# Qatar observation stations, Instruments and calibrations

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1- **observation stations**

Number of surface observation➢

Distribution map of stations➢

Case examples of troubles and problems in ➢ observation stations, and recovery works

Issues and efforts in operation➢

## 2- Instruments in operational use
## Manufacturer and Model

- Current status
- Interval of maintenance and calibration
- Case examples of troubles and problems in Instruments, and recovery works
- Issues and efforts in maintenance and calibration

## 3- Standards and equipment's for calibration

National meteorological standards, working standards, traveling standards

- Manufacturer and Model
- Current status
- Interval of calibration to a superior standard, i.e. national or international standards

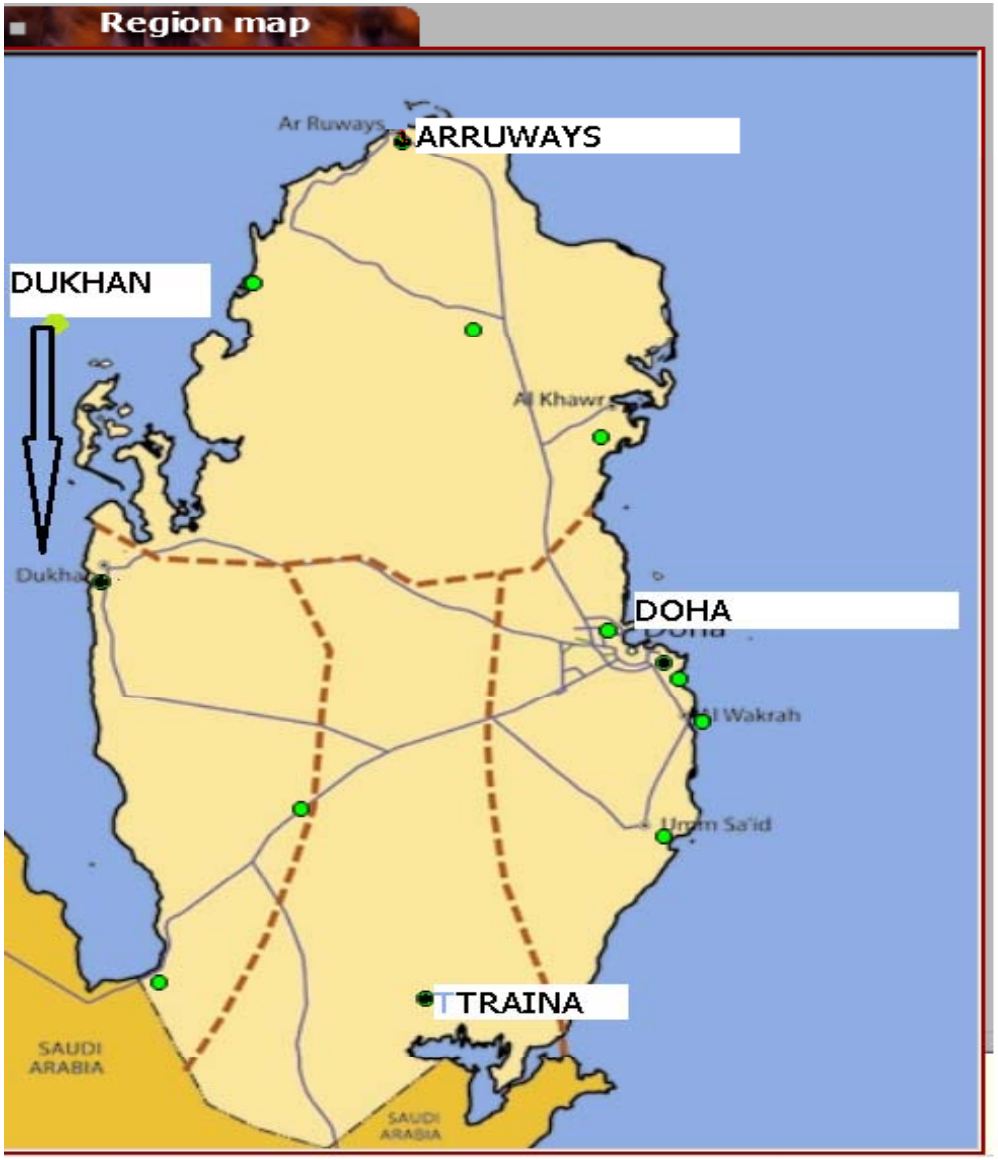
Equipment for Calibration

- Manufacturer, Model and Specifications

## 1- Surface observation station

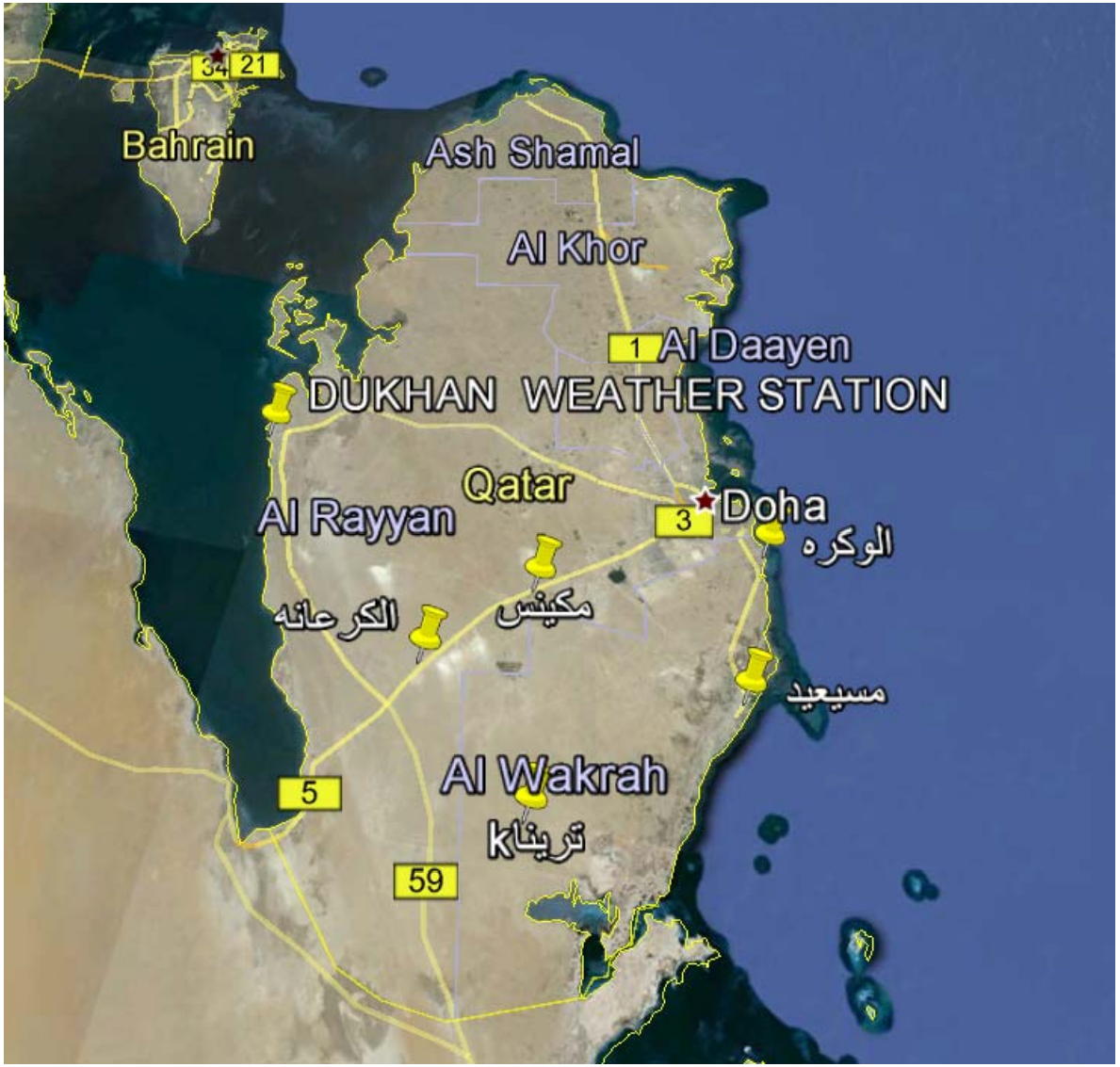
Number of surface observation
Qatar has 19 stations , 7 of them are synoptic station
3 are aviation  stations
And 3 are climatology stations

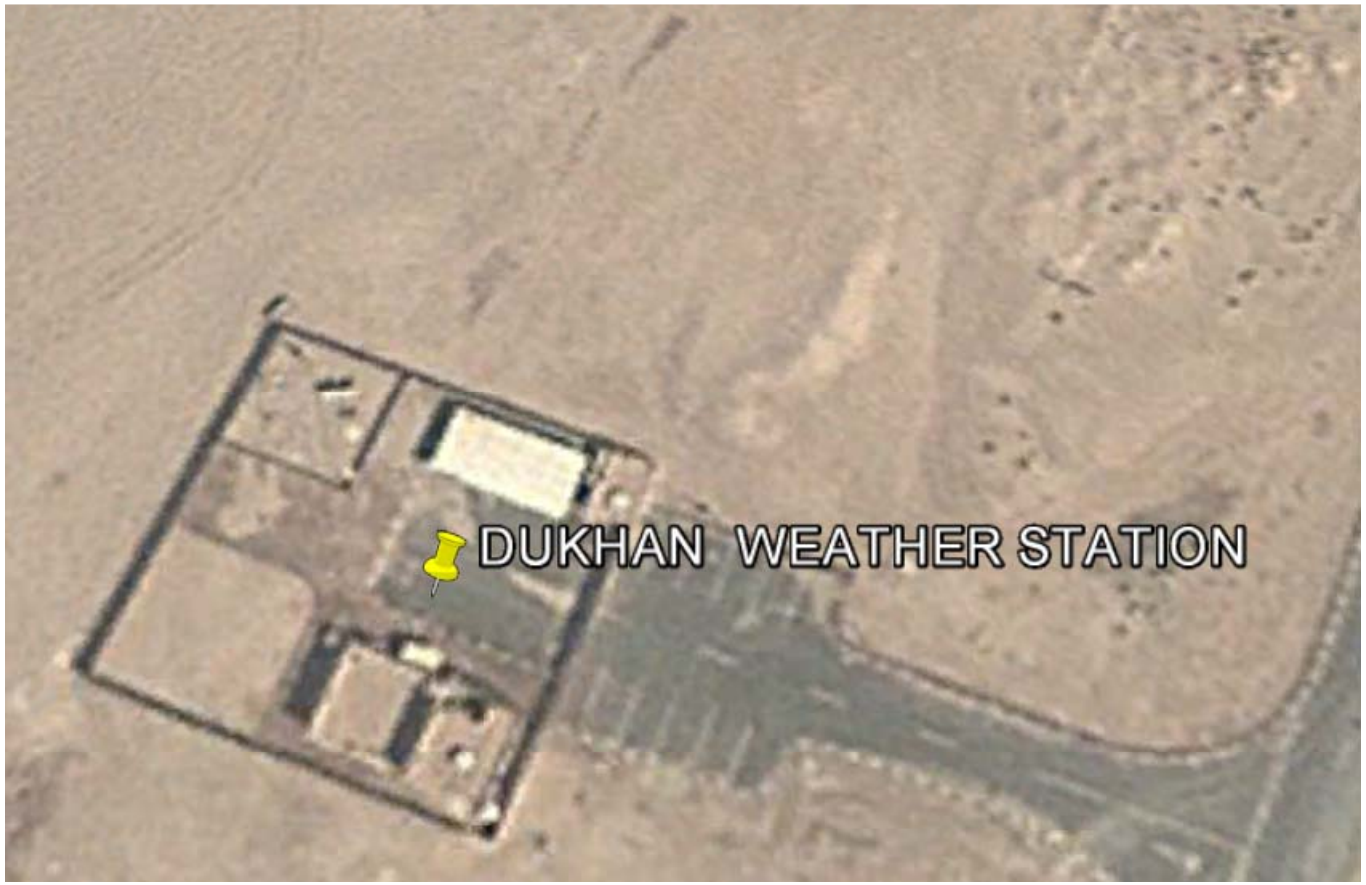
# Distribution map of stations

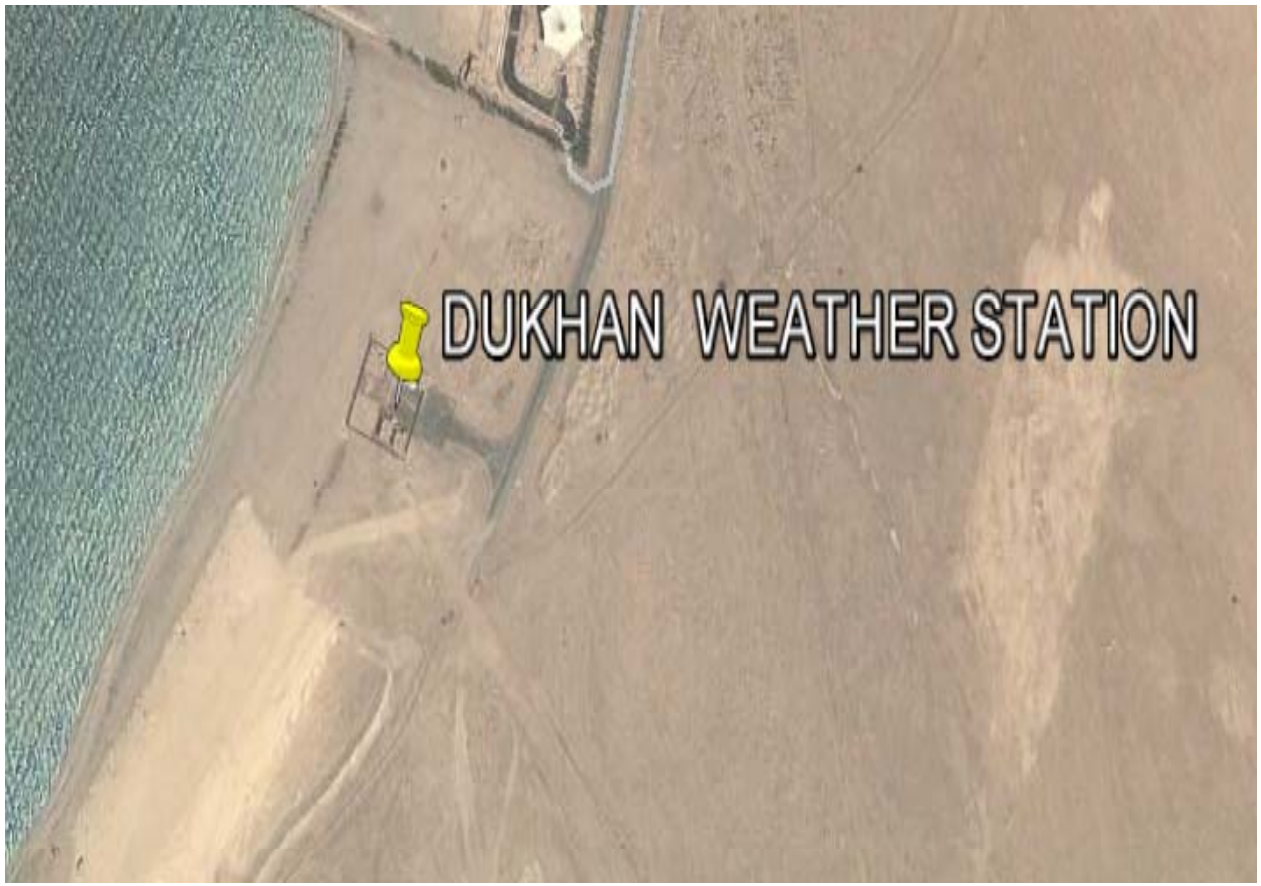


**Case examples of troubles and problems in observation stations, and recovery works:**

For my example we have in the west cost of DUKAN. It has both  Qatar a station called manual and automatic station  nearest the beach. Because of the climate in Qatar the temperature and  more humidity and both wind are high over the year.

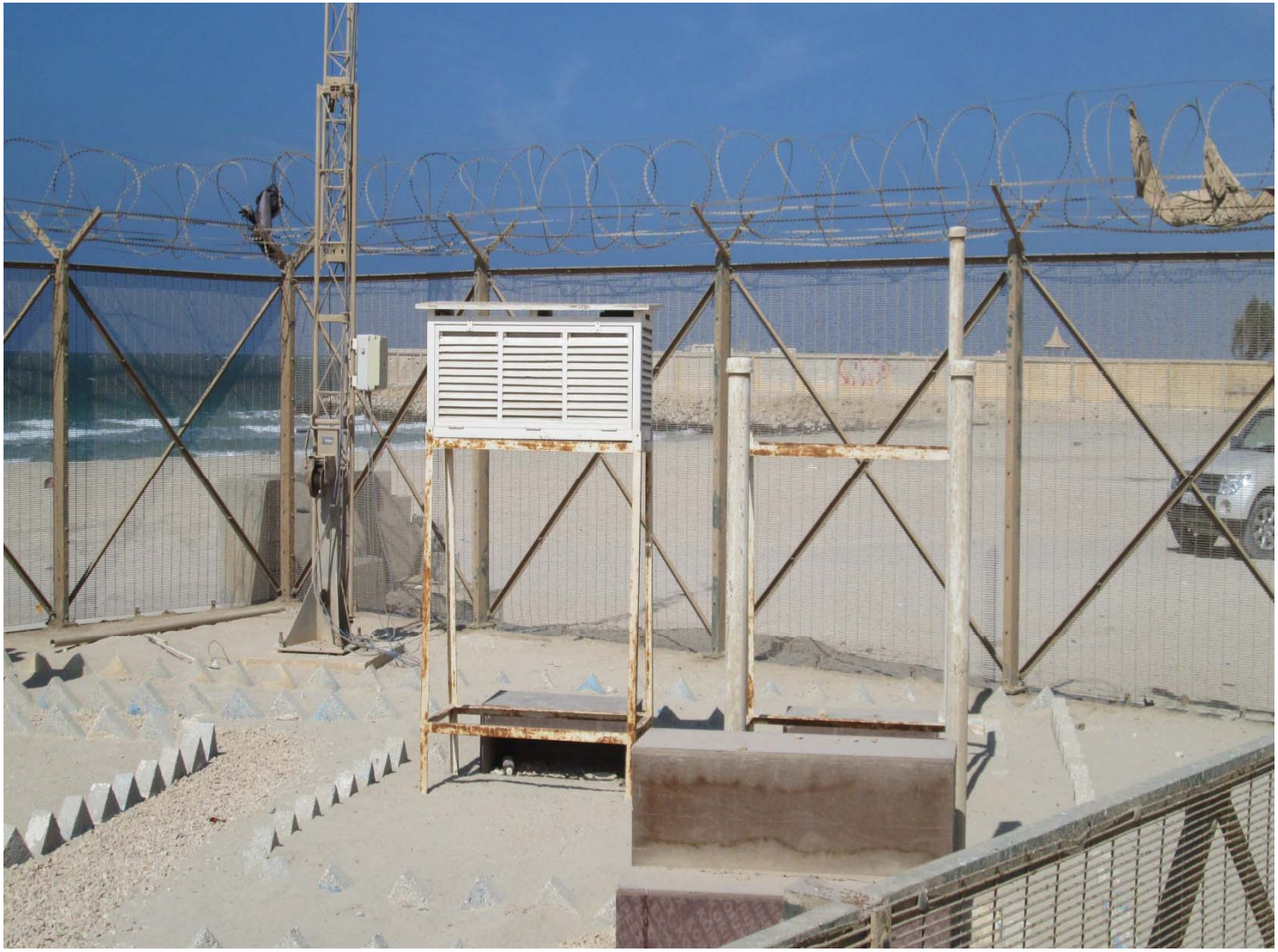

34
21
Bahrain
Ash Shamal
Al Khor
1
Al Daayen
DUKHAN WEATHER STATION
Qatar
Al Rayyan
3
Doha
الوكره
مكينس
الكرعانه
مسيعيد
Al Wakrah
5
ترينا
59


DUKHAN WEATHER STATION


DUKHAN WEATHER STATION

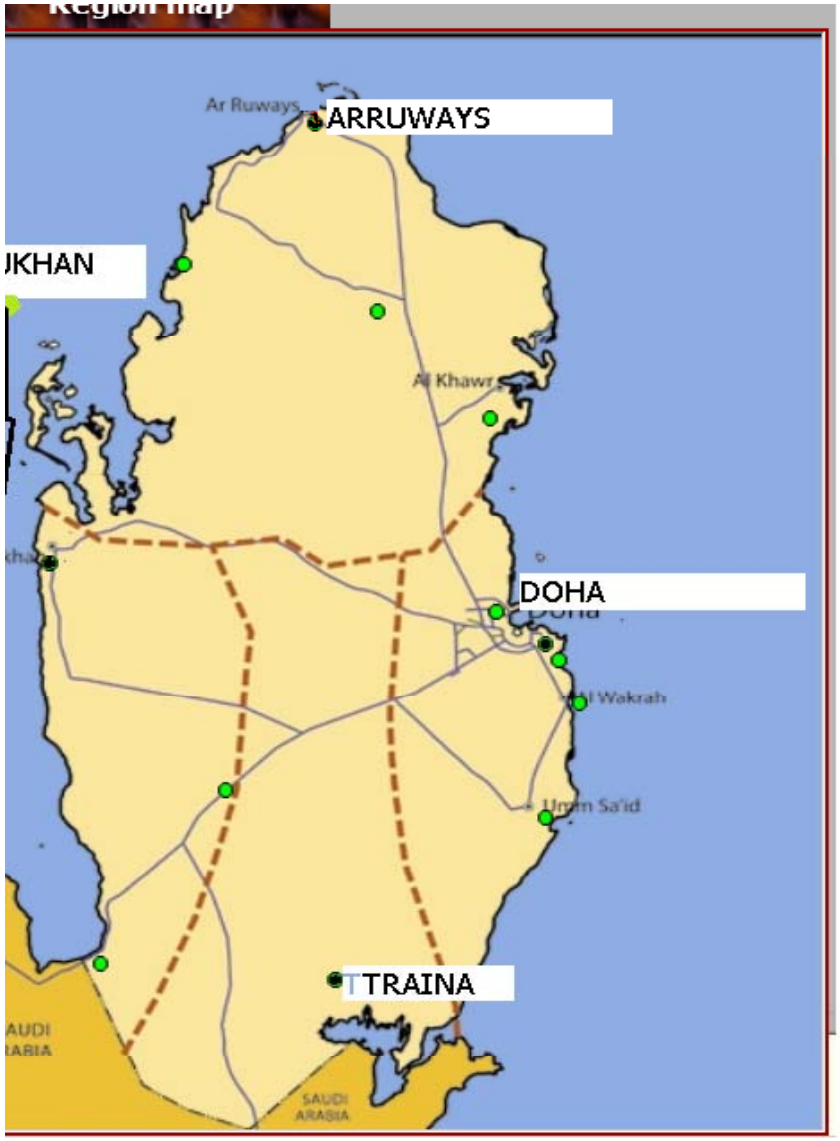
we face many problem like *corrosion* of metal part of instrument  that less the MTF (mean time between failure)  and the maintenance process are also rapid and increase than normal.

*Dust storms*  in all time of the year, so  the measurement process is effected and sometimes covered with wet dust that attached with instruments. Also Automatic sensors need more maintenance between day and night.



Another example of stations is *TRINA*
That located in middle desert in south of Qatar.
It has dust storm all the year and temperature reach around 50 C° in the summer, so the more maintenance is needed. With sand and high Temp, the measurement process cant be in normal case with out of highly maintained.

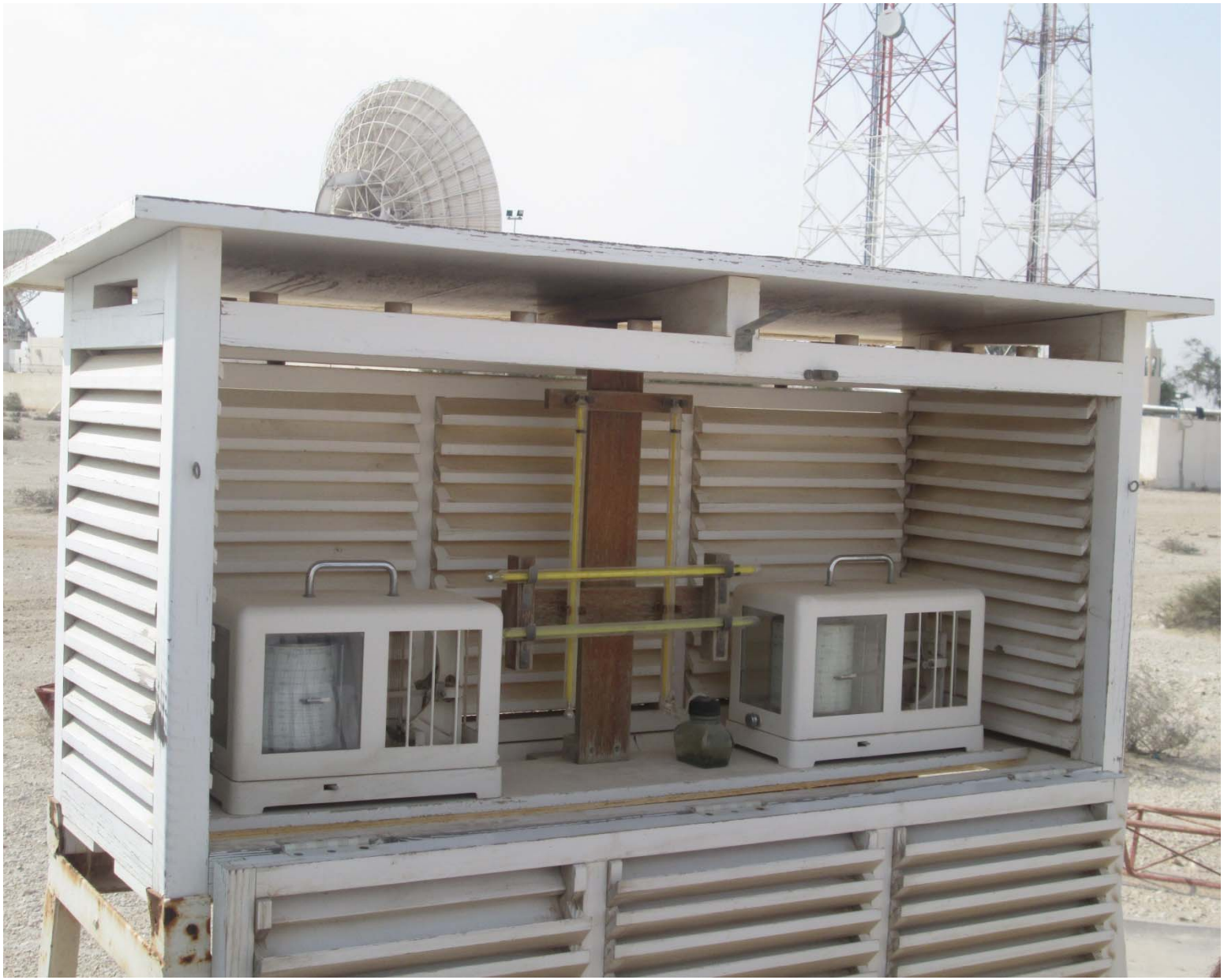
*Instrument measurement + highly maintained = accurate data*


Region Map
Ar Ruways
ARRUWAYS
UKHAN
Al Khawr
DOHA
Al Wakrah
Umm Sa'id
TRAINA
SAUDI ARABIA

Issues and efforts are in operation. Training and workshops are hold in Doha for this purpose to deeply increase experiences and allow to exchange experience not only in forecast but also in observation and method of measurements.

**Instruments in operational use**

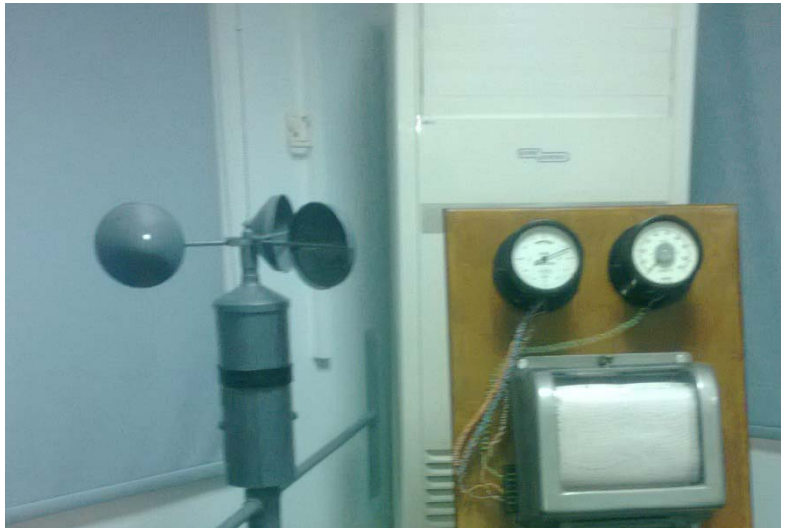
A wide variety of instruments in use
For example: Temperature is measured with ordinary thermometer and Lambrecht thermograph and Vaisala RTD sensor with AWS.

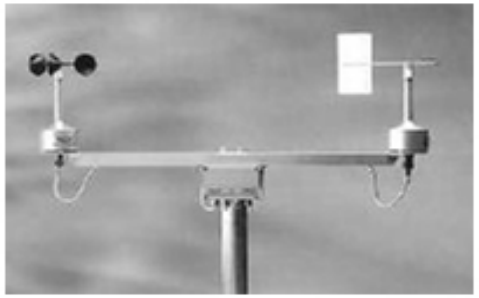


Also measurements for Relative humidity and dewpoint are carried out by dry and wet bulb thermometer, Lambrecht hygrograph and in AWS Vaisala sensors.

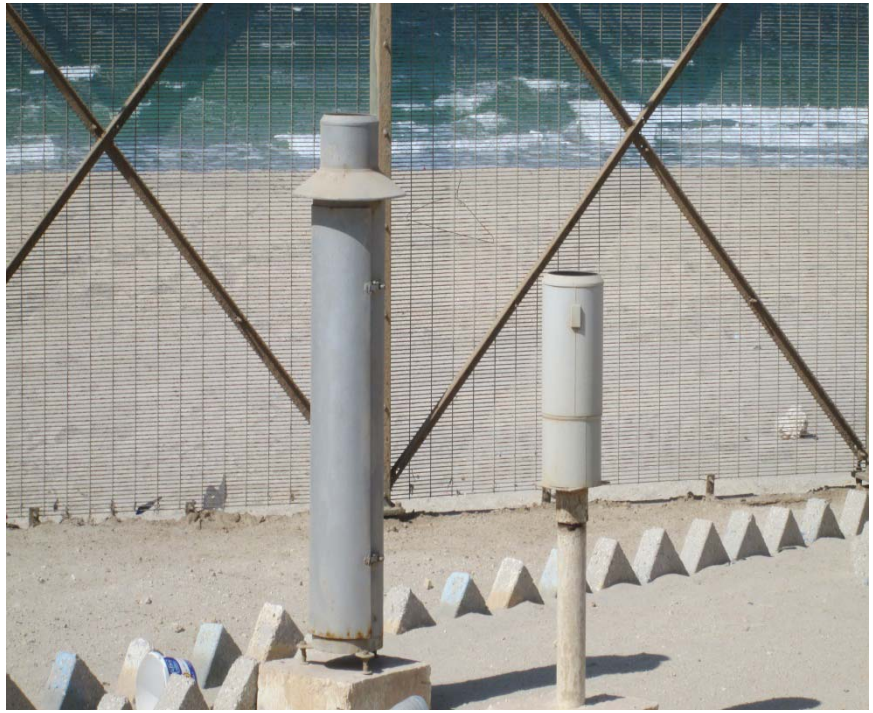
Atmospheric Pressure is measured by optical aneroid in manual station and Vaisala digital pressure sensor in AWS.

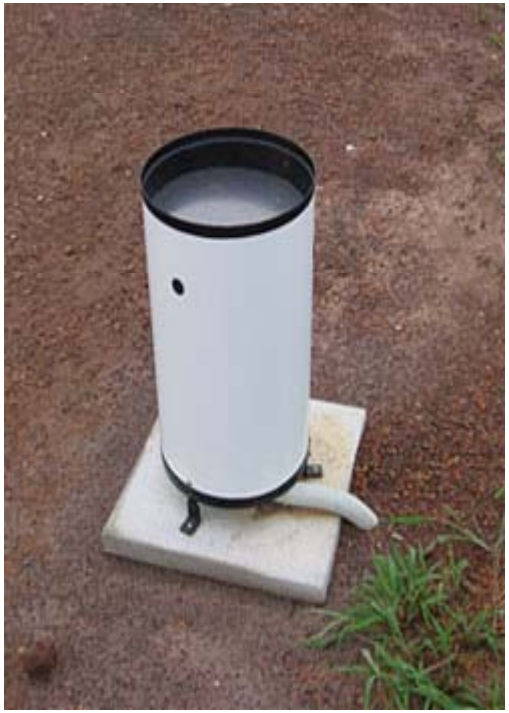
Wind speed and direction is measured with Munro instrument and in AWS are vaisala sensor.





precipitation has  ordinary gage from Lambrecht record gage. In AWS, measured by tipping bucket  from MFI Sensor.

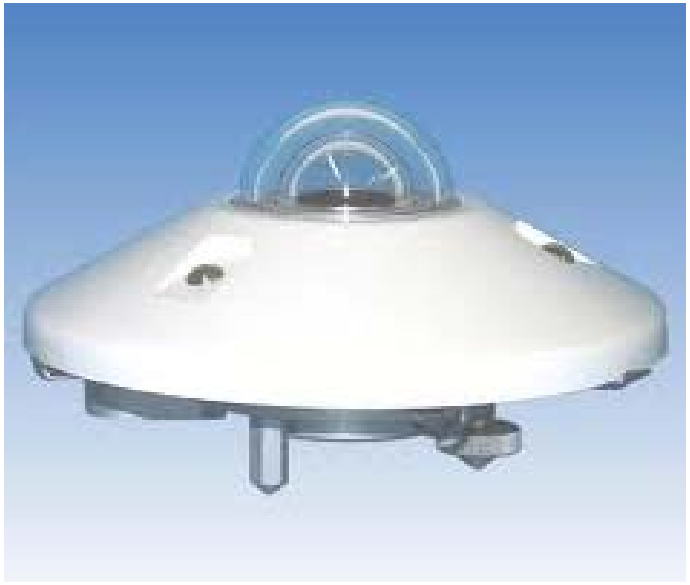


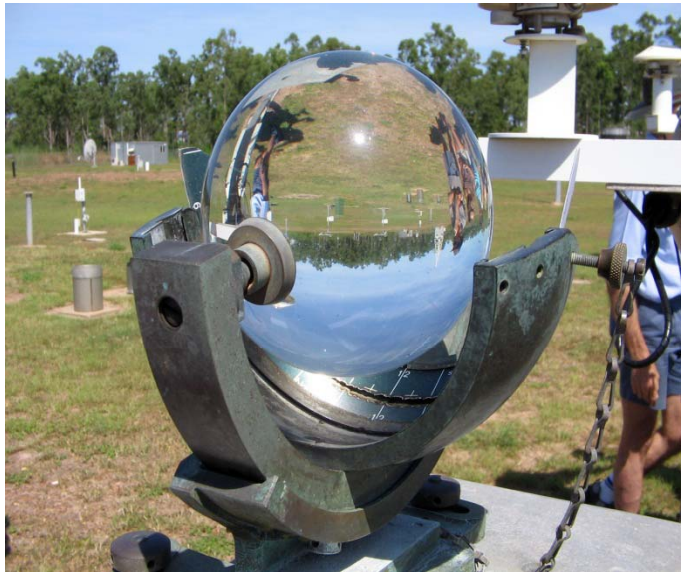


**Radiation instrument**

Global radiation measured by pyranometer manufacture kipe & zone company.

Sunshine duration measured with Casela Campbell stokes.





# Current status and interval of maintenance and calibration

All instruments have been in good case that related to protectively maintenance done monthly and the calibration process done every 3 months for graphs and every 6 months for sensors.

**Case examples of troubles and problems in observation stations, and recovery works**

For various reasons, any measured is affected by errors. An experimental measurement can only be correctly interpreted if it is associated with an estimate of the probable error called **'measurement uncertainty**‘

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For calibration services, manufacturers must rely on a trusted outside specialist, continuously developing standards in compliance with international rules such as ISO 17025, and best practices in statistics and metrology. Service teams at Endress+Hauser are able to provide not just calibration, but also all of the materials and methods necessary to ensure the quality of the calibration service, on site or at one of the laboratories

Plan can improve their efficiency and reduce costs by performing calibration history trend analysis. By doing it, a plan is able to define which instruments can calibrated less frequently and which should be calibrated more frequently. Calibration history trend analysis is only possible with calibration software that provides this functionality.

Using Calibration History Trend Analysis to Adjust Calibration Intervals of Plan Instrumentation. Manufacturing plan need to be absolutely confident that their instrumentation products – temperature sensors, pressure transducers are performing and measuring to specified tolerances. If sensors drift out of their specification range, the consequences can be disastrous for a plan , resulting in costly production downtime, safety issues or possibly leading to batches of inferior quality good being produced, which then have to be scrapped.

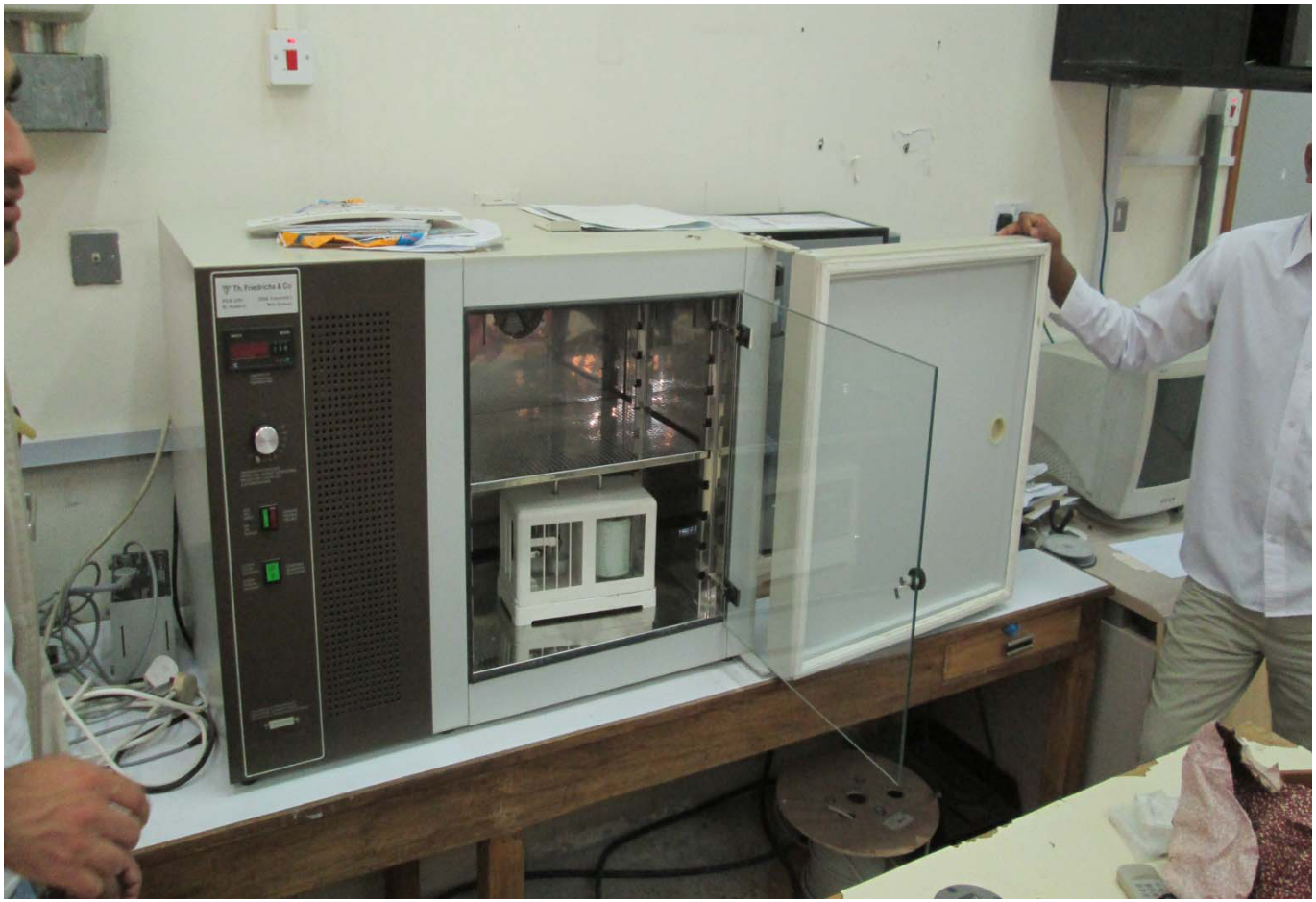
Most process manufacturing schedule  will have some sort of maintenance plan or schedule in place, which ensures that all instruments used across the site are calibrated at the appropriate times. However, with increasing demands and cost issues being placed on manufacturers these days, It needs more time.

**Standards and equipment's for calibration**

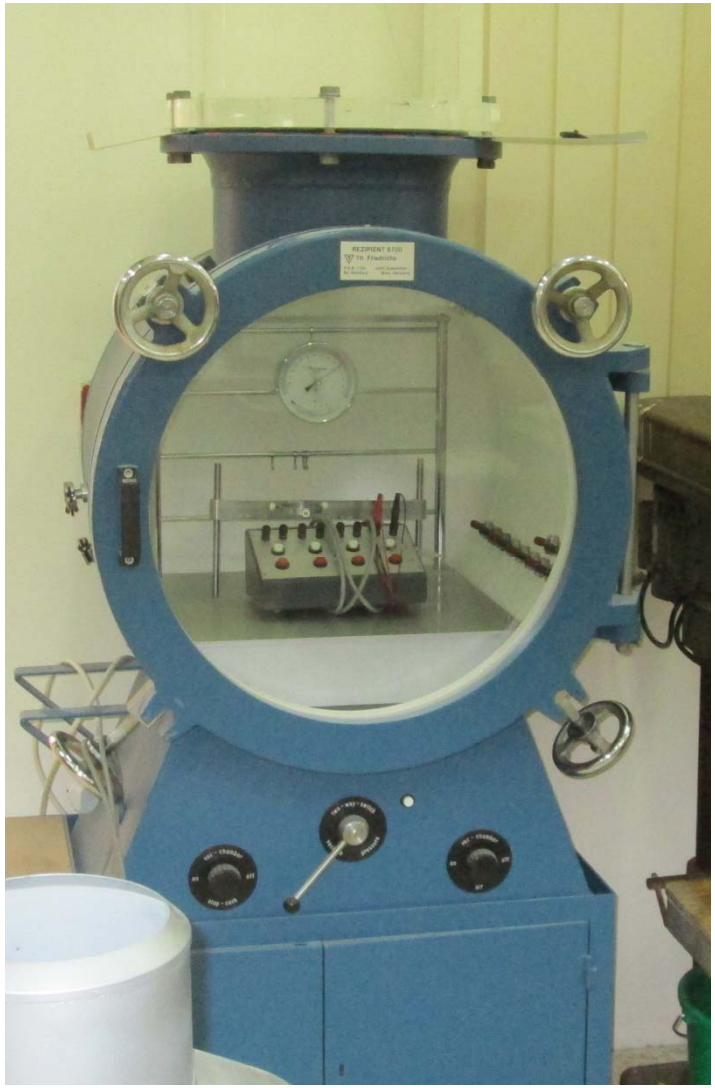
Our workshop has temperature Standard and also has fundamental calibration process. It issues the calibration certificate for temperature, relative humidity, the accuracy , hysterics and uncertainty.

# Relative Humidity calibration

# Temperature calibration Test Chamber



Pressure calibrations chamber For calibration pressure instrument.



# Conclusion

QATAR vision is to switch our workshop sub-regional calibration center. now to we have establish a new building and the renew equipment will frequently later. the pushing for capacity building with the exchange experience also putting in our considerations. These days we are trying to be better than before by supporting and cooperation's with countries in our region.

Thanks for your attention

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