# Introduction of RIC-Beijing


**BIAN ZEQIANG**

**Senior Engineer**

**National Center for Meteorological Metrology**

**Meteorological Observation Cent**

**China Meteorological Administration**

# Outline

## 1. China Meteorology Administration (CMA)

- Organization
- Responsibilities

## 2. Meteorological Observation Center (MOC)

- Functional Structure
- Responsibilities

## 3. Meteorological Metrology Station (RIC-Beijing)

- Introduction
- Instrument and Traceability
- Future plan

# 1. China Meteorology Administration (CMA)

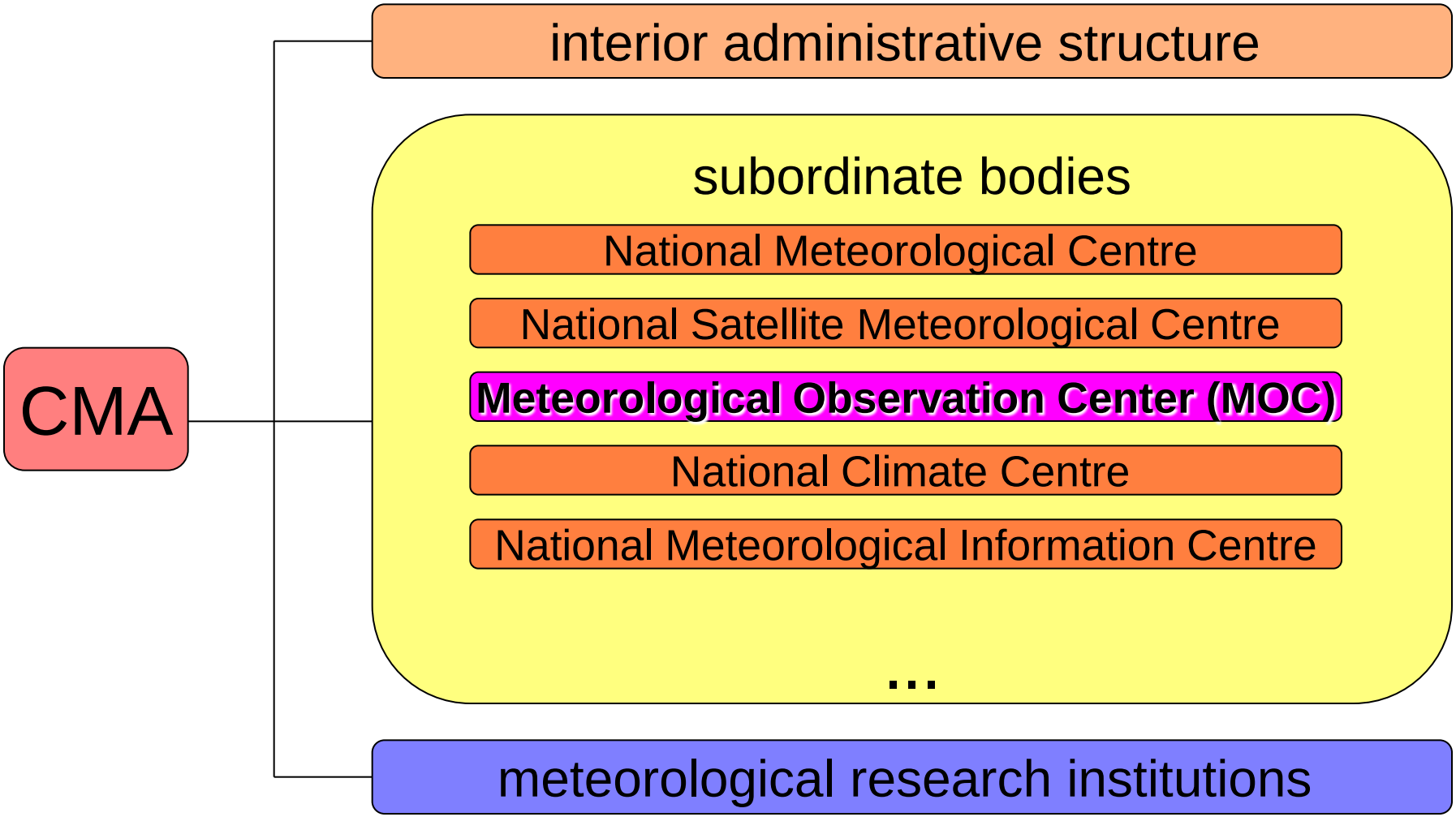
气象探测中心
Meteorological Observation Center

# CMA

- China Meteorological Administration (CMA) is directly affiliated to the State Council of the People's Republic of China.

气象探测中心
Meteorological Observation Center

# Organization

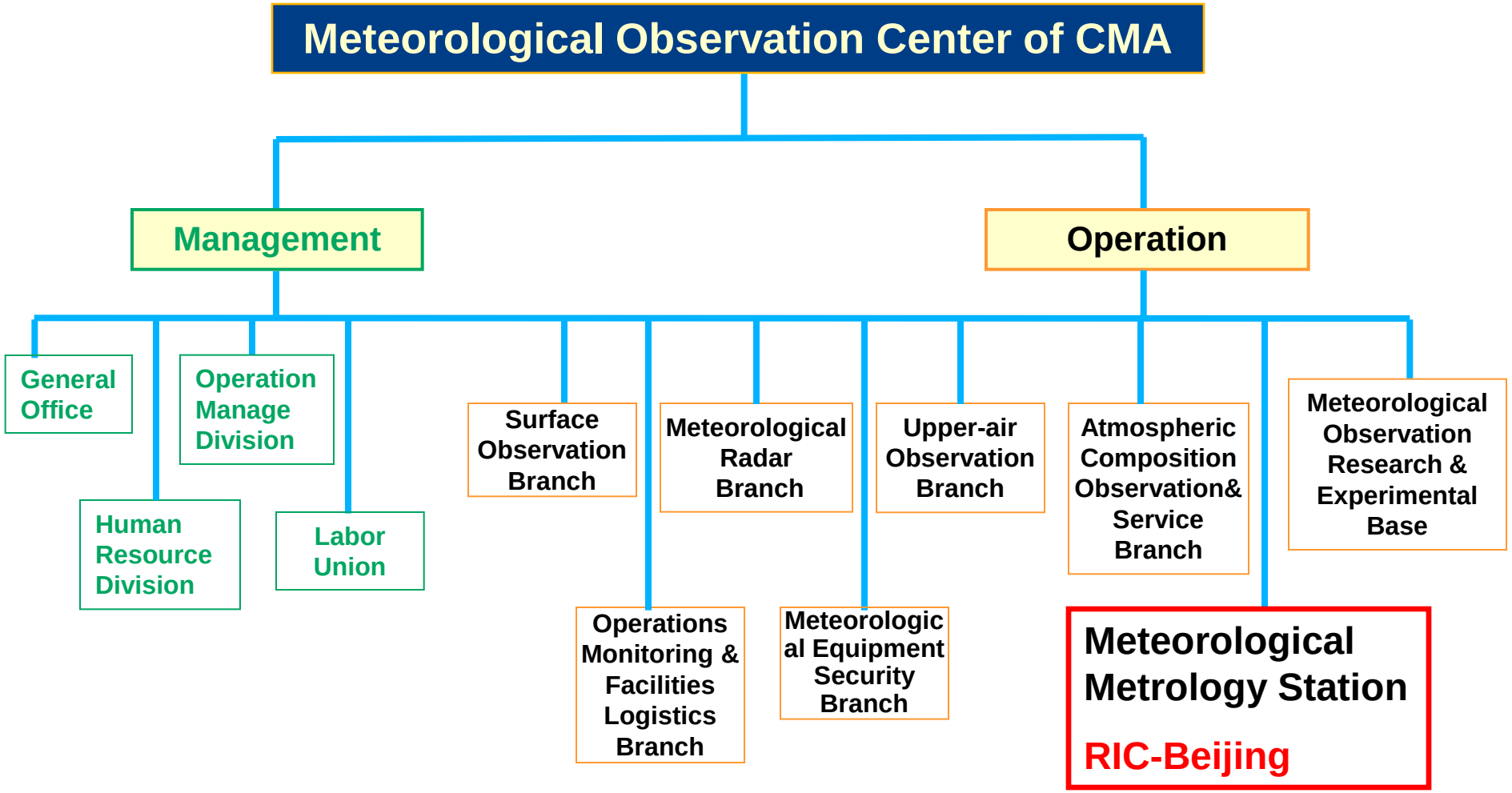



气象探测中心
Meteorological Observation Center

# 2. Meteorological Observation Center (MOC)

气象探测中心
Meteorological Observation Center

# MOC Functional Structure



# Responsibility

## Surface Observation Branch

Responsible for Network design, Maintenance, Technology support & guide, Observation method and criterion, Operation evaluation.

- Automatic weather station (AWS)
- Thunder and lightning detection system
- Ecology and agriculture observation system,
- Marine meteorological observation system
- Renewable energy meteorological observation: Wind , solar
- Customized meteorological observation: Traffic ,electricity,airport,……

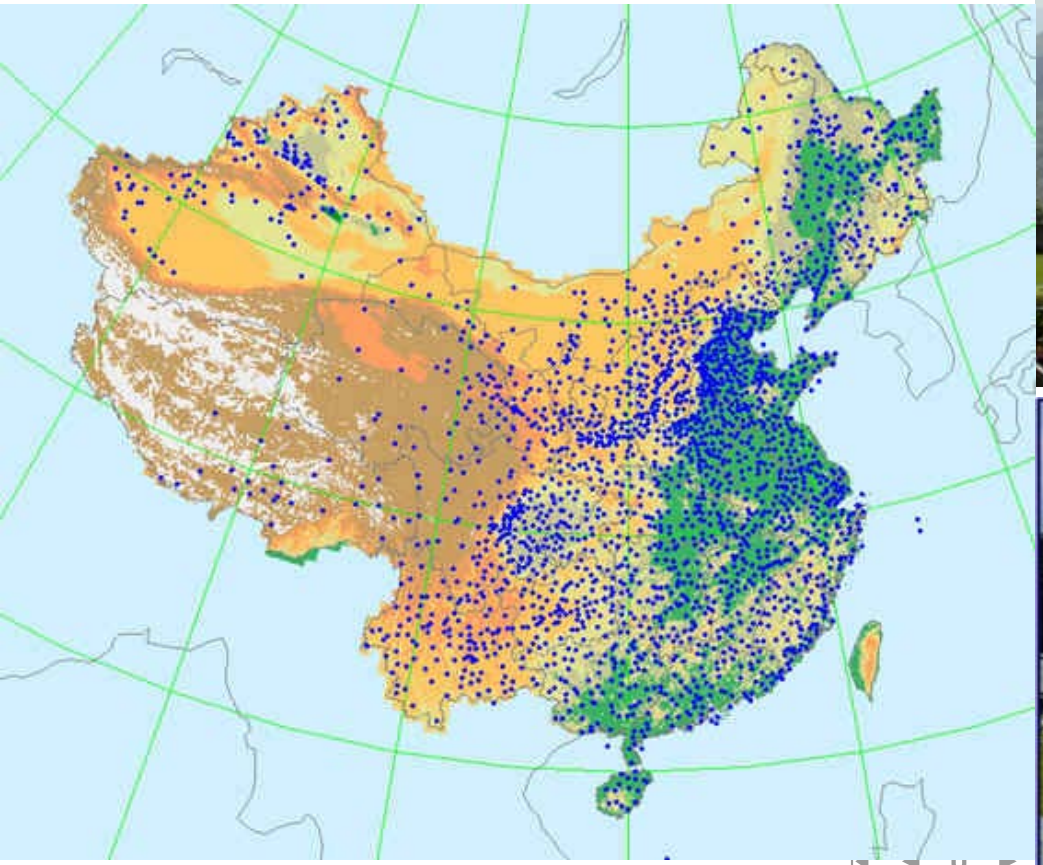






# Surface observation station

- Climate Reference station (143)
- Synoptic station (2313)
- Mesoscale AWS (>27000)



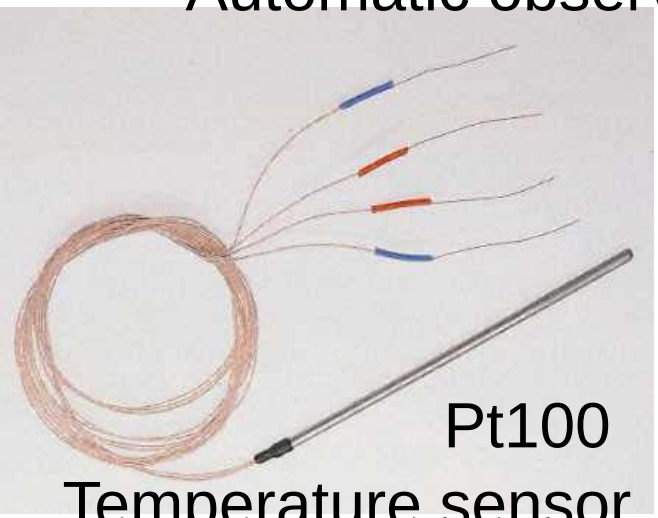

# Instruments in operational use

- Temperature & Humidity, including surface and deep ground temperature

HMP45D, Vaisala

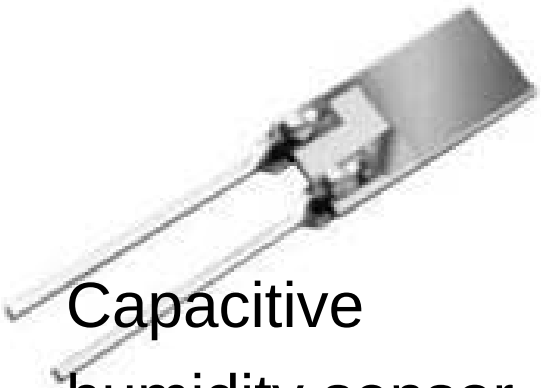
Automatic observation

Manual observation



Pt100

Temperature sensor



Capacitive

humidity sensor

Mercury thermometer

# Instruments in operational use

- Pressure

PTB220, Vaisala

compensated digital pressure sensor


Mercury barometer

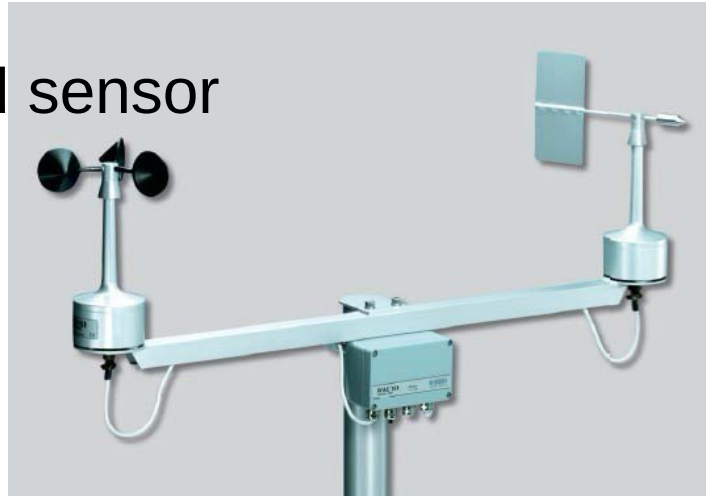
# Instruments in operational use

- Wind direction and speed sensor

EC9-1,Changchun Meteorological instruments Co.

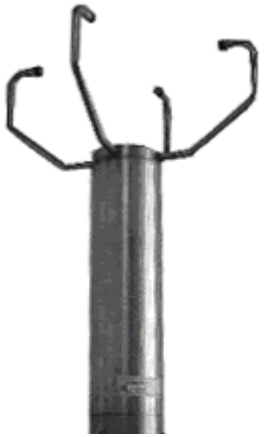

Three cups wind sensor

WAA151, WAV151 , Vaisala .



EL15 ,Tianjin meteorological instruments Co.

Propeller wind sensor



Ultrasonic wind sensor

# Instruments in operational use

- precipitation

SL3– 1,Shanghai Meteorological instruments Co.

Double tipping bucket Pluviometer

RG13H, Vaisala

tipping bucket Pluviometer with a heating

DSC1,Wuxi Meteorological instruments Co.


Suitable for solid, liquid and mixed state of total precipitation and precipitation intensity measurement

# Instruments in operational use

- Radiation- Global, diffuse, reflected radiation pyranometer

TBQ-2B, Huayun Meteorological instruments Co.

thermopile

FS-S6, Wuxi Meteorological instruments Co.

thermopile

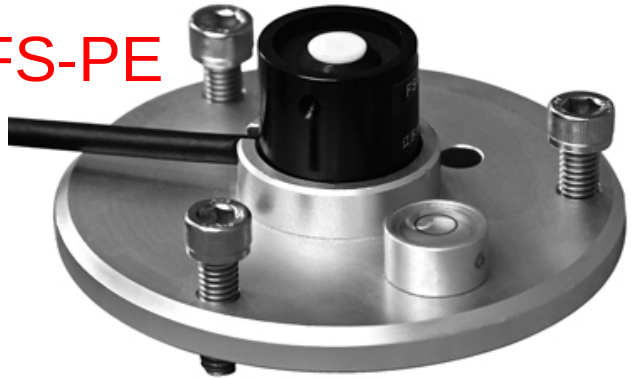
CMP11,CMP21, kipp&Zonen

thermopile

SR11, Hukseflux


thermopile

FS-PE



photoelectric

# Instruments in operational use

- Radiation- direct radiation pyrheliometer

TBS-2-B, Huayun Meteorological instruments Co.

FS-S6, Wuxi Meteorological instruments Co.

CHP1, kipp&Zonen

FS-ST solar tracker

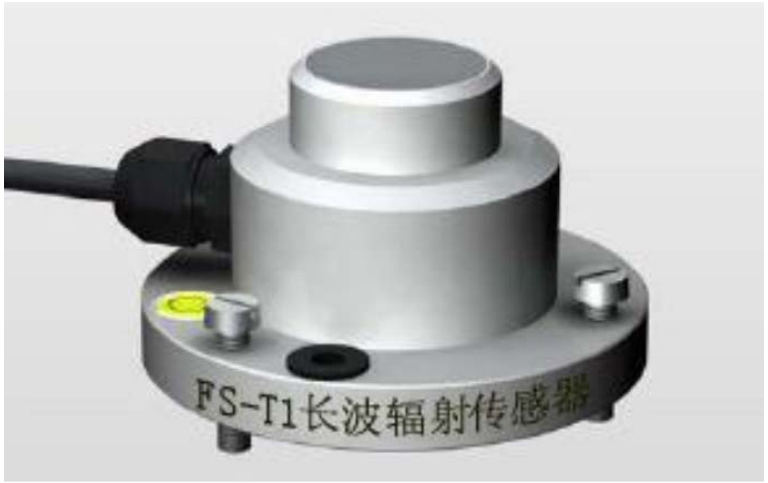
2AP

Met

# Instruments in operational use

- Radiation- long-wave radiation pyrgeometer

FS-T1,Wuxi
Meteorological instruments Co.



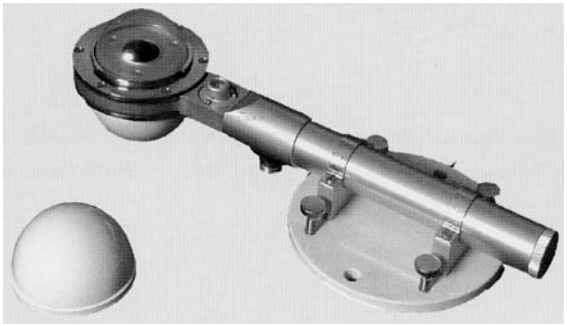

CGR3,CGR4,
kipp&Zonen

upward &downward long-wave

# Instruments in operational use

- Radiation- net total radiation net radiometer

FNP-2,Huayun Meteorological instruments Co.



CNR4, kipp&Zonen

replace Four component:2 pyranometer, 2pyrgeometer


kipp&Zonen


Hukseflux

# Instruments in operational use

- Radiation-UV, photosynthetically active radiation

UVS-E,

kipp&Zonen

UVA&UVB,

FS-PR,Wuxi

Meteorological instruments Co.


photosynthetically active radiation

# Instruments in operational use

- Rotary roller radiometer

FS-R3, Wuxi Meteorological instruments Co.

RSR2, Tianjin meteorological instruments Co.

Through the rotation of the rotating arm, it can measure global, direct and diffuse radiation all at once.

# Instruments in operational use

- Sunshine duration

DSU12, Vaisala

CSD3,kipp&Zonen

WMO defines direct solar radiation S ≥ 120W • m-2 as the sunshine threshold,

so pyrheliometer could measure sunshine duration

# Instruments in operational use

- Evaporation

AG, THIES

Ultrasonic evaporation measurement

Evaporation pool, manual observation

# Instruments in operational use

- Clouds, visibility, weather phenomena


# Surface Observation Environment Protection



"*Surface Observation environment* ***protection regulations***"

# Responsibility

## Upper Air Observation Branch

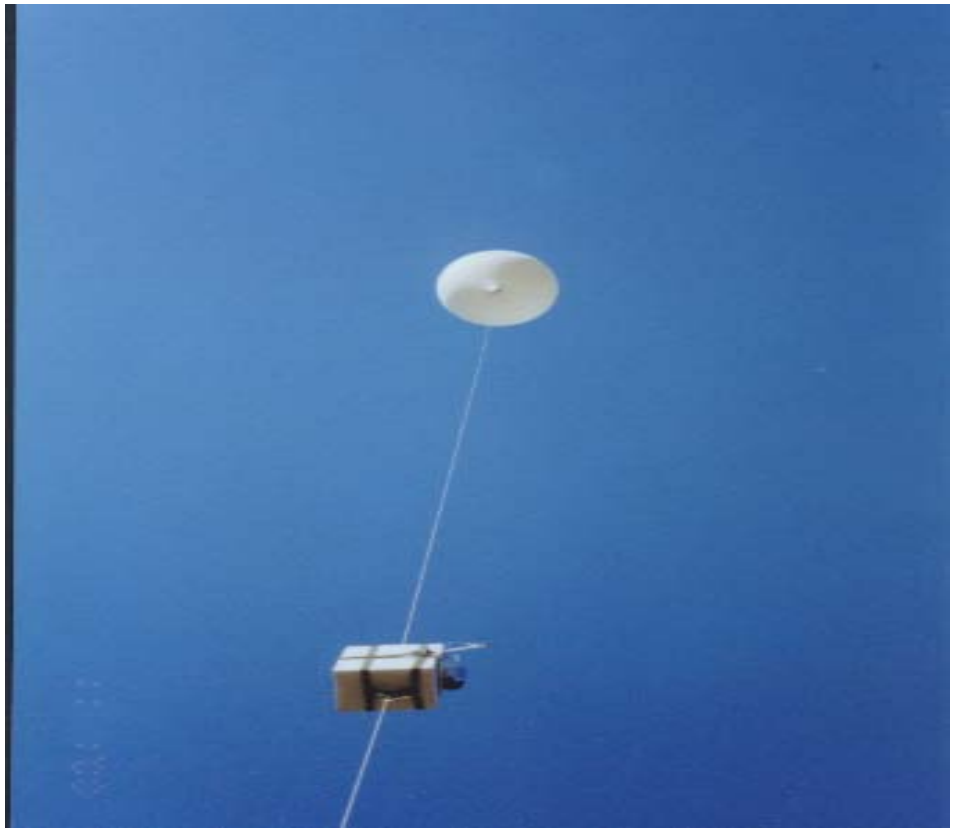
Responsible for Network design, Maintenance, Technology support & guide, Operation evaluation.

- Upper-air sounding system
- GPS/MET vapor sensing system
- Aeroplane AMDAR
- Lidar
- Microwave radiometer

Technology standard, Observation method and criterion.

# Upper Air Observation

- **120** upper-air sounding stations, including 87 global data exchange stations and **7** GCOS GUAN stations
- Regular observation time of 00 and 12 (UTC) for temperature, humidity, pressure, wind speed and wind direction

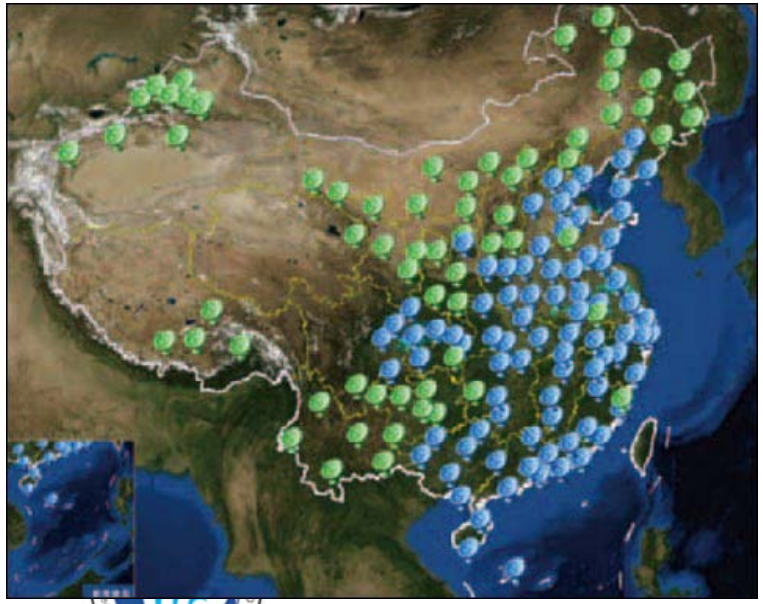


# Responsibility

## Meteorological Radar Branch

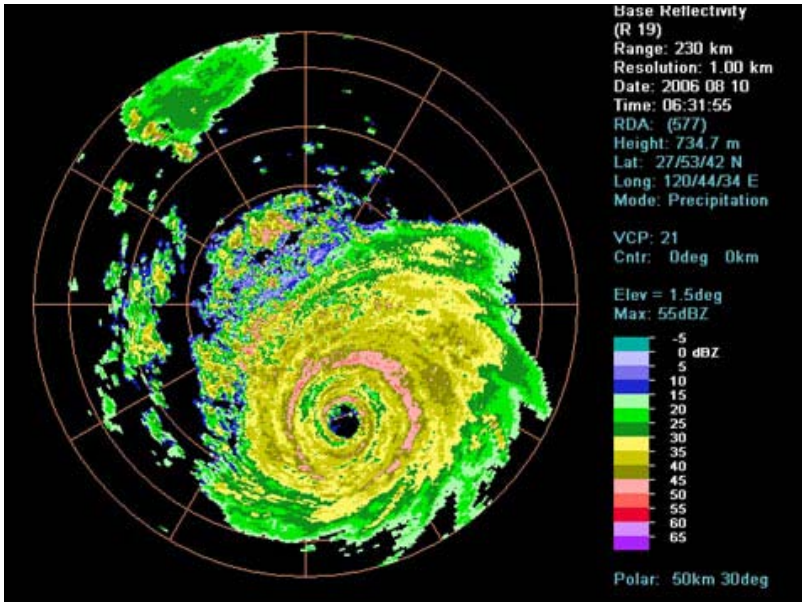
Responsible for Network design, Maintenance, Technology support & guide, Software, Data quality control and assessment.

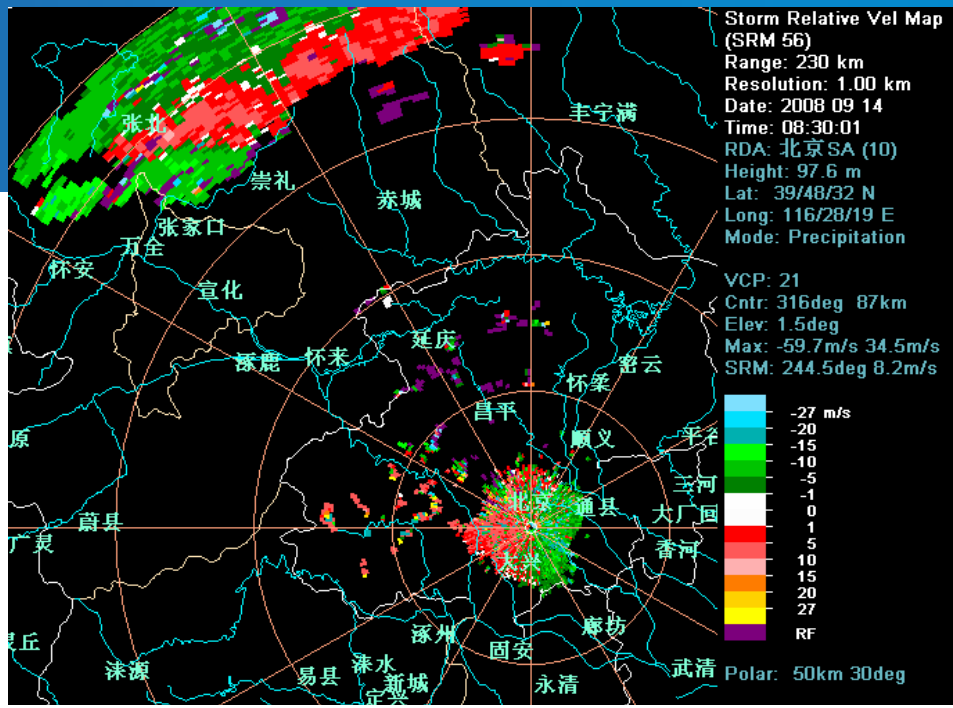
- new generation Doppler radar
- Windprofiler

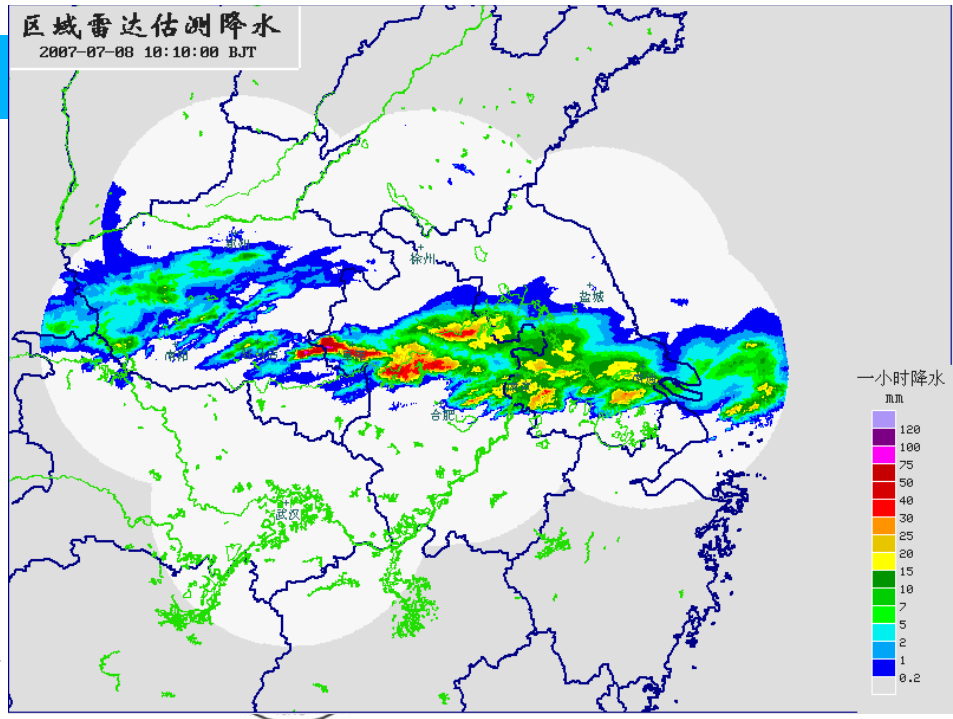


# Radar Mosaic Observation

Saomai typhoon



# Responsibility

## Atmospheric Composition Observation & Service Branch

Responsible for Network design, Maintenance, Technology support & guide.

- Greenhouse gases
- Atmospheric aerosol
- Reactant gases
- ozone column and contour line
- sand and dust storm
- acid rain

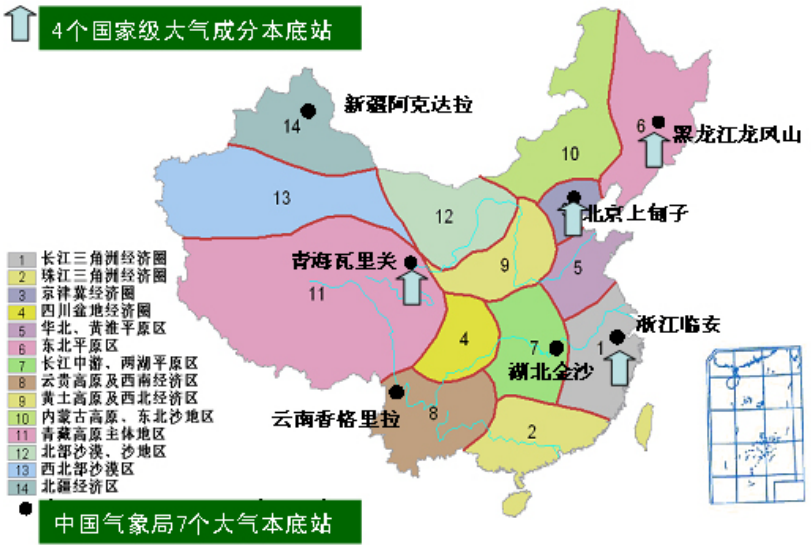



图 3. 国家大气成分本底观测研究台站网络布局分区图

气溶胶监测仪器采样头

# Responsibility

## Meteorological Equipment Security Branch

Responsible for meteorological equipment

- inspection
- repair
- overhaul
- technical guidance
- reserve supply
- emergency dispatch

# Responsibility

## Meteorological Observation Research & Experimental Base

- R&D for new observation technology, method and instrument & equipment and new information collected
- Experiment and comparison of  new instrument

# Responsibility

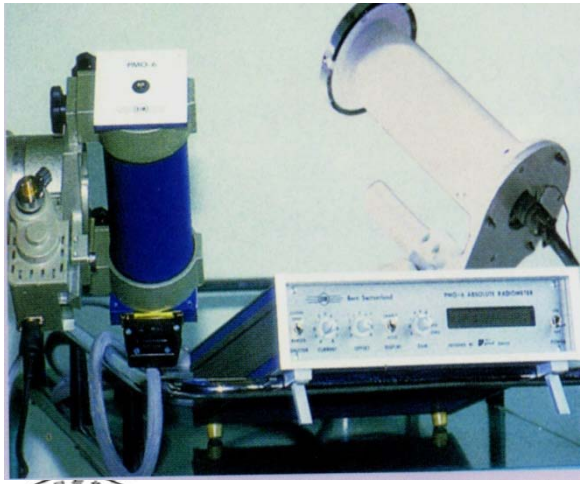
**Operation Monitoring and Facilities Logistics Branch**


- Monitoring and evaluating the running status of meteorological observation network
- Observation real-time data quality control
- Meteorological facilities logistics

# Responsibility

## Meteorological Metrology Station

- CMA Meteorological standard tracing to the source, keeping CMA meteorological standard, and transferring meteorological standard
- Meteorological instrument calibration and check
- Meteorological calibration criterion and method
- RIC-Beijing jobs for WMO regional association II



气象探测中心

Meteorological Observation Center

# 3.Meteorological Metrology Station (RIC-Beijing)

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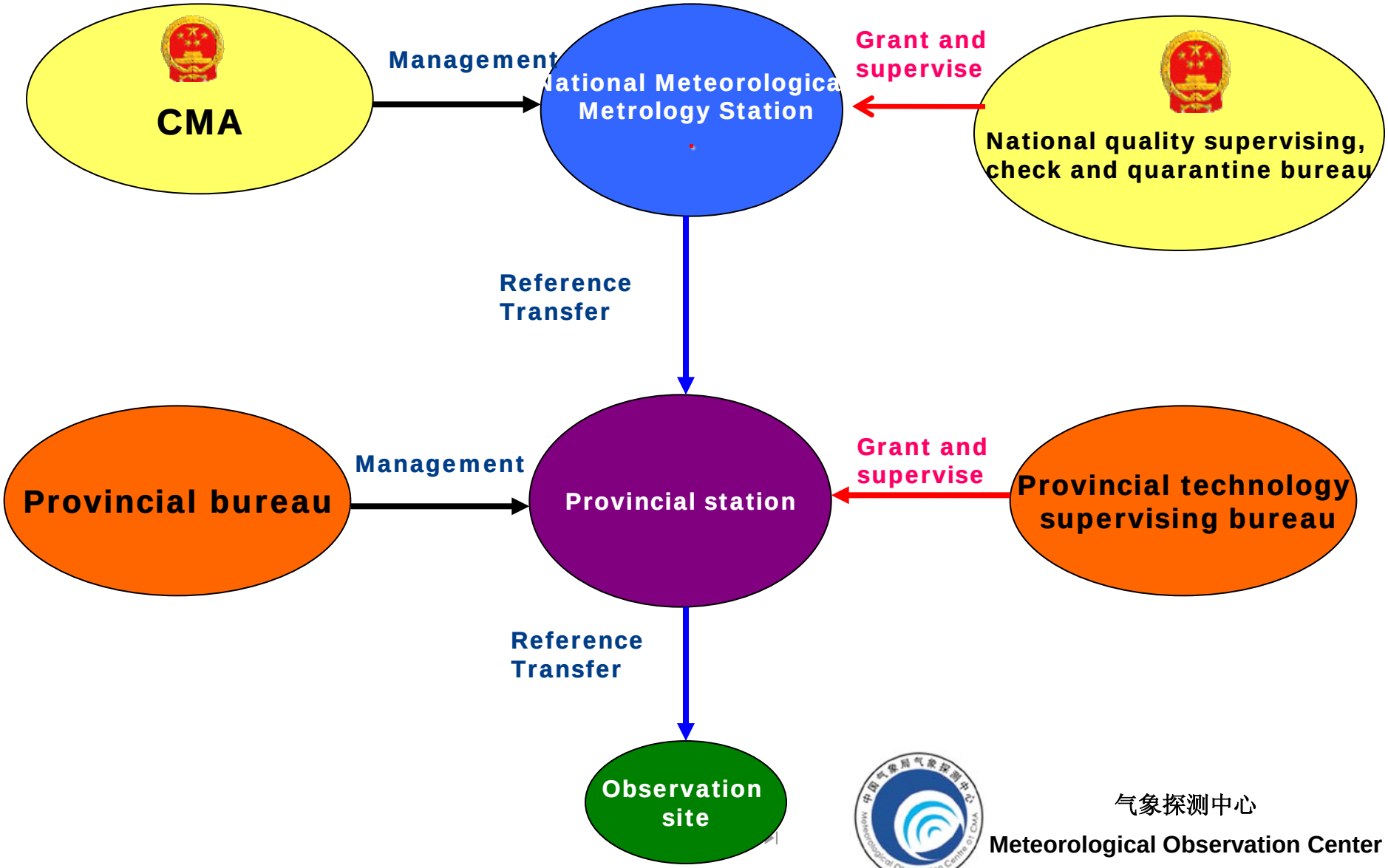
# Meteorological Metrology

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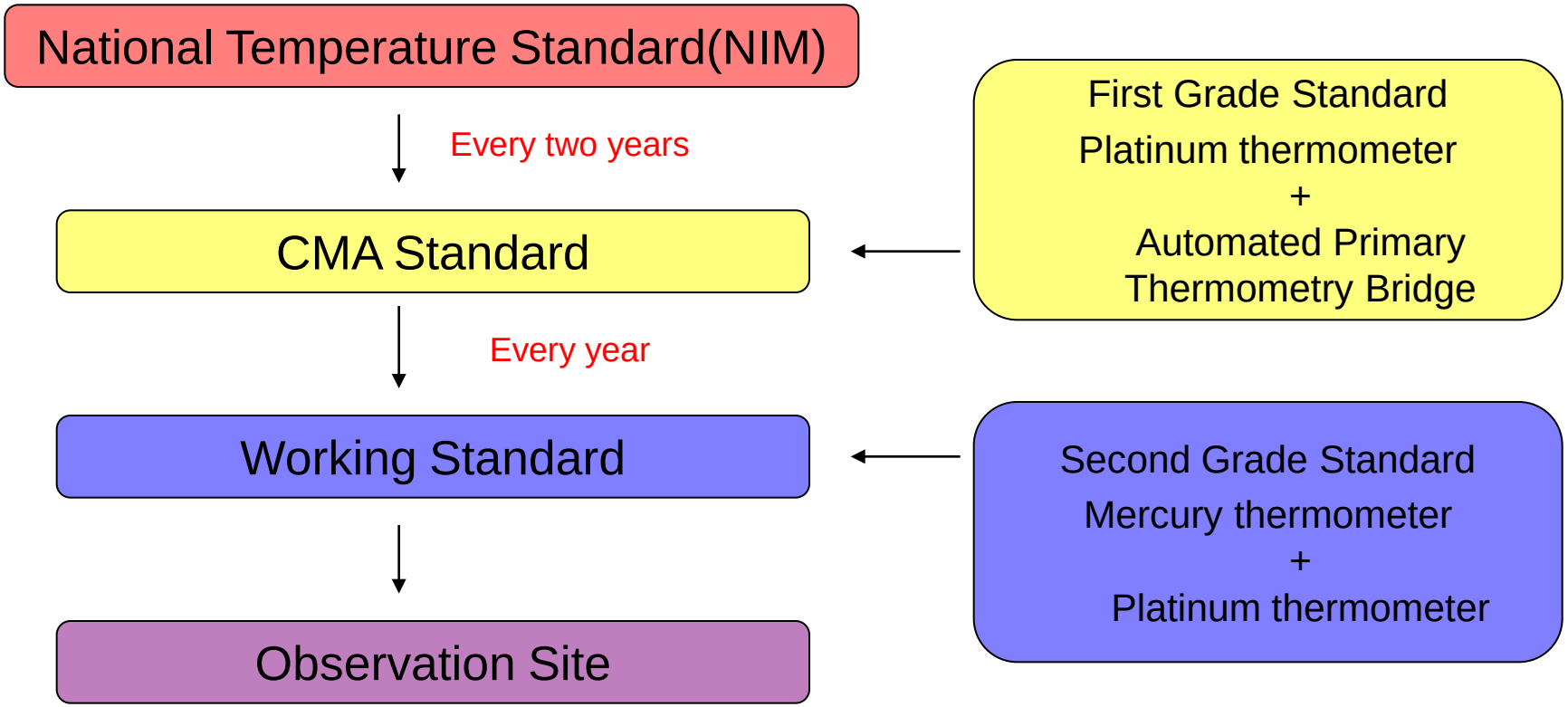
# Instrument and Traceability

Temperature




NIM:National Institute of Meteorology

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# Instrument and Traceability

## Temperature

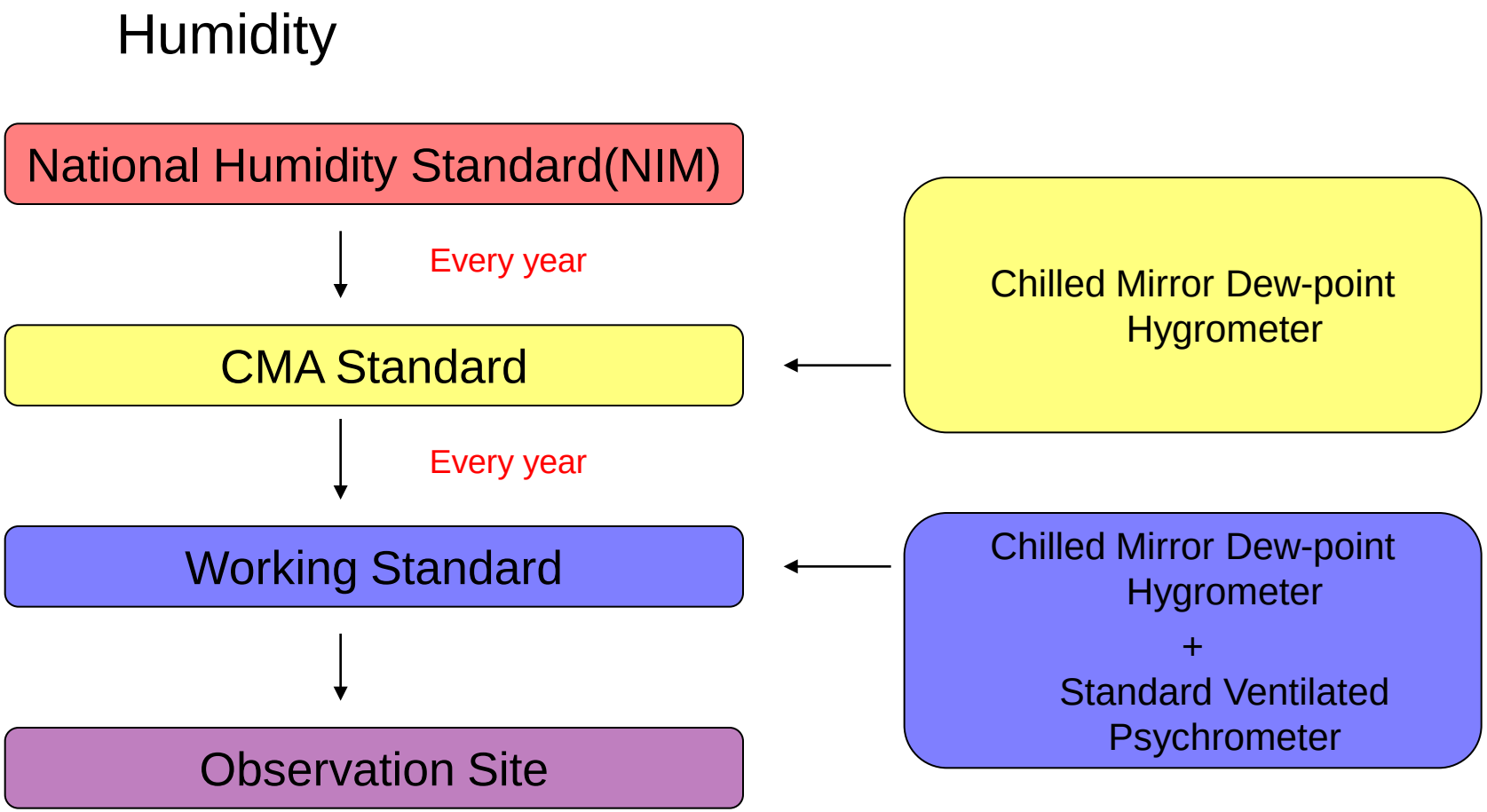
6015T Automated Primary Thermometry Bridge


917/L Low temperature Deep Immersion Liquid Bath


6015T Automated Primary Thermometry Bridge (Canada, M.I.)

917/L Low temperature Deep Immersion Liquid Bath (U.K. , ISOTECH)

# Instrument and Traceability



# Instrument and Trac

## Humidity


DewStar-S-1M Dew point Hygrometer (Japan, Shinyei)


VC3 7060 Climate Chamber (German, Weiss-Votsch)

enter

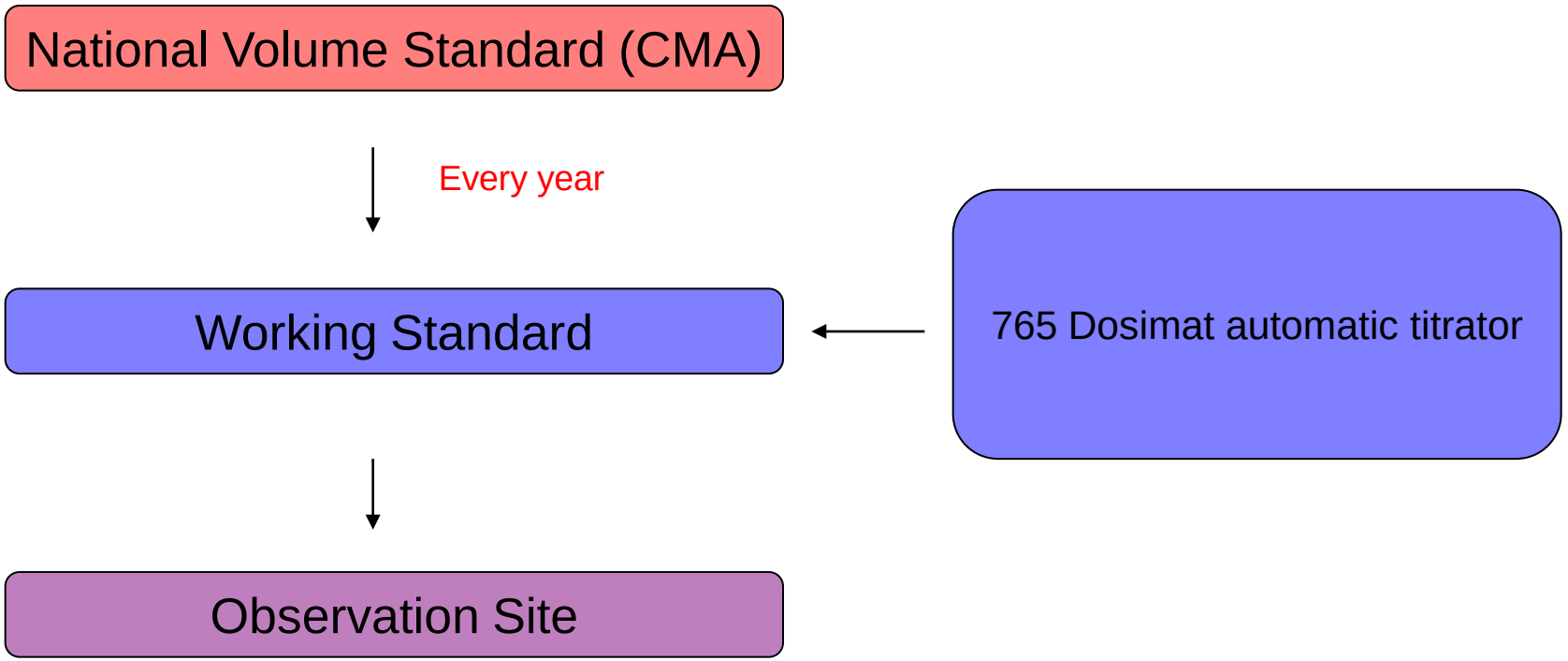
# Instrument and Traceability

Humidity


SRH-3MC135ADR
Accurate humidity Generator (Japan, Shinyei)

# Instrument and Traceability

Precipitation



# Instrument and Traceability

## Precipitation

765 Dosimat
automatic titrator



JJS3 Precipitation
Calibration System

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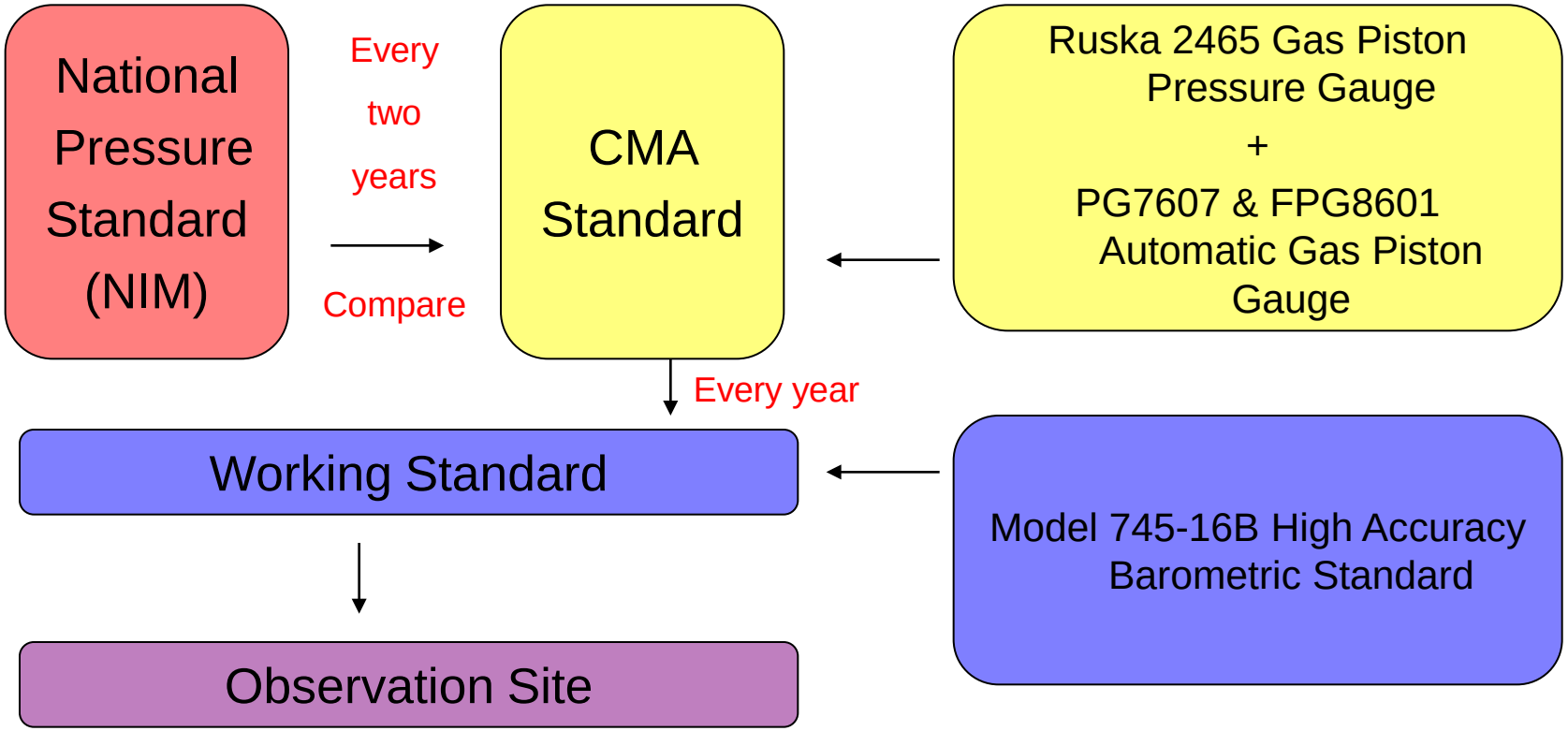
# Instrument and Traceability

## Atmospheric Pressure



# Instrument and Traceability

## Atmospheric Pressure

PG7607 & FPG8601 Automatic Gas Piston Gauge (U.S. DHI)


**Primary Standard for Atmospheric Pressure：**
PG7607 Automatic Piston Gauge (U.S. DHI)


**Uncertainty:**

8ppm+10mPa (Gauge mode)

8ppm+20mPa (Absolute mode)

**Range:**

60hPa~1750hPa

**Primary Standard for Atmospheric Pressure：**
FPG8601 Automatic Piston Gauge (U.S. DHI)


**Uncertainty:**

25mPa+0.003%×RDG
(Gauge mode)

20mPa+0.003%×RDG
(Absolute mode)

**Range:**

1Pa~150hPa

# Instrument and Traceability

## Atmospheric Pressure


Ruska 2465 Gas Piston
Pressure Gauge
(U.S. GE)


Model 745-16B High Accuracy
Barometric Standard
(U.S. Paroscientific)

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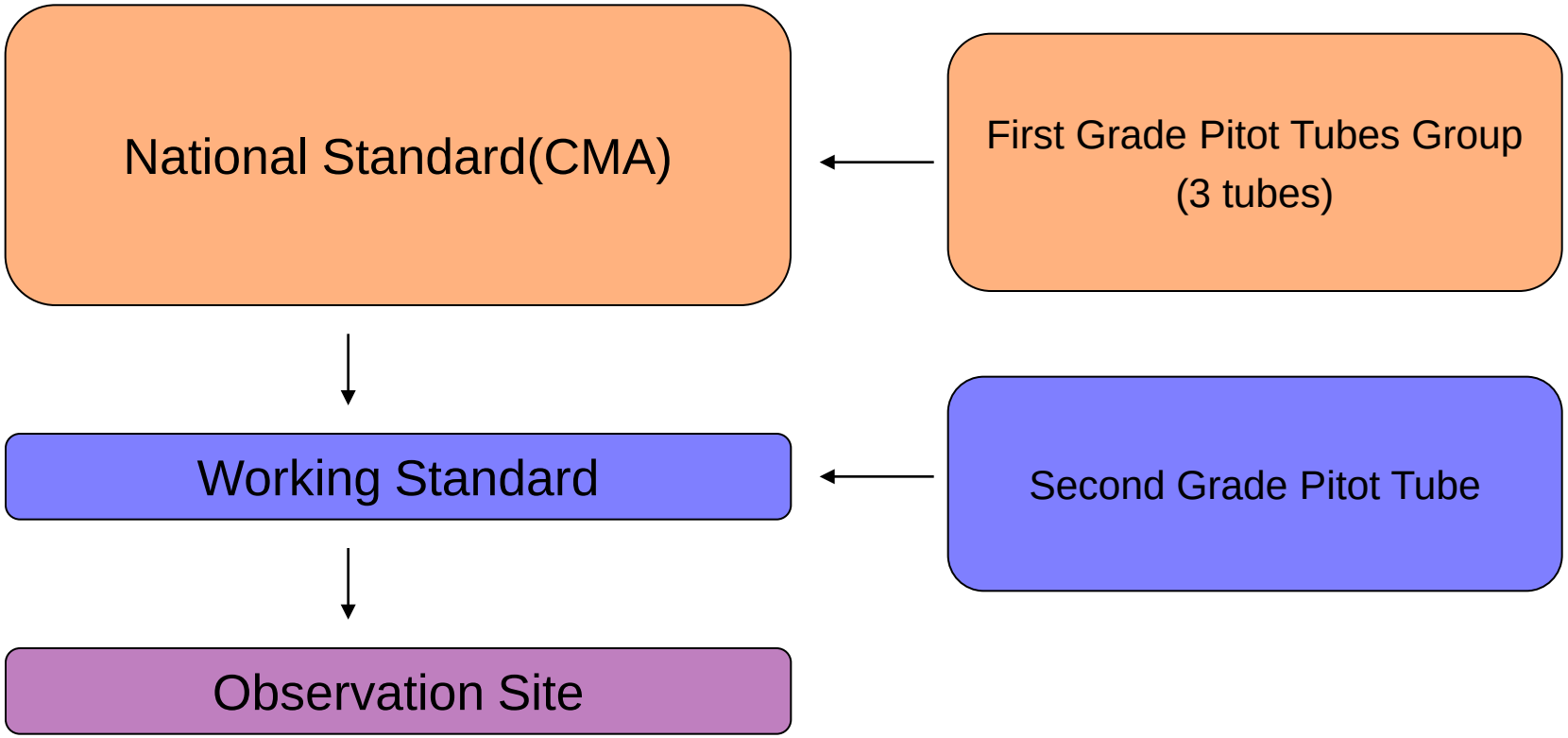
# Instrument and Traceability

Air Velocity



# Instrument and Traceability

## 0.8-meter Wind Tunnel

**Range:0.4m/s~70m/s**

0.8-meter wind tunnel with two test sections & its control system,

风速仪检定装置（大风洞）
The calibrating device for wind speed Instruments(wind tunnel)

nter

# Instrument and Traceability

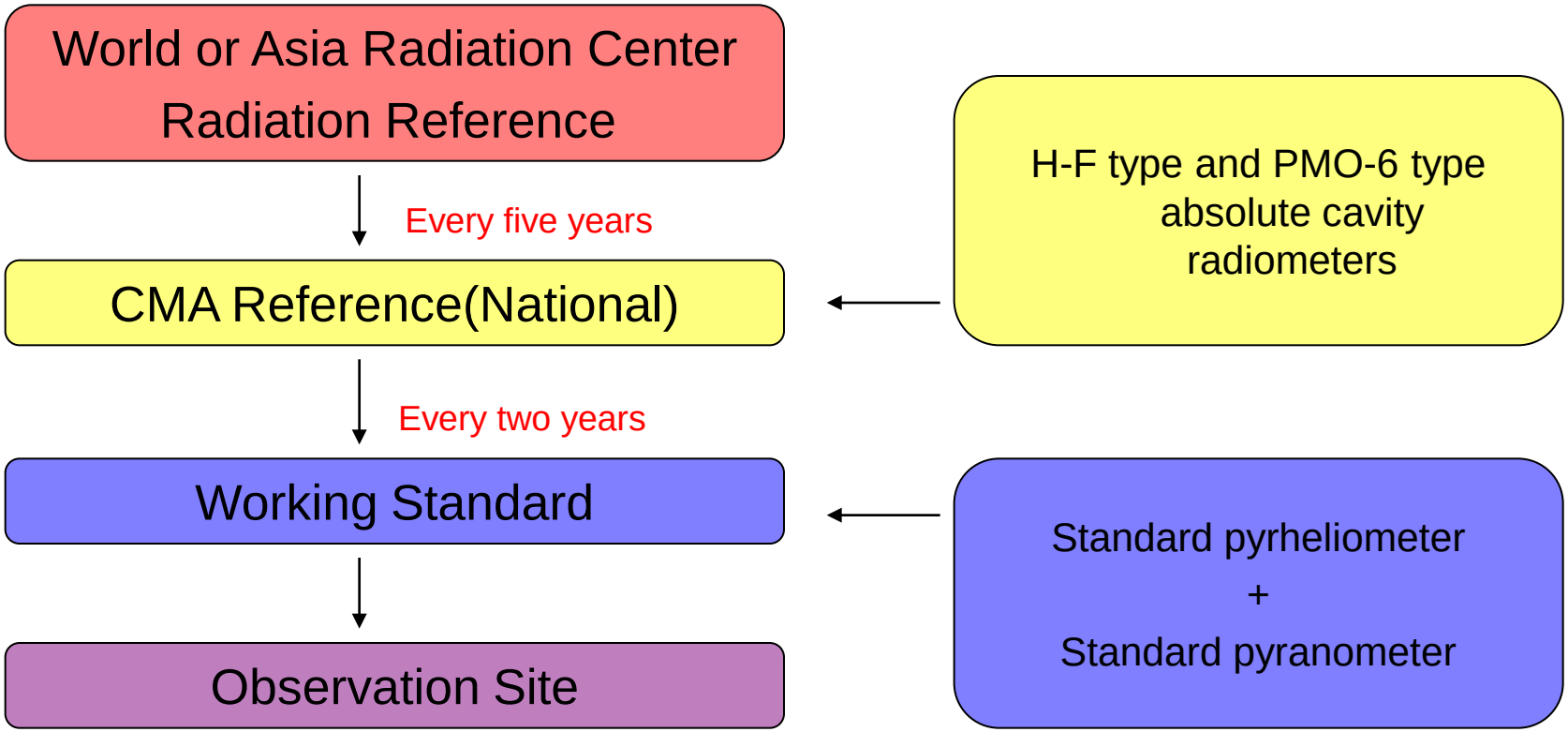
Air Velocity

HDF-500 Wind Tunnel


Very Low Speed Wind Tunnel

# Instrument and Traceability

## Radiation



# Instrument and Traceability

## Radiation


AHF Absolute Cavity Radiometer

# China solar radiation standard group


PMO-6 Pyrheliometer

H-FCavity
pyrheliometer

# Instrument and Traceability

## Radiation

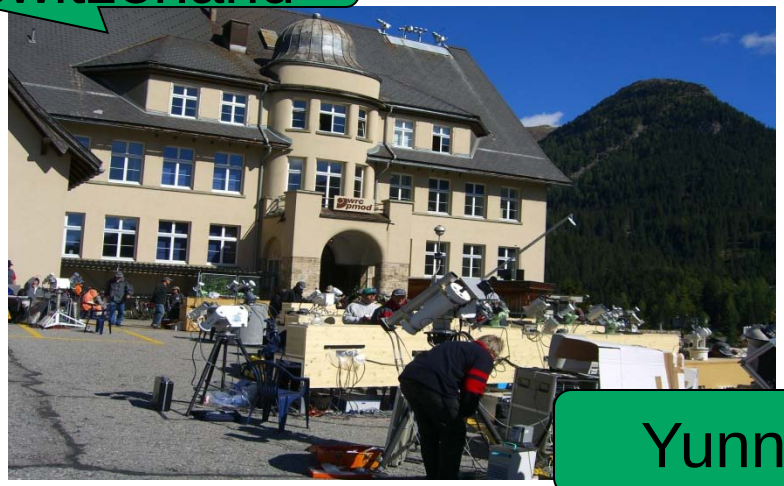
CMP22
Pyranometer

CG4
pyrgeometer

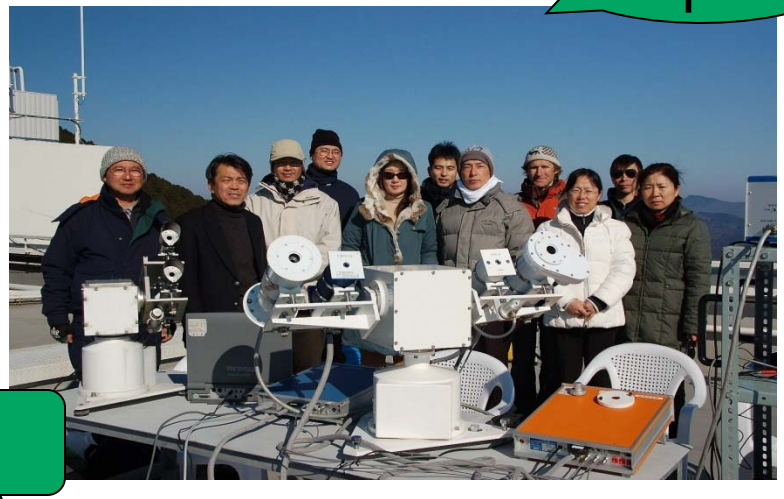

Ultraviolet
radimoter

# comparison

switzerland



Japan

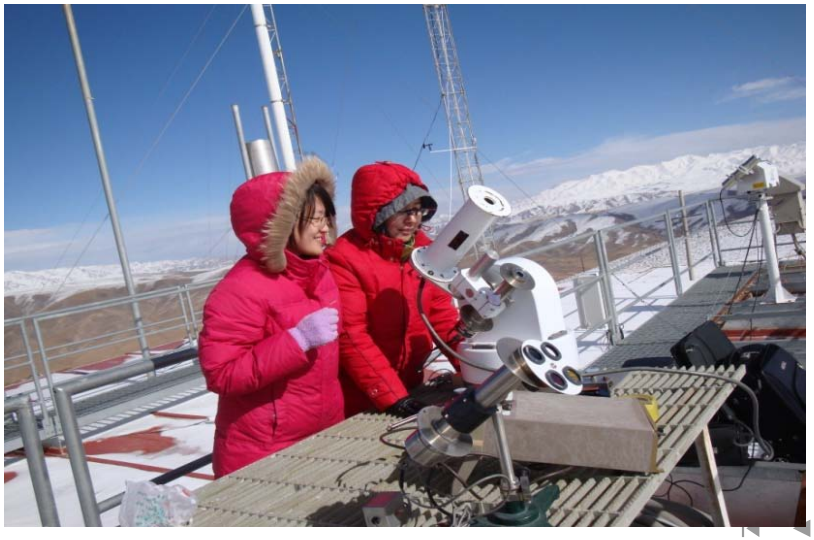


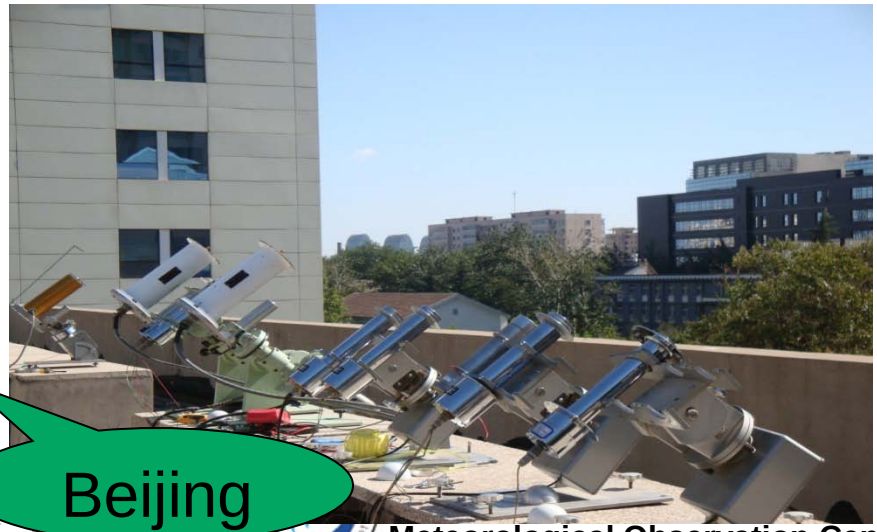
Yunnan

# Calibration

Shangdianzi

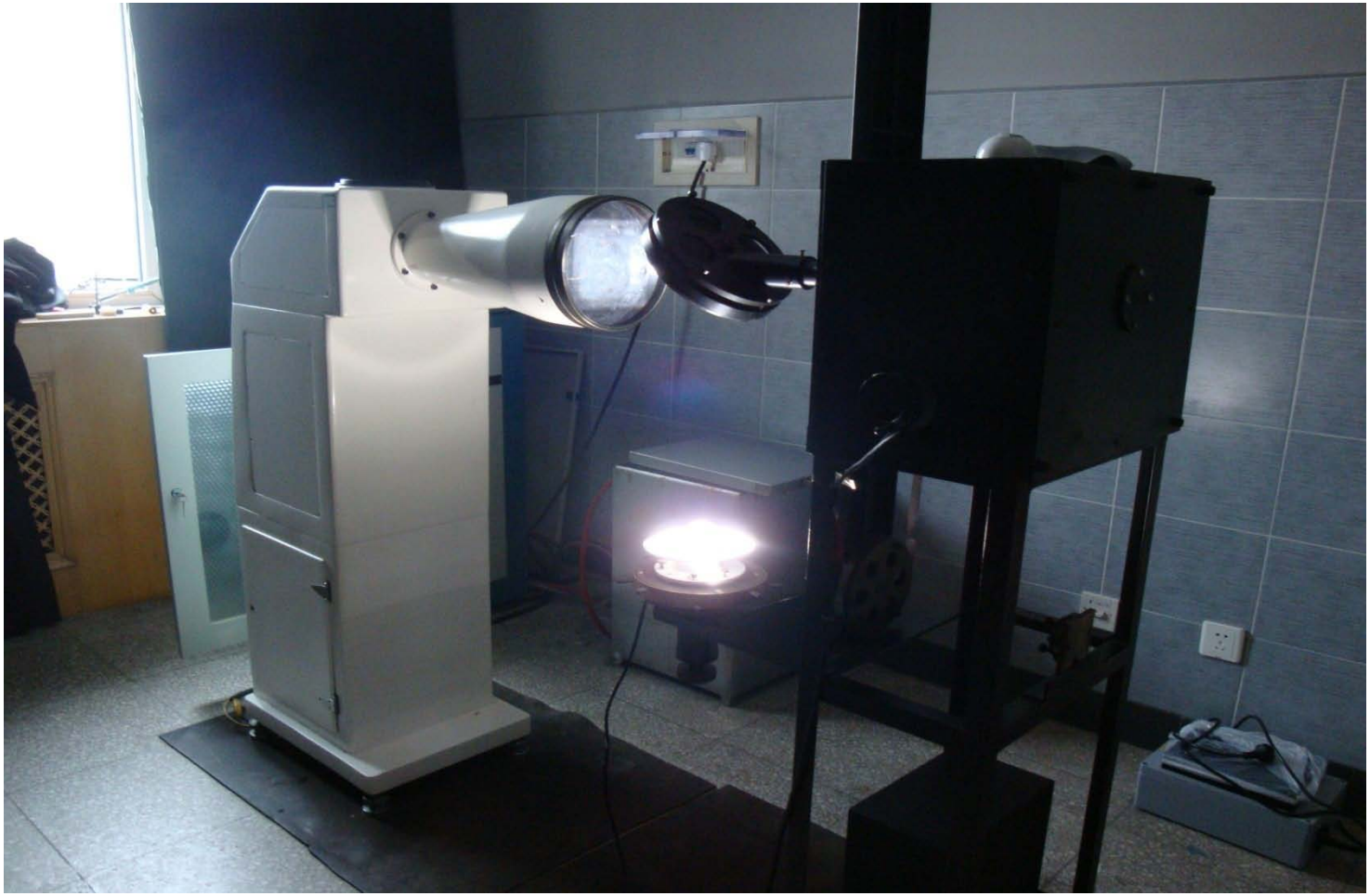
Gucheng



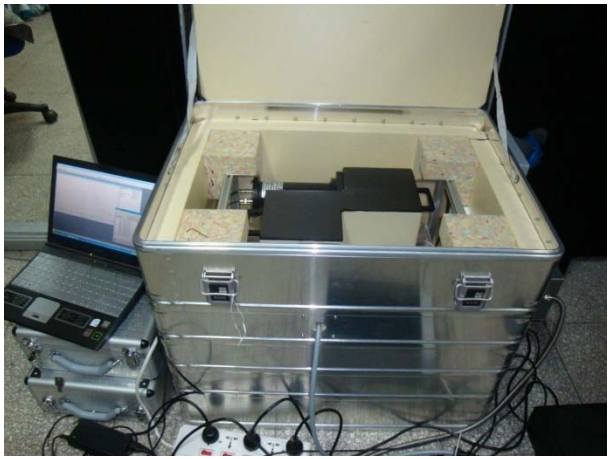


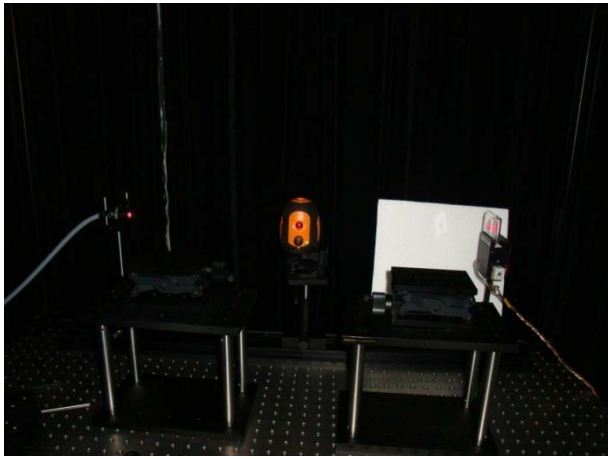
Beijing

# New type of sun simulation

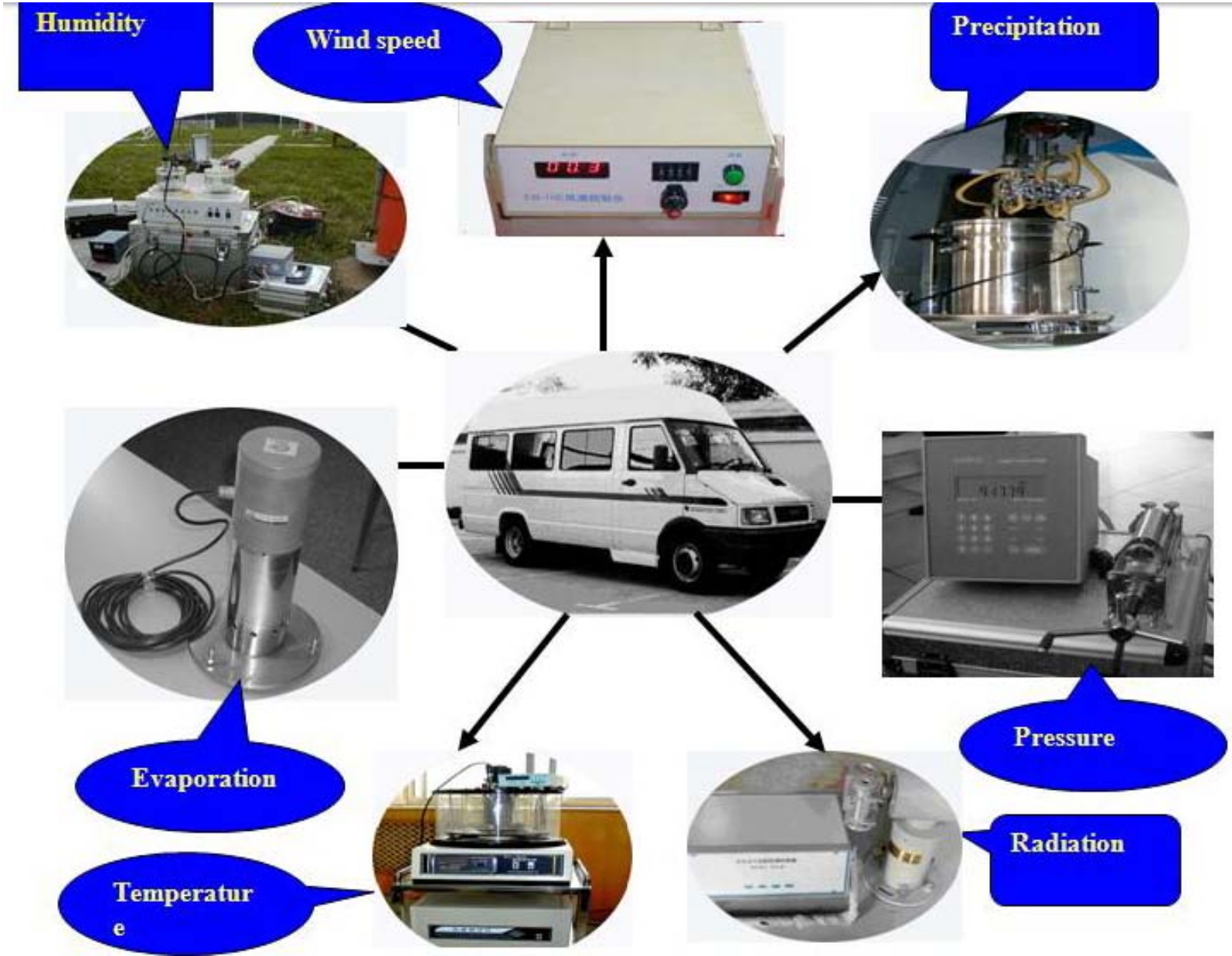


# UV and PAR Calibration



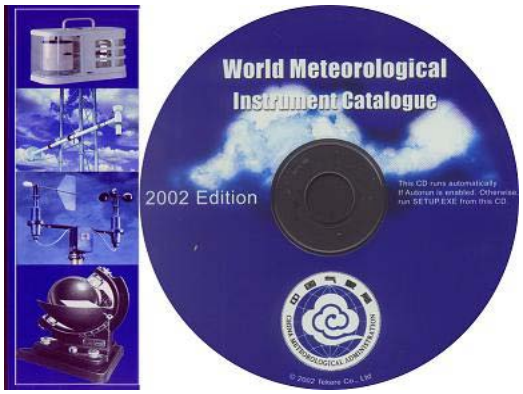


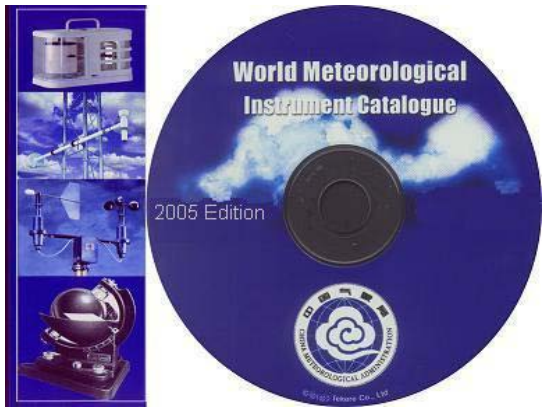
# AWS In-situ Calibration System



# WMO Regional instrument center (RIC-Beijing)

WMO RIC-Beijing edited and published two **World Meteorological Instrument Catalogues** (2000 & 2002 editions). These catalogues were delivered to the Meteorological Services of more than 180 WMO Members for reference.




World meteorological instrument catalogue


RIC-Beijing Website

气象探测中心

Meteorological Observation Center

# Instruments International comparison

International comparison

- **Indonesia**
- **Malaysia**
- **Pakistan**
- **Vietnam**
- **……**

# Future plan

1. Attend the activities of CIMO, WMO;
2. Further cooperation with RIC-Tsukuba;
3. As WMO RIC, intercompare with the members of RA Ⅱ

中国气象局气象探测中心