WORLD METEOROLOGICAL ORGANIZATION

**REGIONAL ASSOCIATION II
(ASIA)**

WORKING GROUP ON PLANNING AND IMPLEMENTATION OF THE WWW IN REGION II
Fifth Session

KHABAROVSK, RUSSIAN FEDERATION
12-15 SEPTEMBER 2007

RA II/WG/PIW-5/Doc. 5.1
(15.VIII.2007)

ITEM: 5.3

Original: ENGLISH

REGIONAL ASPECTS OF THE WWW COMPONENTS AND SUPPORT FUNCTIONS, INCLUDING REPORTS BY THE RAPPORTEURS/CO-ORDINATORS

Integrated Observing Systems (IOS)

(Submitted by Mr Yongqing Chen, China, Rapporteur on the Regional aspects of the GOS in RA II)

Summary and purpose of document

This document provides information on the status of the Global Observing System in RA II and recalls relevant statements from CBS Ext.(06) and Congress XV.

ACTION PROPOSED

The group is invited to take note of the information provided in this document, discuss the noted issues and to develop any appropriate recommendations.

References:

1. Abridged Final Report with Resolutions and Recommendations of the Extraordinary Session 2006 of the Commission for Basic Systems (WMO-No. 1017);
2. Provisional Report with Resolutions from the Fifteenth Congress, Geneva, 7-25 May 2007.

Integrated Observing Systems (IOS)

1. There were some positive trends in the implementation of GOS in RA II in the past four years. In the surface-based subsystem, the availability of the report from both RBSN and RBCN had increased, and some new observing systems were developed. For the space-based subsystem, RA II Members are benefited by the new launched meteorological satellites. There were, however, some problems existed in performance of the GOS in RA II.

Regional Basic Synoptic Network

2. Since the last session of RA II Working Group on Planning and Implementation of World Weather Watch (RA II/WG/PIW), Moscow, Russian Federation, 10 – 13 September 2003, and in accordance with the decision of the Thirteenth session of the Regional Association II (Asia), Hong Kong, China, 7 – 15 December 2004, which approved a total of 1315 surface synoptic stations in RBSN, the number of stations has reduced to 1313 stations during the last Annual Global Monitoring (AGM) period in October 2006. However, the number of upper-air stations in the RBSN has remained unchanged at 321 stations, 282 radiosonde stations and 39rawin stations. The RBSN (surface) consists of 1313 stations out of which 111 (85 in 2004) are Automatic Weather Stations (AWS), a significant increase of 31 % during the intersessional period. The RBSN (upper-air) consists of 321 stations out of which 3 (none in 2004) are autosonde launching stations.

3. The level of implementation of surface stations in the region that make 8 observations per day (complete observational programme) has decreased to around 88 % in 2006 compared to 90 % prior to the approval of a revised RBSN in 2004. The percentage of non-operational stations (silent) increased to 3 % (45 stations) in 2006 compared to 2 % (18 stations) in 2004.

4. The level of implementation of upper-air stations making 2 soundings per day has remained consistent at around 76 % (radiowind) and 82 % (radiosonde) during the period 2004 - 2006.

5. Any one of the following reasons may lead to a silent station: unsettled conditions in the country like Afghanistan(13 surface stations, 1 upper-air station) and Iraq(11 surface station), lack of resources, costly sondes, lack of trained manpower, non-availability of equipment, lack of allocation of funds to NMS, poor communications infrastructure. One cause is also found that the information of station change can not be updated timely by members.

6. From 2002 to 2007, during the October Annual Global Monitoring (AGM) and the January, April and July SMM, the availability of SYNOP reports increased from 82 to 87 per cent (+ 5 per cent) and the availability of TEMP reports from 60 to 77 per cent (+ 17 per cent). During the same period, the number of RBSN surface stations increased from 1234 to 1313 stations (+ 6 per cent) and the number of RBSN upper-air stations decreased from 294 to 282 (- 4 per cent). .

7. In XII-RA II (Seoul, September 2000), a new RBSN list was approved, which was prepared by the rapporteur on the Regional Aspects on the GOS. When revising the RBSN list, several principals were applied. These selecting principals have also been reviewed by RA II members and approved by the XII-RA II. In order to maintain the stability of the RBSN network, the main framework of the RBSN network should be kept unchanged, and the minor changes may only be made in accordance with the request of the RA II Members.

8. The following selecting principals will continue to be used when revising the RBSN list;

- The revised RBSN should have a maximum spatial resolution of 150 km for the surface and 250 km for upper-air stations;

- If an RBSN station had been “silent” according to monitoring results and another RBSN station located nearby (less than 100 km) had regularly reported its observation, the “silent” station should be replaced by the neighbouring station. If there were no regularly reporting RBSN station nearby, the “silent” station should remain on the list;

- In data sparse areas, existing stations should fill gaps (according to Vol. A, publication No. 9) although these may have been previously included in the RBSN;

- Those stations that Members propose include the RBSN list should remain in or be added to the new RBSN list.

9. My recommendation is to maintain the current RBSN list and take it as the initial proposed RBSN list for next RA II session. This list should be sent to RA II members for comments after this meeting and invite those who have silent stations to replace silent stations by nearby new stations according to the above selecting principal if possible. In accordance with the feedback from RA II members, the new RBSN list can be made and submitted to the next RA II session. Therefore, the total number of proposed RBSN stations is 1313(See Appendix I).

RBCN and GCOS (GSN and GUAN)

10. During the intersessional period the number of climatological stations in the RBCN has remained unchanged and consists of 663 CLIMAT and 182 CLIMAT TEMP reporting stations as approved by XIII-RA II (Dec. 2004). The level of implementation of stations reporting CLIMAT has shown a positive increase up to 87 % in 2006 compared to 82 % prior to the approval of a revised RBCN in 2004. Stations reporting CLIMAT TEMP has increased up to 76 % from 64 % during the same period.

11. From 2003 to 2006, during the October AGM exercises, the availability of CLIMAT reports increased from 63 to 81 per cent (+ 18 per cent) and the availability of CLIMAT TEMP reports from 64 to 80 per cent (+ 16 per cent). During the same period, the number of RBCN surface stations increased from 593 to 663 stations (+ 12 per cent) and the number of RBCN upper-air stations decreased from 194 to 182 (- 9 per cent) .

12. Both the GUAN and the GSN in Region II work generally very well, still some improvement is needed as discussed below.

13. All 31 GUAN stations in the Region are working. Most operate on a two soundings per day basis (the GCOS target requirement) and 4 operate on a single sounding per day (the GCOS minimum requirement). None of the stations routinely achieve 5 hPa heights although most routinely achieve at least 10 hPa. The GCOS minimum requirement is 100 hPa. All GUAN stations in the Region meet the GCOS minimum requirement making this one of the best performing Regions.

14. The single biggest deficiency in the GUAN in RA II is the lack of GUAN stations in India. The GCOS Secretariat and the Indian Meteorological Department (IMD) have been discussing a project that would allow some of the Indian upper air stations to use alternate radiosondes for some time. This would allow as many as four Indian stations to be designated as GUAN thus substantially improving the geographic coverage in the Region. The project will possibly be implemented by the end of 2007.

15. There are 261 GSN stations in the region and all but about 25 routinely report, the level of implementation being 96 %. The most common problem is that the monthly CLIMAT reports are not received. Members where additional improvement is needed include India, Turkmenistan, Myanmar, and Viet Nam. Many Members have not yet submitted historical daily and monthly data to the GCOS archive and this remains the largest single deficiency in the usefulness of GSN in RA II.

16. It is also suggested that the current RBCN list should be maintained and be taken as the initial proposed RBCN list for next RA II session like the RBSN. Therefore, the total number of proposed RBCN stations is 702(See Appendix II).

Space–based System of the GOS available for RA II

Geostationary satellite coverage

17. Due to the geographical nature of RA II, the region is observed by several geostationary satellites and parts of the region lie in the field-of-view of more than one satellite.

18. The nominal global configuration of operational geostationary satellites, as agreed by the members of the Coordination Group for Meteorological Satellites (CGMS), includes 6 spacecraft to ensure full coverage from 50°S to 50°N with a spacecraft zenith angle less than 70°

19. The current unserviceability of the GOMS satellite at 76°E is partly compensated for by the temporary operation by EUMETSAT of Meteosat-7 located at 57.5°E under the so-called Indian Ocean Data Coverage (IODC) service.

20. In addition to the nominal configuration, parts of RA II are observed by two further geostationary satellites operated by India Meteorological Department (IMD), namely Kalpana-1 and INSAT-3A

21. MTSAT-1R is the currently operational geostationary satellite of the Japan Meteorological Agency (JMA) and is located at longitude 140°E. MTSAT-1R was launched on 26 February 2005 and carries a payload including a 5-channel imager.

22. FY-2C is the currently operational geostationary satellite of the China Meteorological Agency (CMA) and is located at longitude 105°E.

23. INSAT-3A is currently located at longitude 93.5°E. The satellite is a multi-purpose platform catering the needs of television and radio broadcasting and communications as well as meteorology.

24. Kalpana-1 is a dedicated meteorological satellite whose payload includes a 3-channel radiometer similar in performance to that of INSAT-3A. Kalpana-1 is positioned at longitude 74°E

25. EUMETSAT positioned Meteosat-7 at 57.5°E towards the end of 2006 to take over the Indian Ocean Data Coverage (IODC) service from Meteosat-5 which was de-orbited from its previous position at 63°E in April 2007.

26. The extreme SW part of RA II lies within the field-of-view of Meteosat at its primary location of 0 degrees longitude. This service is currently being provided by EUMETSAT using the Meteosat-9 satellite.

Low-earth orbit satellite coverage

27. NOAA-18 is in sun-synchronous orbit with an Equator Crossing Time (ECT) around 13:55 and, as such, it fills the afternoon position in the collaborative effort between EUMETSAT and NOAA known as the Initial Joint Polar System (IJPS).

28. FY-1D was has already exceeded its life expectancy although it continues to function well. It is in a sun-synchronous orbit which has an early morning ECT of around 06:50.

29. Metop-A has recently been declared operational. It is in sun-synchronous orbit with an ECT around 09:30 and, as such, it fills the morning position in the IJPS.

30. The Defence Meteorological Satellite Program (DMSP) series of low-earth orbit satellites provide an important source of data, especially for NWP applications The satellites fly in sun-synchronous orbits and currently DMSP-F13 has an ECT of around 18:33 and DMSP-F16 around 20:13. Other satellites in the series are also active although some with reduced functionality.

Marine observations

VOS

31. RA-II is relatively active with regard to marine observations with VOS programmes operated by a number of Members. For example, Hong Kong, China, India, Japan, Malaysia, and Singapore have submitted input for the 2006 Ship Observations Team (SOT) annual report.

ASAP

32. The main concentration of the ASAP operations continues to be over the Northern Atlantic (5153 launches in 2006). However, an important contribution is also made by Japanese research ships operating primarily in the North Western Pacific areas and seas adjacent to Japan (938 launches in 2006).

DBCP

33. A number of RA-II Members are participating in the Data Buoy Cooperation Panel (DBCP) and some of its Action Groups. India is maintaining a network of about 25 moored buoys in the Arabian Sea and the Bay of Bengal, is participating in the International Buoy Programme for the Indian Ocean (IBPIO) and is contributing to the DBCP Trust Fund. Japan provides for 18 TRITON buoys deployed in the Western Tropical Pacific and Eastern Tropical Indian Oceans as a contribution to the Tropical Moored Buoy Implementation Panel (TIP). DBCP Action Groups where RA-II Members are particularly active include:

- The Tropical Moored Buoy Implementation Panel (India, Japan). Tropical Pacific Ocean array is complete with 76 moorings. Implementation of the Indian Ocean Array is progressing (target is 47 moorings);
- The Global Drifter Programme (India, Japan, Republic of Korea). The global array is completed with about 1250 drifters maintained in operations. While about 450 of the drifters now report air pressure, it is planned to equip all 1250 drifters with barometers by 2010;
- The OCEAN Sustained Interdisciplinary Timeseries Environment observation System (OceanSITES) (Japan, India);
- International Buoy Programme for the Indian Ocean (IBPIO) (India);
- WCRP-SCAR International Programme for Antarctic Buoys (IPAB) (Japan);
- International Arctic Buoy Programme (IABP) (China, Japan, Russian Federation). There are currently 150 buoys deployed in the Arctic Ocean.

Argo

34. The Argo profiling float network is now nearing completion with 2856 floats operational in July 2007 for a target of 3000. Participating RA-II Members include China, India, Japan, the Republic of Korea, and the Russian Federation.

AMDAR issues

35. The global AMDAR programme continues to make progress on implementing national and regional AMDAR programmes and to improve AMDAR coverage in data sparse areas. The AMDAR Programme now exchanges approximately 220,000 to 250,000 observations per day on the GTS.

36. RA II, AMDAR Program is operational in Saudi Arabia (debatable), China, Japan, Hong Kong China and Korea. Hong Kong China has six reporting aircrafts with approximately 900 observations per day. The high priority task for the implementation of the Middle East AMDAR Pilot Project led by Saudi Arabia has leveled off somewhat, although the Saudi Arabian AMDAR programme has four Saudi Arabian Airlines MD90 reporting aircrafts with other MD90 aircraft in Saudi Arabian Airlines fleet still waiting to be fitted with appropriate AMDAR software. The Saudi Arabia Meteorological Service, according to the AMDAR Focal Point, is continuing to coordinate efforts with local airlines in Saudi Arabia and with countries from around the region, including Egypt and the Islamic Republic of Iran.

37. The E-AMDAR Programme, as part of its contribution to the WWW programme, is providing AMDAR data from European airlines to Members in the RA II, users including the Middle East, China and eventually India.

38. It is recommended that a regional AMDAR panel should be established in RA II to develop a regional programme and its implementation plan.

Review of the Manual on GOS (Regional Aspects for Region II)

39. The new version of the manual on the Global Observing System, Volume I - Global Aspects has been issued as a regular Supplement in 2003.

40. To start action in reviewing and updating the Volume II, the CBS Rapporteur on Regulatory Material prepared a letter by which Rapporteurs on regional aspects of the GOS were invited to study the matter and send their suggestions and comments. I sent some revising proposal to the Rapporteur in 2003.

41. My proposal on the follow-up revising of the Volume II (Region II) of Manual on the Global Observing System are as follows:

- To add the above selecting principal of RBSN stations to the text of Volume II (Region II) of Manual on the Global Observing System;

- To include concept of RBCN and GCOS surface and upper-air observing stations in the Volume II (Region II) of Manual on the Global Observing System.

42. In XII-RA II (Seoul, September 2000), one new concept - Regional Basic Climatological Network (RBCN) was introduced into the GOS. In addition, GCOS surface stations and upper-air stations have been determined before that. Therefore, these two issues should be reflected in the text Volume II (Region II) of Manual on the Global Observing System. Therefore, the existing paragraph 2.3 should be replaced by a new paragraph.

- To update the concerned text of the Volume II.

43. Due to the updating of context of the Volume I of the Manual on the Global Observing System, some relative text of the Volume II should be modified according to the changes to the Volume I.

44. The proposed new version of the Manual on Global Observing System, Volume II - Regional Aspects – Asia is given in Appendix III

Recommendations on the Future Composite GOS and its impact on developing countries

45. The Implementation Plan for the Evolution of the GOS (EGOS-IP) recommendations which address relevant aspects of the issues affecting the evolution of the GOS in developing countries were identified. These relevant recommendations include G1: data distribution, G2 documentation of observations, G3 timeliness and completeness of observations, G6 ozone sondes observations

exchange, G4 Baseline System for provision of comprehensive and uniform data coverage, G9 AMDAR technology for more ascent/descent profiles with improved vertical resolution, G13 Ground-based GPS measurements for total water vapour, G20 More profiles in the tropics.

46. Steps in the framework of the implementation plan include: I) the identification of relevant recommendations of the plan addressing the major issues; 2) the translation of these relevant recommendations into general outlines and specific recommendations and action, and 3) the formulation of a proposal of a strategic plan for the evolution of the GOS, which will enable Members to realize the changes.

47. Furthermore, with regard to the conventional basic data to be exchanged internationally, the regional strategic plan will address:

- The feasibility of the creation of a regional or sub-regional programme managing the evolution of the GOS as EUCOS in Europe, NAOS in America and COSNA in the North Atlantic;
- The organization and funding of major programmes of specific observations over data sparse regions in developing countries;
- The full involvement of the Region in the THORPEX Programme through the establishment of an Asian Regional THORPEX Committee (both operational and research components) and in the planned GEOSS activities, in cooperation with WMO Programmes and Projects in order to enable the Region to have a full cross-benefit with the WWW Programme;
- In many areas in developing countries the current GOS simply does not exist because of many major deficiencies;
- There is a need to establish funding mechanisms or programmes to sustain the production and the achievement of high level performance of the exchange of good quality conventional meteorological, climatological and environmental data;
- Many stations proposed to be within the RBSN especially for the upper-air component are not implemented;
- Failures to catch up with rapid technological developments;
- Poor economic environment and difficulties to establish stations in uninhabited areas;
- Inadequate or lack of telecommunication facilities, lack of capacities for the operation and maintenance of equipment;
- High cost of consumables especially for upper air stations;
- Lack of qualified personnel; the Class IV training is less and less provided;
- Lack of public infrastructure and expertise being the result of the lack of funding and lack of involvement, support, attention and awareness in the matters of meteorological services (climate, weather) by the public officials (governments and regional economic groupings);
- Lack of efficient synergy and working arrangements between OPAG-IOS, the Rapporteur on regional aspects of the GOS in RA II, the Regional Association decision making bodies (President) WMO Regional Offices (Directors) in solving the issues addressing the evolution of the GOS in the Region;
- Lack of Regional Observing programmes such as EUCOS of RA VI that would deal with all the issues and problems and would define the strategies to improve the evolution of the

GOS in the region; rather than to let a single countries run its own national observation programme (if it exists).

***Recommendations*:**

- The evolution must take into account upgrading, restoring, substitution and capacity building (especially in the use of new technologies), taking into account both the use of the data and the production of the data. It is possible that some countries do not and will not be able to produce the data and will therefore only be users of data. To help countries produce data for international exchange, due consideration must be given to the three issues previously identified, i.e. public infrastructure, expertise and funding;

- Possible approaches towards the evolution of the GOS were identified by the EGOS-IP, which recommended for developing countries observing systems that were less dependent on infrastructure, expertise, and funding, such as satellite, AMDAR, and AWSs. However, a minimum set of reliable RAOBs would be required both as a backbone to the upper air network, and also to validate the satellite observations with enough height and accuracy. Migration toward the BUFR code (as a reliable representation of the data) is required;

- If resources are available, the highest priority should go to (a) maintaining the RBSN and RBCN, noting that GUAN stations are part of the RBSN, and (b) rehabilitating observing sites in critical locations;

- Members are urged to distribute, as quickly as possible, certain type of observations made routinely in near real-time but not distributed worldwide. These information are of interest for use in other meteorological applications;

- Observations made by Pilot sounding – In the tropics, the wind profile information is considered to be of particular importance;

- Observations made with high temporal frequency should be distributed globally at least hourly. Examples include regular aviation observations (METAR, SPECI, high resolution Radar observations, AWSs, Buoys Hourly SYNOP, precipitation and wind from local or regional mesonet, soil moisture and temperature;

- The need for good metadata exchange in support of observational data sometimes in real time.

Designating and improving effectiveness of Focal Points on GOS

48. From previous experiences of using the focal points on RBSN as the source of the information, it is found that some members don’t have focal points, and some focal points could not be contacted or some did not respond to my request for information. That may come from the job changing of the focal points or the changes of their personnel information like E-mail. So the current mechanism of focal points is not effective enough and can not be helpful as expected. My recommendation to improve the effectiveness of Focal Points is as follows:

- The members should update their list of focal points on RBSN annually or whenever the position of the focal point is changed. The effective information like telephone, E-mail address should be provided;

- When the information of stations in their RBSN is changed, the concerned member’s focal point on RBSN should inform the Rapporteur on Regional aspects of the GOS in RA II timely;

- The focal points on RBSN should take the responsibility to report to the Rapporteur on Regional aspects of the GOS in RA II on the status of their observing system annually, especially any improvements in their observing system like AWS, Radar, wind profiler, so that the Rapporteur can make analysis and suggestion to the improvement of observing system for the whole Region;

- A small coordinating meeting could be held if any important issues like Implementation Plan for the GOS of the Region should be discussed. The participants can come from the Member countries that represent every sub region of the Region.

49. The proposed Implementation Plan for the evolution of the GOS in Region II is attached in Appendix IV.

Review of the Terms of Reference (ToR) of the Rapporteur

50. In the CBS/IOS Implementation-Coordination Team on Integrated Observing Systems (ICT-IOS), Fourth session, Geneva, September 2006, Rapporteurs from six Regions discussed roles and working mechanism of Rapporteurs on Regional aspects of the GOS. Considering the result of this discussion, I made some proposals to the TOR of Rapporteurs.

51. The proposed ToR of the Rapporteur on Regional aspects of the GOS are as follows:

- Liaison with other Rapporteurs and sub-groups in the Region on matters relevant to the GOS, including training matters, to ensure coordination of matters relating to the GOS;

- To review and advise on the observational data requirements of Members of the Region in the context of the WWW Programme in the WMO Strategic Plan,

- To monitor performance, review, update and advise on the design of observing systems

- To keep a breast of matters related to the development and introduction of new observing systems, including both in situ and space-based platforms and advise on their applications in the Region,

- A reference to the observing system to include both surface-based and space-based observations;

- Responsibility for coordinating input to regional plans for the evolution of the GOS;

- Coordination of the implementation of agreed plans with other Regional Rapporteurs on GOS and the Chair and other members of the OPAG on IOS;

- Acting as the focal point for the region in maintaining regulatory material related to the GOS (including WMO Publication no. 9, Vol. A and the Manual on the GOS).

- To represent the Region on the CBS Implementation/Coordination Team on Integrated Observing Systems.