

# The progress of CMA S2S data center

China Meteorological Administration

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国家气象信息中心

National Meteorological Information Center

## 1. Data Synchronization

2. CMA S2S services

3. Service statistics



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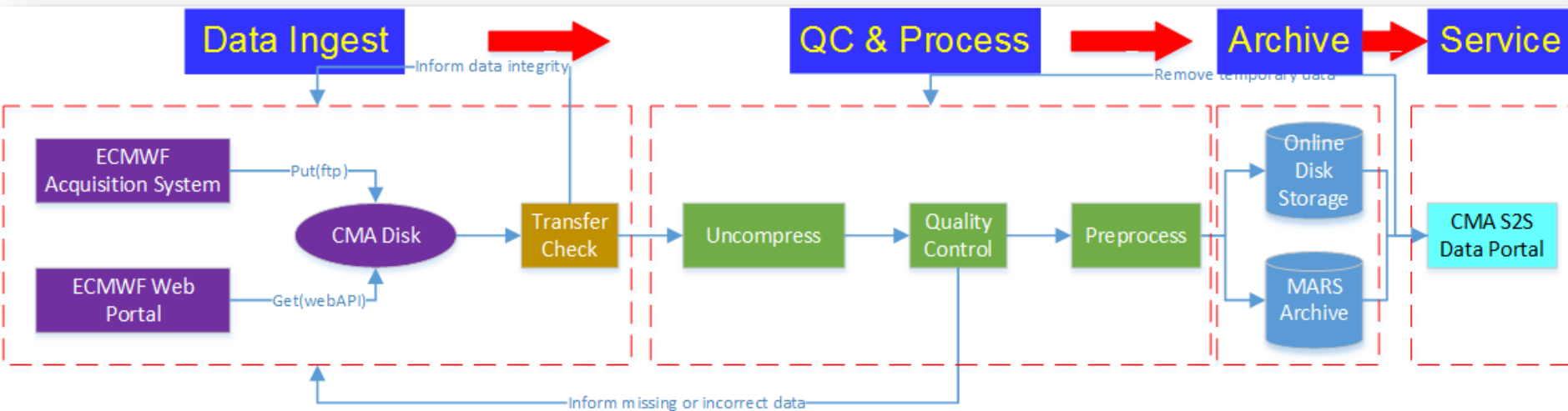
# Background

- Since 2015, CMA has established cooperation with ECMWF
  - CMA provides ECMWF with real-time prediction results of BCC model in S2S time-scale
  - CMA receives S2S data from 10 others product center, except CMA, from ECMWF
  - Check data format, processing, archive and management, and establish a portal for global service



# Construction of CMA S2S archiving center

- CMA S2S Data Archiving Center
  - Collection
  - Data extraction
  - Data storage
  - Data service portal



# Data Collection

- S2S data collection
  - ECMWF collects all S2S center products
  - CMA obtains all data except CMA from ECMWF Archive Center
  - ECMWF pushes directly to the CMA FTP site



# Data check

- Check items
  - Number of files
  - Data size
  - file format (tar.gz/tar/GRIB)
  - Make sure data timeliness and accuracy synchronize with ECMWF



# Data extraction

- Receive data each time → Merge into a big GRIB file
- Big GRIB file → Split into multiple files
  - Rule: s2s\_[centre]\_{yearOfCycle}\_[dataDate]\_{shortName}.grib
- Transfer to an online disk
  - \$DIR/[centre]/{yearOfCycle}/[year]/[month]/[day]



# Data storage management

- Online disk storage
  - Metadata: Index
  - Data: Large capacity disk(200TB)
  - Directory Structure  $\leftrightarrow$  File name mapping
    - Catalog: \$DIR/[centre]/{yearOfCycle}/[year]/[month]/[day]
    - File name: (s2s\_[centre]\_{yearOfCycle}\_{dataDate}\_{shortName}.grib)
      - Realtime forecasts: {yearOfCycle} = [year]
      - Hindcasts:
        - » Fixed model: {yearOfCycle} = 2015 or 2016
        - » Fly model: {yearOfCycle} = The year of the model version
- Other storage methods
  - Tape archiving





# The amount of data

- The amount of data is about 75TB, and the data storage method is NAS online.
- Storage based on the CMA's Cloud platform
  - Easy to dynamically expand



1. Data Synchronization

**2. CMA S2S services**

3. Service statistics



# CMA S2S data service portal

CMA S2S portal launched on **November 16, 2015.**

<http://s2s.cma.cn>


CMA S2S Archiving Data Center

CHINA METEOROLOGICAL DATA SERVICE CENTER (CMDC)

[Home](#) [Description](#) [Data Download](#) [Help](#)

[Login](#) [Register](#)

## About



**The Sub-seasonal to seasonal(S2S) Prediction Project**  
"Bridging the gap between weather and climate"

S2S, sub-seasonal to seasonal prediction project, is a WWRP/THORPEX-WCRP joint research project established to improve forecast skill and understanding on the sub-seasonal to seasonal time scale, and promote its uptake by operational centres and exploitation by the applications community.

CMA, one of the two S2S data archiving center, is responsible for collecting the S2S data from all data providers, performing basic quality check, archiving into both the MARS system and the online disk storage, and providing data service.

The S2S data portal provides both free text and faceted search method to access forecast and reforecast data in format of GRIB2. Up to now, list of parameters provided by each partner is [here](#).

## Notice/News more

[7th International Verification Methods Workshop \(7IVMW\), 3-11 May 2017, Berlin, Germany](#)

The Seventh International Verification Methods Workshop is being organised by the WMO Joint Working Group on forecast Verification Research and will be hosted in Berlin, Germany, jointly by the Free University of Berlin, the Max-Planck-Institute for Human Development, the Hans-Ertel-Centre for Weather Research (HErZ) and the German Weather Service DWD, from May 3 - 11, 2017. The goal of the workshop is to discuss and promote all aspects of verification methodology research and practice, as applied to weather forecasts and warnings, climate predictions, and their applications. Special sessions are planned on verification methods for sub-seasonal and longer range forecasts. Participants are welcome from operational, research and forecast user communities. Details can be found at <http://www.7thverificationworkshop.de> Updated: 2017-01-04 09:13 Blog on the S2S Extreme Workshop There is a blog on the S2S Extreme Workshop, held at the International Research Institute on Climate and Society, Columbia University, New York, from 6 to 7 December 2016. It is posted on the Columbia University site at <http://extremeweather.columbia.edu/2016/12/13/s2s-workshop/>

[KMA forecasts added to S2S database](#)

The both real-time and re-forecast outputs from KMA model have been archived in S2S database starting from the 1st of November, 2016.

# Data description

models

Models

BOM  
CMA  
ECCC  
ECMWF  
HMCR  
ISAC-CNR  
JMA  
KMA  
Meteo-France  
NCEP  
UKMO

Parameters

10 metre u-velocity  
10 metre v-velocity  
CAPE  
Convective precipitation  
Eastward turbulent surface stress  
Geopotential height  
Land sea mask  
Mean sea-level pressure  
Northward turbulent surface stress  
Orography  
Potential vorticity  
Sea ice cover

Models

The following blocks show the centres that provide data to this project together with the latest configuration systems. Follow the link of each Data Provider for specific model description.

BOM

Time range: d 0-62  
Resolution: T47L17  
Ens.Size: 33  
Frequency: 2/week  
Re-forecasts: fix  
Rfc length: 1981-2013  
Rfc frequency: 6/month  
Rfc size: 33  
Volume of real-time forecast per cycle:  
Volume of reforecast per update: 6 TB

CMA

Time range: d 0-60  
Resolution: T106L40  
Ens.Size: 4  
Frequency: daily  
Re-forecasts: fix  
Rfc length: 1994-2014  
Rfc frequency: daily  
Rfc size: 4  
Volume of real-time forecast per cycle:  
Volume of reforecast per update:

ECCC

Time range: d 0-32  
Resolution: 0.45x0.45 L40  
Ens.Size: 21

ECMWF

Time range: d 0-46  
Resolution: T639/319 L91  
Ens.Size: 51

parameters

# Data Access and download

- Subset
- parameter
  - time
  - center

The screenshot shows a web interface for data access. On the left is a sidebar with a 'Centers' menu (circled in red) containing a list of centers: BOM, CMA (selected), ECCC, ECMWF, HMCR, ISAC-CNR, JMA, KMA, Meteo-France, NCEP, and UKMO. Below it is a 'Parameters' menu (circled in red) listing various meteorological parameters. The main content area has two radio buttons: 'Realtime forecasts' (circled in red) and 'Hindcasts'. Under 'Realtime forecasts', there are date pickers for 'Start date' (2015-01-01) and 'End date' (2017-09-30). Under 'Hindcasts', there are date pickers for 'Realtime date' (2016-12-31) and 'Model version date' (2014-05-01). Below these is a 'Hindcast dates' section with a 'Select All' checkbox and a grid of checkboxes for dates from 2014-12-31 down to 1994-12-31. At the bottom, there is a 'Parameters' section (circled in red) with a 'Select All' checkbox and a list of parameters under the heading 'Instantaneous once a day (00Z)', including 10 metre u-velocity, Geopotential height, Potential vorticity, Surface pressure, U-velocity, and Vertical velocity.

**Centers**

- BOM
- CMA**
- ECCC
- ECMWF
- HMCR
- ISAC-CNR
- JMA
- KMA
- Meteo-France
- NCEP
- UKMO

**Parameters**

- 10 metre u-velocity
- 10 metre v-velocity
- CAPE
- Convective precipitation
- Eastward turbulent surface stress
- Geopotential height
- Land sea mask
- Mean sea-level pressure
- Northward turbulent surface stress
- Orography
- Potential vorticity

**Realtime forecasts**

Select a date in the interval 2015-01-01 to 2017-09-30. Dataset is available daily. [Read more](#)

Start date: 2015-01-01 End date: 2017-09-30

**Hindcasts**

Select a date after 2015-01-01. Dataset is available daily. [Read more](#)

Realtime date: 2016-12-31 Model version date: 2014-05-01

Hindcast dates:  Select All

<input type="checkbox"/> 2014-12-31	<input type="checkbox"/> 2013-12-31	<input type="checkbox"/> 2012-12-31	<input type="checkbox"/> 2011-12-31
<input type="checkbox"/> 2010-12-31	<input type="checkbox"/> 2009-12-31	<input type="checkbox"/> 2008-12-31	<input type="checkbox"/> 2007-12-31
<input type="checkbox"/> 2006-12-31	<input type="checkbox"/> 2005-12-31	<input type="checkbox"/> 2004-12-31	<input type="checkbox"/> 2003-12-31
<input type="checkbox"/> 2002-12-31	<input type="checkbox"/> 2001-12-31	<input type="checkbox"/> 2000-12-31	<input type="checkbox"/> 1999-12-31
<input type="checkbox"/> 1998-12-31	<input type="checkbox"/> 1997-12-31	<input type="checkbox"/> 1996-12-31	<input type="checkbox"/> 1995-12-31
<input type="checkbox"/> 1994-12-31			

**Parameters**

Select All

**Instantaneous once a day (00Z)**

Select All

<input type="checkbox"/> 10 metre u-velocity	<input type="checkbox"/> 10 metre v-velocity
<input type="checkbox"/> Geopotential height	<input type="checkbox"/> Mean sea-level pressure
<input type="checkbox"/> Potential vorticity	<input type="checkbox"/> Specific humidity
<input type="checkbox"/> Surface pressure	<input type="checkbox"/> Temperature
<input type="checkbox"/> U-velocity	<input type="checkbox"/> V-velocity
<input type="checkbox"/> Vertical velocity	



# Progress

## ➤ S2S data view

Home **S2S Products** Description Data Download Help

●●● Location : S2S Products

### Products

- All(199)
- ANOMALY(118)
- ELEMENT(63)
- Multi-center(2)
- Time Series(16)

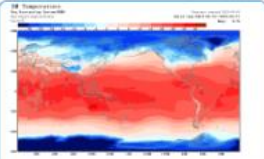
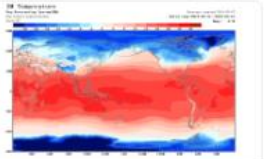
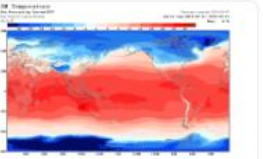
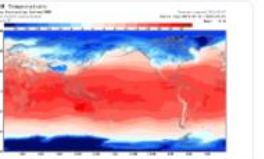
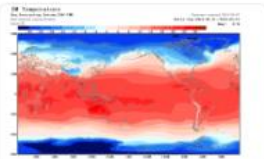
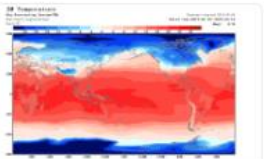
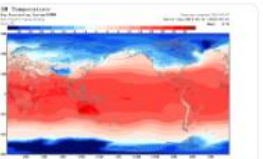
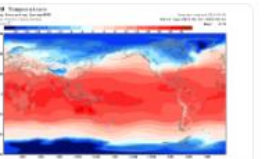
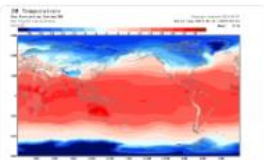
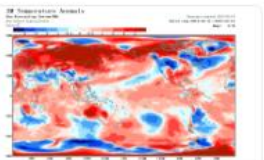
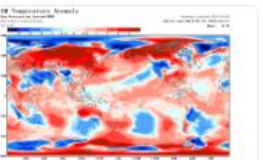
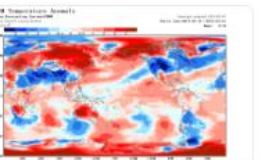
### Parameters

- Geopotential Height(36)
- Wind(45)
- Air pressure(14)
- Precipitation(26)
- Temperature(78)

### Centers

- ISAC-CNR(22)
- KMA(23)
- ECCC(23)
- CNRM (15)
- JMA(23)
- UKMO(22)
- NCEP(23)
- ECMWF(23)
- CMA(23)

### Product List (199)

 UKMO 2M Temperature 2019/02/18	 KMA 2M Temperature 2019/02/14	 ECCC 2M Temperature 2019/02/14	 CNRM 2M Temperature 2019/02/14
 ISAC-CNR 2M Temperat... 2019/02/14	 CMA 2M Temperature 2019/02/18	 ECMWF 2M Temperature 2019/02/18	 NCEP 2M Temperature 2019/02/18
 JMA 2M Temperature 2019/02/14	 KMA 2M Temperature A... 2019/02/14	 UKMO 2M Temperature ... 2019/02/18	 ECMWF 2M Temperatur... 2019/02/18

# Progress

## ➤ Method 1: Batch download

- Step 1. Choose center, parameter, realtime forecasts or hindcasts, then click “submit”;
- Step 2. In file list page, click “Batch Download” to get a batch list file.
- Step 3. Download tools can bulk download data files in the list.

**Centers**

- BOM
- CMA**
- ECCC
- ECMWF
- HMCR
- ISAC-CNR
- JMA
- KMA
- Meteo-France
- NCEP
- UKMO

**Parameters**

- 2 metre temperature
- Surface air maximum temperature
- Surface air minimum temperature
- Temperature
- Sea surface temperature
- Skin temperature
- Surface air dewpoint temperature
- Total precipitation
- Convective precipitation
- Total column water
- Surface pressure
- ..

**Realtime forecasts**  
Select a date in the interval 2015-01-01 to 2019-03-09.  
Start date: 2015-01-01

**Hindcasts**  
Select a date after 2015-01-01. Dataset is available daily.  
Realtime date: 2018-12-31  
Hindcast dates:  Select All

**Parameters**  
Daily averaged  
 2 metre temperature  
 Skin temperature  
 Total column water  
 Total cloud cover  
 Snow depth water equivalent  
 Snow albedo  
 Soil temperature top 100 cm  
 Soil moisture top 100 cm

**Results**

```
http://s2s.cma.cn/batchDownload/027981c1-992c-4b2e-8964-bbd8b3c91b09/s2s_babj_2019_20190309_asn.grib
http://s2s.cma.cn/batchDownload/fefaafdf-265e-4821-9e68-153981bc1ea5/s2s_babj_2019_20190309_2t.grib
http://s2s.cma.cn/batchDownload/a3edf042-dd08-475d-b364-937d1b57fbaa/s2s_babj_2019_20190308_asn.grib
http://s2s.cma.cn/batchDownload/4766b65c-df0b-44f0-9f0a-6e2c3be49c08/s2s_babj_2019_20190308_2t.grib
http://s2s.cma.cn/batchDownload/4c111a26-5a51-45e3-8134-79702d490e98/s2s_babj_2019_20190307_asn.grib
http://s2s.cma.cn/batchDownload/8a22b8e5-503b-4cd1-8a4e-12d9ca96bd30/s2s_babj_2019_20190307_2t.grib
http://s2s.cma.cn/batchDownload/016a8b31-a289-4897-a298-ad81ea82b728/s2s_babj_2019_20190306_asn.grib
http://s2s.cma.cn/batchDownload/ff3b519b-b940-446e-b135-7d1cc22f128d/s2s_babj_2019_20190306_2t.grib
http://s2s.cma.cn/batchDownload/9ca72035-c740-47ca-a99a-01de80c1dacc/s2s_babj_2019_20190305_2t.grib
http://s2s.cma.cn/batchDownload/44a8b9a7-8cce-4b95-b0d3-e82ac020913e/s2s_babj_2019_20190305_asn.grib
http://s2s.cma.cn/batchDownload/23952166-b2e7-4cf9-a738-102c7d164935/s2s_babj_2019_20190304_2t.grib
http://s2s.cma.cn/batchDownload/a59bedcd-ab0e-486d-bef7-8cc563aba635/s2s_babj_2019_20190304_asn.grib
http://s2s.cma.cn/batchDownload/ce57c26f-a8da-4d71-9eef-f1a9988e5ac2/s2s_babj_2019_20190303_2t.grib
http://s2s.cma.cn/batchDownload/df4da556-03da-4eb0-9d5b-5a1fdfe404c6/s2s_babj_2019_20190303_asn.grib
http://s2s.cma.cn/batchDownload/285d856e-a573-4d10-9664-fe6406e78d24/s2s_babj_2019_20190302_2t.grib
http://s2s.cma.cn/batchDownload/2a9f09a6-e3d6-47cc-956a-e8310aaa4b23/s2s_babj_2019_20190302_asn.grib
http://s2s.cma.cn/batchDownload/e00640aa-9c08-47b8-bc08-eccf9e50da3d/s2s_babj_2019_20190301_asn.grib
http://s2s.cma.cn/batchDownload/fc679c16-78cf-4172-85e1-eea17d205732/s2s_babj_2019_20190301_2t.grib
http://s2s.cma.cn/batchDownload/254dae3b-b167-46e1-ac15-b6de2615dcf9/s2s_babj_2019_20190228_asn.grib
http://s2s.cma.cn/batchDownload/87d3668a-69de-49dd-b76b-cc83bdf868b8/s2s_babj_2019_20190228_2t.grib
s2s_babj_2019_20190302_asn.grib
s2s_babj_2019_20190301_asn.grib
s2s_babj_2019_20190301_2t.grib
s2s_babj_2019_20190228_asn.grib
```

“Build order”.  
whose name is like the form of  
[center]\_[dataDate]\_[shortName].grib”, where centre, dataDate,  
[center]-data, yearOfModelVersion is a constant of 2015  
17, ... values for yearOfModelVerion in ECMWF S2S

**Build Order**

Wget Batch Download

4.72M
19.99M
4.77M
19.99M
4.83M
19.99M
4.85M
19.99M
19.99M
4.90M
19.99M
4.93M
19.99M
5.03M
5.08M
19.99M
5.11M

# Progress

## ➤ Method 2: Wget

- Step 1. After the choose page, click “wget”, the files extension name could be changed to cmd or sh in windows or linux OS system.
- Step 2. For windows, you need to install wget software. Then run it.

Results

To download data: select files and click "Build order".

The search result contains multiple files, whose name is like the form of "s2s\_[centre]\_[yearOfModelVersion]\_[dataDate]\_[shortName].grib", where centre, dataDate, shortName are obtained from GRIB2 meta-data, yearOfModelVersion is a constant of 2015 except for ECMWF. There are 2016, 2017, ... values for yearOfModelVerion in ECMWF S2S data.

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> select all <input checked="" type="checkbox"/> this page select		
<input checked="" type="checkbox"/>	s2s_babj_2019_20190309_asn.grib	4.72M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190309_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190308_asn.grib	4.77M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190308_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190307_asn.grib	4.83M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190307_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190306_asn.grib	4.85M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190306_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190305_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190305_asn.grib	4.90M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190304_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190304_asn.grib	4.93M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190303_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190303_asn.grib	4.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190302_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190302_asn.grib	5.03M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190301_asn.grib	5.08M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190301_2t.grib	19.99M	
<input checked="" type="checkbox"/>	s2s_babj_2019_20190228_asn.grib	5.11M	

```
Wget [85%] http://s2s.cma.cn/batchDownload/c73281af-5979-47a0-befb-b926bccf86b7/s2s_babj_2019_20190308_2t.grib
长度: 5003493 (4.8M) [application/x-download]
Saving to: `s2s_babj_2019_20190308_asn.grib'

100%[=====] 5,003,493  1.48M/s  in 3.2s

2019-03-30 13:12:29 (1.48 MB/s) - `s2s_babj_2019_20190308_asn.grib' saved [5003493/5003493]

C:\Users\xing\Downloads>wget http://s2s.cma.cn/batchDownload/c73281af-5979-47a0-befb-b926bccf86b7/s2s_babj_2019_20190308_2t.grib
SYSTEM_WGETRC = c:/progra~1/wget/etc/wgetrc
syswgetrc = D:\Program Files (x86)\GnuWin32/etc/wgetrc
--2019-03-30 13:12:29-- http://s2s.cma.cn/batchDownload/c73281af-5979-47a0-befb-b926bccf86b7/s2s_babj_2019_20190308_2t.grib
正在解析主机 s2s.cma.cn... 10.0.86.141
Connecting to s2s.cma.cn|10.0.86.141|:80... 已连接。
已发出 HTTP 请求, 正在等待回应... 200 OK
长度: 20958240 (20M) [application/x-download]
Saving to: `s2s_babj_2019_20190308_2t.grib'

85% [=====] ] 17,908,768  1.02M/s  eta 3s
```



# Progress

## ➤ Method 3: OPeNDAP

- Step 1. After the choose page, click “Build order” , OPeNDAP is on the right.
- Step 2. Click the button, and choose access OPeNDAP to view and fetch data.

Order No:2019033005280001

Datafiles Num:1470

Datafiles	FileSize(M)	Download	OpenDap
s2s_babj_2019_20190309_2t.grib	19.99		
s2s_babj_2019_20190308_2t.grib	19.99		
s2s_babj_2019_20190307_2t.grib	19.99		
s2s_babj_2019_20190306_2t.grib	19.99		
s2s_babj_2019_20190305_2t.grib	19.99		
s2s_babj_2019_20190304_2t.grib	19.99		
s2s_babj_2019_20190303_2t.grib	19.99		
s2s_babj_2019_20190302_2t.grib	19.99		
s2s_babj_2019_20190301_2t.grib	19.99		
s2s_babj_2019_20190228_2t.grib	19.99		

First Previous 1 2 3 4 5 6 7 8 9 10 11 ... Next End

Action:

Get ASCII

Get Binary

Show Help

Data URL:

Global Attributes: Originating\_or\_generating\_Center: Beijing (RSMC)  
Originating\_or\_generating\_Subcenter: 0  
GRIB\_table\_version: 11.0  
Type\_of\_generating\_process: Ensemble forecast  
file\_format: GRIB-2

Variables:  LatLon\_Projection: 32 bit Integer

LatLon\_Projection =

grid\_mapping\_name: latitude\_longitude  
earth\_radius: 6371229.0

lat: Array of 32 bit Reals [lat = 0..120]

lat:

units: degrees\_north

lon: Array of 32 bit Reals [lon = 0..239]

lon:

units: degrees\_east

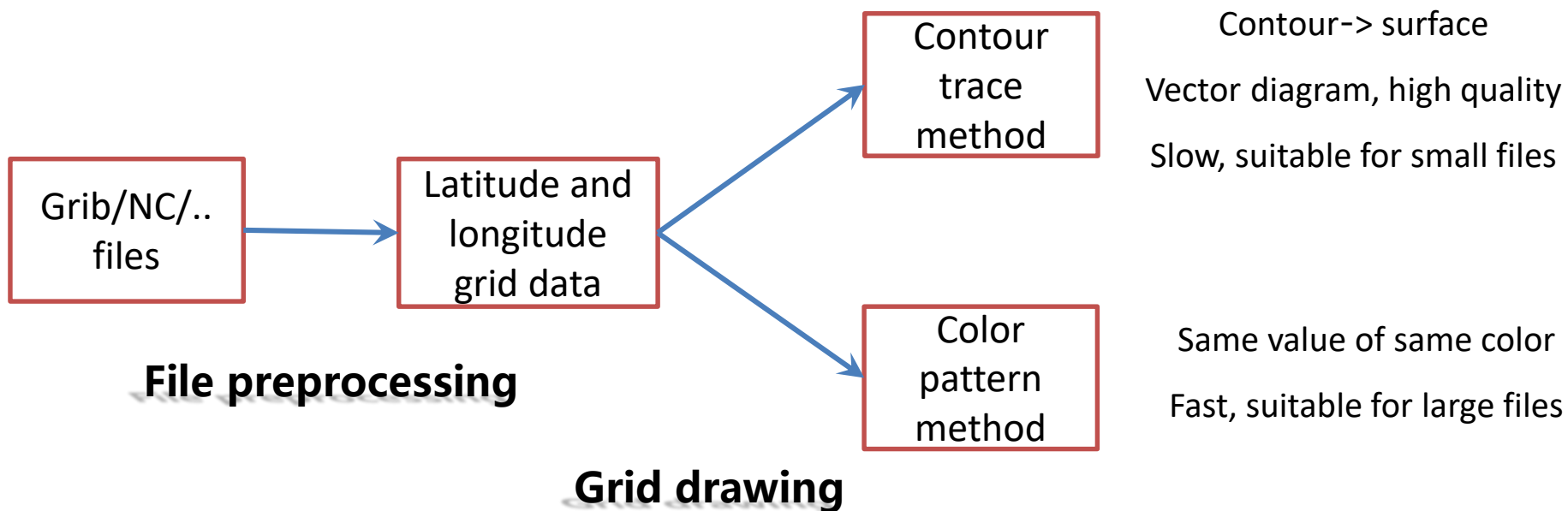
reftime: 64 bit Real

reftime =

units: Hour since 2019-03-08T00:00:00Z  
standard\_name: forecast\_reference\_time  
long\_name: GRIB reference time  
calendar: proleptic\_gregorian

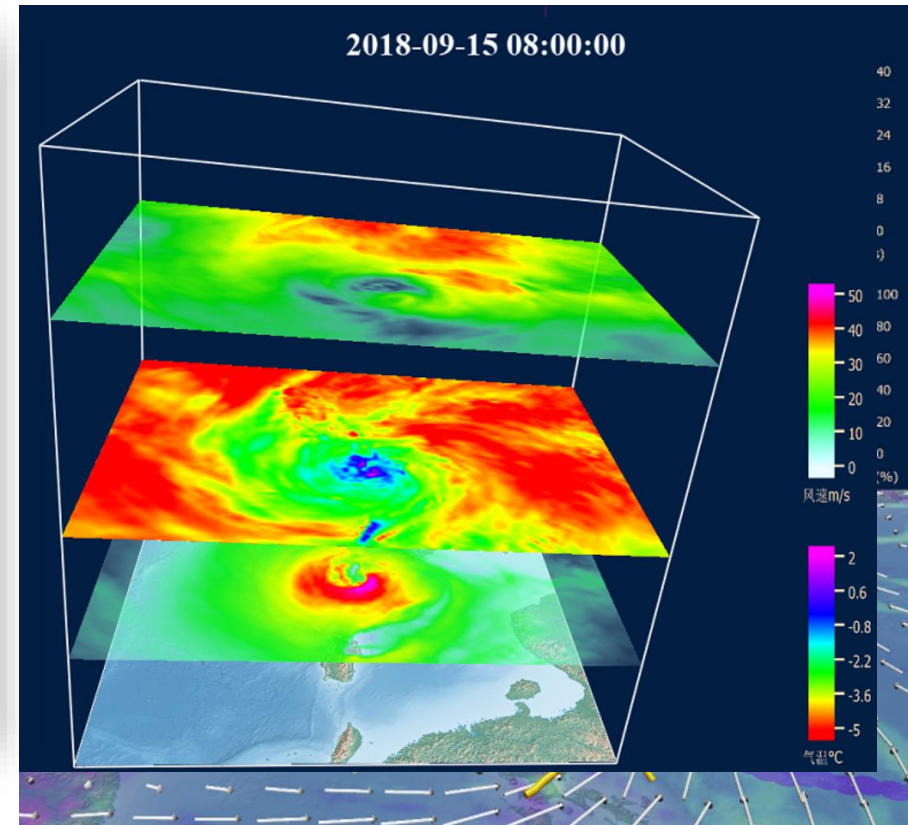
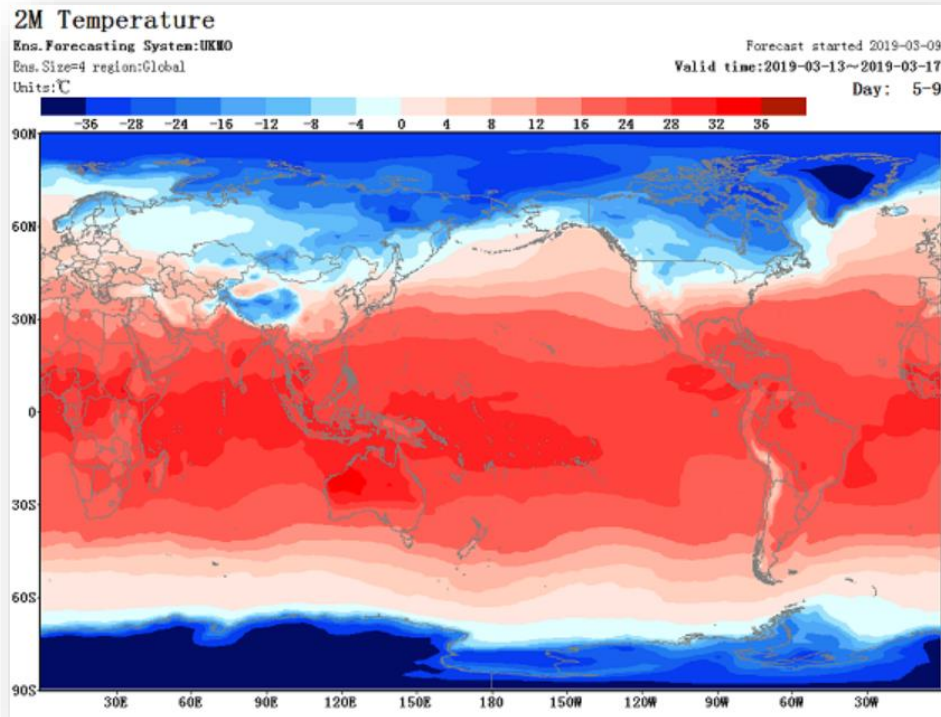
# S2S data visualize

## S2S Visualization components



# Progress

## ➤ S2S data view (2D and 3D)



1. Data Synchronization

2. CMA S2S services

**3. Service statistics**

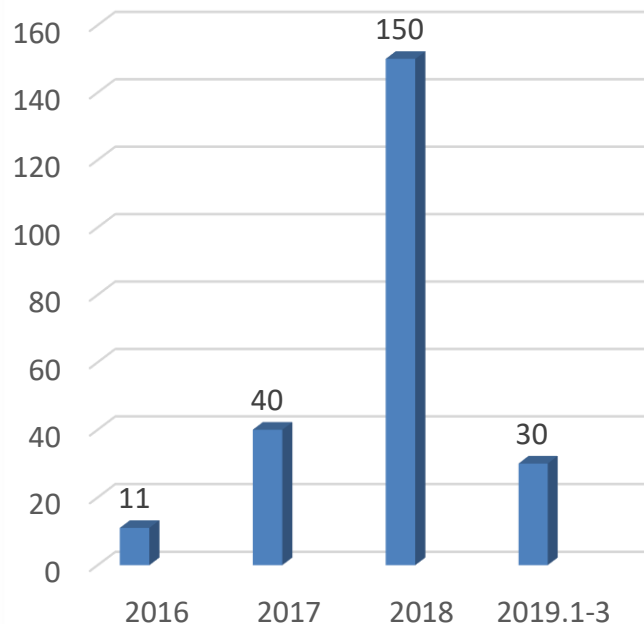


国家气象信息中心

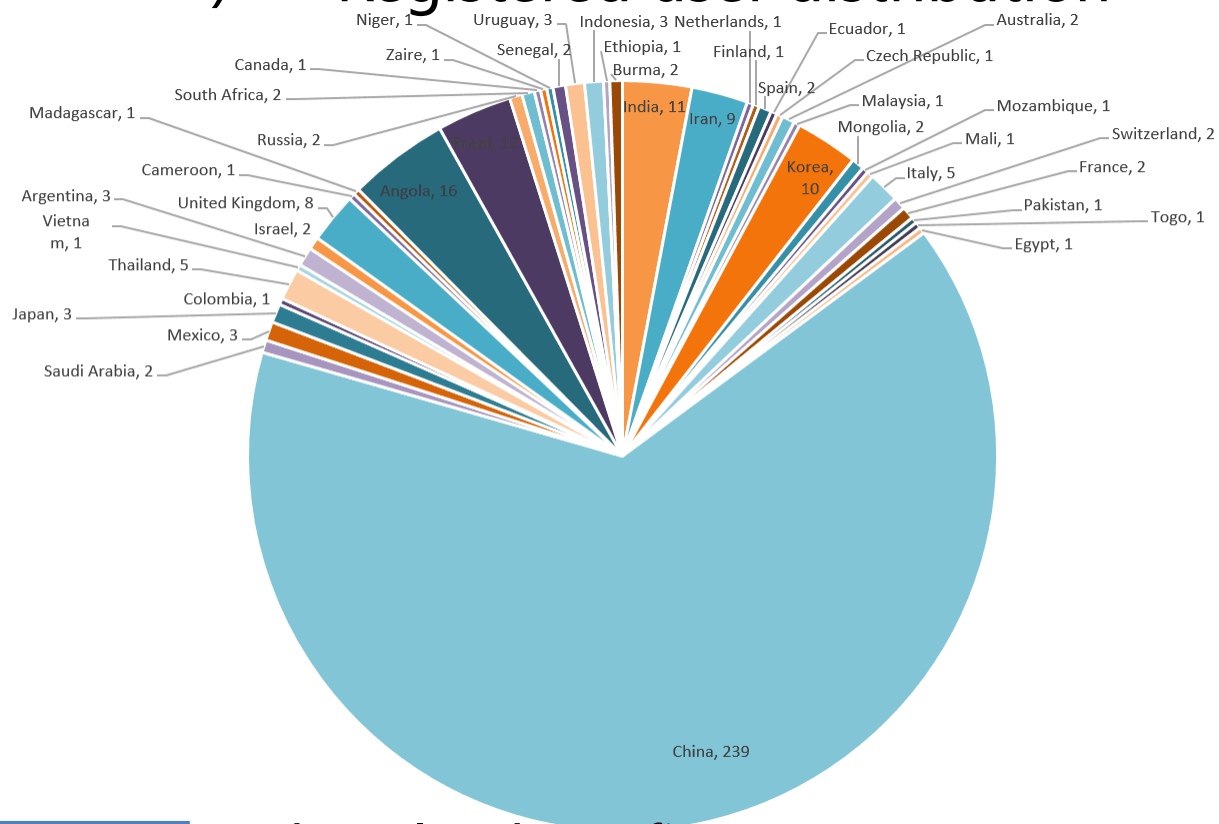
National Meteorological Information Center

# Service statistics

## Visited increased(ten thousands)



## Registered user distribution



## Data download ( TB )

year	amount of data
2016	1.9
2017	3.1
2018	3.2
2019.1-3	20.7

download top five centers

ECMWF, CMA,BOM,UKMO, NCEP

download top five parameters

t, u,v, mx2t6, gh

- Hope we can provide
  - More convenient data acquisition
  - More visualization products
  - Better user experience

# Thank You!

<http://s2s.cma.cn>

