

Introductions to RIC-Beijing

NAN Xuejing, CUI Xiaai

Meteorological Observation Center

China Meteorological Administration

March, 2018



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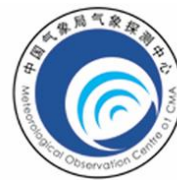
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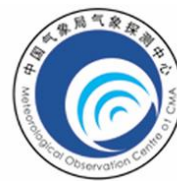
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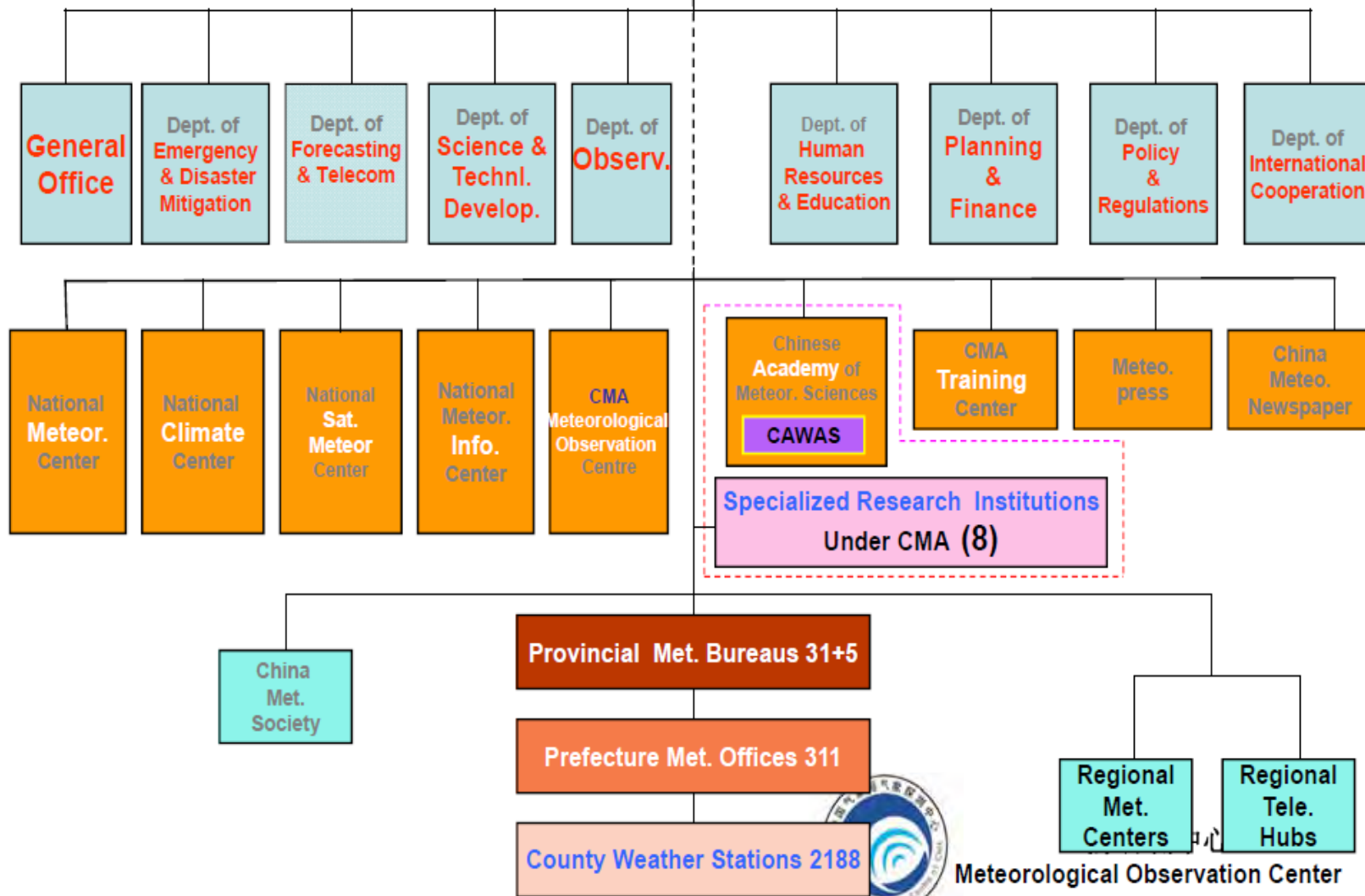
1.China Meteorological Administration(CMA)



气象探测中心
Meteorological Observation Center

State Council

CMA



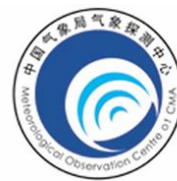


The building of CMA



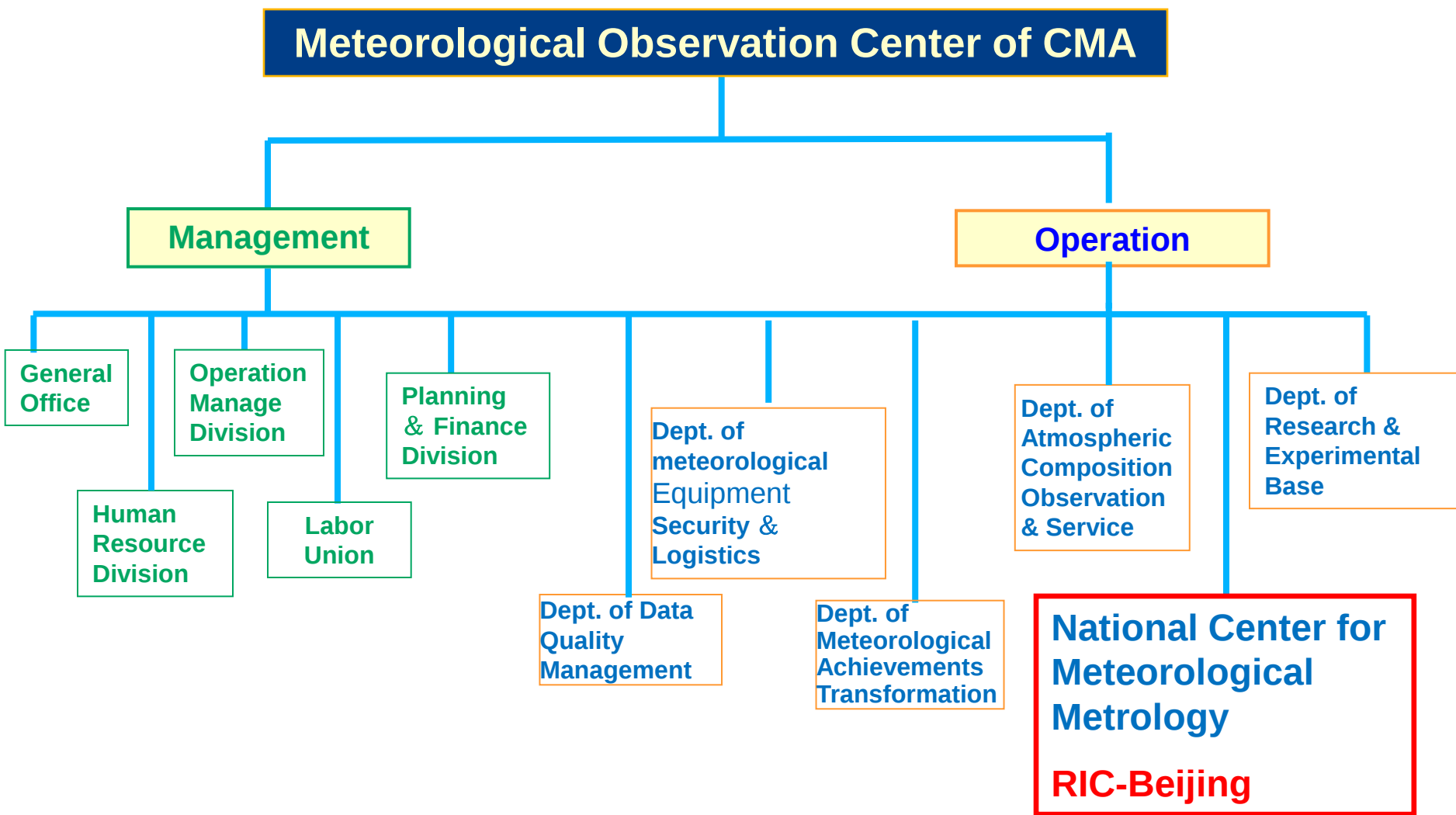
气象探测中心
Meteorological Observation Center

2. Meteorological Observation Center (MOC)



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Meteorological Observation Center

MOC Functional Structure

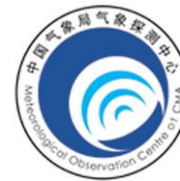


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Meteorological Observation Center

Responsibilities of MOC

- To monitor and evaluate the working status of meteorological observation network.
- Responsible for observation data quality control and assessment.
- Responsible for meteorological facilities logistics.
- Responsible for instrument metrology.
- To research and develop new technology , drawing up standard and observation criterion.
- To organize the experiment and comparison of new instrument.



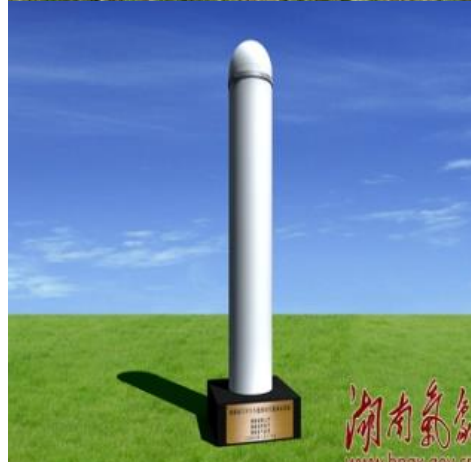
Meteorological Observation System

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



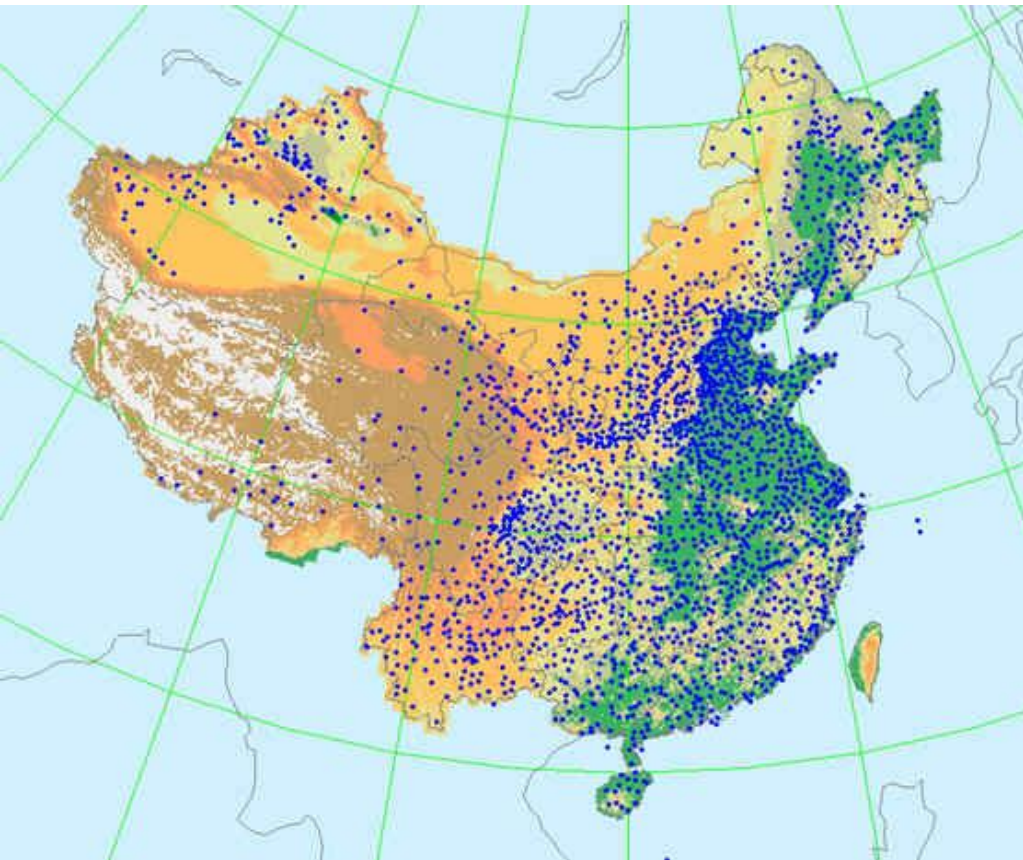
Meteorological Observation System

- Meteorological radar
- Wind profiler
- Upper-air sounding system
- Cloud, Visibility, Weather phenomena
- Atmospheric Composition
- GPS/MET vapor sensing system



Surface observation station

- Synoptic station (2412)
- Mesoscale AWS (>34000)



Surface Meteorological Observation Element



Temperature/Humidity



Air pressure



Wind speed/direction



Precipitation



Radiation



Sunshine duration



Evaporation



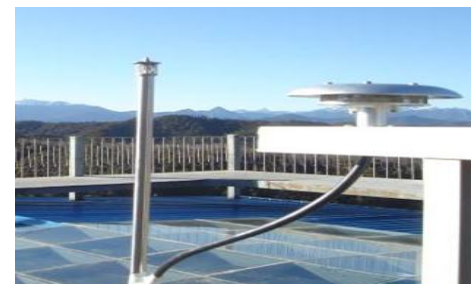
Weather phenomena



Visibility



Acid rain



Atmospheric Composition



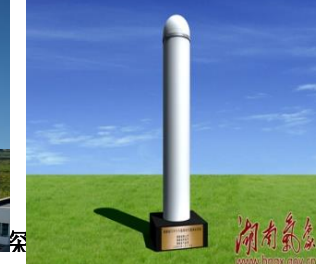
Lightning



Soil humidity



Radar



GNSS/MET

Instruments in operational use

- Temperature & Humidity, including surface and deep ground temperature



Pt Temperature sensor

Capacitive humidity sensor

Instruments in operational use

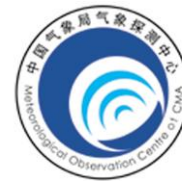
- Atmosphere Pressure



compensated digital pressure sensor



aneroid barometer & barograph



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Instruments in operational use

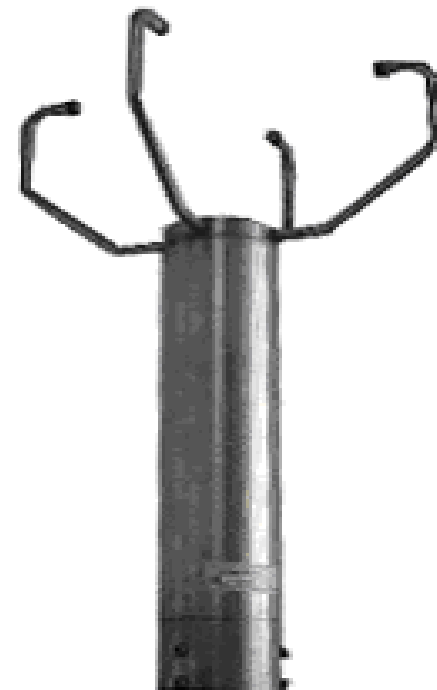
- Wind direction and speed sensor



Three cups wind sensor



Propeller wind sensor



Ultrasonic
wind sensor

Instruments in operational use

- precipitation



Double tipping bucket
Pluviometer



tipping bucket
Pluviometer with a
heating



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



Instruments in operational use

- Radiation- Global, diffuse, reflected radiation
pyranometer



thermopile



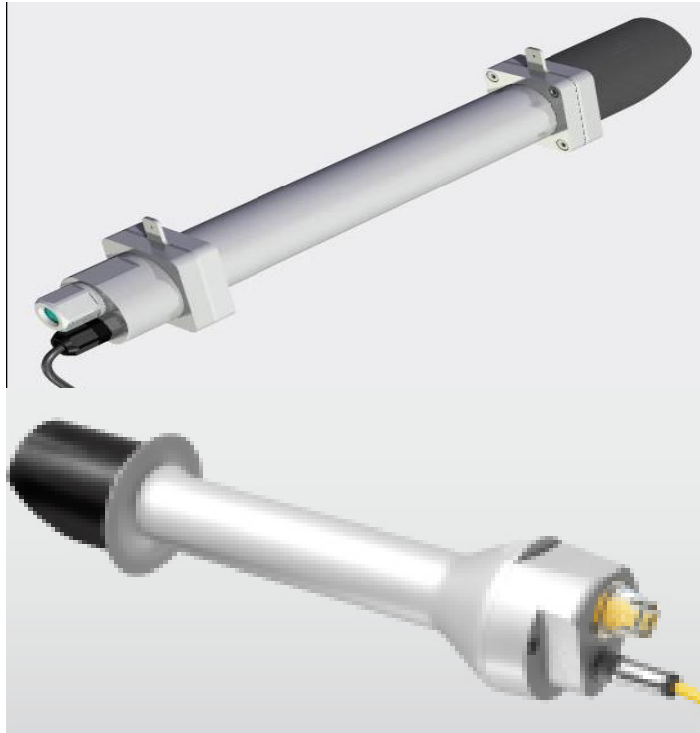
photoelectric

Instruments in operational use

- Radiation- direct radiation



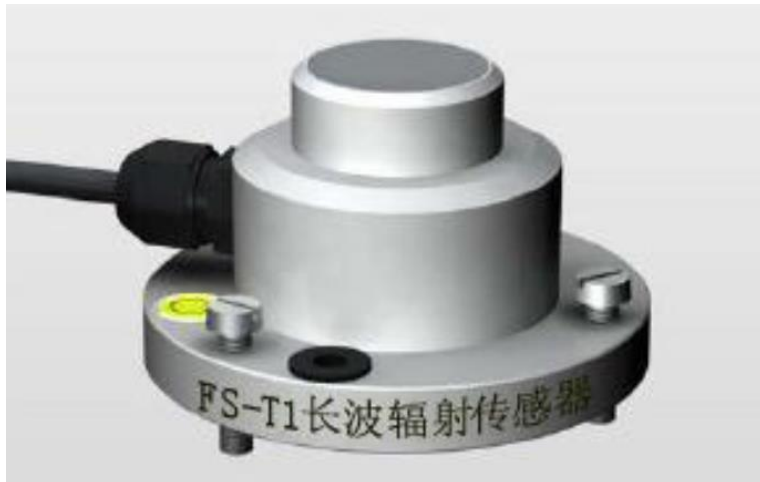
pyrheliometer



solar tracker

Instruments in operational use

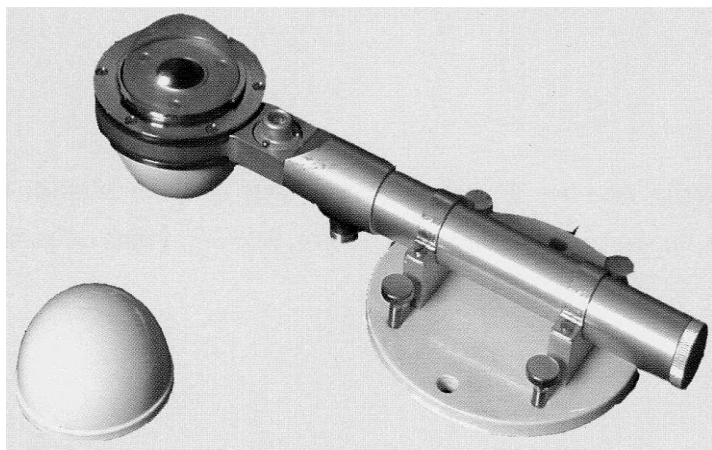
- Radiation---long-wave radiation
pyrgeometer



upward & downward long-wave

Instruments in operational use

- Radiation- net total radiation net radiometer



replace Four component: 2pyranometer, 2pyrgeometer



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Instruments in operational use

- Radiation-UV, photosynthetically active radiation



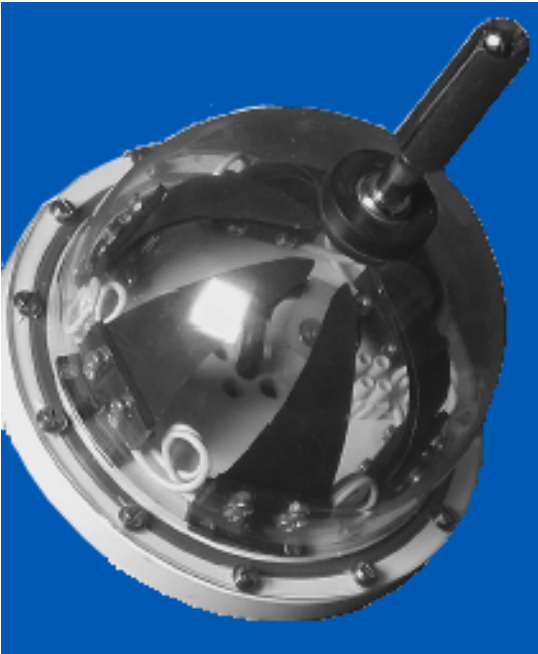
UVA&UVB,



photosynthetically active radiation

Instruments in operational use

- Sunshine duration



WMO defines direct solar radiation $S \geq 120 \text{ W} \cdot \text{m}^{-2}$ as the sunshine threshold,
so pyrheliometer could measure sunshine duration

Instruments in operational use

- Evaporation

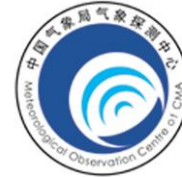
AG, THIES



Ultrasonic evaporation
measurement



Evaporation pool,
manual observation



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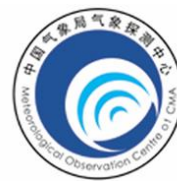
Meteorological Observation Center

Instruments in operational use

- Clouds, visibility, weather phenomena



3.National Center for Meteorological Metrology (RIC-Beijing)

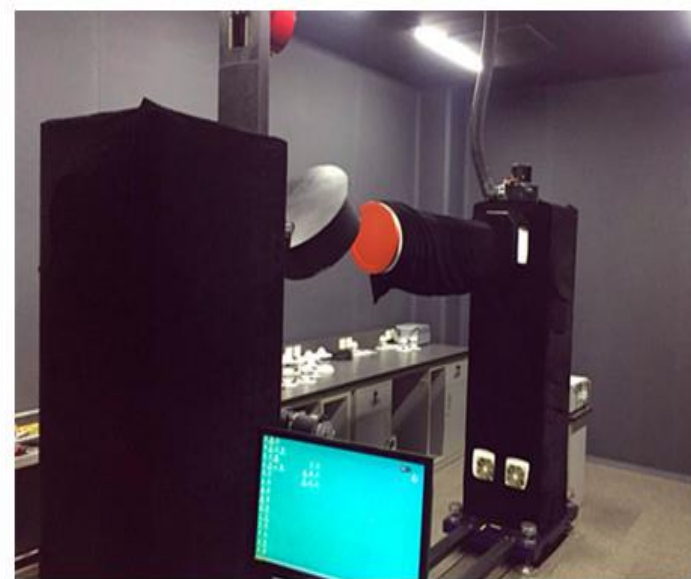


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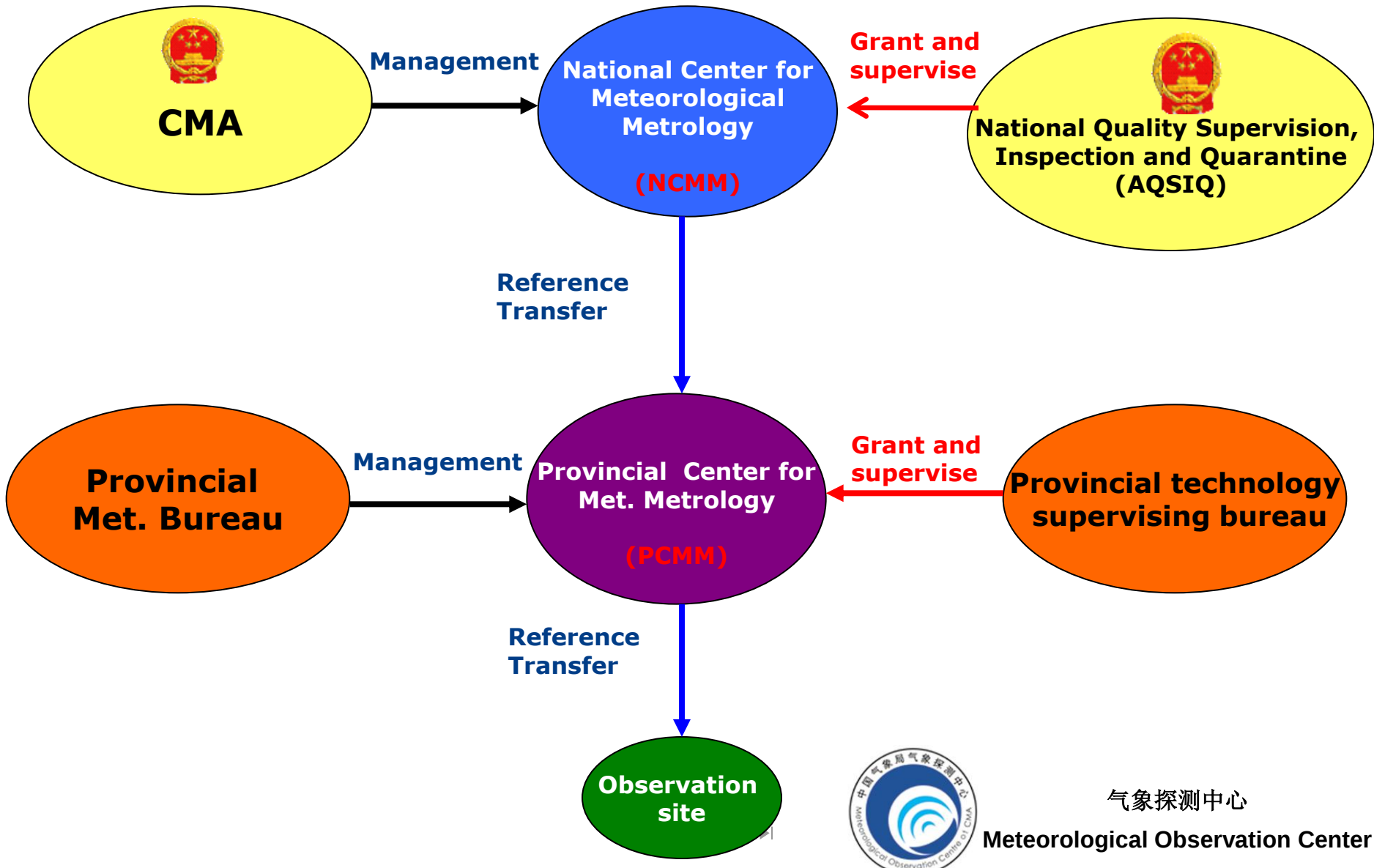
Introductions to NCMM

Responsibilities of NCMM

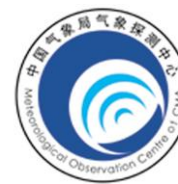
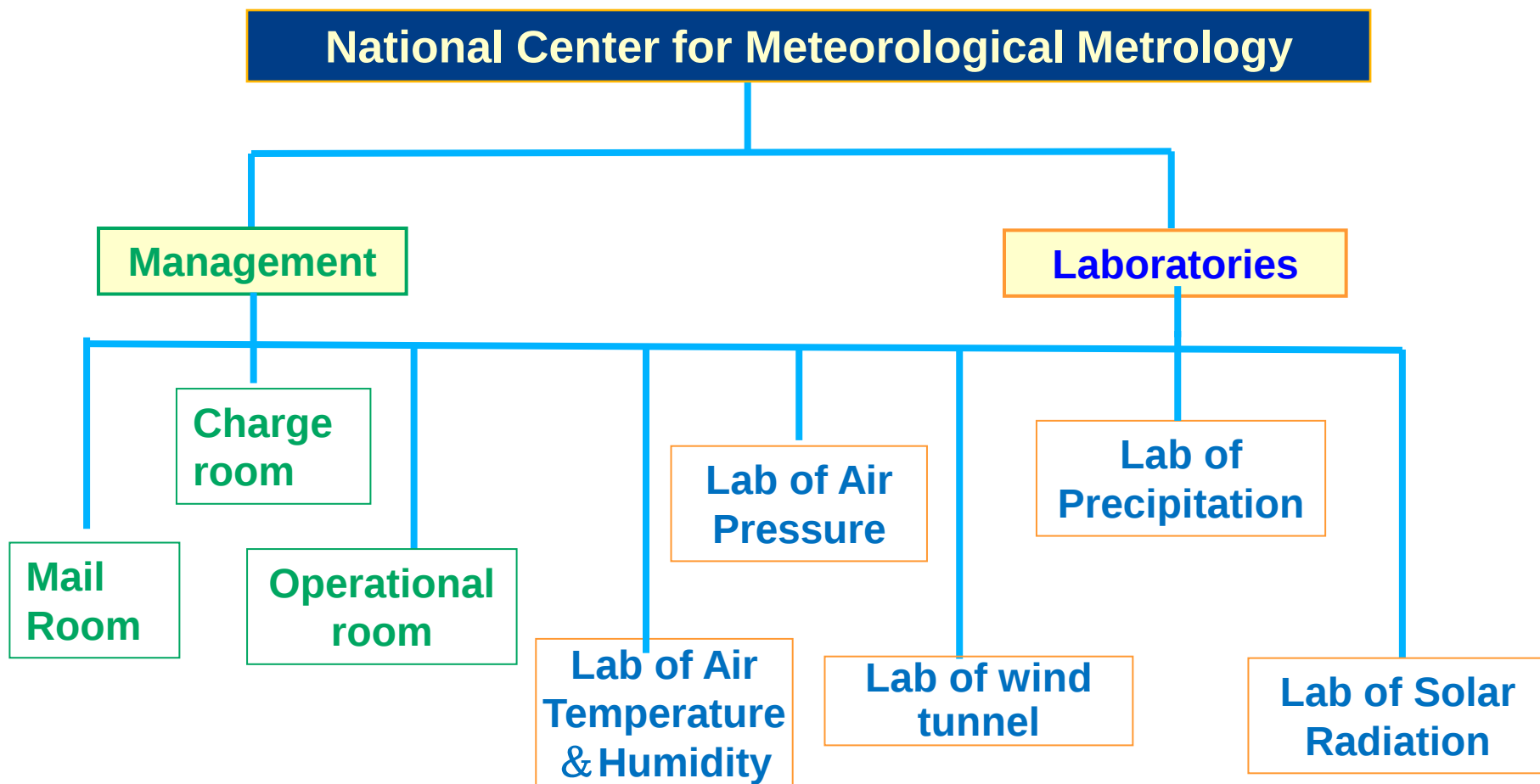
- To keep CMA Meteorological standard with tracing to the source and transferring reference
- To calibrate and check meteorological instrument
- To study and draw up meteorological calibration criterion and method
- To finish RIC-Beijing jobs for WMO RA II



Meteorological Metrology in China



NCMM Functional Structure

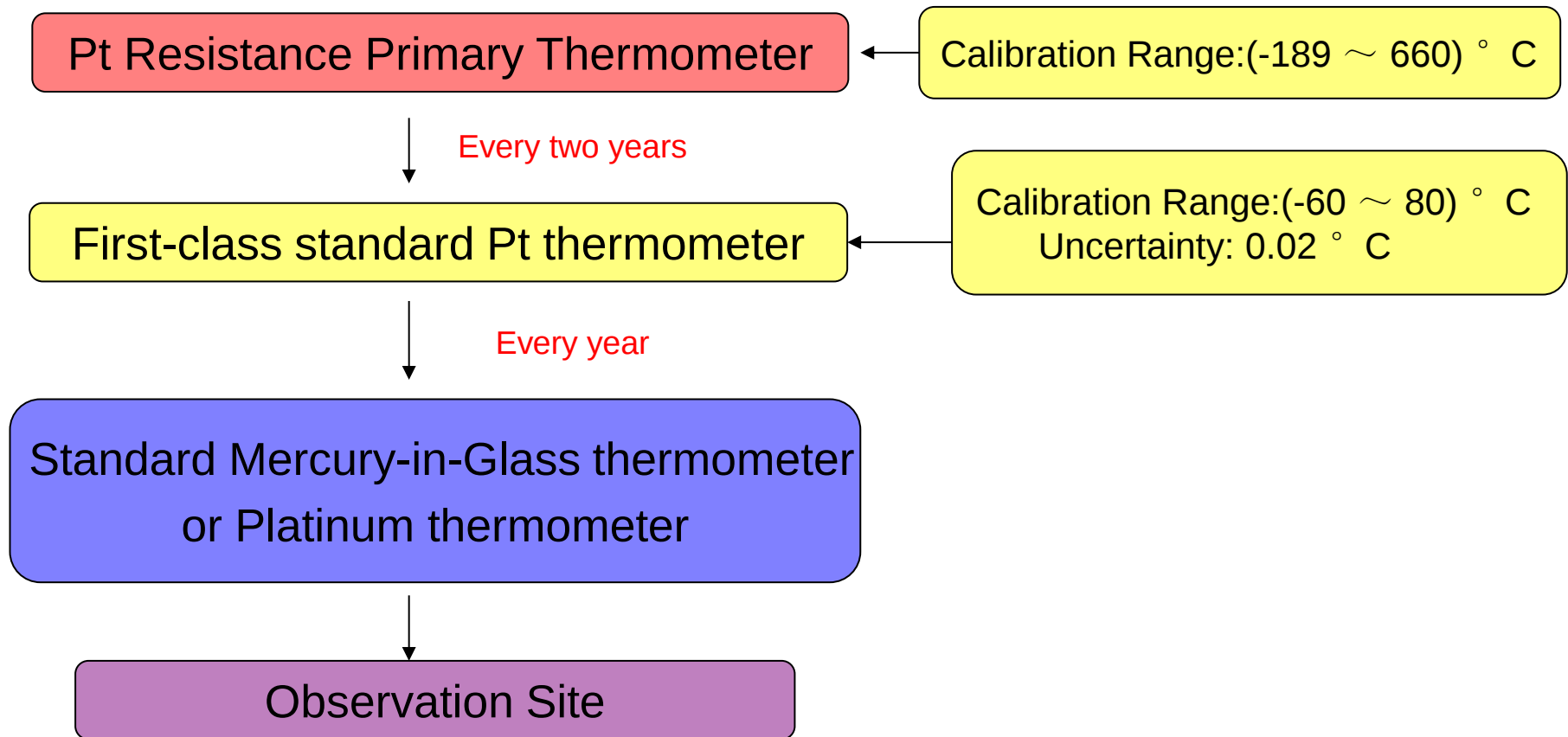


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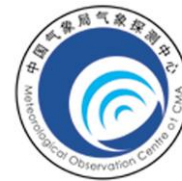
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Instrument Calibration Capabilities

Temperature



NIM: National Institute of Metrology, China



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Reference Equipment----Temperature

6015T Automated Primary Thermometry Bridge



Range: ≤ 1.5 (Ratio)
Accuracy: ≤ 0.02 ppm

917/L Low temperature Deep Immersion Liquid Bath



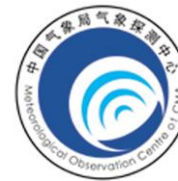
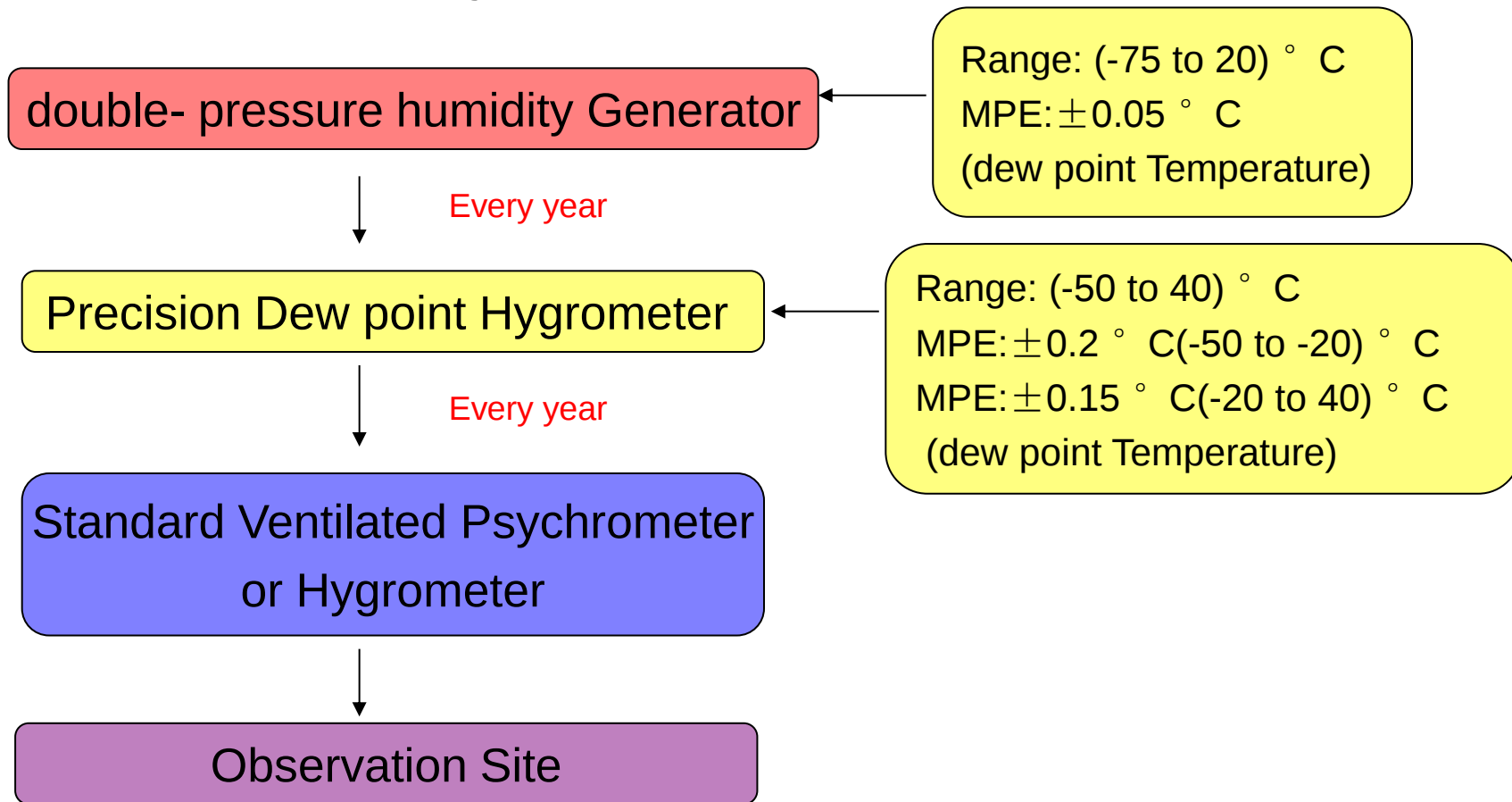
Range: $-80 \sim +80^{\circ}\text{C}$
Accuracy: $\pm 0.005^{\circ}\text{C}$

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

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

Instrument Calibration Capabilities

Humidity



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Reference Equipment

Humidity

DewStar-S-1M Dew point Hygrometer

Range: $-40 \sim +50^{\circ}\text{C}$ (Dew Point)
Accuracy: 0.15°C (Dew Point)



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

VC3 7060 Climate Chamber

Range: $-70 \sim +180^{\circ}\text{C}$; 10 ~ 98%RH

Accuracy: 0.3°C ; 1.5%RH



VC3 7060 Climate Chamber
(German, Weiss-Votsch)

Reference Equipment

Humidity

SRH-3MC135ADR Accurate humidity Generator

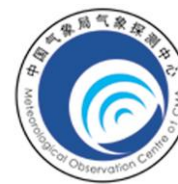
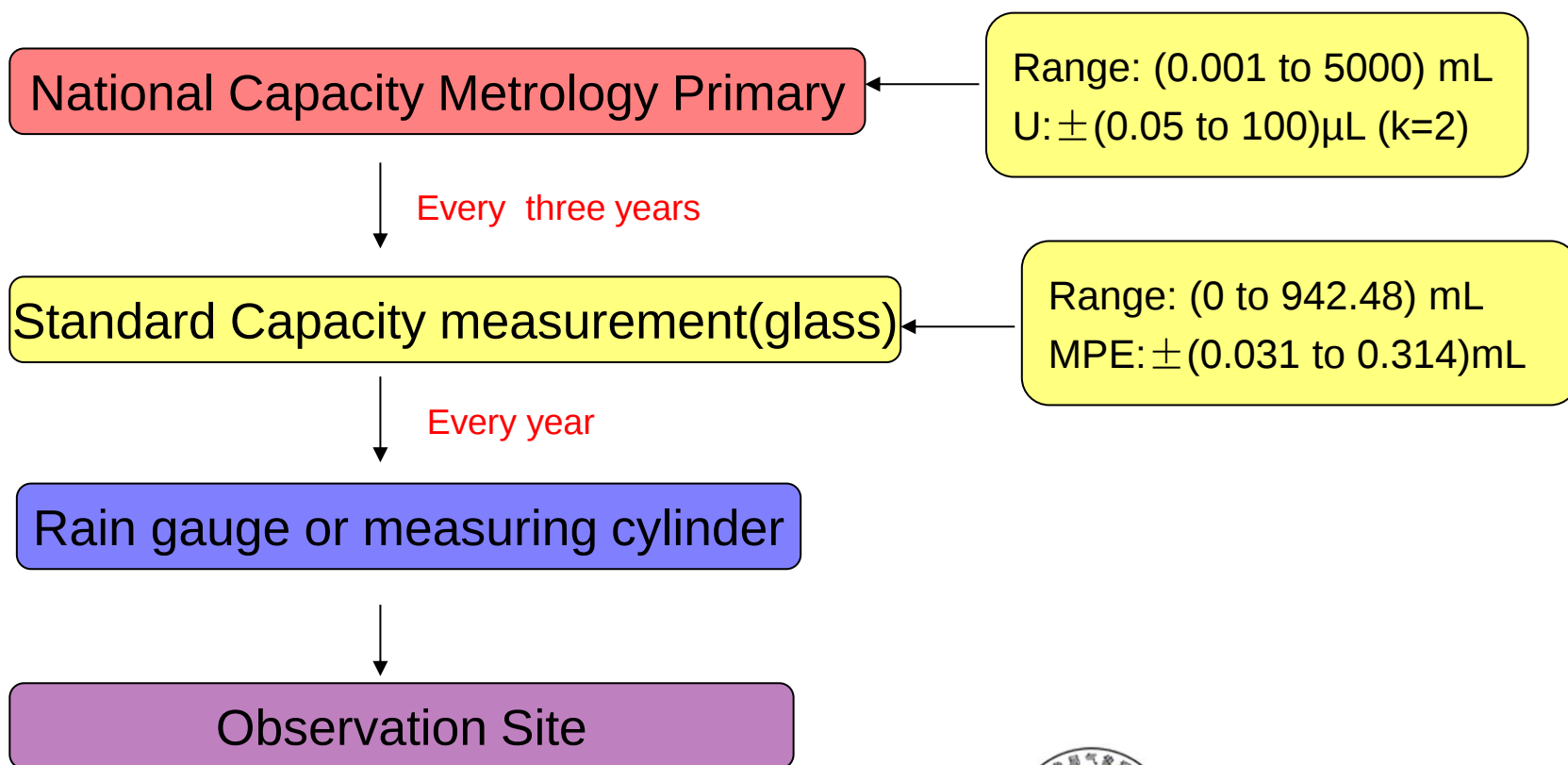
Range: 0 ~ 100%RH (-10 ~ +50℃)
Accuracy: 1%RH



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

Instrument Calibration Capabilities

Precipitation



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Reference Equipment

Precipitation

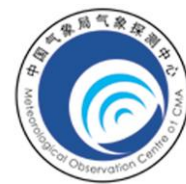
765 Dosimat
automatic titrator



JJS3 Precipitation Calibration System



JJS3 Precipitation
Calibration System

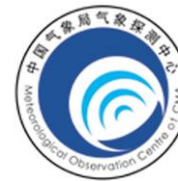
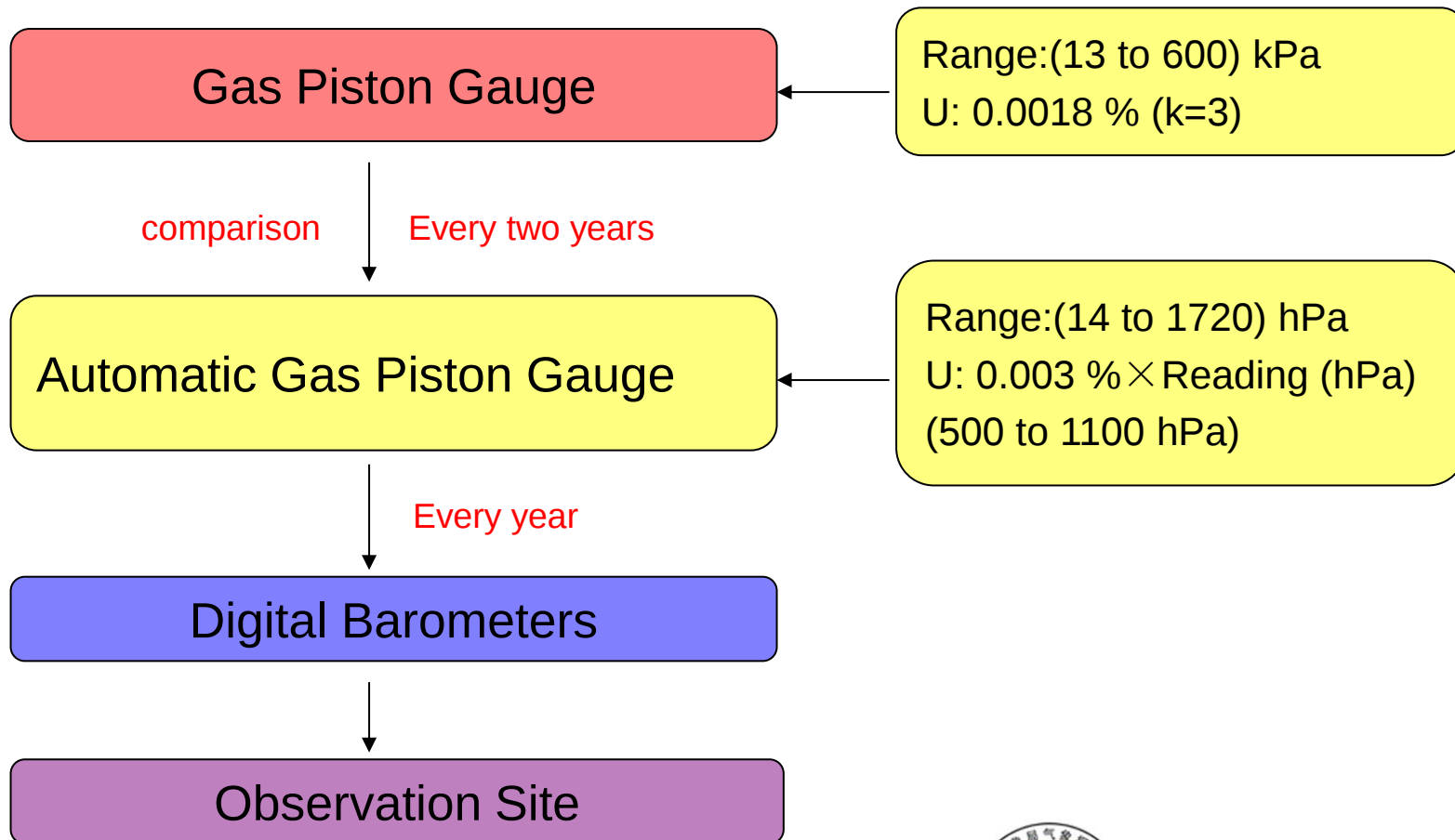


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Instrument Calibration Capabilities

Atmospheric Pressure



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Reference Equipment---Atmospheric Pressure



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



Uncertainty:

8ppm+10mPa (Gauge mode)

8ppm+20mPa (Absolute mode)

Range:

60hPa~1750hPa

PG7000-AMH™

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

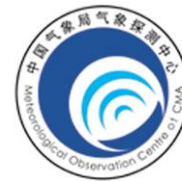


Reference Equipment

Atmospheric Pressure



PG 7601 & PG7607 Automatic Gas Piston Gauge (U.S. DHI)

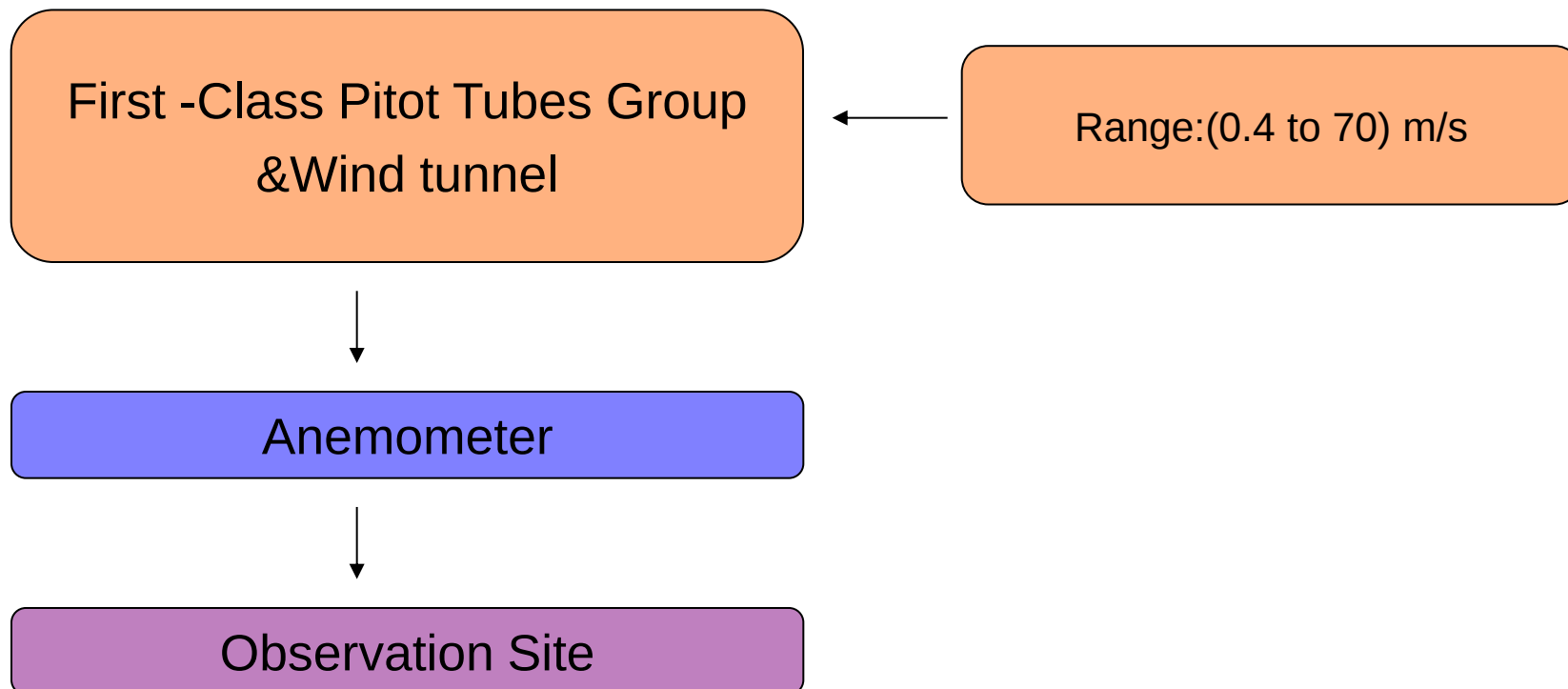


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Instrument Calibration Capabilities

Air Velocity



Reference Equipment

Air Velocity

- 70-meter Wind tunnel with test section & its control system



Reference Equipment

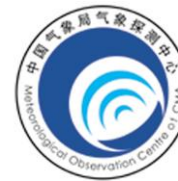
Air Velocity

HDF-500 Wind Tunnel

Range: 0.4m/s ~ 30m/s



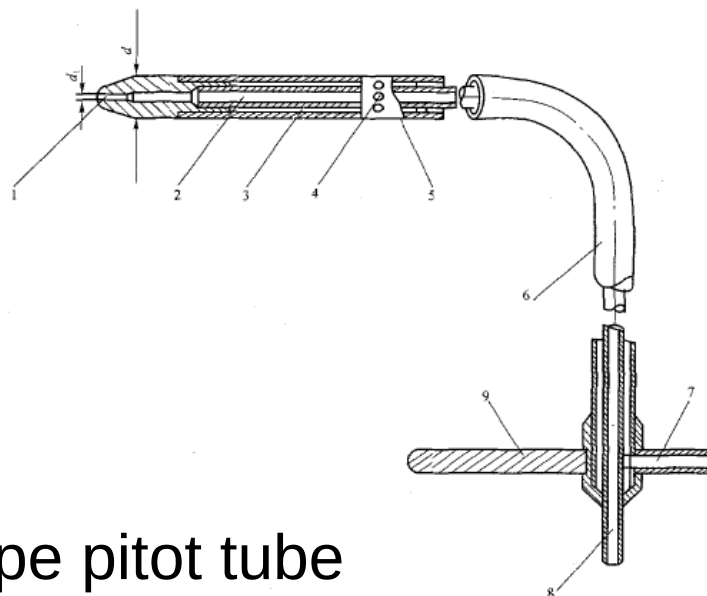
Very Low Speed Wind Tunnel



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Reference Equipment



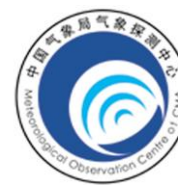
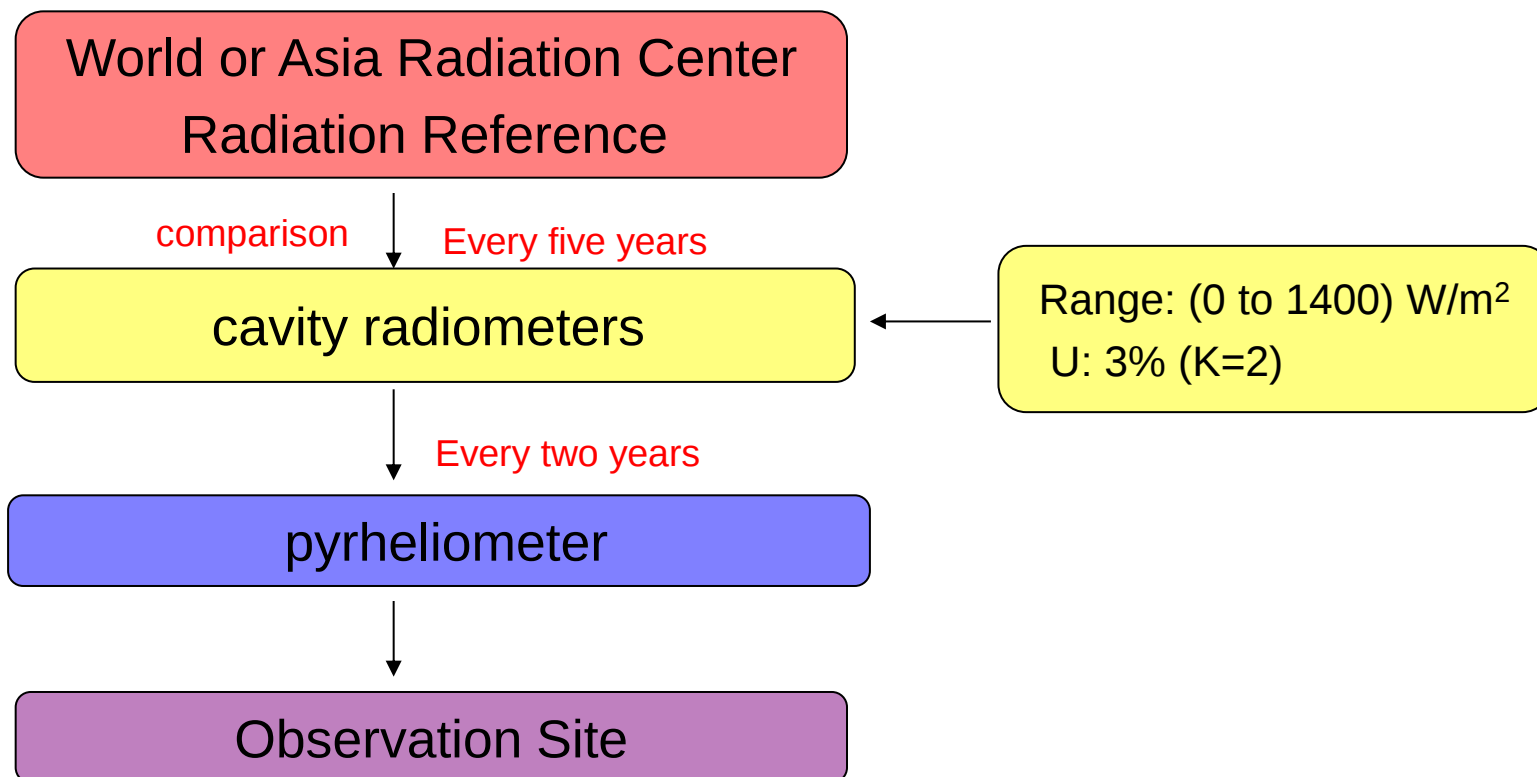
L type pitot tube



Electronic micro pressure gauge

Instrument Calibration Capabilities

Radiation



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Reference Equipment



PMO-6 Pyrheliometer



H-FCavity
pyrheliometer

China solar radiation standard group



Reference Equipment

Radiation

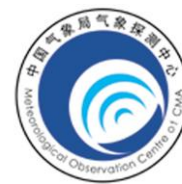


← CMP22
Pyranometer

CG4
pyrgeometer →



← Ultraviolet
radiometer



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Services of RIC-Beijing since 2013

Switzerland in Sep. 2015

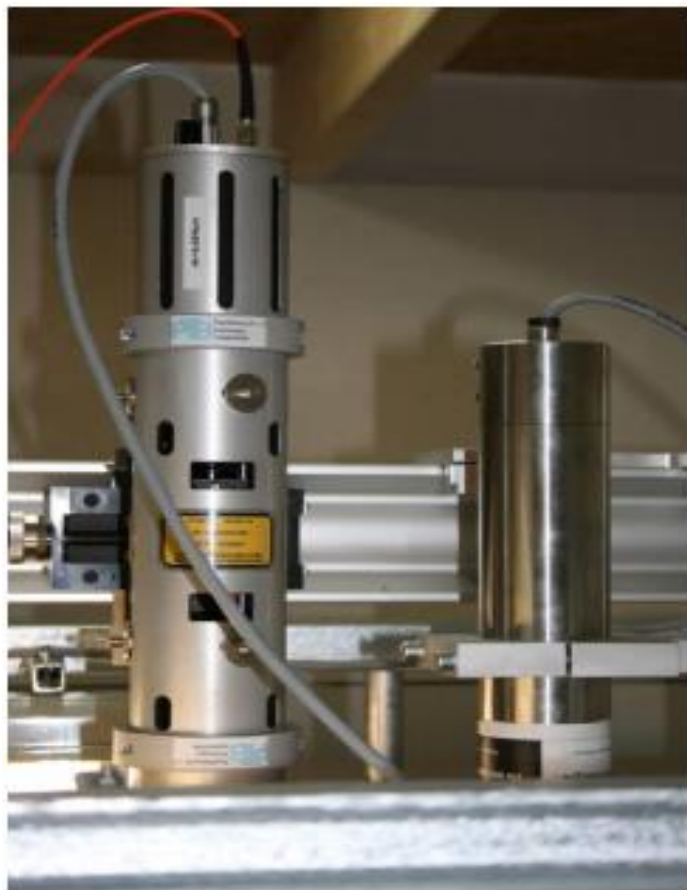


Japan in Jan. 2017



Participating in Radiation intercomparisons

International Comparisons



Comparison with WindGuard, in 2017 Germany
Wind direction and speed

International Comparisons



Providing calibration services for
Indonesia in 2013

International Comparisons



Providing calibration services for
Vietnam in 2013

International Comparisons



Providing calibration services for
Pakistan in 2013

International Comparisons



Providing calibration services for
Indonesia in 2015

International Comparisons



Providing calibration services for
Mongolia in 2015

International Comparisons



Providing calibration services for
North Korea in 2015, 2016

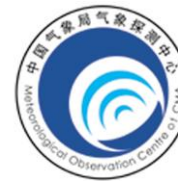
International Tech-training

JMA/WMO TRAINING WORKSHOP ON CALIBRATION AND MAINTENANCE OF METEOROLOGICAL INSTRUMENTS IN RA II (ASIA)



JMA Headquarters, Tokyo
Regional Instrument Centre (RIC)-Tsukuba, Tsukuba, Japan
19-22 February 2013

Participating in training in 2013 Japan



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Meteorological Observation Center

International Tech-training



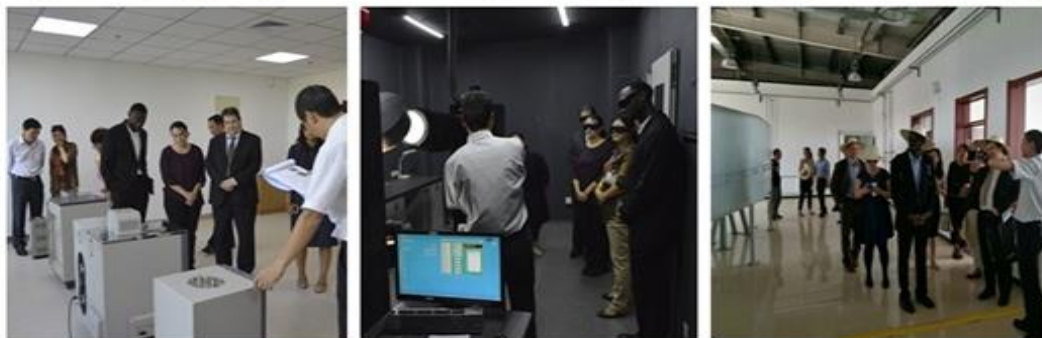
Providing training for BMKG of Indonesia on
radiation instrument use in 2013 China

International Tech-training

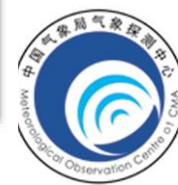


Providing training for Pakistan, Indonesia, South Africa, Thailand, Burma, etc in 2015 China

Visiting Group



Visiting Group
from NWS USA, in
2017 China



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Thank you for your attention!

