Overview of Meteorological Instruments Center (MIC)

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   (1) Quality assurance of meteorological instruments
   (2) Research and development
   (3) Activities of RIC Tsukuba
Meteorological Instruments Center (MIC)

-History and location-

Meteorological Research Institute
Aerological Observatory

MIC Test Field

Tsukuba
Tokyo
Japan
Organizational structure of JMA

**Director-General**

**Deputy Director-General**

**Headquarters**
- Administration Department
- Forecast Department
- Observations Department
  - Administration Division
  - Observations Division
  - Office of Observing Systems Operations
  - Meteorological Instruments Center
  - Office of Aviation Weather Observations
  - Office of Statistics
  - Satellite Program Division

**Local Offices**
- District Meteorological Observatory
- Okinawa Meteorological Observatory
  - Local Meteorological Observatory
  - Aviation Weather Service Center
  - Weather Station
  - Aviation Weather Station
  - Marine Observatory

**Auxiliary Organs**
- Meteorological Research Institute
- Aerological Observatory
- Meteorological Satellite Center
- Magnetic Observatory
- Meteorological College
Organizational structure of MIC

Director

Deputy Director

Senior Scientific Officer

Senior Instrument Inspector

Administration Section

Inspection Section 1

Inspection Section 2

Test Section 1

Test Section 2

RIC Section

( Total 21 staffs )
Main services of MIC

- **Quality assurance of meteorological instruments**
  To inspect meteorological equipments to maintain high-precision meteorological observations in Japan, and to maintain meteorological standard instruments and their traceability.

- **Research and development**
  To research and develop meteorological instruments, and to research site environment and methods of observation.

- **Activities of RIC Tsukuba**
  To assist Members of the Region through calibration and comparison with meteorological instruments, and to support to train instrument specialists as Regional Instrument Center (RIC) in Asia.
Main services of MIC

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Inspection of instruments
- To secure the accuracy of instrument -

Observations of JMA
Thermometer
Hygrometer
Barometer
Wind vane/Anemometer
Rain gauge
Sunshine recorder
Pyranometer

Inspection of instruments in JMA (MIC)

Observations except JMA
Thermometer
Hygrometer
Barometer
Wind vane/Anemometer
Rain gauge
Sunshine recorder
Pyranometer

Grant type Certification (MIC)

Entrustment inspection (MIC)

Meteorological observations
Maintenance and inspection of instruments

Surface Observatory
Aviation Observatory
AWS

About 3,000 units
Instruments per year

Inspection in every 5 years
Paper assessment in every 1 year

About 1,200 units
Instruments per year

MIC

Propeller Anemometer • 340
Rain gauge ••••••••• 300
Sunshine recorder ••• 280

Disassembly, Adjustment, Inspection

Thermometer •• 900
Hygrometer ••• 200
Barometer ••• 400

Paper assessment

About 1,800 units
Instruments
Maintenance and inspection of Propeller Anemometer
Quality control of observational instruments

**<Non Radiation>**
- International standard (SI unit)
- National standard (Japan)
- RIC Tsukuba standard
- RIC Tsukuba Traveling standard
- National meteorological standard (RA member countries)
- Working instruments (Observation sites) (RA member countries)

**<Radiation>**
- WMO standard
- RRC* Regional standard
- National meteorological standard (JMA)
- Working standard (Japan)
- Working instruments (Observation sites) (Japan)

*RRC: Regional Radiation Centre
Calibration equipments
- Standard instruments of JMA -

**Standard thermometer**
Platinum resistance thermometer sensor and alternating current bridge

**Standard hygrometer**
Dew point meter (electronic cooling type) and platinum resistance thermometer

**Standard barometer**
Air piston gauge type

**Other Standard**
Ultrasonic anemometer, Pitot tube, Differential pressure gauge and Wind tunnel, Pyranometer, Burette (Precipitation)
Calibration equipments
- Traveling standard instruments of RIC Tsukuba -

**Standard thermometer**
- Platinum resistance thermometer TS81A (CHINO, Japan)
- Alternating current bridge F-250 (ASL, UK)

**Standard Humidity**
- Hygrometer (sensor) D2 (General Eastern, USA)
- Hygrometer (controller) Hygro M2 (General Eastern, USA)

**Standard Pressure**
- Digital barometer PTB220 (Vaisala, Finland)
Calibration chambers

Chambers for calibrate thermometers

Liquid bath type
Range: -85 ~ +50 °C

Air chamber type
Range: -40 ~ +50 °C

Chambers for calibrate hygrometers

Wet and dry air mixing type
Range: 15 ~ 95%RH

Wet and dry air mixing type
Range: 10 ~ 95%RH 10 ~ +50 °C

Chambers for calibrate barometers

Range: 4 ~ 1050 hPa
Main services of MIC

- **Quality control of observational instruments**
  To inspect meteorological equipments to maintain high-precision meteorological observations in Japan, and to maintain meteorological standard instruments and their traceability.

- **Research and development**
  To research and develop meteorological instruments, and to research site environment and method of observation

- **Activities of RIC Tsukuba**
  To assist Members of the region through calibration and comparison with meteorological instruments, as Regional Instrument Centre (RIC) in Asia.
Research and development

For implementation of most suitable observation

- Research and development on meteorological instruments
- Research on site environment and methods of observation

Summary of activities in recent years

2008
- Test of piezo-resistive barometers
- Development of visibility presumption method using video images at airport

2009
- Test of capacitive hygrometer with warmed probe
- Intercomparison of thermometer screens/shields
  (At TECO-2010, we will announce the poster session)

2010
- Investigation of environmental influence on the quality of meteorological measurement
- Research for instruments of the next generation system on surface measurement.
Examples of research and development

Test of capacitive hygrometer with warmed probe (2009)

Development of visibility presumption method using video images at airport (2008-2009)
Main services of MIC

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Activities of RIC Tsukuba

- History and main activities -

1996 : Japan and China were designated as RICs of RAII at the 11th session of RAII

1997 : Questionnaire on the meteorological instrument in RAII

1998 : RIC Tsukuba held the training workshops cooperating with WMO

1998,2002: Exchanging the information on activities of RIC Tsukuba and RIC Beijing (at Japan)

2007 : Calibration of RAII member’s standard instruments
  • Thailand, barometer and thermometer
  • Hong Kong, China, barometer

2009 : Attendance at the ET-RIC (WMO, CIMO) meeting
  : Visit RIC-France (one of the most advanced and active RICs)

2010 : Calibration trial using RIC Tsukuba’s travelling pressure standard in cooperation with Thai Meteorological Department (TMD)
  Mutual visits between RIC Tsukuba and RIC Beijing
Activities of RIC Tsukuba
- Support for instrument specialists -

- WMO and RIC Tsukuba held the training workshop in Nov. 1998.
- 16 Members in RAIL participated in the workshop
Activities of RIC Tsukuba
- RIC-Tsukuba’s website and leaflet -

Building a RIC Tsukuba’s Website

Publication of a RIC Tsukuba’s leaflet
A questionnaire to RAIL Members

- Future Plan -

- Survey both the present state of operational instrumentation and the training requirements on instrumentation

- RIC Tsukuba have plan to implement a questionnaire to RAIL members in cooperating with RIC Beijing as early as possible in this year.

- Results of this survey will be used for the consideration of future activities of RIC Tsukuba and RIC Beijing and be shared among all RAIL Members

- We wish this survey will prove helpful for us to assist RAIL Members to improve the quality of meteorological instrument and to have well trained experts
Thank you for your attention