

WORLD METEOROLOGICAL ORGANIZATION
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The challenges of new Regional Basic Observation Network on
the Regional Association III

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ABSTRACT

According to decision 21 taken by 69th Executive Congress of World Meteorological Organization (WMO), the new Regional Basic Observations Network (RBON) will be created, which will be mainly made up of the Regional Basic Synoptic Network (RBSN) and Regional Basic Climatological Network (RBCN), but with new functions. It is expected that this new network will provide better services and It will allow regional observing capabilities to be fully exploited. However, although the RBSN and RBCN on the Regional Association III (RA III) have improved their performance with respect to previous years, there are still some challenges for the National Meteorological and Hydrological Weather Services (NMHSs) that must be solved in order that the RBON meets the expected objectives.

In some NMHSs of the RA III, as in the case of Peru, there are institutions linked to the aeronautical sector whose interests currently are not necessarily aligned with the plans of NMHSs and WMO and those that have allowed in the past the conformation of the RBSN and RBCN networks with stations of their own networks. This coupled with the lack of WIGOS Regional Center that help to implement WIGOS National Plan, makes the implementation of the future Regional Basic Observations Network a challenge for these NMHSs.

This presentation attempts to draw some of the key issues and to give some suggestions for the future development of RBON in the RA III

INTRODUCCION

The National Meteorological and Hydrological Services of South America (NMHSs) established their observation networks based on the users or population needs, considering that each country has to meet the demand for weather and climate services. These same institutions, that comprise the Regional Association III (RA III) of the World Meteorological Organization (WMO) (Figure 1), have signed data exchange agreements to access regional information from observation networks, such as the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climatological Network (RBCN) to cover aspects such as weather forecast, among others. Finally, agreements are established to exchange information to cover global needs, establishing for this purpose observation networks such as the GSN (GCOS Surface Network) and GUAN (GCOS Upper Air Network). The GSN and GUAN networks are based mainly on stations which are included in the networks of the WMO World Weather Watch Global Observing System (GOS). Normally the GSN will be made up of stations drawn from Regional Basic Climatological Networks (RBCN) which are designated through the WMO Regional Associations



Figure 1. Countries of WMO Regional Association III

The Commission for Basic Systems (CBS), WMO's technical body, proposed the concept of the Regional Basic Observations Network (RBON), based on the requirements and additional observation needs that the current RBSN and RBCN couldn't provide. With the new RBON it is expected to have a more integrated vision of the observation systems and in this way to be able to satisfy the needs of the different areas of application.

However the RBCN and RBSN networks of some NMHSs of RA III, are constituted mainly by stations that belong to other institutions that are linked to the aeronautical sector and that are governed by principles and rules of their international regulatory body which is the ICAO (International Civil Aviation Organization).

Although these organizations have collaborated with the NMHSs in the past, it is necessary to establish and / or update the respective cooperation agreements with these strategic partners so the RBON requirements can be satisfied.

It is a challenge for the RA III NMHSs to develop their National Observation Strategy and the WIGOS (WMO Integrated Global Observation System) Implementation Plan, to improve the observation networks and the provision of the necessary services required by each country and the international community.

RBSN AND RBCN AND AERONAUTICAL RELATIONSHIP

“The current Regional Basic Synoptic Networks (RBSN) and Regional Basic Climatological Networks (RBCN) consist of surface and upper-air stations designated by the Regional Associations. They have proven to be highly effective, and made valuable regional contributions to the activities of WMO and its Members. The observations from these stations, which are maintained by WMO Members, have been exchanged globally in real time without restriction. Originally designed to support operational meteorology and climatology, these observations have produced significant benefits across a wide range of applications.” (WMO, 2016)

Furthermore, according to the OSCAR (Observing Systems Capability Analysis and Review Tool) there are around 298 stations deployed at aerodromes in South America. Some of these stations belong to the aviation institutions and are part of RBSN and RBCN of RA III. (Figure 2)



Figure 2. RBSN and RBCN of RA III in aerodromes

RBON NETWORK REQUERIMENTS

New and improved observational technologies provide the opportunity to reassess regional observational strategies. As part of the regional WIGOS implementation during its Pre-operational phase (2016- 2019), the RBON is being introduced to replace the existing RBSN and RBCN networks, while their stations are expected to constitute the backbone of the new RBON (WMO, 2016).

However RBON has new requirements such as:

- Stations / platforms must operate for a minimum of four (4) years;
- The stations or platforms may provide data preferably per hour and less than one hour;
- The stations / platforms will comply with the Regional Quality Assessment

RBSN AND RBCN ISSUES

According to GCOS_Network_Monitoring_2017, monitoring CLIMAT reports (message of climate data) for 2017, show that AR III has had a regular performance in the issuance of CLIMAT messages with a 59% of annual delivery for the RBCN network, GSN network included. Although, this table shows a not so bad performance of the region, this is not necessarily optimal, if we make an individual country analysis. (Table 1)

On the other hand, according to the GCOS Surface Network Monitoring Centres of Germany and Japan, several countries of RA III, as in the case of Peru, show a low CLIMAT performance report of GSN. (Figures 3 to 6).

Furthermore, the ECMWF (The European Centre for Medium-Range Weather Forecasts) shows some issues with Synop and Temp messages for RA III, regarding to few and missing observations and differences between TAC and BUFR messages of RBSN.

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Region	No.	12 Monthly CLIMAT	6 - 11 Monthly CLIMAT	1 - 5 Monthly CLIMAT	0 Monthly CLIMAT
RA I	723	18% (23,16,17,19,13,12)	22% (17,22,20,20,23,22)	6% (8, 11, 8, 7,12,13)	54% (52,51,55,54,52,53)
RA II	664	78% (80,73,71,73,67,57)	14% (12,17,18,15,22,30)	1% (1, 2, 4, 4, 1, 2)	7% (8, 8, 7, 8, 10, 11)
RA III	298	59% (64,63,73,81,73,65)	14% (22,25,14, 6,15,23)	12% (1, 0, 1, 1, 1, 0)	15% (13,12,12,12,11,12)
RA IV	337	80% (80,78,78,72,67,66)	8% (8, 10, 11, 18, 18, 18)	3% (2, 3, 3, 2, 2, 3)	9% (10, 9, 8, 8, 13, 13)
RA V	247	60% (64,63,64,59,56,50)	21% (16,18,21,17,24,34)	2% (4, 4, 1, 9, 6, 3)	17% (16,15,14,15,14,13)
RA VI	594	85% (85,79,81,77,77,74)	5% (5, 12, 8, 13, 15, 18)	1% (1, 1, 3, 3, 1, 1)	9% (9, 7, 7, 7, 7, 7)

Table 1. CLIMAT performance report of RBCN (includes the GSN)

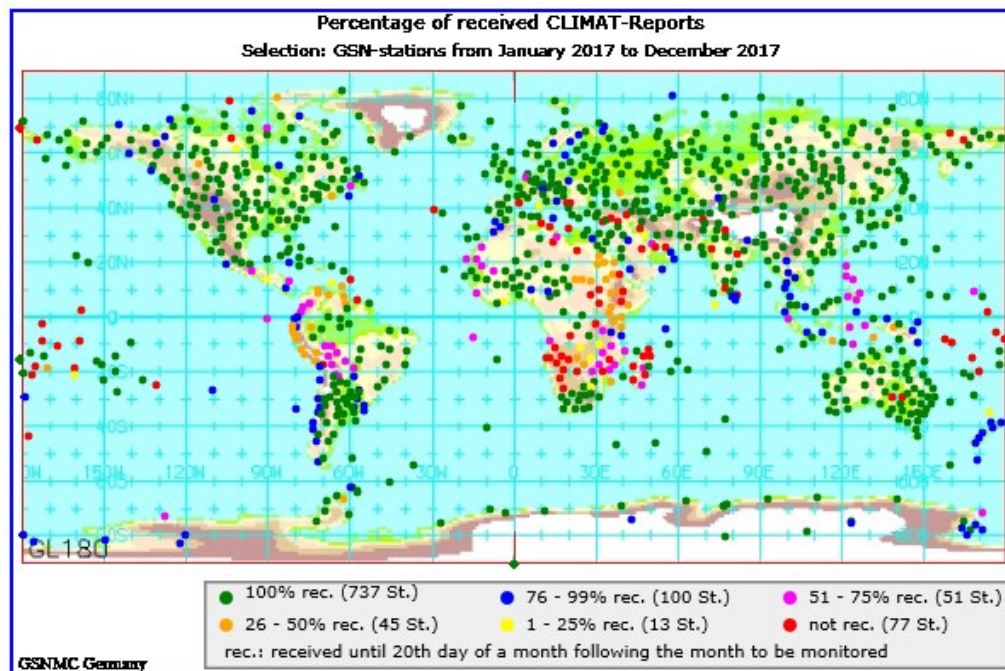


Figure 3. CLIMAT performance report of GSN
Source: GSNMC- Germany

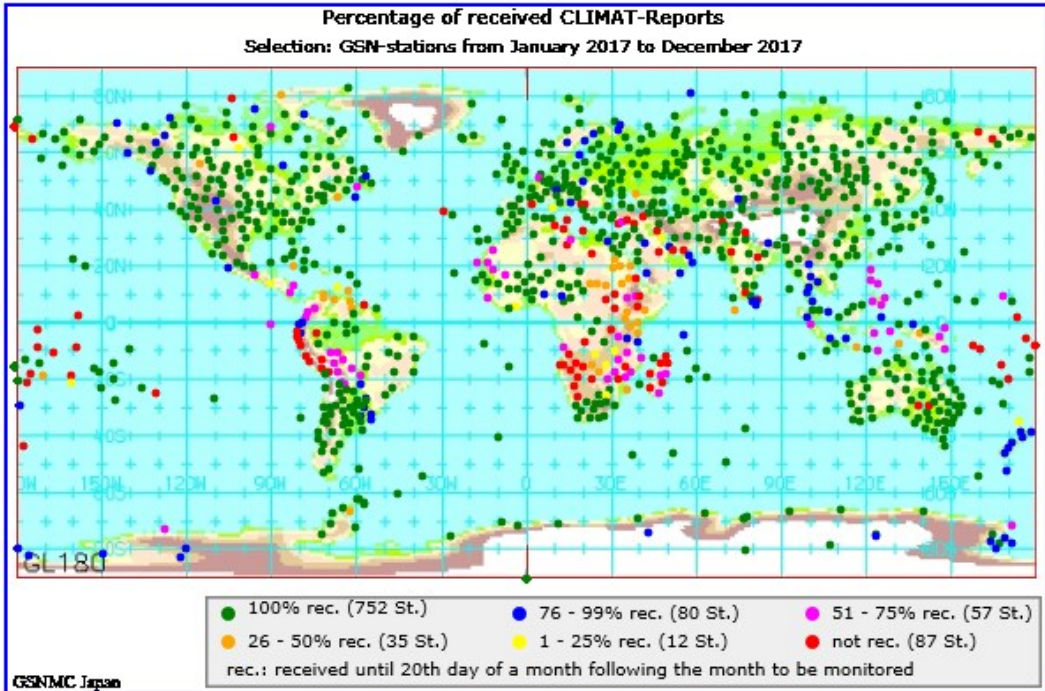


Figure 4. CLIMAT performance report of GSN
Source: GSNMC- Japan

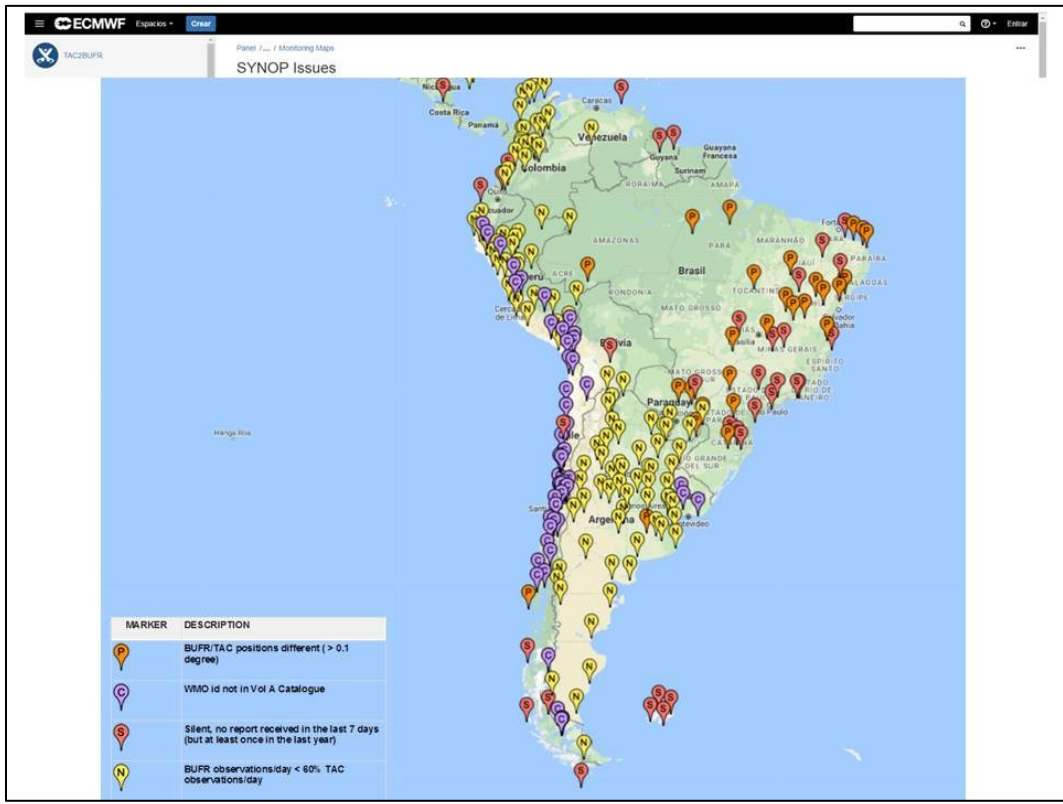


Figure 5. SYNOP issues of RA III
Source: ECMWF

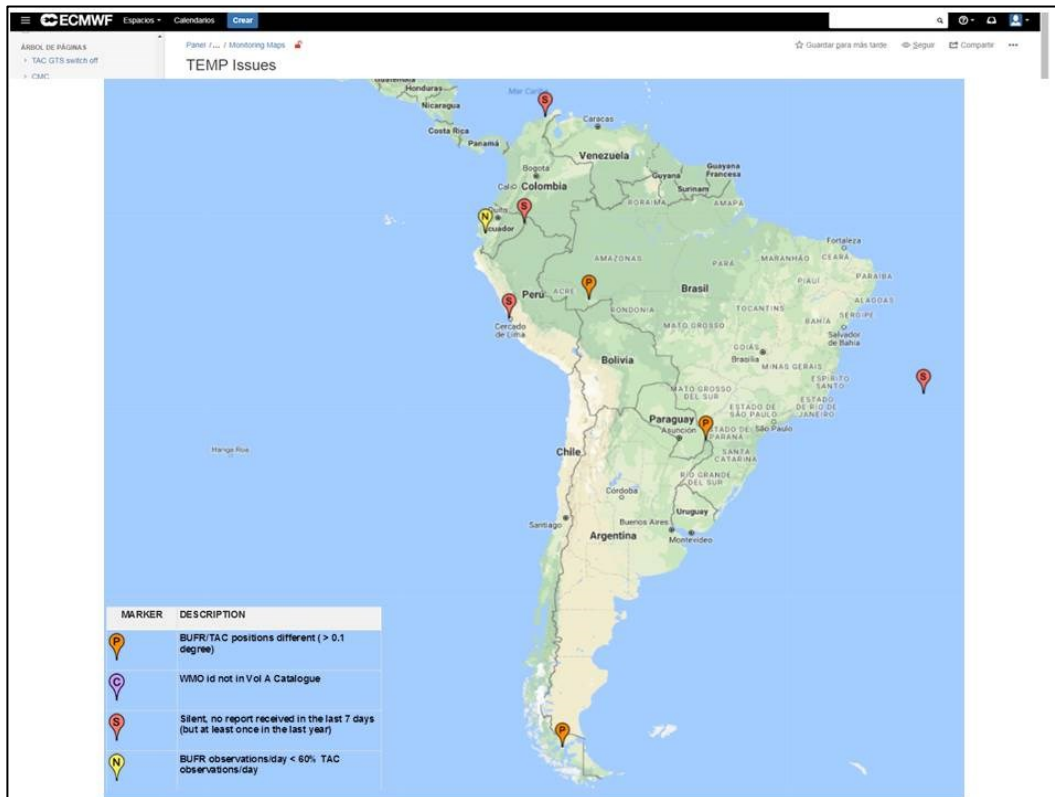


Figure 6. TEMP issues of RA III
Source: ECMWF

REGIONAL ASOCIATION III CHALLENGES

According to monitoring centers, if the NMHSs of RA III have a limitation to produce and issue Synop, Temp and Climat messages with RBSN and RBCN, it could be a risk to accomplish the requirements of RBON in the near future. Moreover they need to update the metadata of their networks in OSCAR surface tool.

The existing weaknesses in the RBSN and RBCN observation networks for Peruvian case are associated with:

- A lack of communication between the NMHS and the organism linked to aeronautical meteorology, which contribute to the development of these networks.

- Limitations in the acquisition processes of supplies for the operation of the stations that belong to the regional networks.
- Lack of capacity to maintain the observation network.
- Insufficient technical capacity to support the observation, coding, and transmission of messages of these networks.

The NMHS of Peru is working to revert this situation, but it is possible that similar situation is occurring in other NMHSs of RA III (personal communication).

CONCLUSIONS

There are weaknesses in some countries of RA III, regarding the RBCN and RBSN to accomplish the RBON in the near future.

It is important to improve the communication channels between NMHSs and the agencies that contribute to the operation of the regional networks as well as between the WMO and ICAO, so that there may be mutual support for the optimal operation of these networks.

Likewise, RA III has a WIGOS regional plan, but the corresponding WIGOS Regional Center has not yet been established. In the case of Peru, there is still not enough information to elaborate the WIGOS National Implementation Plan; it is possible that this is also happening in several countries of the region. It is expected that in the short term, based on the RA III agreements, the WIGOS Regional Virtual Center will soon be established to support countries that need aid in the implementation of such plan.

RECOMMENDATIONS

In order to have a good operation of the RBON in the future, it is recommended that the RA III Members establish and / or update the respective cooperation agreements with the agencies that contribute to the regional observation networks.

It is important that each Member of RA III update their WIGOS checklist and request the corresponding help for the implementation of the WIGOS Plan.

It is recommended that RA III members work quickly with the WIGOS Regional Center so that the center can support the implementation of the WIGOS plan.

It is important that WMO, in coordination with ICAO, promotes the approach of the NMHSs to organisms related to the aeronautical activity that support the RBSN and RBCN.

REFERENCES

1. ECMWF. 2018. *Monitoring Maps*. [ONLINE] Available at: <https://goo.gl/SDwS45>. [Accessed 9 March 2018].
2. WMO. 2018. *OSCAR/Surface*. [ONLINE] Available at: <https://oscar.wmo.int/surface//index.html#/>. [Accessed 1 March 2018].
3. WMO. 2015. *Status of the Global Observing System for Climate: Full report*. [ONLINE] Available at: <https://goo.gl/F1URpo>. [Accessed 1 March 2018].
4. WMO. 2018. *WMO Document Template*. [ONLINE] Available at: <https://goo.gl/7KsFKV>. [Accessed 1 March 2018].
5. WMO. 2016. *WIGOS NEWSLETTER*. [ONLINE] Available at: <https://goo.gl/Ji843B> [Accessed 1 March 2018].