	<input checked="" type="checkbox"/>		Edit
4	Aim of Observation	<input checked="" type="checkbox"/>		Edit
5	Data Time zone	<input checked="" type="checkbox"/>		Edit
6	Unit	<input checked="" type="checkbox"/>		Edit
7	Calibration Scale	<input type="checkbox"/>		Edit
8	Instrument(s)	<input type="checkbox"/>		Edit
9	Intake Height above ground level	<input type="checkbox"/>		Edit
10	Sampling Frequency	<input type="checkbox"/>		Edit
11	Measurement Calibration	<input type="checkbox"/>		Edit
12	Data Processing	<input type="checkbox"/>		Edit
13	Processing for averaging	<input type="checkbox"/>		Edit
14	Original Data Quality Flag (valid/invalid)	<input type="checkbox"/>		Edit
15	Reference(s)	<input type="checkbox"/>		Edit
16	Observation Status	<input type="checkbox"/>		Edit
17	Description	<input type="checkbox"/>		Edit

The screenshot shows the 'Upload Datafile' step. It includes instructions for uploading files (up to 10 MB each) and a section for submitting data files using an FTP server. There are input fields for 'Name' and 'Email' and a 'Submit' button.

1. Select the relevant gas species of each station to register on the WDCGG. (Multiple selections are possible)
2. Input metadata by selection column. (e.g. Organization, Contact(s), Aim of Observation, Time zone, Unit...)
3. Upload the data file on the WDCGG after checking metadata and station information.



# How to find/use data (for users)

- How to search data -

List

Map

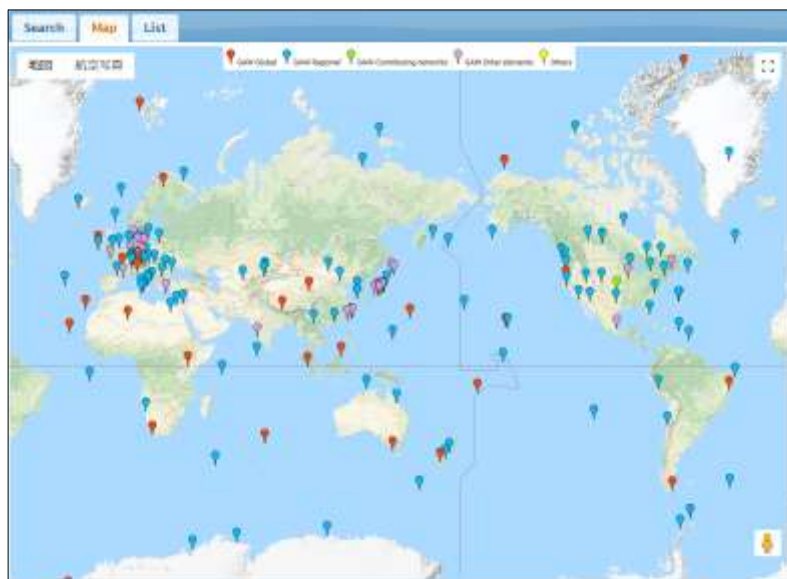
Keyword

by Station

STW ID	Station	Contributor	Country/Territory	WMO Region	Latitude (North + South)	Longitude	Altitude	Instrument
58P	Aerobase	NOAA (US)	Brazil	REGION 05 (South America)	-12.768884124	-38.188879182	0	CO2 CH4 N2O SF6 CFCs HCFCs
AL1	Alex	NOAA (US) / CSIRO (UK)	Canada	REGION 05 (North and Central America)	62.491144676	-62.341516116	270	CO2 CH4 N2O SF6 CFCs HCFCs HFCs PFCs SF6 CFCs CH4
AMC	Amsterdambank	NOAA (US)	France	REGION 01 (Africa)	-37.150818668	77.537808449	76	CO2 CH4 CO
50K	Assekrem	NOAA (US)	Algeria	REGION 01 (Africa)	33.2050664124	5.933333382	2710	CO2 CH4 N2O SF6 CFCs HCFCs

by Gas Species

Station	Contributor	WMO Region	Latitude	Longitude	Altitude	Instrument	Gas Species
Meca Head (MEO) Ireland	NOAA	REGION 03 (Europe)	53.000000000	-10.000000000	0	surface flask flask	CO2
Meca Head (MEO) Ireland	LSCE	REGION 03 (Europe)	53.000000000	-10.000000000	0	surface flask flask	CO2
Meca Head (MEO) Ireland	LSCE	REGION 03 (Europe)	53.000000000	-10.000000000	0	surface flask flask	CO2
Sand Island (MEO) United States of America	NOAA	REGION 03 (Europe)	53.000000000	-10.000000000	0	surface flask flask	CO2
Mt. Kenya (MKO) Kenya	NOAA	REGION 05 (North and Central America)	0.000000000	35.000000000	0	surface flask flask	CO2
Mikawa Ichinomiya (MKO) Japan	ASH	REGION 03 (Europe)	35.000000000	140.000000000	0	surface flask flask	CO2
Maceo Loe (MLO) United States of America	NOAA	REGION 03 (Europe)	19.000000000	-155.000000000	0	surface flask flask	CO2
Maceo Loe (MLO) United States of America	NOAA	REGION 03 (Europe)	19.000000000	-155.000000000	0	surface flask flask	CO2
Maceo Loe (MLO) United States of America	CSIRO	REGION 03 (Europe)	19.000000000	-155.000000000	0	surface flask flask	CO2



Search Map List

Use this function to search WDCGG archive data.

CAWID

Station/Mobile

WMO Region

Country/territory

Station Category

Platform

Gas Species

Sampling Type

Organization

- ✓ Many ways to find the data, including choosing from the entire list, picking up on the map, or searching by keywords.
- ✓ Registration is needed to download data files.

# How to find/use data (for users)

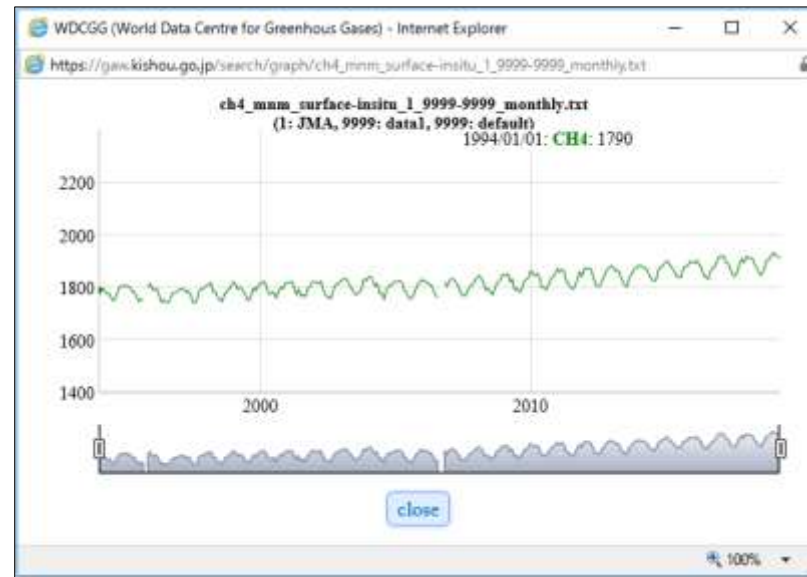
- What kind of data and metadata -

## Metadata

Field	Description
Collaborator(s)	
Aim of Observation	Background observation
Data Time zone	UTC+0900
Unit	ppb
Calibration Scale	1993-01-01 00:00:00 - 1999-12-31 23:59:59: WMO CH4 2004A
Instruments	1993-01-01 00:00:00 - 2009-12-31 23:59:59: MOIRA, CH4-15300000 2010-01-01 00:00:00 - 1999-12-31 23:59:59: Bond Science Inc. GC-1Scan chromatography #10
Station height above ground level	1993-01-01 00:00:00 - 1999-12-31 23:59:59: 20 (m)
Sampling frequency	10 minutes
Measurement Calibration	The quadratic fitting curve is determined every 8 hours by a set of 4 working standard gases of CH4 in natural air mixtures at different concentrations. The mole fraction is determined by this fitting curve (Jan. 2010 - present). The linear fitting curve was determined every 12 hours by a set of 2 station working standard gases of CH4 in natural air mixtures at different concentrations (Jan. 1994 - Dec. 2009).
Data processing	The raw data from instrument is collected by the data acquisition system, and stored in the system as every 10 minutes raw data (or 10 seconds mean data, Jan. 1994 - Dec. 2009). CH4 measurements are checked at the site by an operator every day. All irregular measurements and observations are recorded in a log book. Measurement data are transmitted to the headquarters every month and are checked again there. Finally, the measurement data are checked and validated by the coordinator at the headquarters.
Processing for averaging	[Hourly] Hourly data are taken from the arithmetic mean of observed data for one hour after the irregular and evident error data are rejected. For the details of background hourly data, please refer to <a href="https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html">https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html</a> [Daily] Daily data are taken from the arithmetic mean of background hourly data. For the details of background hourly data, please refer to <a href="https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html">https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html</a> [Monthly] Monthly data are taken from the arithmetic mean of background hourly data. For the details of background hourly data, please refer to <a href="https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html">https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html</a>
Original data quality flag	0: 0: no background condition 1: background condition 2: missing Daily and Monthly data: 1: no valid hourly data 2: valid hourly data 3: valid to averaging For the details, please refer to <a href="https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html">https://www.data.jma.go.jp/gmd/ew/ghg_obs/JMAflag.html</a>

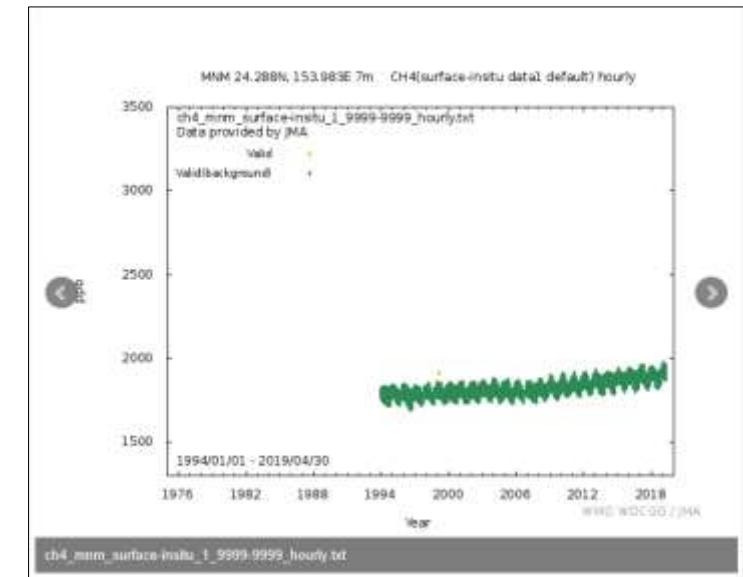
- ✓ Organization
- ✓ Contact(s)
- ✓ Aim of Observation
- ✓ Time zone
- ✓ Unit...

## Time-series data



- ✓ Monthly data plot
- ✓ Period can be changed freely
- ✓ Value is displayed by mouse over

## All plots data



- ✓ All kinds data can be plotted
- ✓ Separate valid data and valid(background) data by flag

# How to find/use data (for users)

- Download observation data -

## Download list

The screenshot shows the 'Download list' interface for Be-7 data. At the top, there are tabs for 'Search', 'Map', and 'List'. Below the tabs, the text reads: 'To get all of the <sup>7</sup>Be files in tgz format, click [here](#). To get <sup>7</sup>Be files for individual stations, click the relevant "file" button in the table below.' There is a search bar with the placeholder text '(start typing)'. Below the search bar is a table with columns: 'DL', 'Favorite', 'Station/Mobile (GAW ID, Country)', 'Contributor', 'Data', and 'Platform: Sampling Type Buffer'. The table contains one row for 'Zugspitze-Schwefelmeßstation (ZSE, Germany)'. A red dashed box highlights the 'DL' column. Below the table is a yellow box with the text: 'Download Data Files: Check here to indicate that you agree to the GAW Data Policy and the WDCGG Privacy Policy. \*Text  NetCDF  Hourly  Daily  Monthly  Event. A blue 'Data Download' button is at the bottom.

## My Favorite

The screenshot shows the 'My Favorite' interface for CO2 data. At the top, there are tabs for 'Search', 'Map', and 'List'. Below the tabs, the text reads: 'To get all of the CO2 files in tgz format, click [here](#). To get CO2 files for individual stations, click the relevant "file" button in the table below.' There is a search bar with the placeholder text '(start typing)'. Below the search bar is a table with columns: 'DL', 'Favorite', 'Station/Mobile (GAW ID, Country)', 'Contributor', 'Data', and 'Platform: Sampling Type Buffer'. The table contains four rows for different CO2 stations: 'Mert (M, Canada)', 'Framontofuna (JMA, Japan)', 'Hon (JMA, Japan)', and 'Inagunima (JMA, Japan)'. A red dashed box highlights the 'DL' column. Below the table is a yellow box with the text: 'Download Data Files: Check here to indicate that you agree to the GAW Data Policy and the WDCGG Privacy Policy. \*Text  NetCDF  Hourly  Daily  Monthly  Event. A blue 'Data Download' button is at the bottom.

- ✓ Download from multiple observational sites is possible on the new WDCGG website.
- ✓ User ID registration is required to download data.

- ✓ If you often look at specific data, please use My Favorite.

When you download, the download information is sent to the data provider(s).

# Feedback to data providers

- Why need an contributor/user ID -

ID  
WDCGG

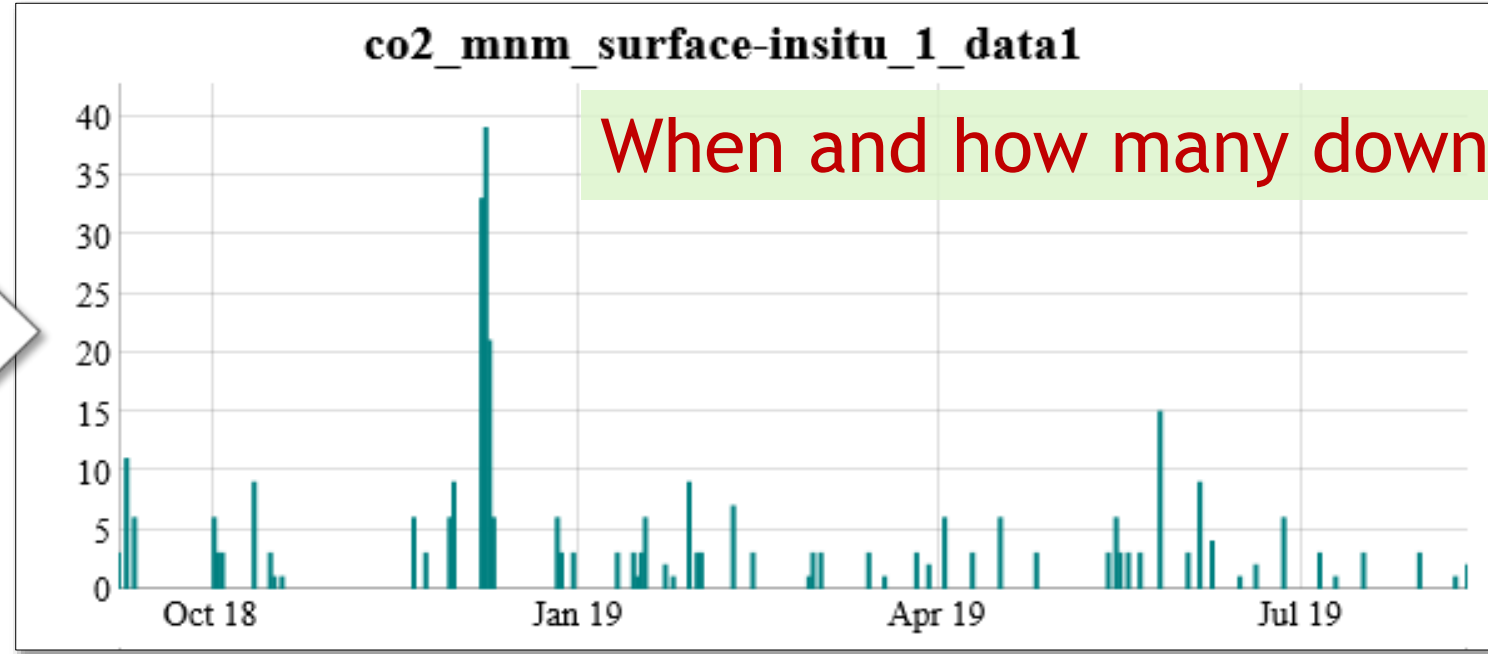
Password  
\*\*\*\*\*

You are  
 User  
 Contributor

Verify address

Login

[Forgot your password?](#)



```
2019/5/20 1 #Atsuya Kinoshita::a-kinoshita@met.kishou.go.jp
2019/5/25 2 #Saki Ohkubo::s.ohkubo@met.kishou.go.jp
2019/6/2 3 #Shou Shimamura::shou.shimamura@met.kishou.go.jp
2019/6/5 4 #Yousuke Sawa::yousuke.sawa-a@met.kishou.go.jp
...
```

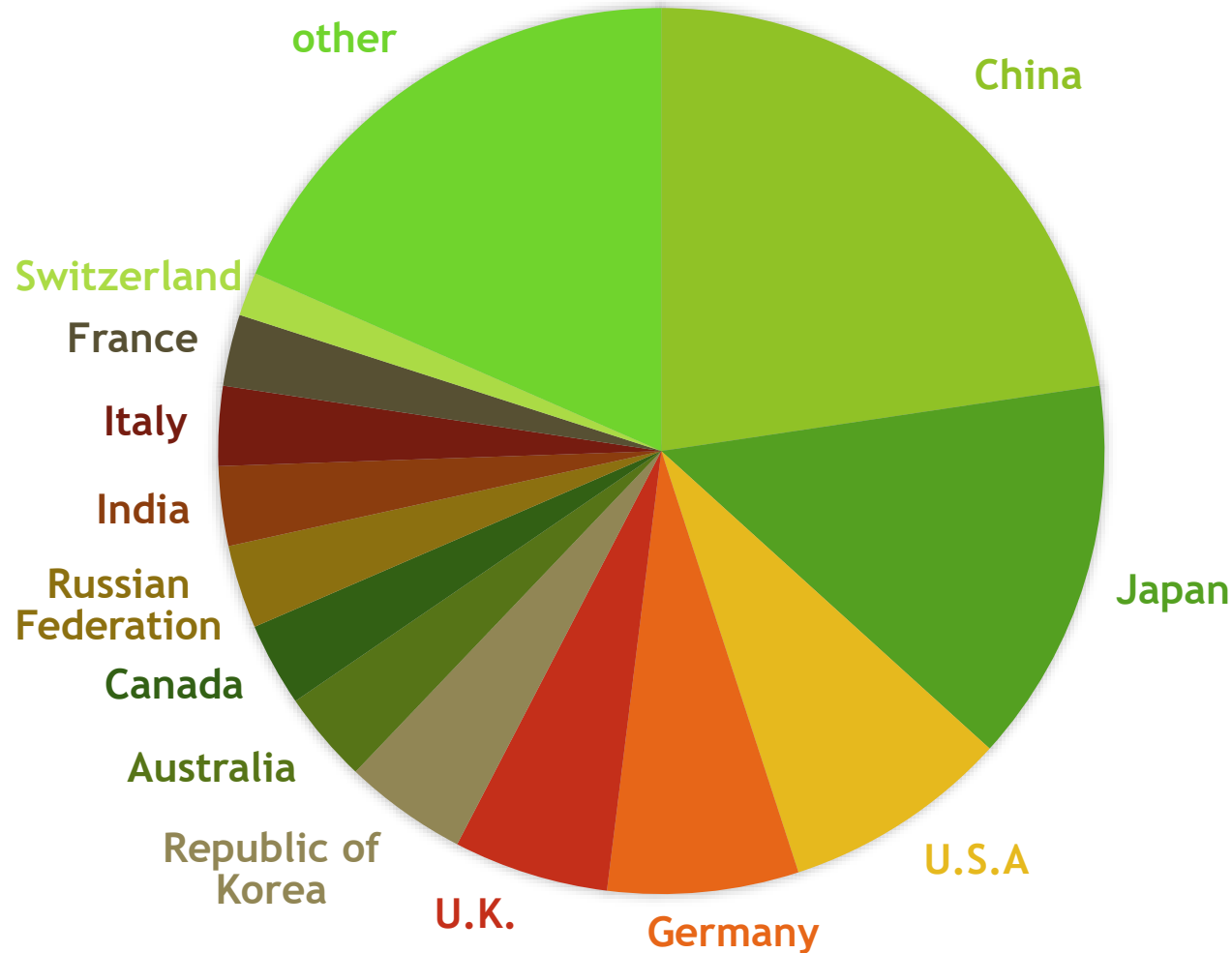
Who download?

✓ Data provider (Contributor) gets download information about data users.

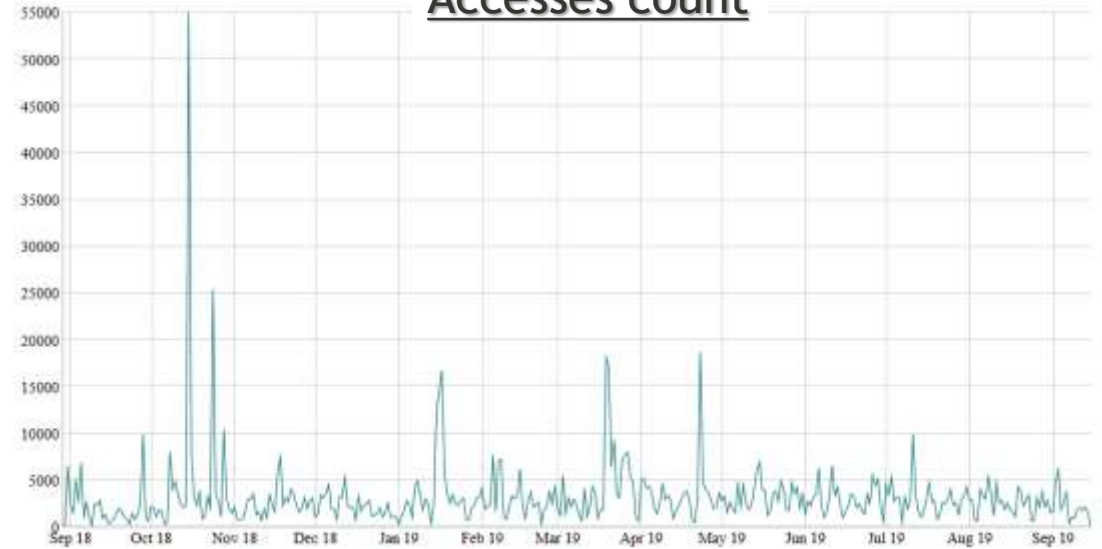
# Statistics on WDCGG users

- Who and how many access -

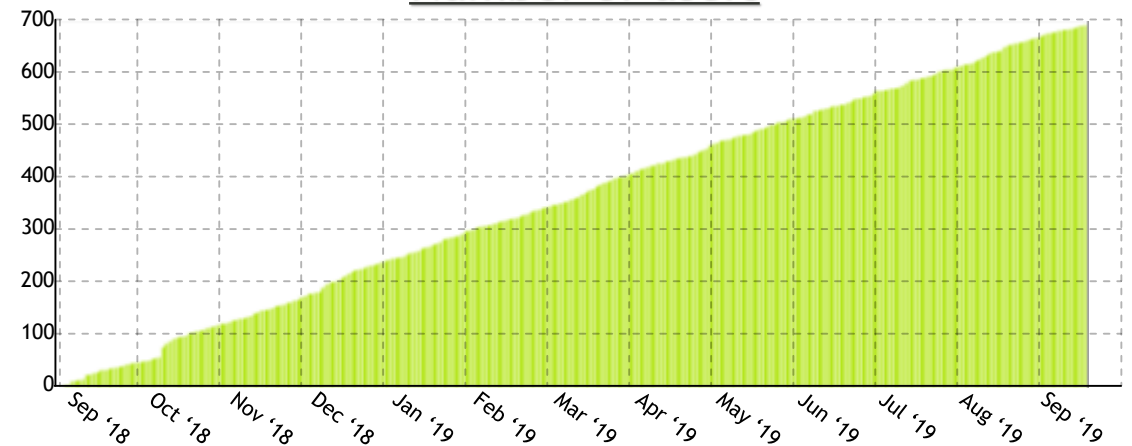
## USER'S COUNTRY/TERRITORY



## Accesses count



## Number of users



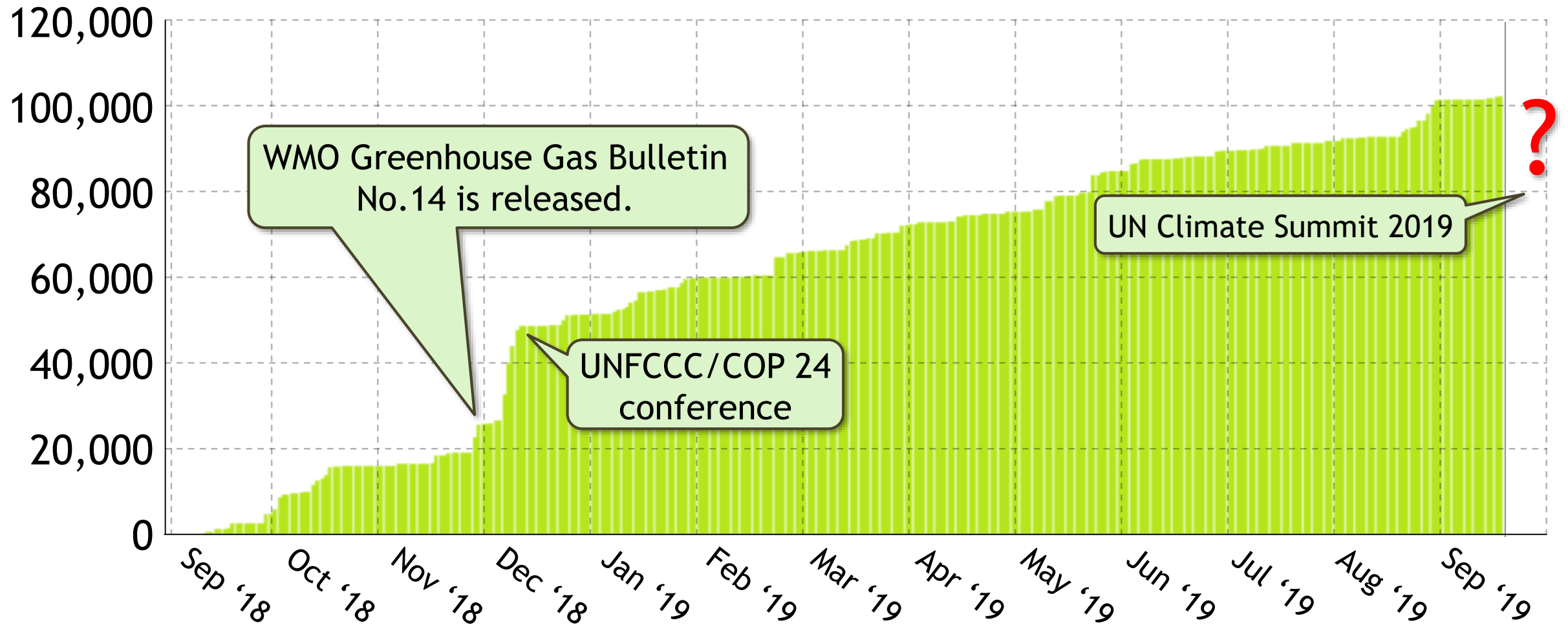
As of 17 September 2019

ET-WDC meeting, 1 October 2019.

# Statistics on WDCGG users

- When download -

## Total download count since opening of the new WDCGG website



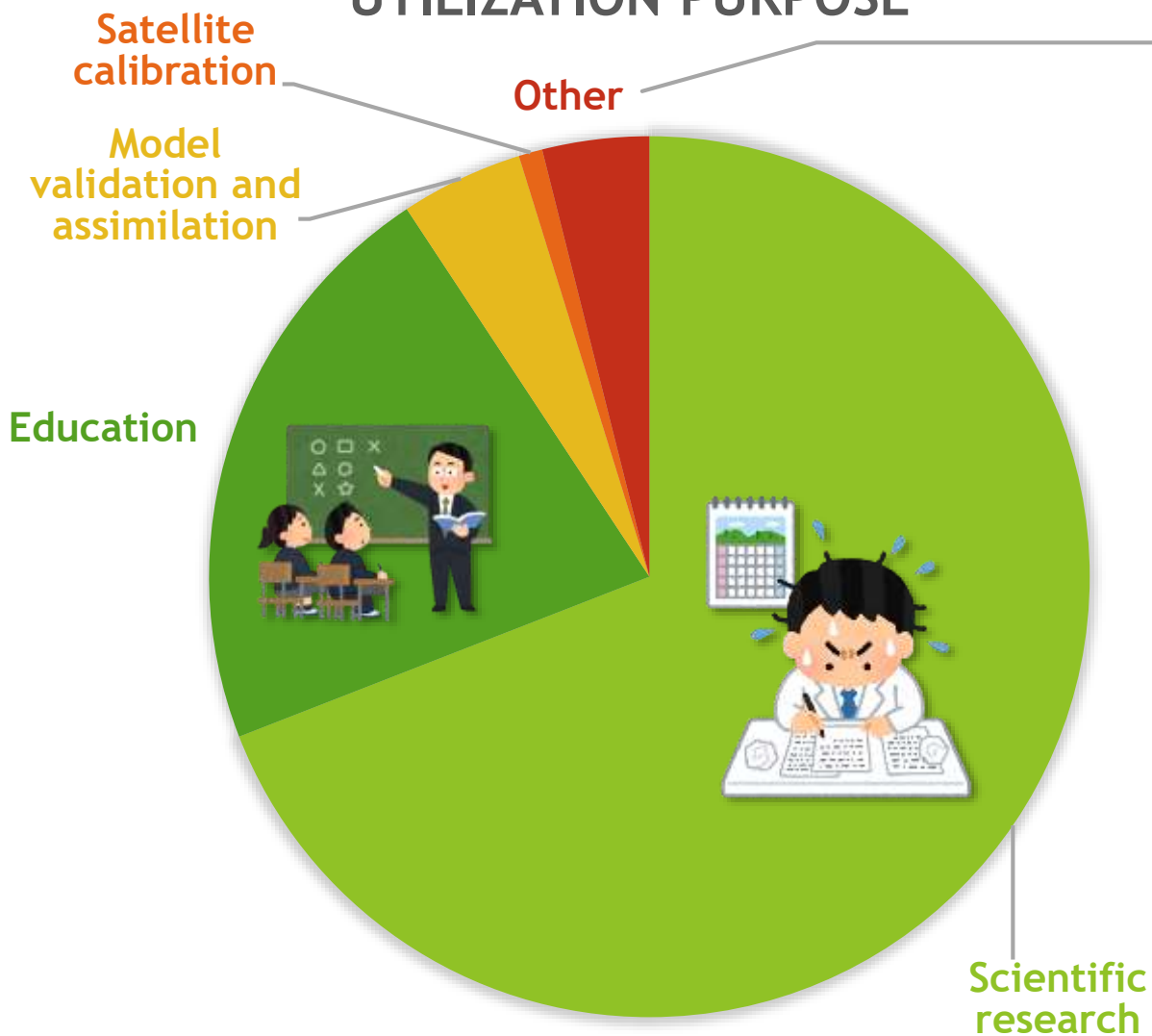
As of 17 September 2019

ET-WDC meeting, 1 October 2019.

# Statistics on WDCGG users

- How used -

## UTILIZATION PURPOSE



## Other purpose

- ✓ Internal and public research on climate change and megatrends
- ✓ Data to use within my third year dissertation
- ✓ I have been Interested in Climate Change for the last 10 years.
- ✓ Personal interest in climate change
- ✓ Airborne validation
- ✓ News reporting
- ..... and so on.

# Changing the data format

```
C01 TITLE: CO2 hourly mean data
C02 FILE NAME: ryo239n00.jma.as.cn.co2.n1.hr2013.dat
C03 DATA FORMAT: Version 1.0
C04 TOTAL LINES: 5120
C05 HEADER LINES: 32
C06 DATA VERSION: 201307
C07 STATION NAME: Ryori
C08 STATION CATEGORY: Regional
C09 OBSERVATION CATEGORY: Air sampling observation at a stationary platform
C10 COUNTRY/TERRITORY: Japan
C11 CONTRIBUTOR: JMA
C12 LATITUDE: 39.03
C13 LONGITUDE: 141.82
C14 ALTITUDE: 260
C15 NUMBER OF SAMPLING HEIGHTS: 1
C16 SAMPLING HEIGHTS: 20
C17 CONTACT POINT: y-fukuyama@met.kishou.go.jp
C18 PARAMETER: CO2
C19 COVERING PERIOD: 2013-01-01 2013-07-31
C20 TIME INTERVAL: hourly
C21 MEASUREMENT UNIT: ppm
C22 MEASUREMENT METHOD: NDIR
C23 SAMPLING TYPE: continuous
C24 TIME ZONE: Local time UTC+9
C25 MEASUREMENT SCALE: WMO X2007 scale
...
C30 COMMENT:
C31
C32  DATE TIME          DATE TIME          CO2   ND    SD    F CS    REM
2018-01-01 00:00  9999-99-99 99:99    413.65  101  0.132  -7  0  -99999999
2018-01-01 01:00  9999-99-99 99:99    413.56  105  0.088  -7  0  -99999999
...
```

```
# header_lines : 189
# Data_Set_Name : co2_ryo_surface-insitu_1_9999-9999_hourly
# Data_Set_Version : 0001-2012-1001-01-01-9999_2018-09-26-1710
# Data_Set_Fair_Use : For Scientific purposes, access to these data .....
#
# GLOBAL ATTRIBUTES
#
# site_gaw_id : RYO
# site_gaw_type : GAW Regional
# site_name : Ryori
# site_country/territory : Japan
# site_wmo_region : REGION II (Asia)
# site_address1 : 1-25,Tahamashimo, Ryori
# site_address2 : Sanriku-cho, Ofunato-shi
# site_address3 : Iwate 022-0211, Japan
# site_latitude : 39.0319
# site_longitude : 141.8222
# site_elevation : 260
# site_elevation_unit : m
# site_lst2utc : UTC+09:00
# site_climate_zone : Cfb
# site_climate_zone:comment : warm temperate climate, fully humid, warm summer
# dataset_creation_date : 2018-09-27
...
# VARIABLE ORDER
#
# site_gaw_id year month day hour minute second year month day hour minute
# second value value_unc nvalue latitude longitude altitude elevation
# intake_height flask_no ORG_QCflag QCflag instrument measurement_method scale
RYO 2018 01 01 00 00 00 -999 -9 -9 -9 -9 413.65 0.132 101 39.0319 141.8222
280 260 20 -999.999 -7 1 3 9 1
...
```

## 1. Flexible header length

The new data header with flexible length contains more detailed metadata compared to the old header.

## 2. Improved and expand metadata information

A data file format mainly intended for machine processing while maintaining human visibility.

## 3. Unity data format

A single format is now applied independent of gas species or platforms.

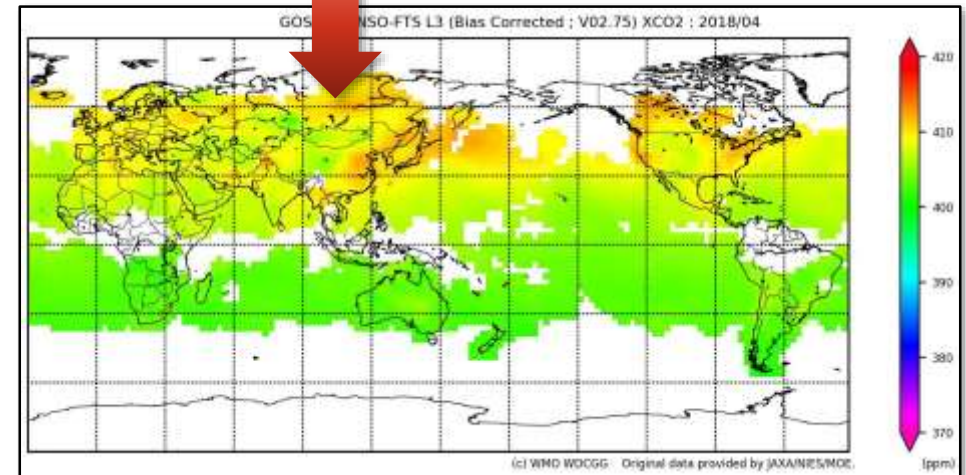
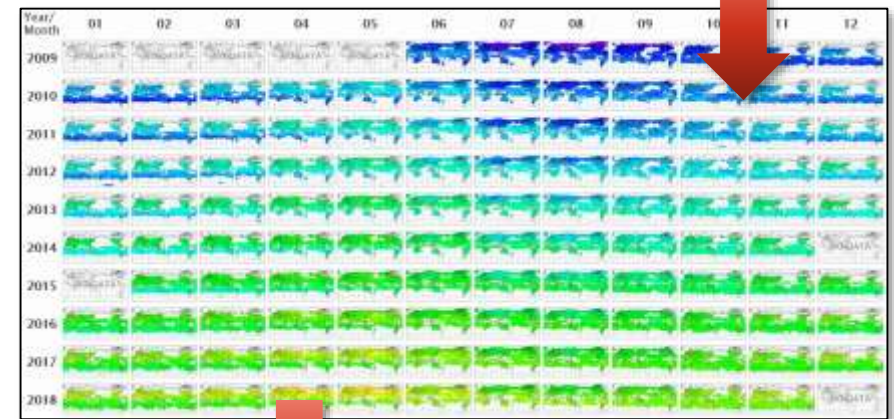


# Start provision of satellite data

# Provision of satellite data since March 2019

Satellite	Organization	Gas Species	Version <i>* : the latest version</i>	Updated Date	Gallery/Metadata
GOSAT	NIES (National Institute for Environmental Studies)	CO <sub>2</sub>	0053-9001-1001-08-08-9999 -2019-03-19-0900*	2019-03-19	<a href="#">view</a>

- ✓ WDCGG began online provision of CO<sub>2</sub> observation data from Japan's Ibuki Greenhouse gases Observing SATellite (GOSAT).
- ✓ Monthly global map of column-averaged CO<sub>2</sub> mole fractions can be seen in the Gallery/Metadata.
- ✓ Downloadable CO<sub>2</sub> data are L2 column volume (SWIR) in daily (combined by month) HDF5 Format.



DL <input checked="" type="checkbox"/>	Gas Species	Organization	Type	Period	Filename	Size
<input checked="" type="checkbox"/>	CO <sub>2</sub>	NIES	daily	2009-04-23 - 2009-04-30	SWIRL2CO2_200904_V02.75.tar	4.18MB
<input checked="" type="checkbox"/>	CO <sub>2</sub>	NIES	daily	2009-05-01 - 2009-05-31	SWIRL2CO2_200905_V02.75.tar	5.61MB
<input checked="" type="checkbox"/>	CO <sub>2</sub>	NIES	daily	2009-06-01 - 2009-06-30	SWIRL2CO2_200906_V02.75.tar	15.66MB
<input checked="" type="checkbox"/>	CO <sub>2</sub>	NIES	daily	2009-07-01 - 2009-07-31	SWIRL2CO2_200907_V02.75.tar	18.95MB

# Presentations at scientific meetings

# 15<sup>th</sup> IWGGMS

15<sup>th</sup> International Workshop on Greenhouse Gas Measurements from Space

June 3-5, 2019, Hokkaido, Japan

JMA participants: Atsuya Kinoshita, Saki Ohkubo, Takashi Maki(MRI)



# 15<sup>th</sup> IWGGMS

June 3-5, 2019, Hokkaido, Japan

The goal of the workshop is to review the state of the art in remote sensing of carbon dioxide, methane, and other greenhouse gases from space.

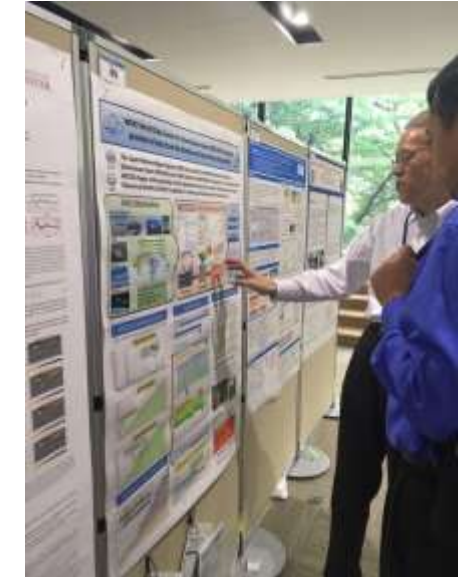
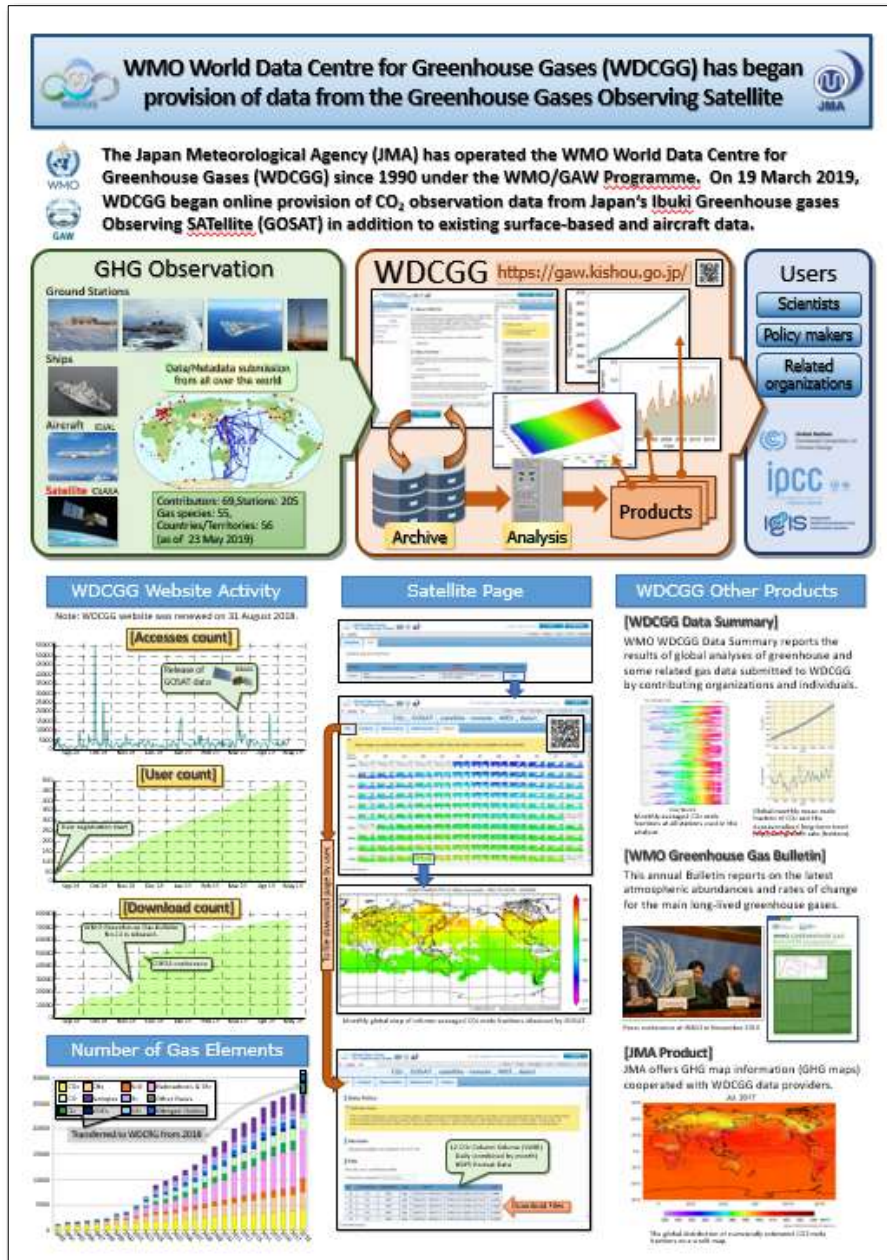
## Our Activities

### Public relations

- WDCGG began online provision of CO<sub>2</sub> observation data from Japan's Ibuki Greenhouse gases Observing SATellite (GOSAT).

### Request

- Agreement was obtained from Dr. Crisp to include OCO-2 data in the WDCGG.



Dr. David Crisp

# SAG-GHG / GGMT-2019

September 1-5, 2019, Jeju, Republic of Korea  
JMA participants: Yousuke Sawa, Atsuya Kinoshita, Teruo Kawasaki



# SAG-GHG / GGMT-2019

September 1-5, 2019, Jeju, Republic of Korea

**Operation of new WDCGG website and started of satellite data collection**  
Atsuya Kinoshita, Saki Ohkubo, Shou Shimamura, Yousuke Sawa WDCGG/WMO Japan Meteorological Agency

The WMO World Data Centre for Greenhouse Gases (WDCGG) is one of the World Data Centres (WDCs) under the Global Atmosphere Watch (GAW) programme, which has been operated by the Japan Meteorological Agency (JMA) since 1990. It serves to collect, archive and distribute data on such gases (e.g., CO<sub>2</sub>, CH<sub>4</sub>, CFCs and N<sub>2</sub>O) and other related gases (such as CO) in the atmosphere, which are measured under GAW and other programmes.

The new WDCGG website started on 31 August 2018, incorporating many requests from the data providers and users. Furthermore, on 19 March 2019, the WDCGG began online provision of CO<sub>2</sub> observation data from satellite in addition to existing surface-based and aircraft data.

**GHG Observations**  
Aircraft  
Ground

**WDCGG** <https://gaw.kishou.go.jp/>

**Products**  
WDCGG Data Summary  
WMO WDCGG Data Summary reports the results of global analyses of greenhouse and other related gas data submitted to the WDCGG by consolidating observations or products.

**Data providers (Contributors)**  
How to register your data  
Feedback to data providers

**Users (Scientists, Policy makers, Related organizations)**  
How to find/use data  
Changes in data format

**Started providing satellite data**  
The WDCGG began online provision of CO<sub>2</sub> observation data from space. Data of methane gas (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are also provided. The data is required to provide the use of this information and further improve the monitoring of global climate and the environmental CO<sub>2</sub> emissions/absorption indicators. The WDCGG plans to continue improving its services for the collection, archiving and distribution of satellite data worldwide, including for GOSAT-2 (the successor to GOSAT).

## Our Activities

### Public relations

➤ New WDCGG website description started in August 2018, incorporating many requests from the data providers and users.

- ✓ Better visibility of the data
- ✓ Changes in data format
- ✓ Start of sending relevant information to the data providers

➤ WDCGG started provision of satellite data in March 2019.

## Request

➤ Request for contributors to provide observation data not yet submitted to WDCGG.

# Regular Publications



# Regular Publications / WMO GHG Bulletin

WORLD METEOROLOGICAL ORGANIZATION | GLOBAL ATMOSPHERE WATCH

## WMO GREENHOUSE GAS BULLETIN

The State of Greenhouse Gases in the Atmosphere  
Based on Global Observations through 2017

No. 14 | 22 November 2018

### Unexpected Increases in Global Emissions of CFC-11

Measurements of the atmospheric abundance of the chlorofluorocarbon CFC-11, a potent greenhouse gas (GHG) and a stratospheric ozone-depleting substance (ODS) regulated under the Montreal Protocol... show that since 2012 its rate of decline has slowed to roughly two thirds of its rate of decline during the preceding decade [1, 2]. The most likely cause of this slowing is increased emissions associated with production of CFC-11 in eastern Asia. This discovery illustrates the importance of long-term measurements of atmospheric composition, such as are carried out under the auspices of the Global Atmosphere Watch (GAW) Programme of WMO, in providing effective support and additional constraints for emissions control legislation.

The Montreal Protocol was designed to protect the stratospheric ozone layer by restricting the production of ODSs such as CFCs. As a consequence, CFC-11 (trichlorofluoromethane, or CCl<sub>3</sub>F) production reported under the Montreal Protocol declined to zero by 2010. As CFC-11 was phased out, its atmospheric abundance peaked in the early 1990s and then declined in a manner largely consistent with declining production combined with residual emissions of CFC-11 gradually escaping from stored "banks" in existing products and equipment.

Atmospheric measurements of CFC-11 made by independent global networks show that since 2012 the rate of decrease in atmospheric CFC-11 has slowed to roughly two thirds of the rate that was observed between 2002 and 2012 [1, 2]. These global trends are shown in the left graph of the figure for

possible causes such as changing atmospheric transport. This conclusion is supported by recent increases in the northern to southern hemispheric differences in atmospheric concentration levels. Correlations between elevated abundances of CFC-11 and other measured gases further suggest that these increases originate from emissions in eastern Asia [1].

Separate CFC-11 emission trends resulting from model calculations taken from the 2018 WMO ozone assessment [2], based on data from each of the global measurement networks AGAGE (black) and NOAA (red), are shown in the graph on the right of the figure. They are contrasted to CFC-11 production as reported under the Montreal Protocol (green). These results show a leveling off of CFC-11 emissions around 2005, followed by an emission increase of about 15% after 2012. Emission scenario projections for the years 2006 and 2012 based on atmospheric data, reported production and releases from banks are shown as dots and dashed (gray), respectively.

This work demonstrates the importance of long-term measurements of atmospheric composition, such as are carried out under the auspices of the GAW Programme, in providing observation-based information to support national emission inventories, especially in the context of agreements to address anthropogenic climate change, as well as for the recovery of the stratospheric ozone layer.

### Global monthly mean mole fractions

Download csv data files.

Data (csv file)	CO <sub>2</sub> Mole fraction, Growth rate	CH <sub>4</sub> Mole fraction, Growth rate	N <sub>2</sub> O Mole fraction, Growth rate
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WMO Greenhouse Gas Bulletin No.14, 2018.

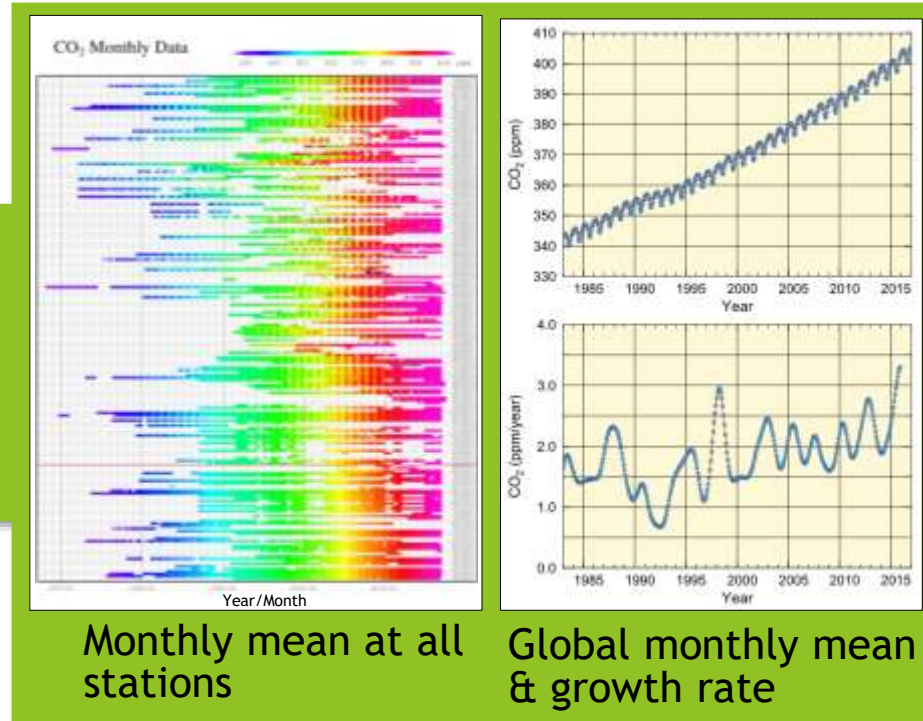
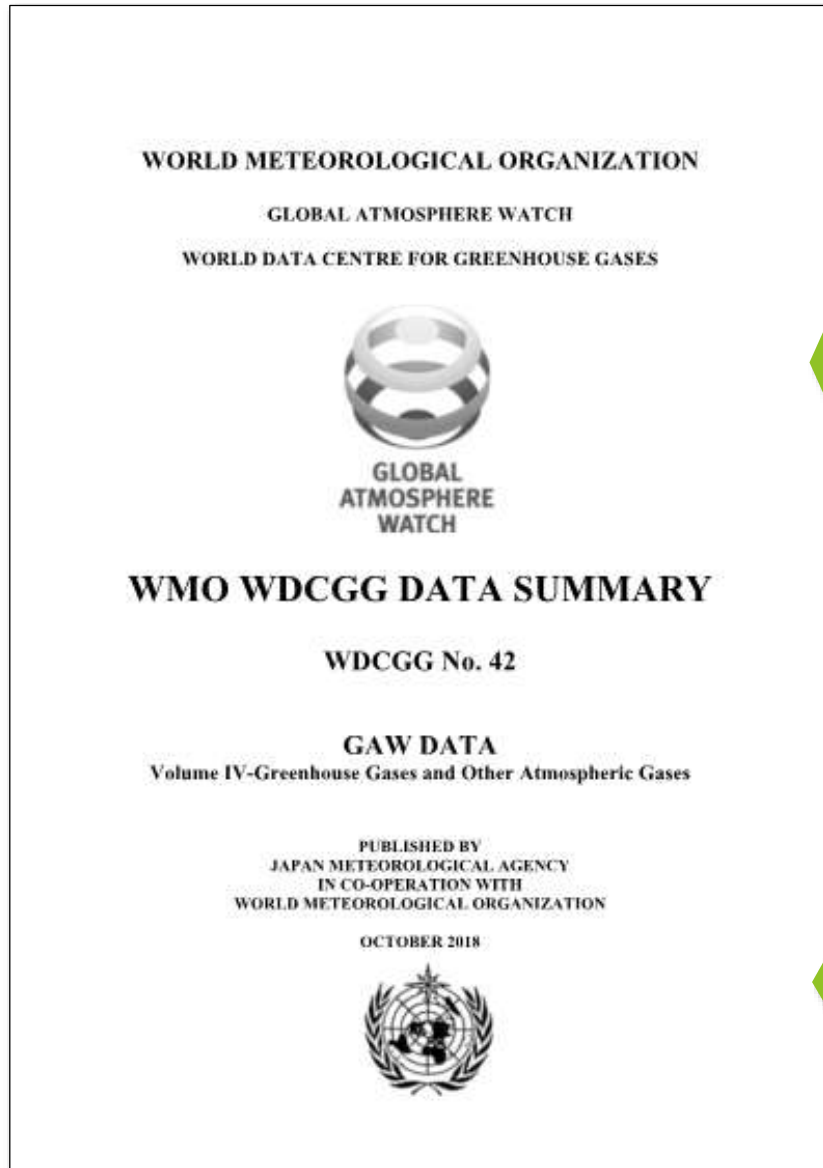
Globally averaged mole fractions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) (annual, monthly)

Figure 7. Monthly mean mole fractions of SF<sub>6</sub> and the most important halocarbons: (a) SF<sub>6</sub> and lower mole fractions of halocarbons and (b) higher halocarbon mole fractions. The numbers of stations used for the analyses are as follows: SF<sub>6</sub> (85), CFC-11 (23), CFC-12 (25), CFC-113 (21), CCl<sub>4</sub> (3), CH<sub>2</sub>Cl<sub>2</sub> (24), HCFC-141b (6), HCFC-142b (14), HCFC-22 (13), HFC-134a (16), HFC-152a (8).

Monthly mean mole fractions (SF<sub>6</sub>, CFCs, HFCs, HCFCs, CCl<sub>4</sub>)

➤ Contents are prepared by SAG-GHG

# Regular Publications / WDCGG Data Summary



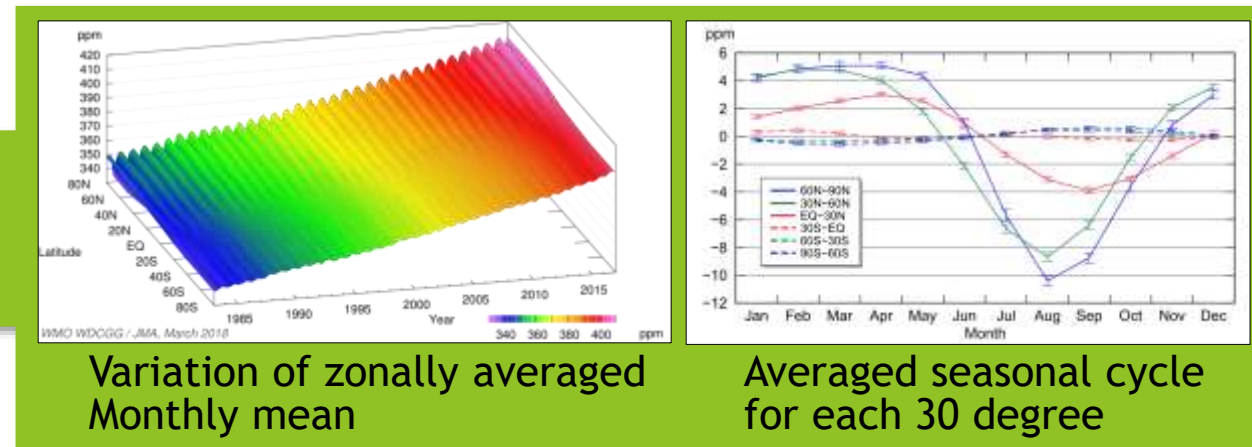
Monthly mean at all stations

Global monthly mean & growth rate

In addition

- ✓ Trend for each 30 degree
- ✓ Monthly mean for each 30 degree
- ✓ Calibration and standard scales
- ✓ Observational station list

..... and so on.

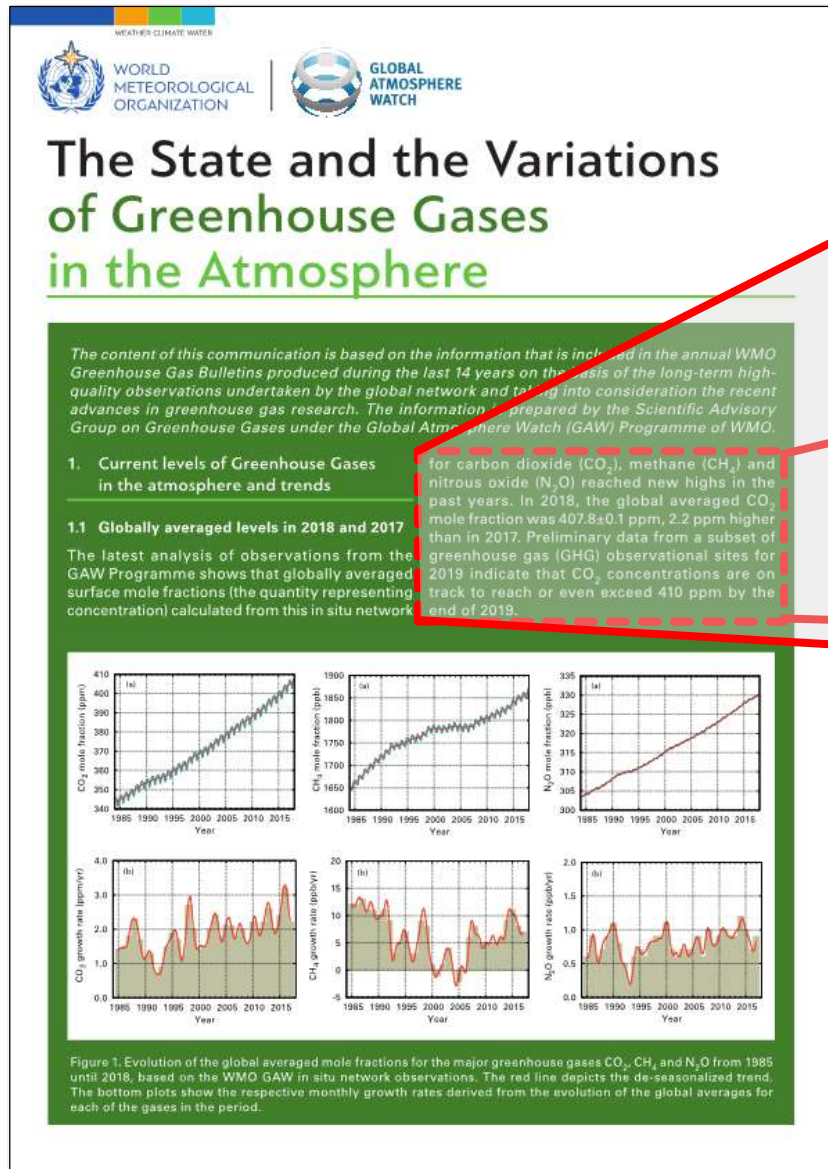


Variation of zonally averaged Monthly mean

Averaged seasonal cycle for each 30 degree

➤ All contents are prepared by our staff

# Report of WMO/GAW to the 2019 UN Climate Summit



for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) reached new highs in the past years. In 2018, the global averaged CO<sub>2</sub> mole fraction was 407.8±0.1 ppm, 2.2 ppm higher than in 2017. Preliminary data from a subset of greenhouse gas (GHG) observational sites for 2019 indicate that CO<sub>2</sub> concentrations are on track to reach or even exceed 410 ppm by the end of 2019.

✓ We asked contributors to send the latest data as possible to WDCGG one month earlier than usual for the Climate Summit.



in New York on 23 September 2019.

➤ Contents are prepared by WMO/GAW

# Current and future plans

# Currently working plans

## Publication of meteorological data

- ✓ WDCGG started collecting meteorological data records as environmental information for each observation station from this year again.
- ✓ Publication method is undecided yet.

## Expansion of satellite data

- ✓ WDCGG plans to continue improving its services for the collection, archiving and distribution of satellite data worldwide, including for GOSAT-2 (the successor to GOSAT).
- ✓ In addition, OCO-2 data will be included.

Item name	Number of digits	"No expression"	Data	Content	Explanation of the item
Site_gaw_id	3	-		Site code	3-letter site identification code as defined by GAW/SIS for stationary platforms
Year	4	-999		Year	Calendar year of observation
Month	2	-9		Month	Calendar month of observation
Day	2	-9		Day	Day of observation
Hour	2	-9		Hour	Hour of observation
Minute	2	-9		Minute	Minute of observation
Second	2	-9		Second	Second of observation
Wind_direction	Variable	-99.9		Wind direction (degree)	The angle in degrees between true north and the wind direction, and increases in a clockwise direction.
Wind_speed	Variable	-99.9		Average wind speed (m/s)	Speed of the wind averaged over the previous 10 minutes. If not, please note *
Relative_humidity	Variable	-99.9		Relative humidity (%)	
Precipitation_amount	Variable	-99.9		Precipitation amount (mm)	
Air_pressure	Variable	-999.9		Air pressure (hPa)	
Air_temperature	Variable	-99.9		Air temperature (degree Celsius)	
Dew_point_temperature	Variable	-99.9		Dew point temperature (degree Celsius)	
Sea_water_temperature	Variable	-99.9		Sea water temperature (degree Celsius)	Temperature at the observation point
Sea_surface_water_temperature	Variable	-99.9		Sea surface water temperature (degree Celsius)	
Sea_water_salinity	Variable	-9999.9		Sea water salinity (permil)	Sea water salinity at the observation point calculated using Practical Salinity Scale of 1978: PSS-78 and expressed in permil
Sea_surface_water_salinity	Variable	-9999.9		Sea surface water salinity (permil)	Sea surface water salinity calculated using Practical Salinity Scale of 1978: PSS-78 and expressed in permil
Latitude	Variable	-999.999999999		Latitude	Latitude of sampling location in decimal degrees (north: +; south: -)
Longitude	Variable	-999.999999999		Longitude	Longitude of sampling location in decimal degrees (east: +; west: -)
Elevation	Variable	-999.999		Station height	Station height (m) above sea level

# Future plans

## ➤ netCDF

Provision of netCDF format data in addition to text data

## ➤ DOI

Add DOI to each observation data

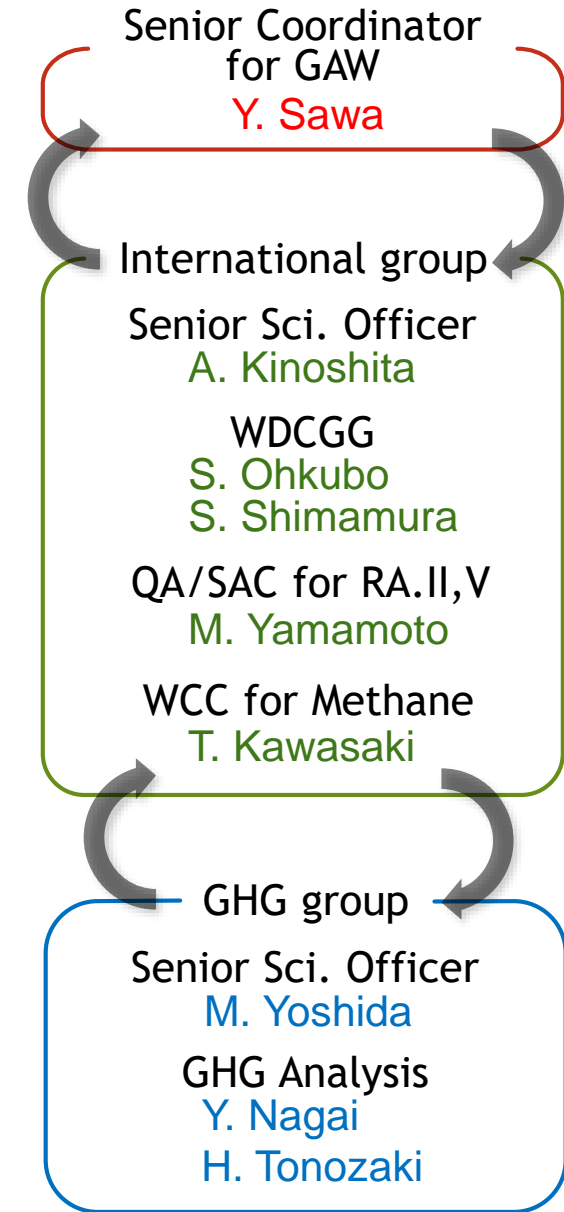
## ➤ Uncertainty column

WDCGG is requested to add the necessary uncertainty columns to data format (in GGMT-2019)

## ➤ GAWSIS

Exchange metadata with GAWSIS by automatic reading using API

# GAW/WDCGG staff in Atmospheric Environment Division, JMA



Thank you for your attention!