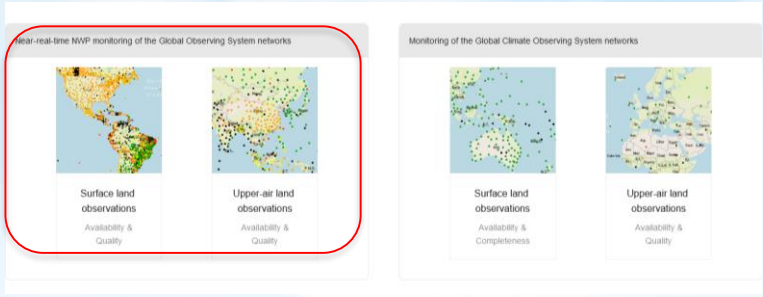
ONLINE WORKSHOP ON REGIONAL WIGOS CENTRE (RWC) FUNCTIONS AND TOOLS FOR REGIONAL ASSOCIATION (RA) II

12 July 2021

How to evaluate data availability and data accuracy

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

FOCUS ON
GOS NRT NWP monitoring/pressure
Results of 26th June 2021



Acronyms used:

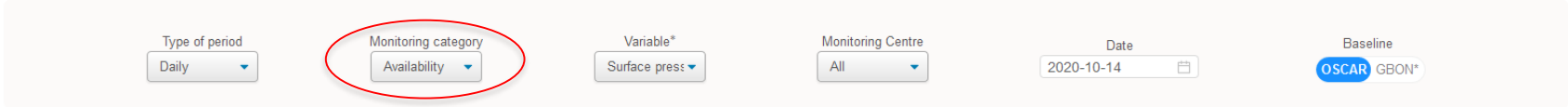
S Surface land observations

UA Upper-air land observations

WMO OMM
World Meteorological Organization
Organisation météorologique mondiale

Category 'Availability'

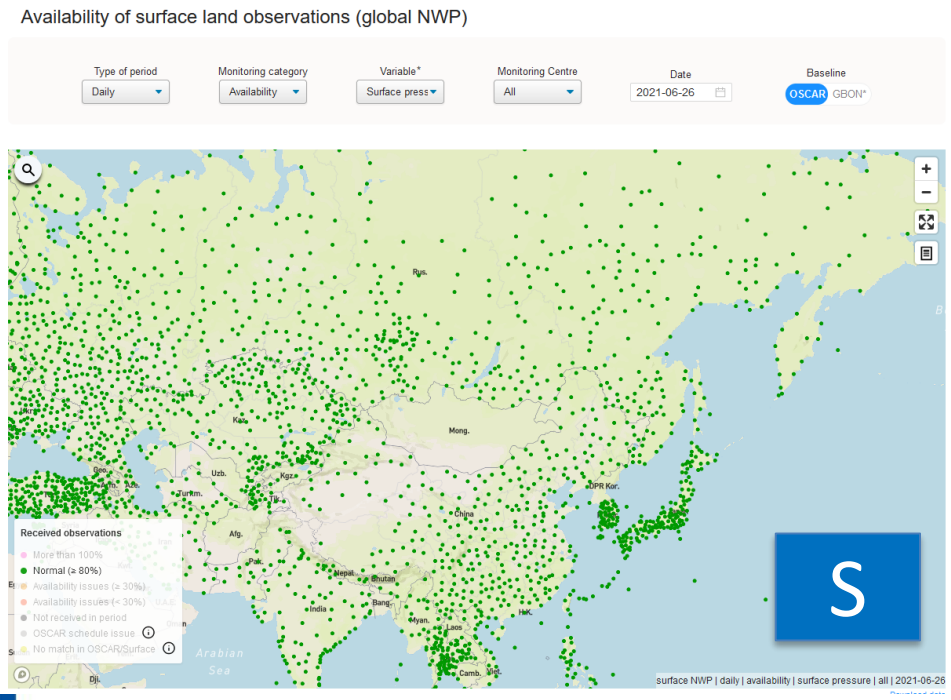
- RWC may select the **Monitoring category 'Availability'** in the web tool to evaluate the performance related to data availability

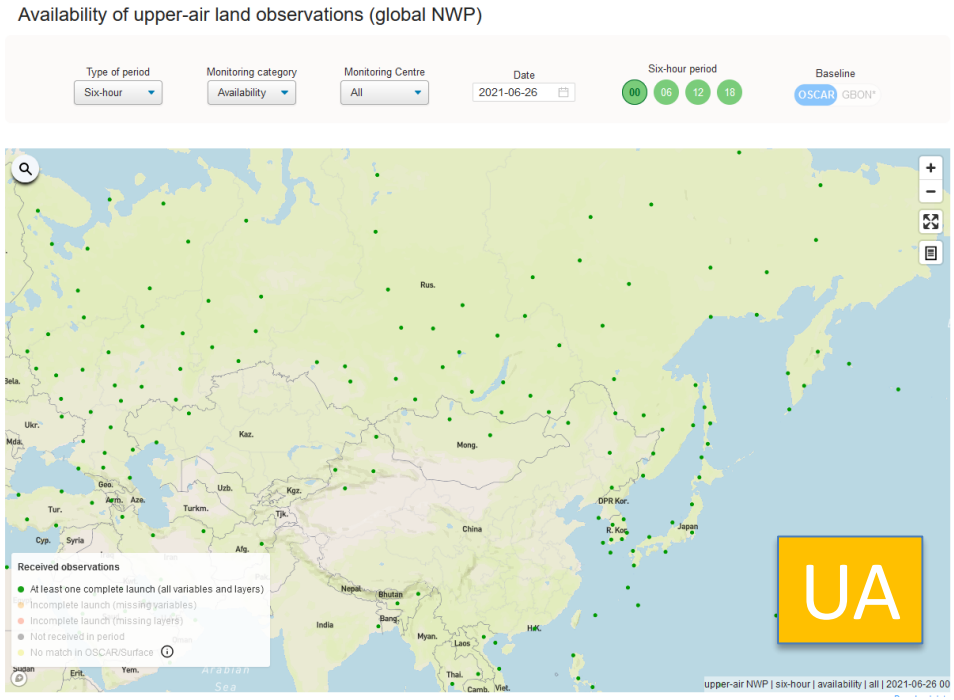


- The monitoring of data availability is based on performance figures of WIGOS Monitoring Centres (MC) obtained from comparing the observations received to those expected to be ingested to the WMO Information System (WIS) according to the schedule of international exchange determined from OSCAR/Surface metadata.
- **If at least one WIGOS Monitoring Centre shows 'Normal' (green) and others show different results, e.g. 'Availability issues' (orange or red) no action is required by the RWC.**

Normal (≥ 80%)

- Stations shown as green dots
- S: Normal (≥ 80%)
- UA: ‘at least one complete launch (all variables and layers)’ in six-hourly display, ‘no issue’ in daily display
  ➔ station is performing well, no action required ☺

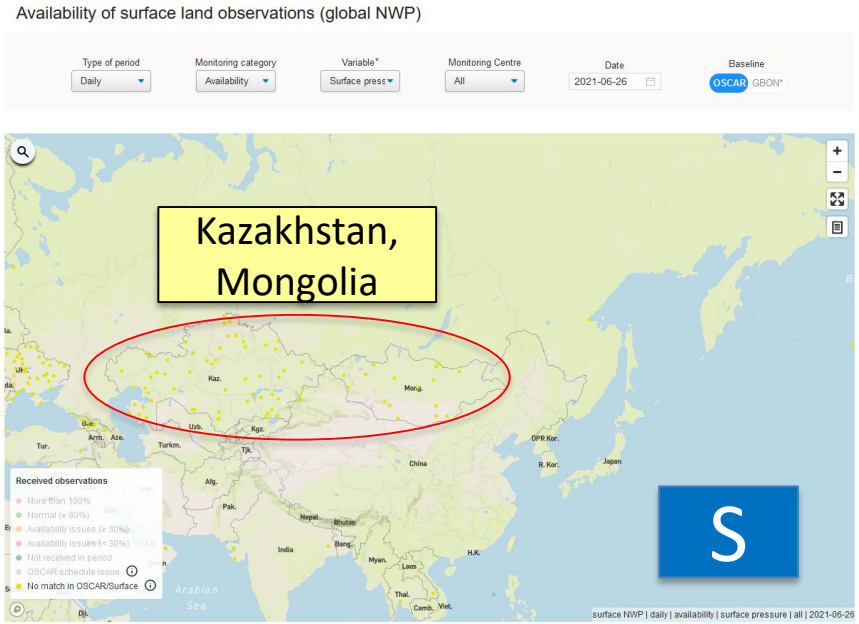


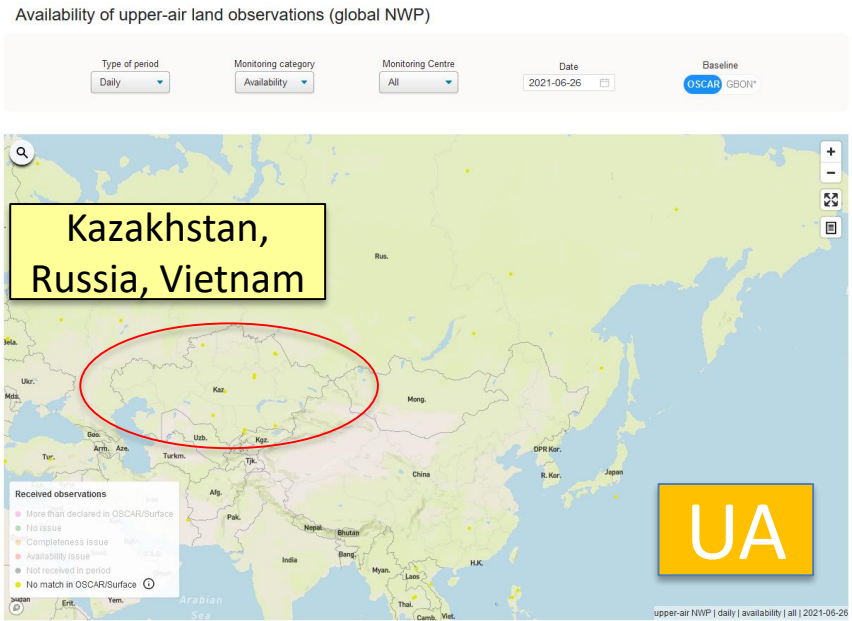


No match in OSCAR/Surface

- No match in OSCAR/Surface – although data available on WIS!
- Stations shown as yellow dots, are reporting but has not been registered in OSCAR/Surface so far, or at least there is no match of the station ID (potential reason: NMHS might not have sufficient number of WMO IDs but did not migrate to WSI yet).

➢ RWC to initiate an incident management process asking WDQMS NFP to contact OSCAR/Surface NFP

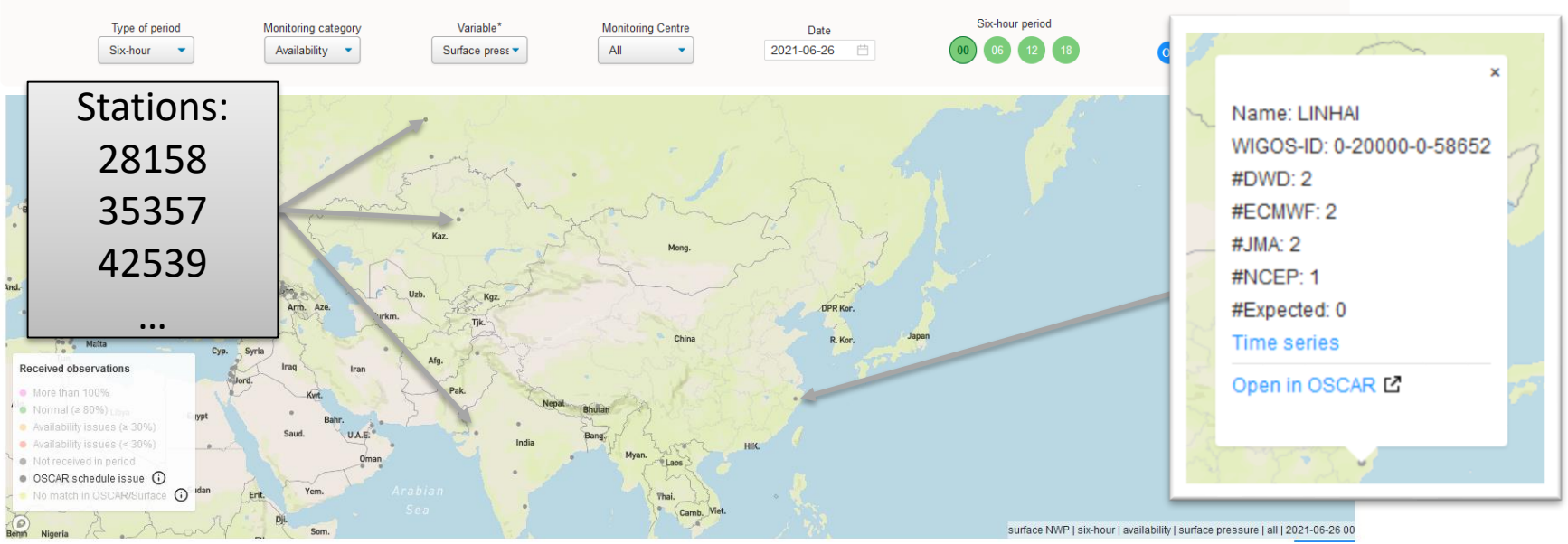




OSCAR schedule issue

- ***Only in surface land stations monitoring!***
- Stations shown as grey dots are reporting but there seem to be issues in the OSCAR schedule (potential reason: NMHS might report higher temporal resolution but didn´t set the field ‘international exchange’ correctly → ‘#Expected’ = 0).

➢ RWC to initiate an incident management process asking WDQMS NFP to contact OSCAR/Surface NFP

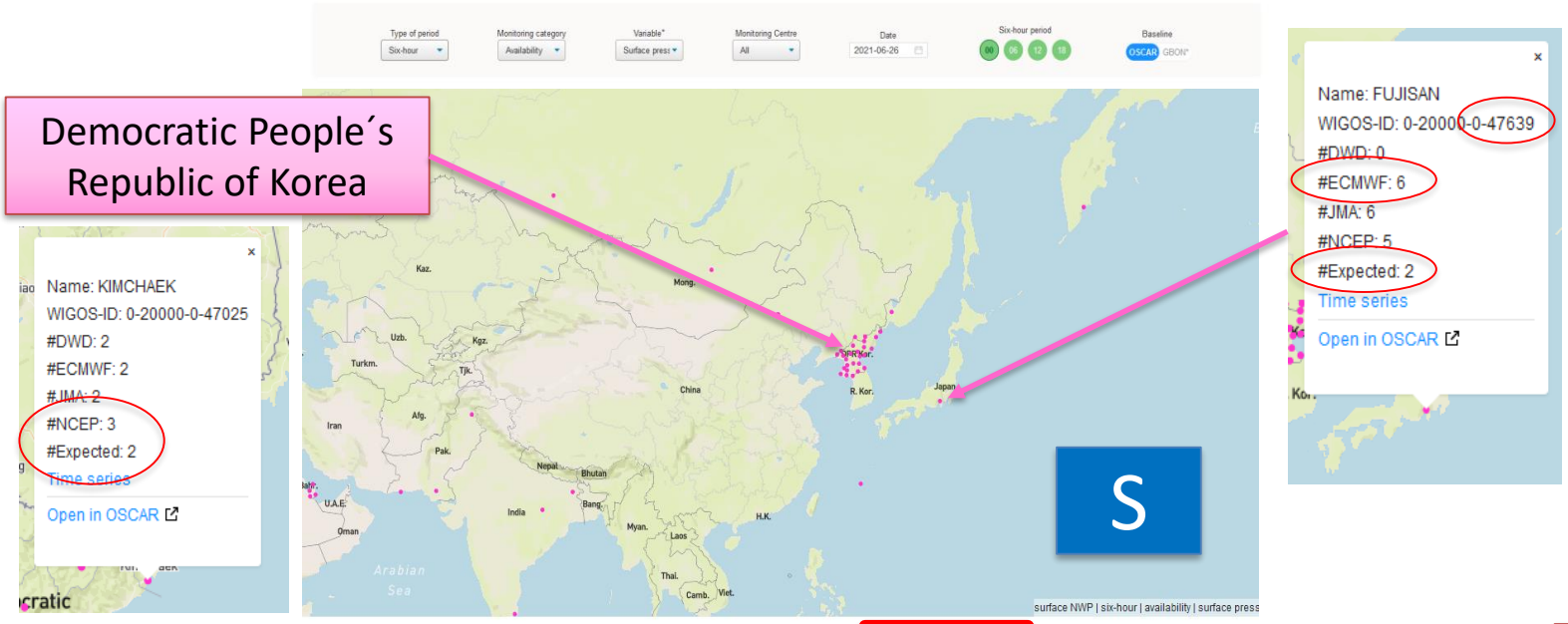


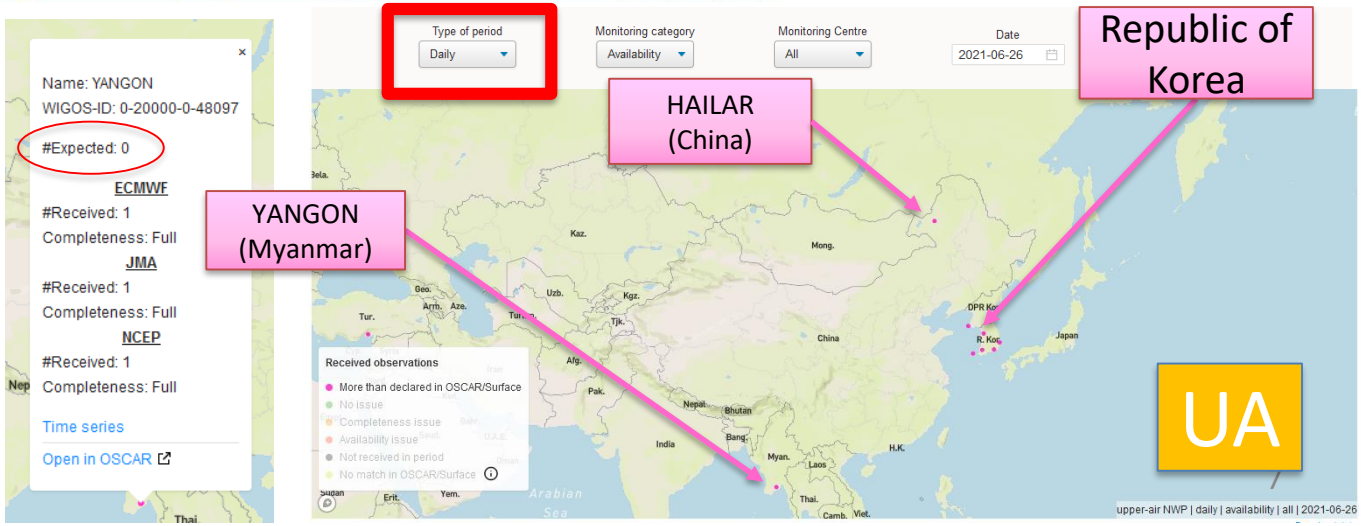
S: More than 100%
UA: More than declared in OSCAR/Surface

- Stations shown as pink dots
- ***upper-air land stations: only in daily display***
- More data available - actually a 'happy problem' because more data are shared internationally than indicated in OSCAR/Surface
- Most likely there is an issue with the expected number of measurements in the metadata field **'Reporting interval'** in OSCAR/Surface for this particular variable (→ see '#Expected')

➢ RWC to initiate an incident management process asking WDQMS NFP to contact OSCAR/Surface NFP to make corresponding changes in OSCAR/Surface metadata

S: More than 100%
UA: More than declared in OSCAR/Surface



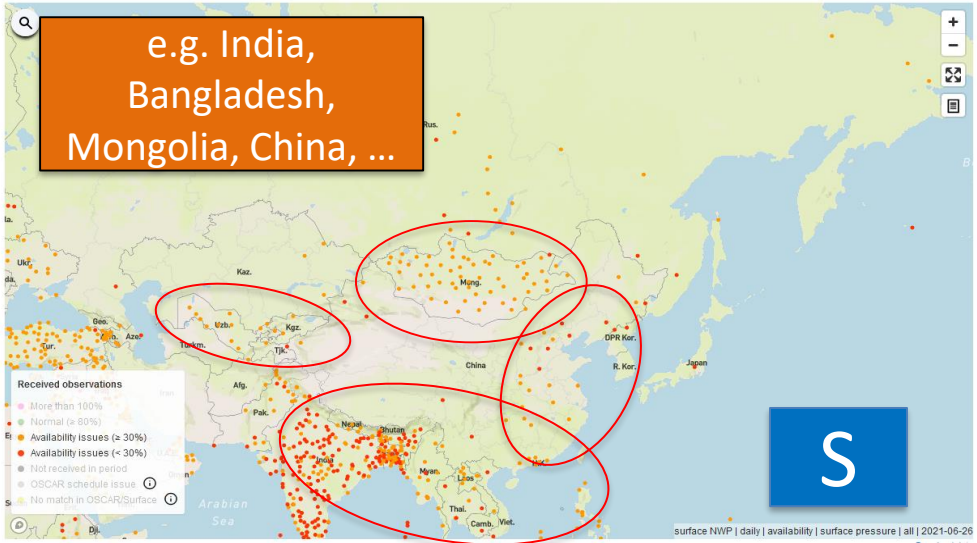


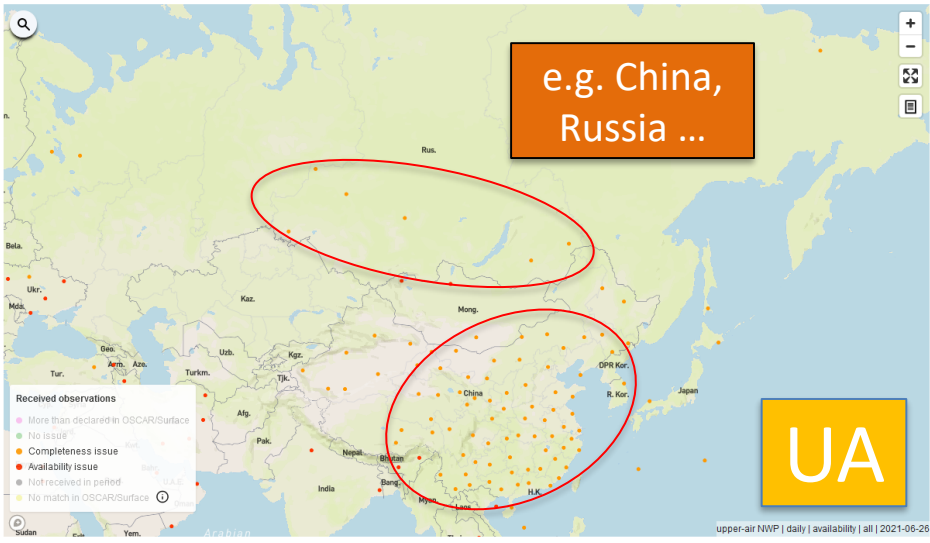
WMO OMM

Availability issues ● (≥30%) and ● (<30%)

- Stations showing orange or red dots have availability issues
- If they continue to appear having **'Availability issues'** especially when selecting **'All' Centers** and the **'Daily'** display

➢ RWC to initiate an incident management process asking WDQMS NFP to take actions to investigate the cause of the incident and to find a solution (issues often related to incorrect entries in OSCAR/Surface on reporting interval)





Not received in period

- Data from stations shown as black dots were **‘Not received in period ‘** – this is shown especially when selecting **‘All’ Centers** and the **‘Daily’** display
- If data of this station were not received since a longer period of time (more than 5 days) it is a ‘silent station’

➢ RWC to initiate an incident management process asking WDQMS NFP to take actions to investigate the cause of the incident and to find a solution

Reasons for 'no data received'

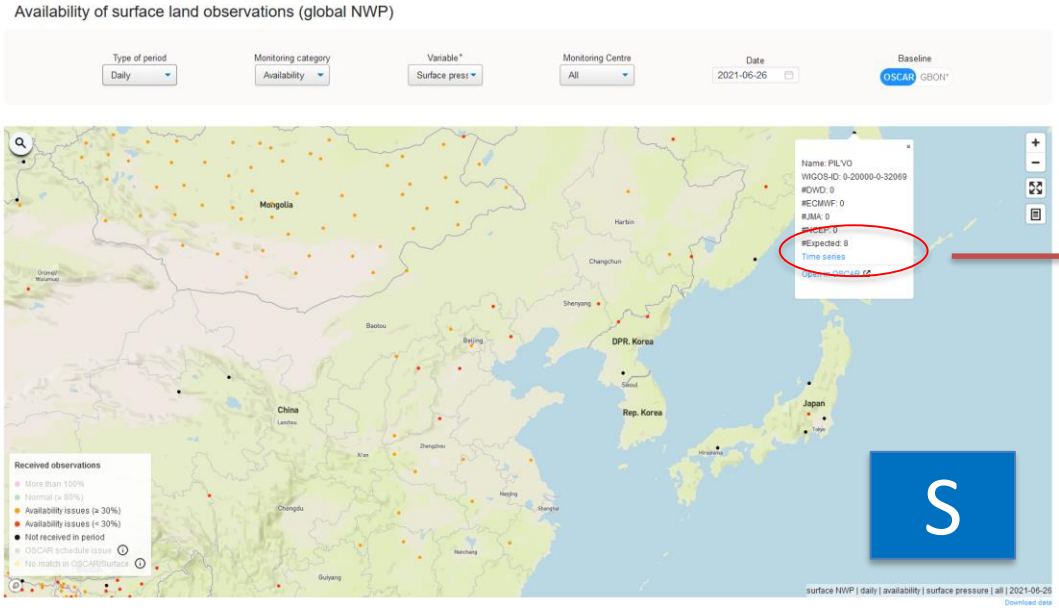
There are several reasons for no data being received by the WIGOS Monitoring Centres. The causes for these issues have to be clarified by the country concerned; these could be for example:

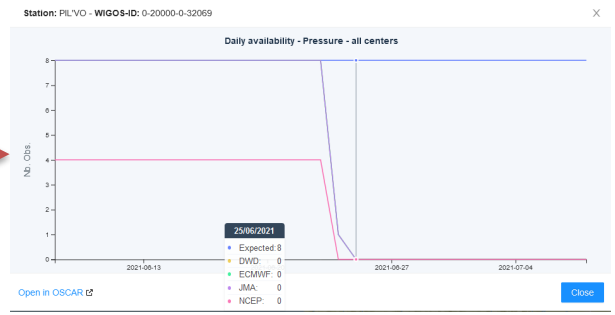
1. Station is not intended to report to WIS (only national use of the data intended) ➔ WDQMS NFP together with OSCAR/Surface NFP to check GOS affiliation in OSCAR/Surface
2. No data received due to technical issue at site (issues related to data transmission or sensor malfunctioning) ➔ WDQMS NFP to work with WIS NFP and/or maintenance technician to check data transfer from site or sensors at site
3. Station data is expected in the WIS but no data available ➔ WDQMS NFP to work with WIS NFP to check WIS dissemination

Example - data outage of a particular station

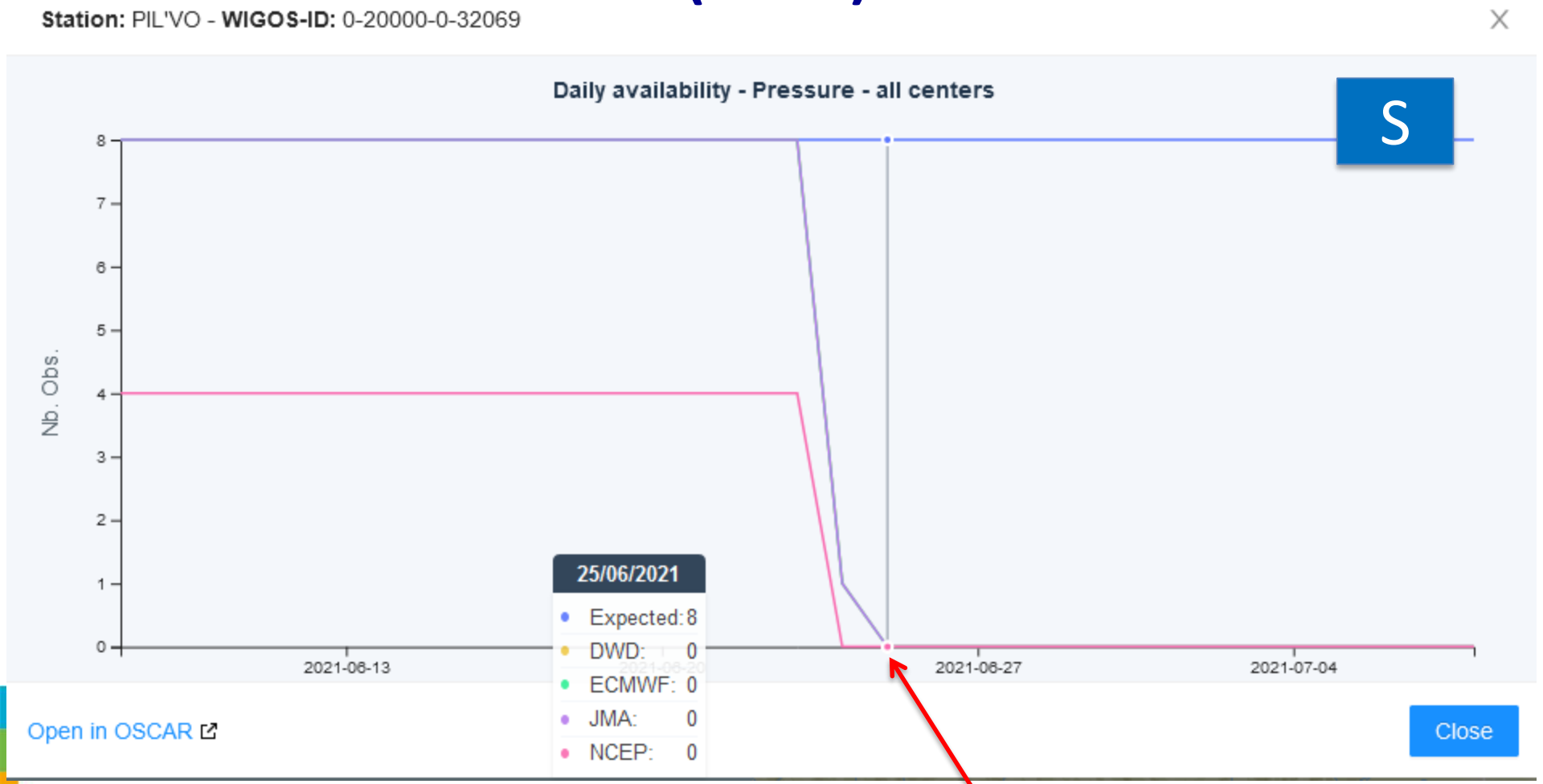
- Surface land station 32069 PIL'VO, Russian Federation usually reports 8 messages per day to WIS
- However, since 25th June 2021 no data were available on WIS (No. of obs. received by each of the WIGOS MC = 0), shown as ● dot in availability map

➢ RWC would have to raise an incident ticket concerning this data outage after 5 days the latest, i.e. on 30th June 2021





Example - data outage of a particular station (cont.)

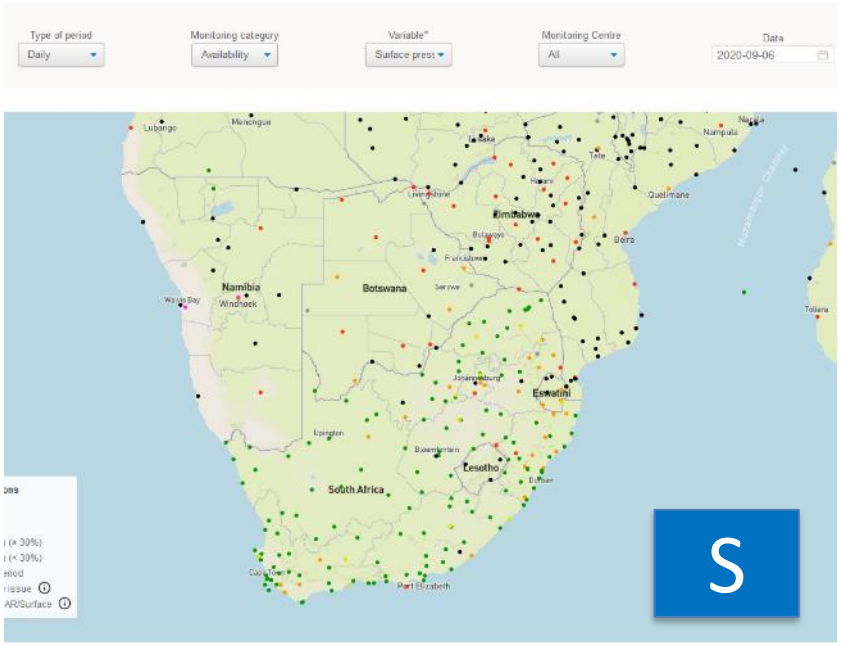


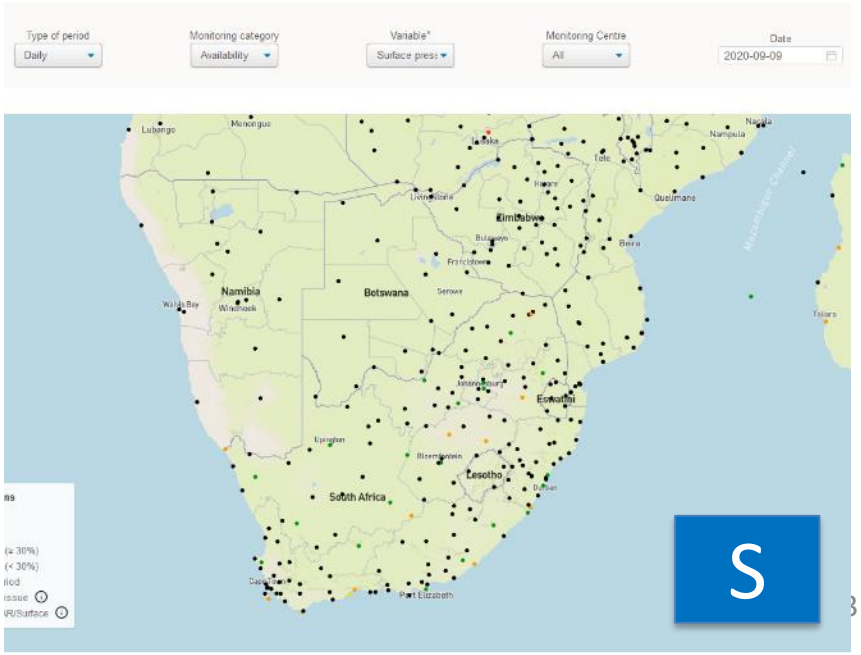
Data outage

Example - data outage of entire country/ies

- Most of the observations for countries in Southern Africa were not received during the period 8 to 10 September 2020.
- This might have happened due to technical challenges at the RTH because the stations in South Africa were operational.

➢ In such a case RWC shall raise an incident ticket as soon as possible after recognizing this incident to rectify this incident!

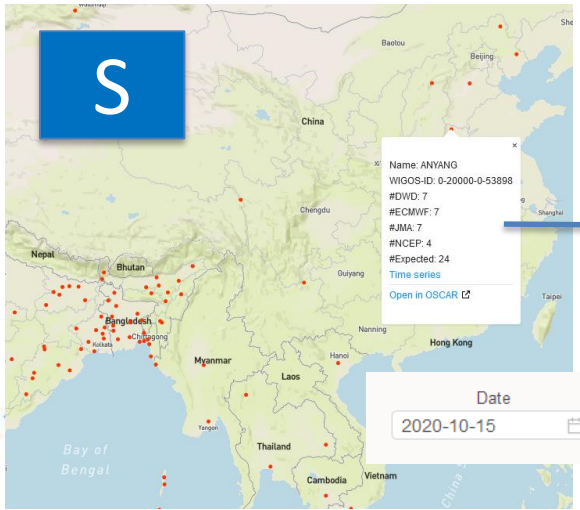


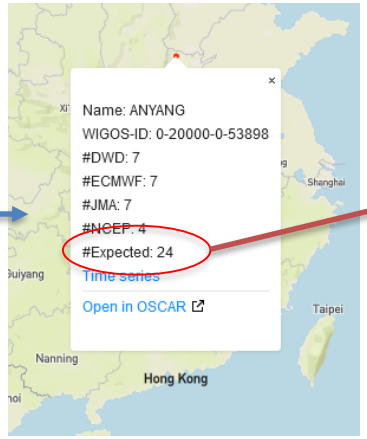


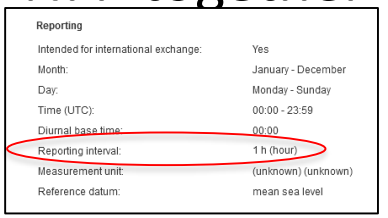
Example – incorrect OSCAR/Surface metadata

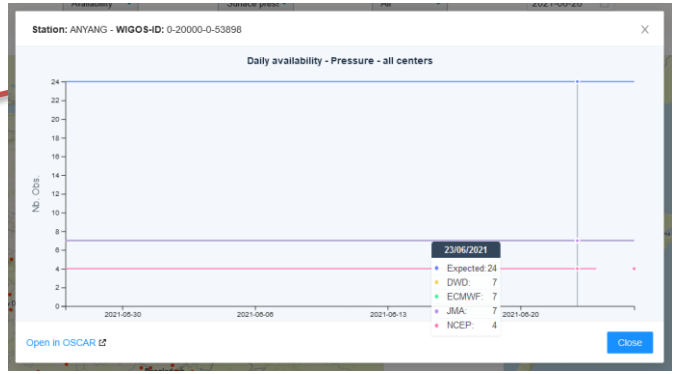
- Surface land station 53898 ANYANG, China reports 7 messages per day to WIS
- However, the expected number of observations according to OSCAR/Surface are 24 per day, ● dot in availability map
- According to OSCAR/Surface the station reports pressure on an hourly basis (Reporting interval: 1 h (hour))

➢ RWC should raise an incident ticket asking WDQMS NFP together with OSCAR/Surface NFP to check the metadata





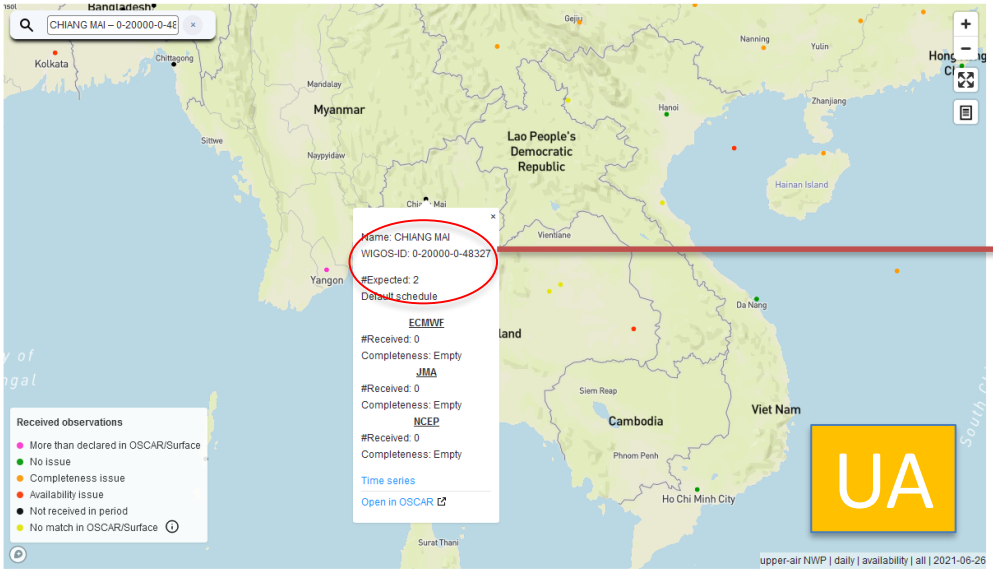


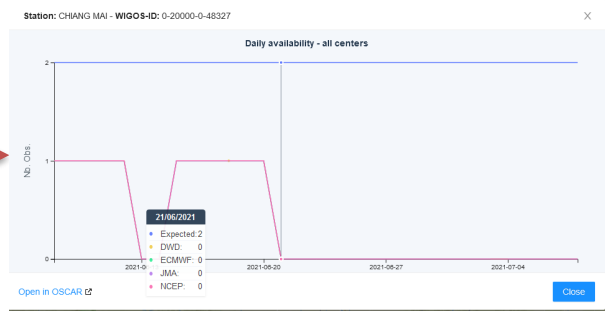


Example - data outage and incorrect OSCAR/Surface metadata of a particular station

- Upper-air land station 48327 CHIANG MAI, Thailand usually reports one sounding per day to WIS (default setting if OSCAR/Surface metadata information is missing)
- Since 21th June 2021 no data were available on WIS shown as ● dot in availability map

➢ RWC would have to raise an incident ticket concerning the data outage as well as the missing OSCAR/Surface metadata





Example - data outage and incorrect OSCAR/Surface metadata of a particular station

Data outage

Category ‘Quality’

- RWC may select the **Monitoring category ‘Quality’** in the web tool to evaluate the performance related to accuracy

- The WDQMS web tool provides ‘Quality’ performances as Observation against Background (O-B) values averaged over a selected period (6-hourly or daily) of a particular variable
  e.g. 2m temperature, 10m zonal wind component, 10m meridional wind component, 2m relative humidity
  surface land stations only: surface pressure/geopotential height
- **If at least one WIGOS Monitoring Centre (MC) shows low (good) O-B results (green dots) most likely the issue is related to the corresponding WIGOS MC which shows larger O-B results → no action required by RWC**

Next slides:

S

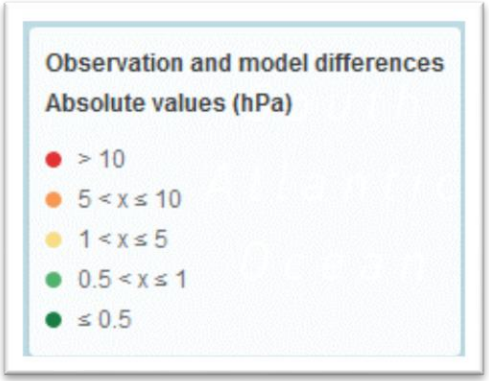
Constraints of O-B results

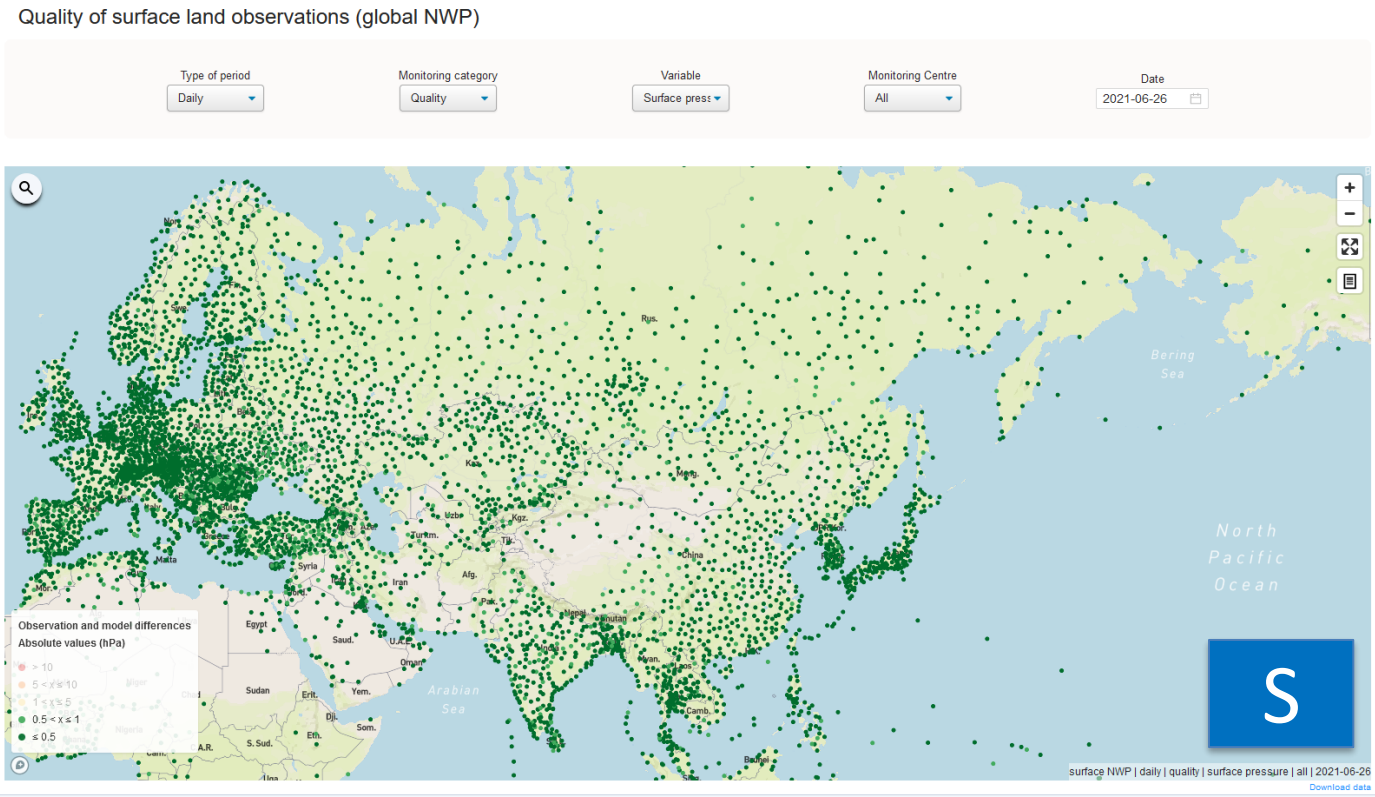
- NWP models base on observations from the respective regions and the observations are interpolated to the model layers
- **O-B results of pressure observations are quite reliable** because the pressure can be interpolated to the relevant levels quite well
- However, large O-B results of temperature and relative humidity are often caused by model biases. Especially in winter times and in areas with steep orography models cannot always resolve strong temperature inversions and thereby might lead to wrong 2m temperature or 2m relative humidity forecasts.
- Therefore O-B results of the variables 2m temperature and 2m relative humidity have to be considered with care.

➢ **Hence, incident tickets should only be raised in case of ongoing large errors in O-B results with an increasing trend → stations showing ● or ● dots**

Absolute pressure obs values ≤ 1 hPa

- Stations shown as green dots
- The quality of pressure observations is good, the station is performing well
  ➔ no action required ☺

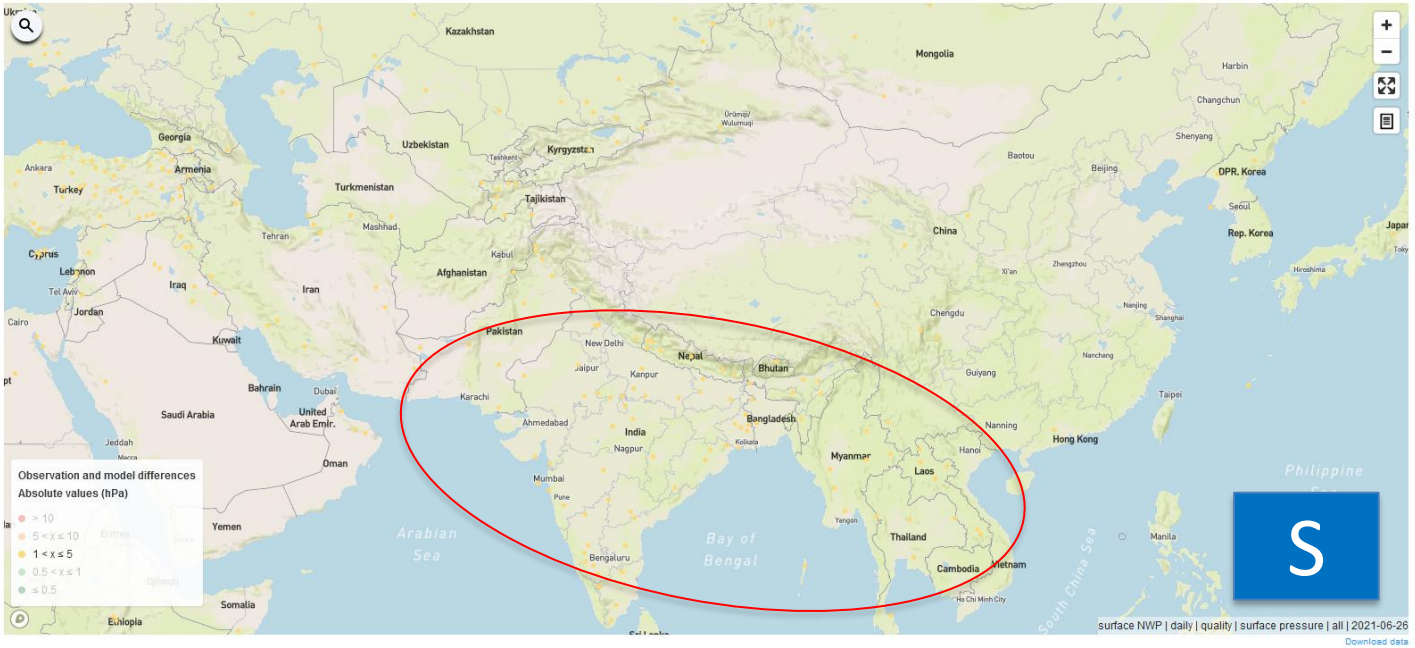




Absolute pressure obs values 1 - 5 hPa

- Stations showing yellow dots have quality issues
- If they continue to appear having quality issues especially when selecting **'All' Centers** and the **'Daily'** or **'Alert'** display

➢ RWC to initiate an incident management process with medium priority (●) asking WDQMS NFP to take actions to investigate the cause of the incident and to find a solution



Absolute pressure obs values > 5 hPa

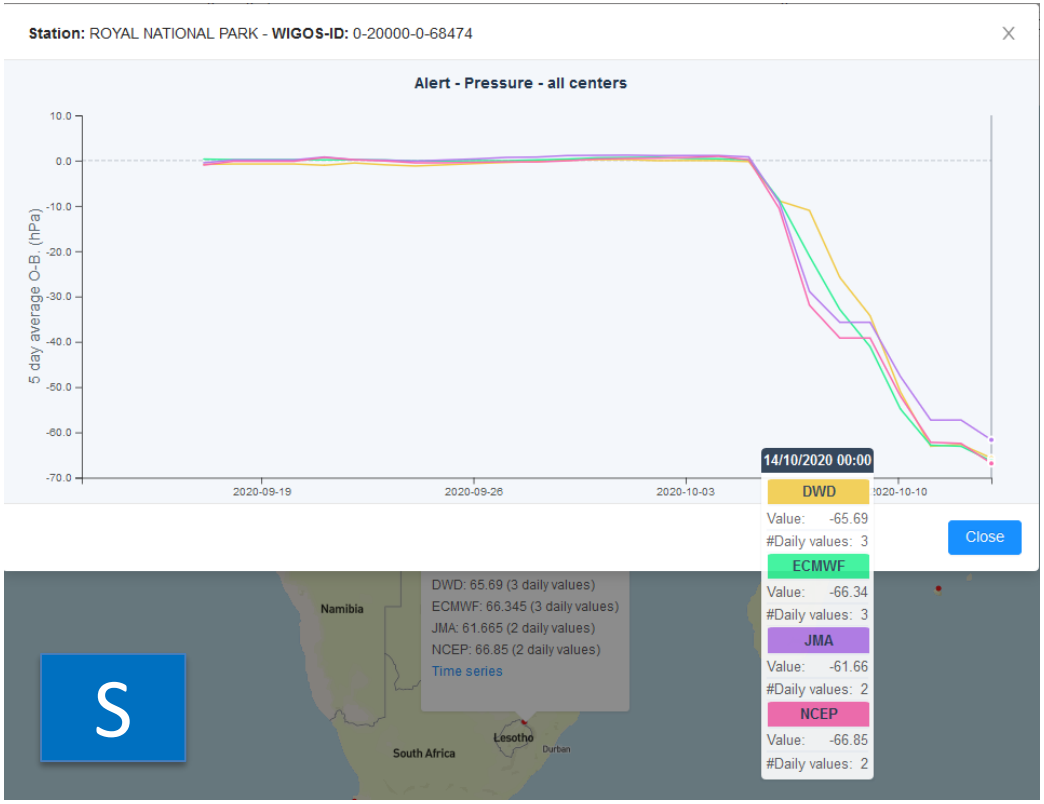
- Stations showing orange or red dots have large quality issues
- If they continue to appear having quality issues especially when selecting **'All' Centers** and the **'Daily'** or **'Alert'** display

➢ RWC to initiate an incident management process with high (●) or very high priority (●) asking WDQMS NFP to take actions to investigate the cause of the incident and to find a solution

Example No. 1 – worsening pressure O-B results

- Station 68474 ROYAL NATIONAL PARK showed low pressure O-B results (≤ 1 hPa) but since 06th October 2020 the O-B results dropped significantly (≥ - 60 hPa) for all monitoring centres
- Potentially sensor drift leading to increasing wrong measurements at site

➢ RWC to raise a ticket related to this incident after 5 days the latest, i.e. on 11th October 2020

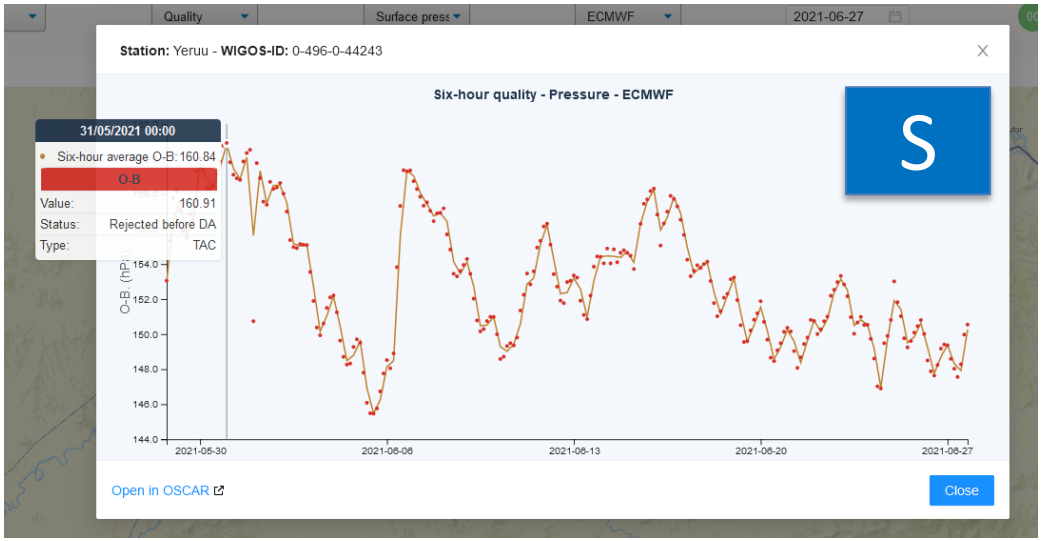


WMO OMM

Example No. 2 – continuous large pressure O-B results

- Station 44243 Yeruu, Mongolia shows constant large pressure O-B results (≥ 150 hPa)
- Most likely related to incorrect metadata being used as background for data assimilation by WIGOS MCs (either from OSCAR/Surface or BUFR messages)
- OSCAR/Surface: station height 674.5m, barometer height 2181m

➢ RWC to raise a ticket related to this incident to check with NFP the barometer height and station height in OSCAR/ Surface and/or BUFR metadata as well as with MC FP

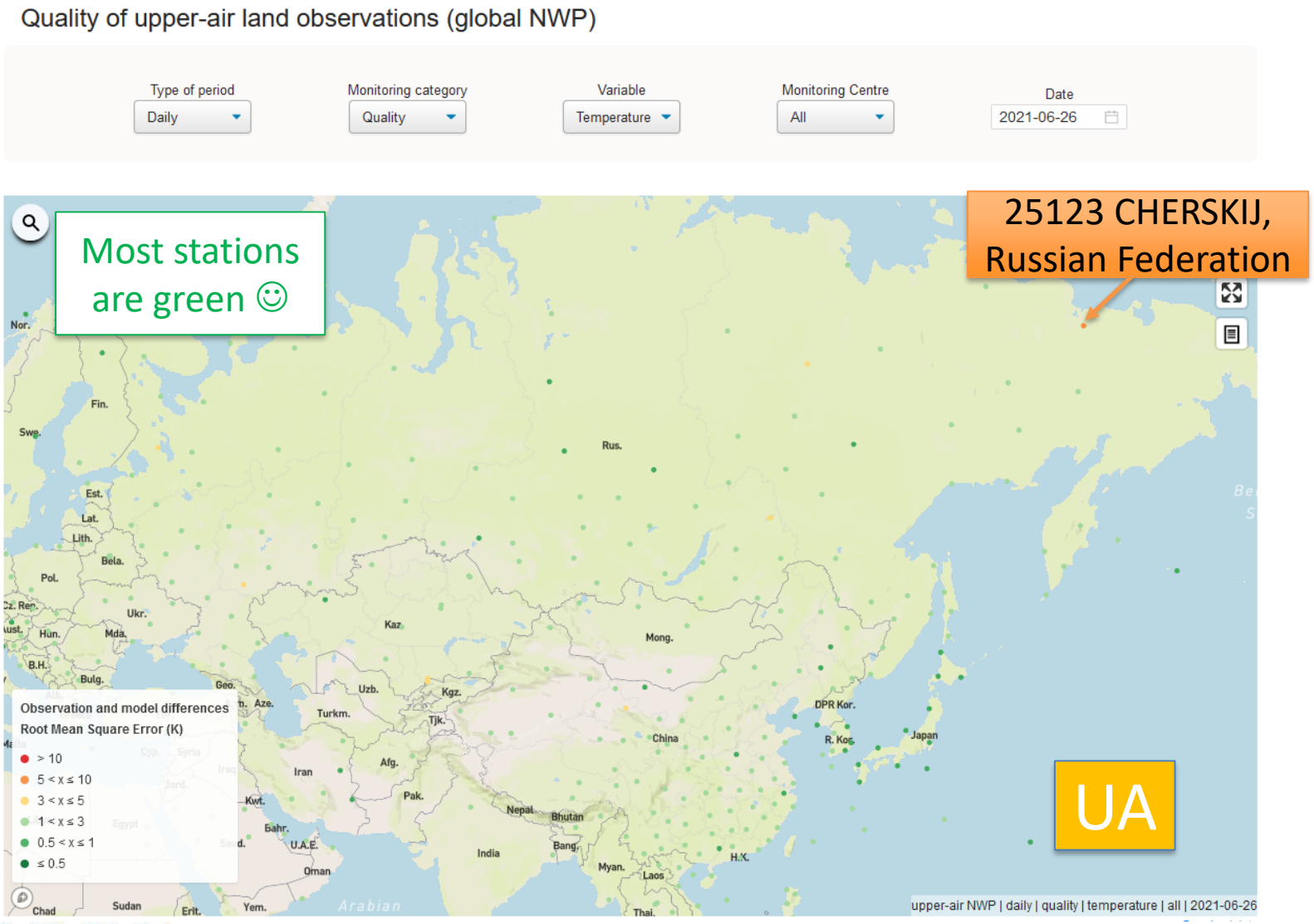


Example No. 3 – sporadic dips in pressure O-B results

- Station 38856 DARVAZ, Tajikistan shows sporadic dips in pressure O-B results
- Most likely related to sporadic incorrect measurements or readings at site

➢ RWC would have to raise a ticket related to this incident if the issue is frequently reoccurring

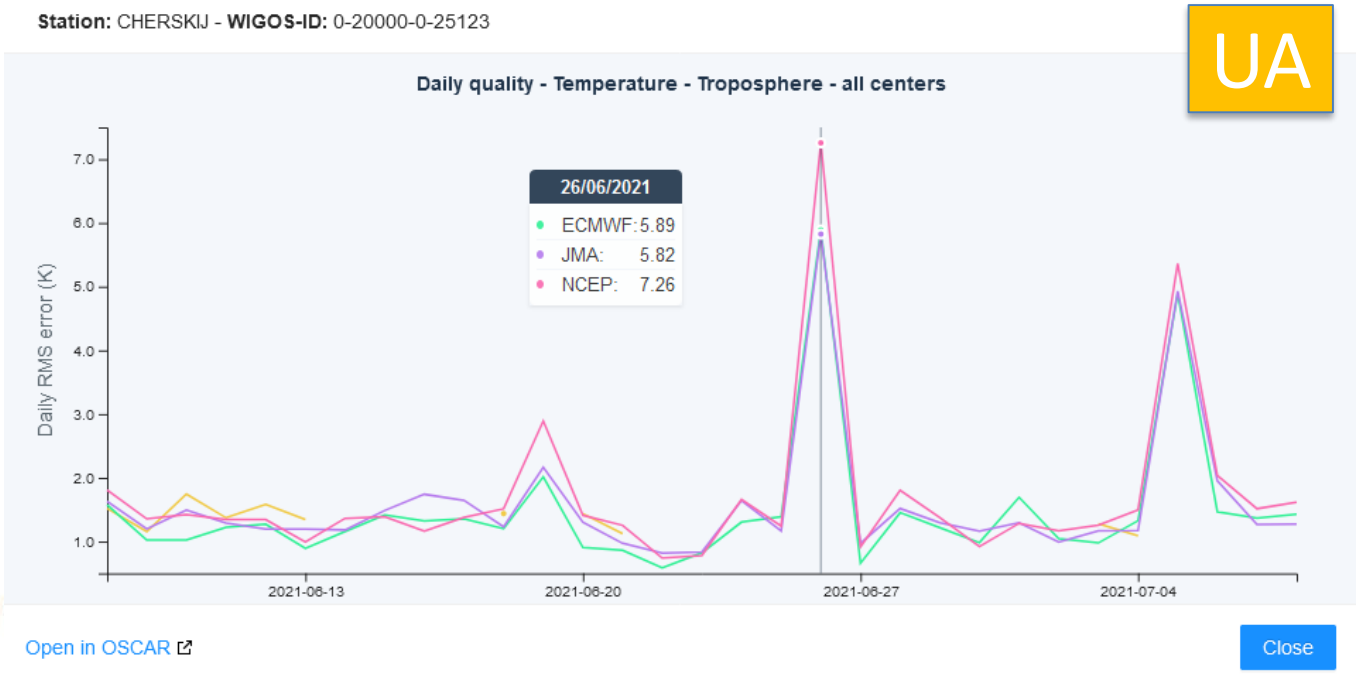
UA: temperature obs values



Example – sporadic dips in temperature O-B results

- Station 25123 CHERSKIJ, Russian Federation shows sporadic large temperature O-B results
- Potential causes: bad radiosonde batch, incorrect handling of the radiosonde, etc.

➢ RWC would have to raise a ticket related to this incident if the issue is frequently reoccurring



RWC starting to operationalize…

- When starting its WDQMS operations RWC should initiate incident management processes for long-term ongoing issues of the following types of issues before getting into detail with special incidents of particular stations:
- **Monitoring category 'Data availability'**
  - No match in OSCAR/Surface
  - Stations which didn´t report for a longer period of time (i.e. so-called 'silent stations')
  - Stations reporting more than expected according to OSCAR
- **Monitoring category 'Quality'**
  - Ongoing, constant large surface pressure O-B results (most likely related to incorrect OSCAR/Surface metadata)

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Thank you

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