

**WORLD METEOROLOGICAL ORGANIZATION**

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**REGIONAL ASSOCIATION II**

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

**FOURTH SESSION**

**(MOSCOW, 10-13 SEPTEMBER 2003)**



**FINAL REPORT**

## **DISCLAIMER**

### **WMO General Regulations 42 and 43**

#### **Regulation 42**

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups, the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

#### **Regulation 43**

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

## **EXECUTIVE SUMMARY**

The fourth session of the Working Group on Planning and Implementation of the WWW in Region II was held in Moscow at the Scientific Research Centre "Planeta" of the Russian Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet) from 10 to 13 September 2003.

The WG reviewed its activities since re-establishment by the twelfth session of RA II in September 2000. In particular, the session reviewed the decisions made and guidance given by the twelfth session of RA II, the CBS Extra-ordinary session (2002), Fourteenth Congress and EC-LV that had relevance to the work programme of the working group. Major discussions were focused on the present status of WWW implementation and operation of its key facilities including implementation of the GOS space-based sub-system in Region II. The WG considered in details information on regional aspects of WWW components and support functions provided by the regional Rapporteurs/Coordinators. The session also reviewed the development of the GSN and GUAN networks in the region taking into account the introduction of RBCN. The session discussed the implementation aspects of technical cooperation activities related to the WWW and also the status and further development of Public Weather Services in the region.

## **GENERAL SUMMARY OF THE WORK OF THE SESSION**

### **1. OPENING OF THE SESSION (agenda item 1)**

1.1 At the kind invitation of the Government of the Russian Federation, the fourth session of the Working Group on Planning and Implementation of the WWW in Region II was held in Moscow at the Roshydromet's Scientific Research Center "Planeta" from 10 to 13 September 2003. The list of participants is given in Annex I. Mr P. Rajesh Rao, chairman of the working group opened the session. On behalf of Dr Alexander Bedritsky, Head of Roshydromet and President of WMO, Dr Juri Tsaturov, First Deputy Head of Roshydromet, welcomed the participants. He stressed the importance of the meeting for the overall meteorological activities in the region, where big gaps still exist between various NMSs. A growing input of the Russian Federation into the implementation of the WWW in the region was mentioned. He underlined that the major task of the meeting is to develop effective proposals and recommendations to further improve WWW operations in RA II. He wished the participants every success in the meeting and pleasant stay in Moscow.

1.2 Mr D. Schiessl, Director WWW Basic Systems Department, on behalf of Prof. G. O. P Obasi, Secretary-General and Mr M. Jarraud, Secretary-General elect thanked Roshydromet for the arrangements made to host the meeting. He extended special thanks to Dr A. Bedritsky, PR of the Russian Federation with WMO. He mentioned that because of the tight budget, WMO is doing its best to arrange all activities under the technical programmes in a most economical way. Introduction of practice to have two back to back meetings within one week, like ICM and WG PIW in Moscow is one good example of this approach. He also expressed his confidence that the results of the session would be of significant benefit to the implementation of the WWW in Region II.

### **2. ORGANIZATION OF THE SESSION (agenda item 2)**

#### **2.1 Adoption of the Agenda (agenda item 2.1)**

The session adopted the agenda as shown in Annex II.

#### **2.2 Working arrangements (agenda item 2.2)**

The session agreed on its working hours.

### **3. REPORT OF THE CHAIRMAN OF THE WORKING GROUP (agenda item 3)**

3.1 Mr P. Rajesh Rao (India), chairman of the working group presented an in-depth report on the activities of the group since its reestablishment by the twelfth session of RA II (Seoul, Republic of Korea, 19-27 September 2000). Based on the terms of reference given by RA II and the decisions/ recommendations of the third session of WG on PIW in Doha, (Qatar, October 1999), guidelines of the 5LTP of WMO, a draft work plan for the inter-sessional period was prepared and submitted to the president of RA II in February 2001. Members of the group were requested to start work on the plan. The Advisory Working Group (AWG) of RA II, at its meeting in Nanjing, China (November 2001) approved the work plan. The chairman reported that considerable progress had been achieved by the subgroup on GTS and the Rapporteurs in their respective fields. Within the activities on regional aspects of the GOS, revised lists of RBSN and RBCN stations have been prepared and submitted to the present session of the working group for approval. To avoid coding errors in compiling CLIMAT TEMP reports, examples of general coding errors by the operators have been sent to all Members of the region. An amendment to the regional coding procedures for precipitation reporting has been approved by the president of RA II. Considerable progress has also been achieved in upgrading of GTS in the region. A number of circuits

have been upgraded to 64 kbps speed and TCP/IP protocol. There were firm plans for Moscow-New Delhi, Tokyo-New Delhi and Beijing-Tokyo circuits to join Cloud II. Five Members had implemented links through the Internet, which were an effective solution. The chairman pointed out that the maintenance of HF broadcasts proved to be difficult due to high costs and therefore, required an alternative solution. Following the CBS-XII recommendation, India had commissioned a satellite-based DAB service with World Space as a replacement of HF broadcasts.

A comprehensive survey was carried out recently on the operation of GDPS centres in the region. There was growing interest amongst Members for Ensemble Prediction System products, but it was pointed that these were not accessible to them. Many Members have stressed the need to have a regional database to provide access to high resolution NWP products. For the interpretation of NWP products, a number of workshops were held which were attended by many Members of the region.

Hong Kong, China had made operational two Websites viz. Website for Official City Forecasts and Website on Severe Weather Warning. The Regional Training Seminar on PWS Programme was proposed to be held in Brunei in December 2003 which would be of immense help to Members for improving their public weather service activities.

The chairman also highlighted the emerging challenges. The migration to the Table Driven Codes was mentioned as such a challenge. New observing systems like wind profilers, AMDAR, GPS water vapour measurements have emerged whose judicious deployment could reduce the requirement for continental upper-air stations involving large recurring expenditures. The quality management issue was another challenge before the Members as user agencies demanded quality of service. The chairman requested members of the group to keep abreast of these challenges and take appropriate actions.

The chairman finally expressed his sincere thanks and appreciation to all members of the working group, staff of WMO Secretariat and Acting president of RA II for their assistance and excellent cooperation during the whole inter-sessional period.

#### **4. CONSIDERATION OF THE DECISIONS OF THE ELEVENTH SESSION OF RA II, CBS EXTRAORDINARY SESSION (2002), FOURTEENTH CONGRESS AND EC-LV INCLUDING REQUIREMENTS FOR WWW SUPPORT TO OTHER PROGRAMMES (agenda item 4)**

4.1 The Session reviewed the main decisions of the twelfth session of RA II, CBS-Ext.(02), Fourteenth Congress and EC-LIV related to the implementation of the WWW in the Region. Detailed discussion on the implementation by the working group of the decisions of the WMO constituent bodies relating to observing networks, data-processing and telecommunication systems, as well as WWW data management and Public Weather Services took place under the appropriate agenda items

#### ***Decisions and recommendations taken by XII-RA II***

4.2 The working group recalled that in accordance with the decision of XII-RA II, the Association should continue to play an active role in the implementation and further development of the WWW in Region II to keep the WWW Programme under continuous review and to recommend adjustments in the light of Members' changing requirements, as well as the developments in science and technology. It should also identify deficiencies, propose remedial measures and develop system support projects on a regional scale. The working group noted with satisfaction that, following the recommendations of XII-RA II, during the thirteenth financial period, particular attention in Region II was given to the following activities:

- To further improve coordination and integration of functions and activities of the basic WWW components on the basis of 5LTP;
- To review the status of the observational networks and activities of the data-processing centres, identification of their deficiencies and development proposals for their improvement, including the use of the AMDAR reports in the Region;
- To review the implementation of the telecommunication network in the Region, and evaluate the possibilities for applying new technologies with a view to developing and implementing an improved RMTN on the basis of new telecommunication techniques, including satellite-based telecommunication services.

#### ***Decisions and recommendations taken by CBS-Ext.(02)***

4.3 The working group recalled the deliberations of CBS-Ext.(02) which reiterated the need for strengthening collaboration between the technical commissions and the regional associations, and encouraged arrangements for the involvement of experts from Regions in the activities of the subsidiary bodies of the technical commissions. The working group recommended that, as a follow up, current arrangements in RA II, comprising regular participation of the RA II/WG/PIW chair in sessions of the Commission, inclusion of the Regional Rapporteurs/Coordinators on the component programmes of the WWW in the corresponding CBS Implementation Coordination Teams as ex-officio members, regional representation in the CBS Management Group are quite satisfactory and have to be continued. The working group also supported the organization of the technical conferences in conjunction with the sessions of the Commission with adequate regional representation and welcomed efficient information policy of CBS that reached out to all Regions.

#### ***Decisions and recommendations taken by Cg-XIV***

4.4 The working group noted that Cg-XIV stressed the role to be played by the regional associations in coordinating the WWW implementation, identifying deficiencies, specifying requirements, and planning system support projects, on a regional scale. In particular, it invited the regional associations:

- (1) To recommend projects and procedures, as necessary, for the coordinated implementation of the WWW Programme in the Regions;
- (2) To recommend systems support and technical cooperation activities needed to assist Members in their implementation and operation of the WWW in accordance with the programme;
- (3) To keep the WWW Programme under continuous review and establish requirements for adjustments in the light of Members' changing requirements and developments in science and technology, bearing in mind the principles and directives laid down in the plan.

The working group agreed that the above issues should require special attention in planning and implementation activities of the group.

4.5 The working group noted the concerns reported by the presidents of the regional associations during the Congress, which among others, are the following:

- (a) Difficulties faced by several Members in maintaining and further developing their basic meteorological and hydrological observing networks, telecommunication facilities and data processing systems;
- (b) Weak forecasting and warning systems in many countries to analyze, interpret, predict, and disseminate timely and accurate warnings on natural disaster, such as tropical cyclones, floods, sand/dust storms, drought, monsoon depressions, forest fires/haze, and other extreme weather events;
- (c) The need to develop and improve seasonal and inter-annual climate prediction capacities in various less developed NMHSs and building capabilities in Member countries for better understanding and assessment of the nature and extent of potential threats from climate change and variability, specially the impacts of sea level rise on low lying islands and countries with extensive coastlines;
- (d) The need to give further attention to the enhancement of human resources development of Members through education and training, particularly through the provision of long-term fellowships, as well as through the use of new technology including distance learning;
- (e) Increasing trend of scarcity of fresh water and high incidents of water pollution in many countries and regions and, therefore, the need to give high priority to accelerate the development and implementation of HYCOS projects in all Regions, in particular, in RAs II and V, to contribute to the efforts of Members to address the critical issue of availability of fresh water;
- (f) The issue of commercialization/cost recovery of meteorological and hydrological services and the international exchange of meteorological and hydrological data and products and new challenges and opportunities faced by NMHSs in those areas;
- (g) The need to further enhance collaboration with relevant regional and subregional organizations, institutions and development partners in all Regions.

4.6 The working group agreed that the above concerns could be effectively addressed through the implementation of the strategy developed in the Region to strengthen and improve its basic meteorological and hydrological facilities and services and recommended to update the Strategic Plan for the Enhancement of NMSs in Asia. The working group also noted positive results in joining forces to solve problems of WWW implementation at the subregional level among CIS (Commonwealth of Independent States) Member States and recommended use of the experience gained in other parts of the region.

4.7 The meeting was also informed of the decision of Cg-XIV related to the establishment of the WMO Space Programme and WMO Consultative Meetings on High-level Policy on Satellite Matters. The scope, goals and objectives of the new WMO Space Programme should respond to the tremendous growth in the utilization of environmental satellite data, product and services within the expanded space-based component of the GOS, that now included appropriate R&D environmental satellite missions. Congress supported the WMO Space Programme Long-term Strategy, reviewed at the third session of the Consultative Meetings on High-level Policy on Satellite Matters. Congress agreed that the WMO Space Programme Long-term Strategy provided an excellent balance to the 6LTP and the programme and budget for 2004-2007. Congress considered it appropriate to institutionalize the sessions as WMO Consultative Meetings on High-level Policy on Satellite

Matters in order to establish more formally the dialogue and participation of environmental satellite agencies in WMO matters. Congress was unanimous that the WMO usercommunity should be represented at the highest level at the sessions and that the space agencies should also be represented by their Directors. Future sessions of the Consultative Meetings on High-level Policy on Satellite Matters should be chaired by the President of WMO, as had been the case for the first three sessions. The Consultative Meetings would continue to provide advice and guidance on policy-related matters and would maintain a high level overview of the WMO Space Programme

4.8 The working group noted the decisions of Cg-XIV related to the Global Data Processing including Emergency Response Activities. It recommended that the guidelines given by the Congress regarding EPS forecasting, Severe weather forecasting, Emergency response Activities, Seasonal to interannual forecasts, Regional user requirements and training should be fully taken into account in the planned regional activities.

### ***Decisions and recommendations taken by EC-LV***

4.9 The working group noted the decision of EC-LIV concerning the review of the *Manual on the GOS* (WMO-No. 544); amendments to the *Manual on the GTS* (WMO No. 386), the *Manual on Codes* (WMO-No. 306), the *Manual on the GDPS* (WMO No. 485).

4.10 Regarding the Public Weather Services (PWS) programme, the Council encouraged Members to supply more information to those Web sites, and where possible, to host similar sites in additional language versions. The Council reiterated the importance of achieving positive and collaborative partnerships with the national and international media, while promoting at the same time, the role of the NMSs as the single official source for the issue of warnings and the official source of public forecasts and encouraging the media organizations to attribute the source of their information to the NMSs concerned. The Council also encouraged dialogue with private sector meteorological service providers as a means of promoting mutual understanding of respective roles. The working group reviewed and discussed the above issues of PWS in relation to WWW development under item 7.

4.11 Concerning the development and implementation of the Future WMO Information System, the Council requested the president of CBS to pursue further development of the FWIS towards the refinement and consolidation of the concept and then the design and implementation planning phases. It emphasized that the support and involvement of the regional associations and the technical commissions were needed, as early as possible, in all phases of the FWIS development in order to ensure a full and shared ownership of the project, and its effective implementation. The working group recommended that these activities at the regional level should be fully coordinated with the work of CBS ICT on Information Systems and Services.

4.12 Concerning the development and implementation of the strategy for the WMO-wide migration to table-driven code forms, the Council endorsed the migration plan developed by CBS. The Council requested the Secretary-General to organize the relevant training programme, including the use of CAL tools, covering all WMO Regions over the period 2003-2005. It also urged NMHSs to train their staff on computer and information technologies at the local level in order to facilitate and speed up the migration to TDCF, as well as the introduction of computer-based techniques. The working group discussed in details migration issues under item 6.4

## 5. STATUS OF WWW IMPLEMENTATION AND OPERATION (agenda item 5)

### SURFACE-BASED SUBSYSTEM OF THE GOS

#### ***Regional Basic Synoptic Network (RBSN)***

5.1 The working group noted that during the inter-sessional period the number of RBSN surface stations has been increased from 1195 to 1235. According to the results of the annual global monitoring of the operation of the WWW, the percentage of SYNOP reports actually received at MTN centres remained the same (82%) during the period 1999-2002. The number of upper-air stations included in RBSN decreased from 334 (1999) to 327 in 2002. The percentage of TEMP reports received during this period in comparison with expected reports from RBSN stations has shown a clearly positive trend starting from 52% in 1999 and amounting to 62% in 2002. The major reason in the improved availability of observational data was promptly coordinated and action was taken by the Members concerned, the Secretariat and donor countries. However, the existing gaps in the observational data coverage continued to be mainly due to the deficiencies in the operations of both observing and telecommunication networks, high cost and lack of consumables and spare parts especially in developing countries and in countries with economies in transition. Further details on the RBSN performance including other networks, are given in the report of the Rapporteur on the Regional Aspects of the GOS (see section 6.1 of the report).

#### ***Regional Basic Climatological Network (RBCN)***

5.2 The working group noted that following the recommendation of EC-LII (May 2000), the study, initiated by the Secretary-General, to identify the reasons for low availability of CLIMAT and CLIMAT TEMP reports, had shown that the conditions leading to low availability of reports were many and varied. Among the most frequently occurring are the following:

- The stations were completely "silent" (no SYNOP or TEMP reports);
- The stations were operational, but CLIMAT and CLIMAT TEMP reports were not generated;
- The reports were generated and provided, but for (a) different (nearby) station(s) rather than for the stations requested;
- The reports were generated, but not properly communicated to the associated Regional Telecommunication Hub (RTH);
- The reports were communicated, but not according to WMO formatting and coding procedures;
- The reports were in good order, but transmission *between* RTHs failed;
- The monitoring procedures between centres may be different, causing different results for the availability of the reports.

5.3 Based on the positive experience gained in RA IV, the study suggested that a separate Regional Basic Climatological Network (RBCN) should be developed for each Region. This network should include GSN and GUAN stations supplemented by other CLIMAT and CLIMAT TEMP reporting stations needed to meet regional requirements as requested by Cg-XIII. An appropriate procedure for defining such networks had been developed by the WG on Planning and Implementation of the WWW in RA VI in collaboration with GCOS and in coordination with CBS.

5.4 CBS-XII (November-December 2000) felt that the establishment of RBCN would provide a valuable justification for maintaining a minimum number of CLIMAT reporting stations, and these RBCN stations could serve as a target list for WWW monitoring. CBS-XII also requested the RTHs to provide regular information on availability of the reports from their zones of responsibility during the WWW monitoring. Following the recommendations

of the Executive Council and CBS, the sessions of XII-RA II (September 2000), XIII-RA III (September 2001), XIII-RA-IV (March-April 2001), XIII-RA V (May 2002), XIII-RA VI (May 2002) and XIII-RA I (November 2002) considered and agreed the concept of defining a separate RBCN for their regions and adopted appropriate resolutions. Based on the approved list of RBCN stations (as of July 2003), all regions, including the Antarctic, comprised a total of 3 086 stations, constituting the following regional breakdown:

RBCN	RA I	RA II	RA III	RA IV	RA V	RA VI	ANTARCTIC	TOTAL
CLIMAT	616	593	344	242	188	520	72	2 575
CLIMAT TEMP	19	194	49	72	74	91	12	511

5.5 The working group was informed on the recent WWW monitoring results based on the approved lists of RBCN stations which showed that the availability of CLIMAT and CLIMAT TEMP reports was not satisfactory, providing the global average of only 49 per cent and 53 per cent respectively. The density of reports was particularly low in Regions I, II and III. In order to increase the availability of CLIMAT messages, further efforts by Members should be made to ensure that their operational observing stations compiled and transmitted the CLIMAT/CLIMAT TEMP messages according to existing regulations. Following the above recommendations, the Secretariat initiated preparation of special guidance material related to the operational procedures and practices to be used by observers and technicians in compiling and transmitting CLIMAT and CLIMAT TEMP messages over the GTS. It is planned that this document (40-50 pages with illustrations, tables and graphics) will be posted on the WMO Web site for review by the CBS/OPAG/IOS members and then circulated to Members. For better implementation of the above guidance material in the practice, it is also foreseen to organize training workshops in the regions concerned.

### ***2002 Annual Global Monitoring of the WWW***

5.6 The working group noted that the Secretariat received results of the 2002 annual global monitoring from 20 RA II Members. An analysis of the results of the 2002 annual global monitoring of the operation of the WWW is available in the WMO server under <http://www.wmo.ch/web/www/ois/monitor/agm/agm2002.htm>. Table A is a condensed summary of the results.

**Table A**

Type of data	Reports received from 1 to 15 October 2002 at MTN centres	Reports expected to be prepared*
SYNOP	83%	97%
Part A of TEMP	64%	88%
CLIMAT	65%	73%
CLIMAT TEMP	61%	67%

Note: The percentages are calculated with the RBSN as the reference

\* At stations implemented according to WMO No. 9, Vol. A (July 2002).

### ***SYNOP and TEMP reports issued by RBSN stations***

5.7 The availability of SYNOP and TEMP reports from RBSN stations in Region II is not fully satisfactory. The availability of reports was not homogeneous within the Region. There are areas from where the availability of reports was not satisfactory:

- No SYNOP reports were received from Afghanistan, Cambodia and Iraq. Less than 50 per cent of the expected reports were received from Kuwait, Lao People's Democratic Republic, Myanmar, Tajikistan and Yemen.
- No TEMP reports were received from Afghanistan, Cambodia, Iraq, Lao People's Democratic Republic, Myanmar, Nepal, Qatar, Tajikistan, Turkmenistan and Yemen. Less than 50 per cent of the expected reports were received from Bangladesh, Democratic People's Republic of Korea, Iran, Kazakhstan, Mongolia, Oman, Pakistan, Russian Federation, Thailand and Uzbekistan.

5.8 The total availability of SYNOP and TEMP reports from RBSN stations located in Region II from 1998 to 2002. The average number of SYNOP reports received daily on the MTN increased from 3763 in 1998 to 4118 in 2002 (+9,4%) together with the number of surface RBSN stations from 1195 to 1234 (+8,3%). The average number of TEMP reports received daily on the MTN decreased from 389 in 1998 to 376 in 2002 (-3,5%), as well as the number of upper-air (RW) RBSN stations from 326 to 294 (-10,9%), resulting in an increase in terms of percentage from 60% to 64%.

5.9 As regards the timeliness of the reception on the MTN, 81, 82 and 83 per cent of the required SYNOP reports were available on the MTN within one hour, two and six hours, respectively, after the time of observation; 56 and 64 per cent of the required TEMP reports were available on the MTN within two and twelve hours, respectively, after the time of observation.

5.10 No SYNOP reports were received from 83 stations and no TEMP reports from 53 stations during the monitoring period from 1-5 October 2002. Several stations, from which SYNOP and/or TEMP reports were received, although these stations were not indicated as implemented in Volume A of WMO Publication No. 9, were also noted. The session recommended to invite Members to send to the Secretariat the relevant updates of Volume A as appropriate.

### ***CLIMAT and CLIMAT TEMP reports issued by RBCN stations***

5.11 The availability of observational CLIMAT and CLIMAT TEMP reports from the RBCN stations in Region II is not fully satisfactory. There are areas from where the availability of reports was scarce:

- No CLIMAT reports were received from Afghanistan, Bangladesh, Cambodia, Democratic People's Republic of Korea, Iraq, Kuwait, Maldives, Tajikistan, Qatar, Viet Nam and Yemen. Less than 50 per cent of the expected reports were received from Iran, Myanmar, Russian Federation and Turkmenistan.
- No CLIMAT TEMP reports were received from Afghanistan, Cambodia, Democratic People's Republic of Korea, Iran, Iraq, Kazakhstan, Kyrgyz Republic, Kuwait, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Pakistan, Qatar, Sri Lanka, Tajikistan, Turkmenistan, Uzbekistan, Viet Nam and Yemen.

## **Special Monitoring of the MTN (SMM)**

5.12 The Special Monitoring of the MTN (SMM) provides information complementary to that of the AGM. The details on the last analysis of the SMM exercises are available under <http://www.wmo.ch/web/www/ois/monitor/monitor-home.htm>. There were no significant changes in the availability of SYNOP and TEMP reports from Region II from July 2002 to April 2003. The lists of countries, for which no reports or less than 50 per cent of the expected reports were received (see above paragraph 2), are the same, except for Afghanistan and Qatar for which TEMP reports were received during the April 2003 SMM.

### **SPACE-BASED SUBSYSTEM OF THE GOS AVAILABLE IN RA II**

5.13 The group noted that the space-based component of the GOS is now comprised by satellites of three types: operational meteorological polar-orbiting and geostationary satellites and environmental R&D satellites. Further details for operation of the space-based subsystem are given in section 6.1 of the report.

## **6. REGIONAL ASPECTS OF THE WWW COMPONENTS AND SUPPORT FUNCTIONS, INCLUDING REPORTS BY THE RAPPORTEURS/CO-ORDINATOR (agenda item 6)**

### **6.1 Global Observing System (agenda item 6.1)**

6.1.1 The session expressed its appreciation to the report of Mr Chen Yongqing (China), the Rapporteur on the Regional Aspects of the GOS. It noted the results of several meetings attended by the Rapporteur and felt that appropriate proposals and recommendations of these meetings would provide an effective contribution to the GOS implementation and redesign activities in the region.

6.1.2 The meeting noted that there were some positive trends in the implementation of GOS in RA II in the past three years. In the surface-based subsystem, the RBSN and RBCN lists had been revised, and some new observing systems were developed. For the space-based subsystem, RA II Members installed more satellite data receivers. There were, however, some problems in performance of the GOS in RA II.

### **Surface-Based Sub-System**

#### *The Regional Basic Synoptic Network (RBSN)*

6.1.3 The meeting recalled that in 2000, XII-RA II approved a revised RBSN list for RA II prepared by the Rapporteur on the Regional Aspects of the GOS. The approved RBSN list resulted in 1198 surface stations, 298 radiosonde stations and 35 rawin stations. When revising the RBSN, the following principles were applied:

- The revised RBSN should have a 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.

6.1.4 The meeting noted that the RBSN list, after modifications introduced by Members since the last session of RA II, included 1235 surface stations, 294 radiosonde stations and 33 rawin stations (as of March 2003).

6.1.5 According to the RBSN station selecting criteria, the meeting suggested that 9 additional stations should be included into the RBSN list. Therefore, the total number of proposed RBSN stations is 1244(See Annex III).

6.1.6 The meeting requested the rapporteur to add columns in the RBSN surface station list so as to state whether the stations are fully or partially automated or manual stations.

6.1.7 The meeting also requested that Rapporteur to send the proposed RBSN list to RA II Members to check before submitting it to the next session of RA II for approval.

6.1.8 As indicated in the WWW twenty-first status report on implementation issued by WMO Secretariat in 2002, the level of implementation of RBSN surface stations as of 1 October 2002, according to information provided by RA II Members, was 91%. The level of implementation of RBSN upper-air stations was 82% for radiosonde and 76% for rawin respectively. Although the implementation level of surface RBSN stations in RA II has increased in recent years, the implementation level of upper-air RBSN stations is still low.

6.1.9 The meeting noted that the October 2002 annual monitoring results showed that the availability of RBSN in RA II was 83% for SYNOP reports and 64% for TEMP reports. The meeting noted that it was evident that the availability of SYNOP reports from the Region II was generally satisfactory whilst the availability of TEMP reports was not satisfactory from northern, southeastern and western parts of the Region. October 2002 annual monitoring results also showed that among the RBSN stations, 77 SYNOP stations and 46 TEMP (part A) stations, which had been implemented, were "silent," and 6 SYNOP stations and 7 TEMP (part A) stations, which were not implemented, were also "silent." Any one of the following reasons may lead to a silent station: unsettled conditions in the country, lack of resources, costly sondes, lack of trained manpower, non-availability of equipment, lack of allocation of funds to NMS, poor communications infrastructure.

6.1.10 In order to maintain the stability of the RBSN network, the meeting suggested that 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. Whenever the RBSN network is modified, the above principles should be applied. The meeting also suggested that those Members, whose TEMP report availability rate was not satisfactory, should make more efforts to improve their upper-air data availability and provide more TEMP reports to the GTS.

#### *The Regional Basic Climatological Network (RBCN)*

6.1.11 The meeting noted that the RBCN lists, after the modifications introduced by Members since the last session of RA II, consisted of 593 surface observing stations and 194 upper-air-observing stations. The October 2002 AGM result showed that the availability of RBCN in RA II was 65% for CLIMAT reports and 61% for CLIMAT TEMP reports. Thus, it agreed that the implementation rate of RBCN in RA II was not satisfactory because of low report availability.

6.1.12 The meeting suggested that further measures should be taken to make RA II Members aware of the importance of the RBCN for the climate prediction and research, and every Member should also make every effort to provide CLIMAT and CLIMAT/TEMP reports from RBCN stations to the GTS. The proposed list of RBCN stations is given in Annex IV.

6.1.13 The meeting requested the Rapporteur to include in the proposed RBCN list amendments developed by GCOS-AOPC and reconfirm the modified list with the RA II Members before submitting it to the next session of RA II for approval.

6.1.14 The meeting was informed that USA is providing financial support for some GUAN and GSN stations selected from RA I and RA III to upgrade/rehabilitate their operation. It was also informed that USA would most likely provide more funds to support the operation of some GSN and GUAN stations selected from other WMO regions.

#### *Marine observations*

6.1.15 The meeting noted that the total number of ships recruited by Members of the Association has increased slightly during the intercessional period. The number recruited by 14 Members totalled 2037 in 2002, compared to 1898 in 1998. In April 2003; the total number of active drifting buoys deployed by operators from five countries was unchanged at 57, compared with the same month in 1998. Implementation of the Argo project of sub-surface profiling floats is now well underway. In April 2003, 184 floats were deployed operationally by five Members of the Association. Reports from the great majority of all these different automated sea stations are exchanged in real time on the GTS In April 2003. As far as upper air observations are concerned, six Japanese ships equipped with upper-air sounding equipment were operational during 2002.

#### *Aircraft observations*

6.1.16 The meeting also noted that about 150 000 AMDAR observations per day were currently being exchanged on the GTS representing nearly a three-fold increase in volume compared to 1998. In Region II, several projects were under development. Saudi Arabia has implemented the first operational system in the Middle East. In addition, Saudi Arabia was also leading the development of a regional program expected to involve other countries in the Middle East region. Hong Kong, China was developing a programme and had begun onboard testing. Japan was receiving real-time data and evaluating system components. The Republic of Korea was planning its own AMDAR programme. China Meteorological Administration and China Civil Aviation Administration had reached an agreement to cooperate on AMDAR plan and have initiated a pilot project. Egypt, the United Arab Emirates and Kazakhstan had expressed their interests in the AMDAR programme. In the Middle East, most countries were receiving E-AMDAR data, while some other countries were also receiving data from USA, Australia and E-AMDAR. Oman, Saudi Arabia and Egypt were interested in establishing dedicated target programmes.

6.1.17 The meeting noted that overall, the availability of AMDAR reports in Region II continued to be low. The meeting suggested that more regional workshops should be organized in RA II to train experts and discuss how to participate in the AMDAR programme. The meeting also suggested to develop a regional program or an action plan to promote the collection and exchange of the AMDAR data.

### *Other Observations*

6.1.18 The meeting also was informed that several RA II Members were deploying new meteorological radars to help mitigate natural disasters. Japan, Hong Kong, China, Vietnam and China were deploying Doppler radar systems.

### **Space-based Sub-System**

#### *Operational Satellites*

6.1.19 The meeting was informed of Meteorological satellite situation. With regard to LEO satellites, the polar orbiting meteorological satellites FY-1C and FY-1D had provided helpful meteorological data for RA II Members. RA II Members had also been benefited from NOAA (USA) and METEOR (Russian Federation) Satellite. With regard to the geostationary satellite, FY (China) and GMS (Japan) series of satellites had greatly helped RA II Members in weather monitoring and forecast.

#### **Research and Development (R&D) Satellites**

6.1.20 The meeting noted that current constellation of R&D satellites included NASA's Aqua, Terra, NPP, TRMM, QuikSCAT and GPM missions, ESA's ENVISAT, ERS-1 and ERS-2 missions, NASDA's ADEOS II and GCOM series, Rosaviakosmos's research instruments on board ROSHYDROMET's operational METEOR 3M N1 satellite, as well as on its future Ocean series and CNES's JASON-1 and SPOT-5

#### *Ground Segment*

6.1.21 The meeting noted that 34 Members of the region (100%) were equipped with polar-orbiting receivers (APT and HRPT) and 32 Members (94%) were equipped with geostationary (WEFAX and HR) receivers. Based on WWW goals, RA-II Members had achieved an overall implementation for ground receiving equipment of 94%.

### **Other activities carried out by the Rapporteur**

#### *Coordinating the work related to the RBSN stations*

6.1.22 The meeting noted that a letter had been sent to Members by WMO Secretariat in 2002 requesting to inform the rapporteur on the Regional Aspects of the GOS on any changes of their RBSN stations. Unfortunately, only a few Member countries responded to the letter and sent the required information. The meeting highlighted that it was very important that any changes in stations performance introduced by Members should be communicated to the rapporteur to update the RBSN list timely.

#### *Collaboration with Rapporteur on the improvement of Volume A*

6.1.23 The meeting noted the rapporteur had given several comments and suggestion to the Rapporteur on the Improvement of Volume A for the preparing of the report for the improvement of the Volume A.

6.1.24 The meeting also recommended that WMO should start to study the problems, which existed in the current station Index numbering System, arising from the situation that more and more AWSes were being established for the meso-scale weather forecast purpose.

*The Second Session of Implementation/Coordination Team on the Global Observing System*

6.1.25 The meeting noted that the second session of the CBS Implementation and Coordination Team for Integrated Observing Systems had been held on 14 October 2002 at WMO Headquarters, Geneva, Switzerland. A variety of issues related to IOS were discussed in that meeting. Several reports concerning the progress made on Marine Observation, AMDAR, credible quality control program for AWSs, development of Operational Data Requirements and Redesign of the Global Observing System, revision of the Manual on GOS and Improvement of Volume A were reviewed as well in the meeting.

## **6.2 Global Telecommunications System (agenda item 6.2)**

The meeting noted with appreciation that the report of the Implementation Co-ordination Meeting on the GTS in Region II, which was held in Moscow from 8 to 10 September 2003. The main deliberations of the ICM are given below.

### ***Status of implementation of the Regional Meteorological Telecommunication Network***

6.2.1 A diagram on the status of implementation is included in Annex V. The meeting noted with satisfaction that the implementation of RMTN circuits in Region II had made very significant progress, in particular:

- (a) Implementation of the IMTN plan for MTN circuits in the Region, according to CBS plans;
- (b) Upgrade of a number of regional circuits to Frame Relay circuits, in the South-Eastern part of the Region;
- (c) Upgrade of a number of regional circuits to 64 kbit/s digital leased circuits, in particular in the area of responsibility of RTH Jeddah;
- (d) Upgrade of a number of regional circuits to V.34 (19.2-33.6 kbit/s) leased circuits, in the Northern part of the Region;
- (e) Progress in the introduction of the TCP/IP procedures
- (f) Upgrades of data-dissemination systems, by the replacement of an HF radiobroadcast by a satellite-based system using DAB techniques (RTH New Delhi), and in the satellite-based TV-Inform-Meteo system.

6.2.2 The meeting noted, however, that there were still a number of shortcomings:

- (a) Four NMCs were only connected by GTS connections operating at low speeds: Colombo, Kathmandu, Male and Yangon;
- (b) Five NMCs have no connection to the GTS: Baghdad, Dushanbe, Kabul, Phnom Penh and Sana;
- (c) A number of regional circuits were operating at low speed, with a very low cost-effectiveness.

6.2.3 The meeting noted with appreciation that all the RTHs were operating a Web server. Almost all NMCs have access to the Internet, at least for E-mail services, and a number of NMCs are also maintaining a Web site. Some RTHs' Web servers were used as an efficient complementary mean for providing data and products to the NMCs, in particular for those NMCs with low-speed or no connection to the GTS. It was noted that some RTHs were also collecting observational data from NMCs by E-mail.

6.2.4 Region II is covered by the following satellite-based data-distribution systems: ISCS (primarily ISCS (Pacific)), METEOSAT/MDD, MTSAT, TV-Info-meteo (Russia), VSAT systems operated by China, India and Thailand, and the UKSF/WWW project. The satellite system operated by China and METEOSAT/MDD were integrated into the RMTN. The INSAT satellite operated by India includes a Meteorological Data Distribution channel (INSAT/MDD), which can be received at some NMCs associated to RTH New Delhi and located within the footprint of the satellite.

6.2.5 Five RTHs were operating a radio facsimile broadcast. All the RTHs stressed the very high recurrent costs, associated to the difficulty or even impossibility of the procurement of spare parts.

### ***GTS techniques and procedures***

6.2.6 The meeting took note that CBS further developed procedures and implementation guidance for the use of TCP/IP and related protocols on the GTS, including the refinement of procedures for IP addressing and routing, and of the recommended practices for the FTP. The session re-emphasized that the use of TCP/IP has considerable benefits for the development of the GTS, enabling reduced costs for communications equipment, reduced software development work through use of industry standard software systems and use of a larger panel of cost-effective telecommunication services. The migration towards TCP/IP on the GTS was progressing quickly.

6.2.7 With respect to the access to the Internet, that all WWW centres had already implemented, CBS emphasized the critical importance of adequate security measures to ensure efficient and safe operations for the GTS. The meeting noted with appreciation the guidance that was developed by CBS in this respect for collecting observational bulletins via e-mail over the Internet, and for the establishment of virtual private networks (VPNs) via the Internet between GTS centres.

6.2.8 The meeting noted with particular interest that CBS recommended satellite-based digital video broadcasting (DVB) and digital audio broadcasting (DAB) data-communication techniques for improving the implementation of GTS data-distribution systems. These new communication services are a highly cost-effective solution in terms of recurrent and investment costs for meteorological data-distribution with large or medium capacity respectively. The meeting noted with appreciation that these techniques were being introduced in the Region for the upgrade of the GTS.

6.2.9 The meeting took note that CBS further developed procedures related to GTS operation and information exchange. As regard the refinement of the functions and responsibilities of RTHs, the meeting recommended to align the text of "3.3 Functions of RTHs" included in the *Manual on the GTS*, Volume II, Region II accordingly, as follows: *"RTHs in Region II should perform the functions defined in 2.1, Part I, Volume I of the Manual."*

6.2.10 With respect to the extension to 500 Koctets of the maximum length of meteorological messages containing data in binary presentation forms, the meeting invited RTHs in Region II to study the implications and feasibility with their associated NMCs with a view to assessing a realistic implementation date, and to contribute the findings to the CBS/OPAG on ISS.

6.2.11 The meeting stressed the need for a tight technical coordination between an RTH and its associated NMCs for the implementation, operation and further improvement of data communication techniques and procedures for the GTS. The meeting underlined the considerable benefits of sharing experience and advice between the data-communication experts of the RTH and of the NMCs, in particular in the present context of the introduction of the TCP/IP.

6.2.12 The meeting noted with appreciation that RAll MTN centres (Beijing, Moscow, New Delhi, Tokyo) had implemented the new data base procedures for the improved Volume C1 – Catalogue of Meteorological Bulletins, and that RTH Jeddah was taking the necessary action. The meeting also noted that four RTHs located in Region II (Bangkok, Beijing, New Delhi and Tokyo) were maintaining a routeing catalogue, accessible by the other GTS centres, in particular by their associated NMCs, via the WMO server or their own Internet server. The meeting urged the five other RTHs (Jeddah, Khabarovsk, Novosibirsk, Tashkent and Tehran) to implement their routeing catalogue.

***Implementation plan for the further development of the Regional Meteorological Telecommunication Network, including the improved RMTN project***

6.2.13 The meeting recommended that the United Arab Emirates, with NMC Abu-Dhabi, which was not yet associated to any RTH, be included in the zone of responsibility of RTH Jeddah.

6.2.14 The meeting recommended that, in the framework of the upgrade of the GTS circuits linking RTHs Tokyo, Bangkok and New Delhi and the resulting improvement in cost-effectiveness, the Bangkok-New Delhi connection be also upgraded and re-included into the RMTN. It recommended that the additional circuit Beijing-New Delhi, operating at 9.6 kbit/s be included in the RMTN plan as a circuit interconnecting two major RTHs in the Region and ensuring a higher reliability and capacity of the whole RMTN. It also recommended that the circuit Bangkok-Singapore be endorsed as an inter-regional circuit, noting the plans of RTH Bangkok to upgrade both inter-regional circuits Bangkok-Kuala Lumpur and Bangkok-Singapore to Frame Relay.

6.2.15 The meeting confirmed a practical step-by-step approach for the implementation of the Improved RMTN, in view of the geographical extension of the Region and taking due account of the most cost- that were available in different parts of the Region. In particular, data network services such as Frame Relay, were available and/or cost-effective only in parts of the Region, while digital or even analogue leased circuits were the optimum solution in other parts. The meeting emphasized that the plan should be reviewed in light of the development of the data-communication services, in order to take an early benefit from the telecommunication development.

6.2.16 The meeting endorsed the general strategy for promoting the Improved RMTN implementation as follows:

- Each RTH should survey the technical status, capabilities and opportunities of its associated NMCs, as well as the data-communication network services that are commercially available and cost-effective in their respective zone;
- RTHs should assist their associated NMCs in developing implementation plans, including target implementation dates; this plans should include the migration to TCP/IP, which is a key factor for enabling the use of cost-effective systems and communications;
- As an initial step, current circuits should be upgraded as soon as possible using data-communication services that are the most cost-effective, such as Frame Relay services where available.
- NMHSs should take the necessary measures for ensuring an adequate training of the technical staff of NMCs on the relevant Information and Communication Technologies for the Improved RMTN.
- Financial assistance is expected to be required for a number of NMCs for the implementation of the Improved RMTN, through individual VCP projects on the basis of the NMC/RTH plans mentioned above, or other cooperation projects.

6.2.17 The meeting agreed upon the development plan for 2003-2005, based on the coordinated firm plans of the RTHs and NMCs of Region II, which is included in Annex VI. The meeting agreed to review the progress of the implementation of the development plan before the forthcoming XIII-RA II (End-2004).

6.2.18 The meeting also underlined the importance of data distribution systems as crucial elements of the RMTN. With respect to EUMETSAT-MDD, it noted that Meteosat Second Generation MSG-1 was successfully launched in August 2002, but a power amplifier failure on board MSG-1 led to the non-activation of the dissemination mission. As a result, EUMETSAT was implementing an alternative dissemination system via telecommunication satellite services, EUMETCast, based on digital Video Broadcast (DVB) techniques. It was planned to offer MDD users the option of receiving their MDD transmissions via a EUMETCast reception station, the MDD service being included in the Low Rate Information Transmission (LRIT) data stream of the EUMETCast broadcast. The implementation aspects of METEOSAT-MDD in Region II should therefore be reviewed, in coordination with EUMETSAT, in light of the finalized specifications of EUMETCast.

6.2.19 The meeting recommended, as requested by XII-RA II, to amend *the Manual on the GTS* to reflect the inclusion of METEOSAT-MDD in the RMTN by including the following paragraph 3.11.2 in Volume II – Regional Aspects – Region II (Asia) – Part I:

“3.11.2 The METEOSAT geostationary meteorological satellites operated by EUMETSAT provide a meteorological data distribution (MDD) service as part of the RMTN. With Meteosat Second Generation (MSG), the MDD programme will be embedded in the data distribution service operated by EUMETSAT.”

6.2.20 The meeting agreed upon the following mechanism to review the MDD programme of transmission with respect to Region II:

- An MDD schedule ad hoc group, established by the chairman of the WG-PIW in Region II, is entrusted to compile data and products requirements of the WWW centres receiving MDD in Region II, to prepare proposals for changes to the MDD transmission programmes with indications of priorities and to submit the proposals to the chairman of the WG-PIW.
- The chairman of the WG-PIW in Region II reviews and submits the proposals for changes to the MDD transmission schedules to a focal point designated by EUMETSAT, through the WMO Secretariat.

6.2.21 The meeting also noted that the foreseen technological changes in the satellite-broadcast system providing SADIS, as well as the UKSF project was likely to change the UKSF/WWW project specifications and implementation planning. Noting the interest of several NMCs for this project, the meeting invited the UK Meteorological Office to review the UKSF/WWW project accordingly and to inform RA II Members concerned.

6.2.22 The meeting underlined the high financial burden of the operation of HF radio broadcasts for the RTHs concerned, and the limited efficiency. It agreed that RTHs should plan the discontinuation of the HF radio broadcasts and their replacement by more efficient techniques, such as DAB datacast via satellite.

6.2.23 The meeting stressed the importance of National Meteorological Telecommunication Networks (NMTNs) for the collection of observational data and distribution of meteorological information on a national level. It agreed that the general strategy for implementing NMTNs is the use of public/commercial telecommunication services (e.g. Public Data Networks, Public Switched Telephone Networks, VSAT networks, etc), which are generally cost-effective and efficient in areas where the public telecommunication infrastructure is available. Digital radio-telecommunication Systems, Data Collection Platforms (DCPs) are appropriate for NMTN operation in remote areas, depending on the national or sub-national conditions.

The meeting also emphasized that the considerable development of information and communication technologies, with respect to both hardware and software, with the adoption of industry standards for the GTS, such as TCP/IP procedures, was providing opportunities for a sustainable introduction of PC-based GTS/GDPS systems in many National Meteorological Centres.

6.2.24 The meeting noted that the implementation and capacity of the Internet is uneven, but there are rapid developments and changes that the meteorological community should take up as an opportunity for progress. The current Internet could not generally guarantee the quality of service (reliability and committed information rate) for the operational real-time exchange, and the dedicated GTS links would continue to be dedicated to the exchange of real-time and critical data and products. The Internet is however playing an increasingly important role for the exchange of less time-critical information, for the supply of data and products to other users as well as for the active participation of NMHSs in WMO and related coordination activities. In some cases, the Internet may be the only telecommunication means that is available and affordable for providing a connection of an NMC with the GTS.

6.2.25 The meeting therefore emphasized that all RTHs should operate a server for facilitating the exchange of relevant information with other WWW centres, and in particular with its associated NMCs. RTHs should also be capable of capturing meteorological data from e-mail, in particular as a back-up function, with a view to its insertion into the GTS. NMCs should as well implement an Internet access and develop Internet functionality, as an integrated component of the upgrade of WWW systems. Adequate security measures should be taken, along the guidelines developed by CBS to ensure an efficient use in a secure data-communication environment.

### ***Radio-frequencies for meteorological activities***

6.2.26 The meeting took note that XIV Congress re-affirmed the prime importance of radio frequency matters for meteorological and related environmental operations and research. It particularly emphasized that the utmost importance should be attached to ensuring absolute protection of the special bands allocated to space-borne passive sensing (e.g. the exclusive 23.6 - 24 GHz passive band for measurement of atmospheric water vapour), which were a unique natural resource for atmospheric measurements and had an increasing importance in meteorology (e.g. observation, NWP, climatology). Congress strongly urged Members to actively participate in radio frequency activities, especially the preparation of World Radiocommunication Conferences (WRC) issues, conducted by their national telecommunication administrations, by regional radiocommunication organizations (With respect to WMO Region II, the Asia -Pacific Telecommunity-APT for Asia-Pacific and the Arab League for the Middle East), and by the ITU. The meeting also noted with appreciation the favourable outcome of the recent World Radiocommunication Conference 2003 (WRC-03, Geneva, 9 June-4 July 2003) as regards the several items of serious concern for meteorology.

## **6.3 Global Data Processing and Forecasting System System (agenda item 6.3)**

6.3.1 The session expressed its appreciation for the report of Dr Woo-Jin Lee (Republic of Korea), Rapporteur on the Regional Aspects of GDPS. The report was based on the results of survey on the capabilities of various GDPS centres in the Region and requirements for WWW products conducted by the Rapporteur. The status of GDPS in RA II is summarized in tables 1-9, A.1, A.3 (See Annex VII). The meeting invited Members of RA II to update the information presented in these tables.

6.3.2 In order to improve implementation of the GDPS in the Region the meeting agreed with the following proposals made by Members of RA II and submitted by Rapporteur:

- There are observed steady improvements on NWP models and data assimilation in the Region during the intersession period. However more than half of the Members in Region II were not reported to prepare for their own NWP system. Considering that NWP model is the core part of the data processing, it is desired to put more effort on promoting the importance of the NWP and on strengthening the bilateral or regional cooperation for the technical transfer and assistance. In this regard, the meeting noted that WMO and Rep. of Korea are collaborating on formulation of a regional project for NWP by using PC clusters.
- There is a tendency to move from the optimum interpolation scheme to variational schemes for data assimilation in Region II to cope with the rapid progress in remote sensing measurement and other asynoptic observing systems including AMDAR. It is recommended to share the expertise in the region while utilizing the international cooperation with advanced countries in other region.
- More members request additional GPV data from ECMWF and other advanced centers for more variables and for longer lead time. It is desired to have a regional database to access the high-resolution model output and EPS products for the severe weather forecasting from WMCs/ RSMCs or leading NMCs. The user's capability to develop and/ or maintain the software for the exchange of numerical products through GRIB-2 format need to be monitored for the exchange of ensemble prediction system outputs and long-range products.
- The ensemble prediction system outputs for the medium and long range are available through Internet in the Region. The instruction for the interpretation of the product and associated standard verification scores are recommended to be provided along with the product, including the interpretation of probabilistic forecasts.
- While few Members in the region develop their own tools for nowcasting and mesoscale models for severe weather, the rest of Members plan to build expertise on this area. It is desired to have a demonstration project to provide members the utility and beneficial potential of such tools on operational forecasting of severe weather. In Region II, both mid-latitude and tropical systems are co-existing, and the region need to identify the severe weather systems and approach to support the forecasting technique based on the numerical weather prediction technique or nowcasting tools. In this regard, it is recommended to develop conceptual models based on intense observation projects and similar experimetns through the cooperation among Members.
- In order to exploit the benefit from the long-range dynamic prediction output, it is highly recommended to maintain the standard verification system so that users are enabled to develop experience in the limitation and value of the products. The meeting noted that a pilot project APCN (Asia-Pacific economic cooperation Climate Network) is under way with the cooperation in the Region for the exchange of long-range forecast products, which could contribute for the development of multimodel prediction system.
- The meeting noted the growing interest on non-nuclear environmental hazards including chemical spills, transboundary pollutant transports, etc., while the notion that NMHs is a critical component of the total EER system. Some environmental issues like Asian dust, shared by neighbouring countries, could be benefited from the regional support on the exchange of transport model products in the limited scale. It is recommended that the scheme extend to support for more broad environmental problems at hand.

- Parallelization techniques are widely used and expanded in various modeling activities to enable data processing on multiple processors or clusters, depending on the architecture of the computer system. Already the leading centers in this region had developed codes on parallel machine, and others plan to do so. It is recommended in this Region to draw the importance of this technology for the future.
- The computer aided learning (CAL) modules are rapidly developing under WMO programme. It is recommended to distribute the developed CAL modules in the Region under the support of WMO programme, and to maintain opportunity to use them for education and capacity building on various subjects including ensemble prediction system.

#### **6.4 Data Management (DM), including Codes (agenda item 6.4)**

6.4.1 The meeting expressed its appreciation to Mr A. Shimazaki (Japan), Rapporteur on Regional Aspects of Data Management, for the comprehensive report, which covered the activity on Data Management in RA II.

6.4.2 Two surveys in June and July 2003 according to the tasks of the Rapporteur had been conducted. The meeting expressed its sincere appreciation to the Rapporteur for the coding samples of CLIMAT and CLIMAT TEMP with detailed instruction he had developed and invited the Secretariat to incorporate these examples in the technical guidance referenced in paragraph 5.5.

##### *Reporting of Precipitation*

6.4.3 The Rapporteur drafted an amendment of the regional regulations on 24-hour precipitation, which is required according to the amendment of global regulation for 24-hour precipitation. The amendment was approved by the Chairman of the WG/PIW and the President of RA II, and will come into force on 5 November 2003. The Rapporteur informed the Member of RA II of the amendment with the first survey.

6.4.4 Concerning the survey on an amendment to the regional regulation to aligning 6- and 12- hour precipitation, almost all respondents agreed the amendment drafted by the Rapporteur including its applicable date (November 2005). The Rapporteur modified the draft amendment, taking account of the result of the survey. The draft amendment was approved by the session (Annex VIII), and will be submitted to the 13<sup>th</sup> session of the RA II.

##### *Promoting reporting of snow depth*

6.4.5 The result of the survey shows that many respondents are compliant to the regional regulations on snow depth reporting, however, it was felt that the observation time and WMO heading used by some Members are to be changed so as to be exchanged globally.

##### *Exchange of additional data*

6.4.6 Concerning the survey of requirement for additional data, such as aircraft, satellites and wind profiler data, it was found that only some of the respondents have such data, while all respondents expressed their wish to obtain such data. The session agreed such information derived from the survey should be updated as appropriate, and made accessible to the Members in RA II. JMA kindly informed that they will provide such information to the WWW server until next the session of RA II in order to promote the exchange of the data. The Members are encouraged to inform any changes to the information.

### *Use of the Internet*

6.4.7 It was found that all respondents are accessing the Internet, however, significant gaps were found in traffic speed of the Internet connection. The session encouraged the Members to keep abreast of the development of the Internet in their countries/territories to enhance their Internet connection as far as possible.

6.4.8 The survey showed that the level of security of the Internet is still insufficient. For securer use of the Internet, the session recommended to introduce virus protection software, as a minimum, and as far as possible, also firewall, user account and passwords, intruder detection system.

### *Migration to the Table Driven Code Forms*

6.4.9 Concerning the migration to Table Driven Code Forms (TDCFs), only one respondent has completed the national migration plan. However, many respondents are preparing or will prepare the plan. The session recommended that the preparation for the Migration to the TDCFs should be accelerated. The meeting pointed to possible difficulties in the monitoring of the WWW once the transition to TDCF draws near because the monitoring software and practices require significant modification. It was agreed to bring this problem to the attention of CBS and the RA II.

## **6.5 Operational Information Service (Agenda item 6.5)**

6.5.1 The working group noted that the objective of the Operational Information Service (OIS) is to collect from, and distribute to WMO Members and WWW Centres a detailed and up-to-date information on the facilities, services and products made available in the day-to-day operation of the WWW.

6.5.2 The meeting was informed that the following operational information is posted on the WMO server under <http://www.wmo.ch/web/www/ois/ois-home.htm>:

- WMO No. 9, Volume A - Observing Stations
- Catalogue of Radiosondes and upper-air wind systems in use by Members
- Regional Basic Synoptic and Climatological Networks
- WMO No. 9, Volume C1 - Catalogue of Meteorological Bulletins
- WMO No. 9, Volume C2 - Transmission programmes
- Routeing catalogues of bulletins
- Monitoring Reports (quality and quantity)
- WMO No. 9, Volume D - Information for Shipping
- WMO No. 47 - International List of Selected, Supplementary and Auxiliary Ships
- Operational Newsletter on the World Weather Watch and Marine Meteorological Services
- Additional data and products as defined in Resolution 40 (Cg-XII)

6.5.3. The Secretariat also dispatches the WMO Publications No. 9 and 7 on CD-ROM once a year. It continues to provide paper copies upon request of WMO Members, but Members are invited to examine carefully the requirements for a paper copy in light of the high cost of production and dispatch. The Operational Newsletter of the WWW and Marine Meteorological Services is distributed only via electronic mail every month

6.5.4 The session noted that information on the Data Processing and Forecast Systems is provided on a yearly basis in the WWW Technical Progress Report on the GDPS. Further information on the processed information exchanged on the GTS is available in Volume C1 - Catalogue of Meteorological Bulletins. It was noted that CBS-EXT.(02) recommended to

distribute the WWW Technical Progress Report on the GDPS on a CD-ROM instead of a paper format.

6.5.5 A project for the interactive on-line access to Volume C1 (Catalogue of Meteorological Bulletins) is being developed by the Secretariat. A demonstration of the application is available on:

[http://www.wmo.ch/web/ddbs/jen/MeteorologicalBulletins/Meteorological\\_Bulletins.html](http://www.wmo.ch/web/ddbs/jen/MeteorologicalBulletins/Meteorological_Bulletins.html)

## **6.6 Technical Cooperation activities related to WWW (Agenda item 6.6)**

6.6.1 The meeting was pleased to note the activities carried out to support the WWW in Region II through VCP, UNDP and Trust Funds projects. However, the meeting noted with concern that, as at 15 June 2003, 43 VCP requests relating to the WWW submitted by 16 Members of RA II have not yet received full support.

6.6.2 The Extraordinary session of the Commission for Basic Systems in 2002 agreed on guidelines for allocation of priorities for technical co-operation support activities related to the WWW Basic Systems. The meeting confirmed these priorities for technical co-operation support of the WWW Programme for Region II.

6.6.3 Cg-XIV (May 2003) decided that as in the thirteenth financial period, the fields of cooperation covered by the VCP during the fourteenth financial period shall include the implementation of the WWW as a first priority. The meeting agreed to encourage donors to support the requests for support to the implementation of the WWW in Region II with the highest priority in accordance with the guidelines agreed by CBS.

## **6.7 Implementation of the Regional Strategic Plan for the Enhancement of the National Meteorological Services (NMCs) in RA II (agenda item 6.7)**

6.7.1 The working group noted with appreciation the activities undertaken by Members and WMO on the implementation of the Regional Strategic Plan for the Enhancement of the NMSs in RA II. The working group encourage Members and requested WMO to fully meet the objectives of the Strategic Plan and to provide necessary assistance for the implementation of the recommendations of events that was recently organized by WMO, and in particular, the Regional Workshop on Management: Strengthening Capacity Building of the National Meteorological Services of Least Developed Countries (LDCs) in Asia (Bangkok, Thailand, October 2002) and the Meeting of Directors of NMSs of Countries in Central Asia which was held in Almaty, Kazakhstan in March 2003.

## **7. PUBLIC WEATHER SERVICES (agenda item 7)**

7.1 The group received with appreciation the report of Mr Edwin S.T. Lai (Hong Kong, China), Rapporteur on Regional Aspects of Public Weather Services on the activity in this area. It agreed with proposals and recommendations prepared by the rapporteur which are given below.

### *PWS in RA II - Current and Future*

- Without the benefit of a comprehensive survey, it is difficult to state categorically to what extent RA II Members are affected by the PWS initiative, or the lack of it, in recent years. But general indications are that the gap is wide, ranging from NMSs that are more progressive and forward-thinking in PWS to those that are still struggling to take the first step.
- However, the response within RA II to the two WMO pilot websites, WWIS and SWIC, has been extremely encouraging. The successful proof of concept has since led to the parallel development of WWIS in other official WMO languages, as well as

a planned extension of SWIC to other tropical cyclone basins and other types of severe weather. It does show that given the opportunity, RA II Members are prepared and willing to venture into the exciting business of PWS and the full potential of PWS initiatives within the Region is yet to be fully realized. Already, trial implementation of these initiatives have gradually and surely led to many of the objectives of the PWS programme being wholly or partially attained.

- Expectation to hold a regional workshop for forecasters in severe weather forecasting has not been met owing to a lack of funding. However, workshops in GDPS products and PWS for RA II Members have been organized (Bahrain, September 2002) or planned (Brunei, December 2003). In critical weather situations, the emphasis is increasingly on “real-time public communication”, e.g. direct TV and radio presentations by trained meteorologists. With more NMSs developing their own web-based resources or running their own broadcasting facilities, there should be more opportunities for NMSs to launch real-time public communication programmes in the most timely and innovative manner.

#### *PWS Requirement in WWW-related Issues*

- The business of operational forecasting is gradually crystallized into four levels:
  - (1) NMSs requiring more synoptic or upper-air observational data, mostly for conventional analysis purpose;
  - (2) NMSs requiring more GPV data, mostly for enhanced external support in numerical prognostic guidance;
  - (3) NMSs requiring more mesoscale and remote-sensing data, mostly for nowcasting systems or high-resolution regional NWP models;
  - (4) NMSs requiring more PWS-related information, mostly for media, travellers, special users and decision-makers
- The above can be seen as a kind of evolutionary process that a developing NMS has to go through. From Appendix A in Doc. 6.4, ADD.1, some NMSs in RA II are already in Level 3; but very few in Level 4.
- Types of PWS information that are most sought after in Level 4 are: severe weather warnings, actual or expected rainfall/snowfall amounts, actual rain rates, severe winds and gusts, record-breaking events and impact/damage statistics, temperature range, UV, sunshine hours, extended forecasts (say up to a week ahead) and various types of weather indices.
- These go well beyond the basic meteorological information in the form of data and products tailored for professional meteorologists. How do we exchange such information effectively and systematically beyond the confines of GTS and the barriers of language (a major obstacle at the initial stages of WWIS development)? Do we go back to an encoding approach, or encoding in the form of the adoption of a uniform set of pre-agreed icons? And what is the best means of transmissions and format/protocol for exchange?
- To forecasters who are now very much in the frontline of PWS, operational and communication systems facilitating effective delivery of information (text, diagrams, graphics, data streams in audio or video format) to users is also an issue, not only in the local context but also beyond the borders to international media or to other NMSs in the region.

#### *PWS – Assessment and Development*

- The trend in PWS user assessment is moving towards more effective use of web statistics and automated telephone system feedback mechanisms in obtaining an

overview of how and when users access various types of PWS information. With more monitoring statistics to serve as guidance, NMSs are in a better position to establish and trigger mechanisms that will bring about further development and improvement in their PWS programmes.

- Further development of user-based PWS assessment would necessitate the formulation of a set of recommended core user assessment criteria and questions such that a more complete picture can be obtained regarding PWS activities worldwide, special flavours and characteristics on a regional basis, and differences in PWS strategies and problems between one country and another. Apart from such questionnaires or surveys, indirect objective means to assess PWS progress, less conclusive they may be but possibly more accessible on a regular basis, should also be explored and adapted for use wherever feasible.

## 8. FUTURE WORK PROGRAMME (agenda item 8)

8.1 The meeting considered the proposals developed by the chairman of the working group and agreed that in the course of preparing for the session of RA II, the Working Group activities should be focused on the following major issues:

### *Global Observing System*

1. To keep under review RBSN stations of the Region and identify defaulting stations on the basis of quantity monitoring reports;
2. To keep under continuous review the availability of CLIMAT/CLIMAT TEMP reports from RBCN stations in the Region;
3. To ascertain from the Members the current performance of the GPS sondes;
4. To explore the possibility of bulk procurement of GPS sondes through a Central Nodal Agency which could result in savings in costs;
5. To pursue with the Members for appointing a focal point for continuous feedback on the status of RBSN stations;
6. To keep abreast of the plan of redesign of the GOS and apprise the Members of its progress and possibility of new techniques of observations which could increase the availability of data from the Region;
7. To pursue with the AMDAR panel for substantial increase of AMDAR data over Region II.

### *Data Management*

1. To update information derived from the survey among member countries for their requirement of additional data and products;
2. To encourage all the Members of the Region for having Internet connection;
3. To pursue the evolution of FWIS and apprise Members of the Region of its progress;
4. To closely follow the development of quality management framework and apprise Members of its status.

5. To pursue with all RTHs on MTN in Region II to maintain their parts of the comprehensive catalogue of meteorological bulletins in close collaboration with the Rapporteur on the GTS;
6. To pursue vigorously with Members for early preparation of migration plan to Table-driven Codes.

#### *Global Telecommunication System*

1. To review the status of the GTS in the Region and make efforts to have all NMCs connected to the GTS;
2. To closely monitor the progress of integration of GTS into the improved RMTN;
3. To pursue with participating countries in the pilot project the results of satellite broadcast of bulletins (through SADIS).
4. To plan for the discontinuation of the HF broadcast from the Region;
5. To urge all Members of the Region to implement TCP/IP procedures on GTS circuits through detailed circular;
6. To closely follow the development of new proposals on exchange of addressed messages, routing of observational data, detection of duplicated bulletins and the pilot project of new monitoring of data.

#### *Global Data Processing System*

1. To develop proposals for establishment of a Regional Data Base for providing access to high resolution NWP products from major GDPS centres to Members of the Region II;
2. To develop proposals for technical assistance to developing countries of the Region for strengthening their NWP capability;
3. To develop proposals for training of experts from developing countries of the Region in interpretation of NWP products;
4. To develop proposals for a regional workshop on the use of EPS products in close collaboration with the rapporteur on PWS;
5. To pursue formulation of regional project for Numerical Weather Prediction using PC clusters and establishment of a pilot project in Mongolia.

#### *Public Weather Services*

1. To coordinate with Hong Kong, China and WMO Secretariat for inclusion of warnings regarding tropical cyclones;
2. To promote standardization of formats and contents of severe weather warnings issued by Members of the Region;
3. To study the possibility of inclusion of severe weather warnings in cities in the World City Forecasts;

4. To develop proposals for a regional workshop for training of forecasters in severe weather forecasting and public weather service in close collaboration with the rapporteur on the GDPS.

## **9. CLOSURE OF THE SESSION (agenda item 11)**

9.1 The chairman of the working group expressed his appreciation to the active participation of the members in the deliberations of the meeting. He extended his thanks to Roshydromet and to the WMO Secretariat for their valuable assistance and for the excellent arrangements provided. Mr D. Schiessl, Director for WWW Basic Systems Department thanked the Rapporteurs, the chairman and all members of the working group for their excellent contribution and joined the chairman in his remarks addressed to the host country. Mr A. Gusev, on behalf of the hosting country, thanked all participants who contributed to the meeting, which resulted in valuable proposals and recommendations on further improvement of WWW operation in RA II.

9.2 The meeting was closed on Saturday, 13 September 2003 at 13:30 p.m.

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## ANNEX I

WORLD METEOROLOGICAL ORGANIZATION

RA II/WG/PIW/INF. 2  
(17.IX.2003)

REGIONAL ASSOCIATION II  
(ASIA)

ENGLISH ONLY

**WORKING GROUP ON PLANNING AND  
IMPLEMENTATION OF THE WWW IN REGION II  
FOURTH SESSION**

MOSCOW, 10-13 SEPTEMBER 2003

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## **ANNEX II**

WORLD METEOROLOGICAL ORGANIZATION

RA II/WG/PIW/Doc. 1  
(31.1.2003)

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REGIONAL ASSOCIATION II  
(ASIA)

ITEM 2

ENGLISH ONLY

**WORKING GROUP ON PLANNING AND  
IMPLEMENTATION OF THE WWW IN REGION II  
FOURTH SESSION**

MOSCOW, 10-13 SEPTEMBER 2003

### **PROVISIONAL AGENDA**

- 1. OPENING OF THE SESSION**
  - 2. ORGANIZATION OF THE SESSION**
    - 2.1 Adoption of the agenda
    - 2.2 Working arrangements
  - 3. REPORT OF THE CHAIRMAN OF THE WORKING GROUP**
  - 4. CONSIDERATION OF THE DECISIONS OF THE TWELFTH SESSION OF RA II, CBS EXTRA-ORDINARY SESSION (2002), FOURTEENTH CONGRESS AND EC-LV INCLUDING REQUIREMENTS FOR WWW SUPPORT TO OTHER PROGRAMMES**
  - 5. STATUS OF WWW IMPLEMENTATION AND OPERATION**
  - 6. REGIONAL ASPECTS OF THE WWW COMPONENTS AND SUPPORT FUNCTIONS, INCLUDING REPORTS BY THE RAPPORTEURS/COORDINATORS**
    - 6.1 Global Observing System (GOS)
    - 6.2 Global Telecommunications System (GTS)
    - 6.3 Global Data-processing System (GDPS)
    - 6.4 WWW Data Management (DM), including Codes
    - 6.5 Operational Information Service (OIS)
    - 6.6 Technical Co-operation activities related to WWW
  - 7. PUBLIC WEATHER SERVICES**
  - 8. INTERNATIONAL EXCHANGE OF DATA AND PRODUCTS**
  - 9. FUTURE WORK PROGRAMME**
  - 10. CLOSURE OF THE SESSION**
-

### ANNEX III

#### POPOSED LIST OF STATIONS COMPRISING THE REGIONAL BASIC SYNOPTIC NETWORK (RBSN) IN RAIL

<u>INDEX</u>	<u>STATION NAME</u>	<u>OBSERVATIONS</u>
<b>AFGHANISTAN, ISLAMIC STATE OF</b>		
40904	FAIZABAD	S
40913	KUNDUZ	S
40922	MIMANA	S
40938	HERAT	S
40938	HERAT	W R
40942	CHAKHCHARAN	S
40945	BAMIYAN	S
40948	KABUL AIRPORT	W R
40954	JALALABAD	S
40971	KHOST	S
40974	FARAH	S
40977	TIRIN KOT	S
40988	BUST	S
40990	KANDAHAR AIRPORT	S
40996	DESHOO	S
<b>BAHRAIN</b>		
41150	BAHRAIN (INT. AIRPORT)	S
<b>BANGLADESH</b>		
41859	RANGPUR	S
41883	BOGRA	S
41883	BOGRA	W R
41886	MYMENSINGH	S
41891	SYLHET	S
41907	ISHURDI	S
41923	DHAKA	S
41923	DHAKA	W R
41936	JESSORE	S
41950	BARISAL	S
41978	CHITTAGONG (PATENGA)	S
41992	COX'S BAZAR	S
<b>CAMBODIA</b>		
48966	SIEMREAP	S
48972	STUNG TRENG	S
48978	SEN MONOROM	S
48982	KOS KONG	S
48983	KOMPONG SOM/VILLE (EX SIHANOUKVILLE)	S
48991	PHNOM-PENH/POCHENTONG	S
48991	PHNOM-PENH/POCHENTONG	W R
48998	SVAY RIENG	S
<b>CHINA</b>		
50557	NENJIANG	S
50557	NENJIANG	W R
50603	XIN BARAG YOUQI	S
50632	BUGT	S
50727	ARXAN	S
50745	QIQIHAR	S
50756	HAILUN	S

50774	YICHUN	S
50774	YICHUN	W R
50788	FUJIN	S

<u>INDEX</u>	<u>STATION NAME</u>	<u>OBSERVATIONS</u>
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50915	ULIASTAI	S
50949	QIAN GORLOS	S
50953	HARBIN	S
50953	HARBIN	W R
50963	TONGHE	S
50978	JIXI	S
51076	ALTAY	S
51076	ALTAY	W R
51087	FUYUN	S
51133	TACHENG	S
51156	HOBOKSAR	S
51243	KARAMAY	S
51288	BAYTIK SHAN	S
51334	JINGHE	S
51431	YINING	S
51431	YINING	W R
51463	WU LU MU QI	S
51495	SHISANJIANFANG	S
51542	BAYANBULAK	S
51573	TURPAN	S
51644	KUQA	S
51644	KUQA	W R
51656	KORLA	S
51709	KASHI	S
51709	KASHI	W R
51716	BACHU	S
51730	ALAR	S
51747	TAZHONG	S
51765	TIKANLIK	S
51777	RUOQIANG	S
51777	RUOQIANG	W R
51811	SHACHE	S
51828	HOTAN	S
51828	HOTAN	W R
51839	MINFENG	W R
51886	MANGNAI	S
52203	HAMI	S
52203	HAMI	W R
52267	EJIN QI	S
52267	EJIN QI	W R
52323	MAZONG SHAN	S
52323	MAZONG SHAN	W R
52418	DUNHUANG	S
52418	DUNHUANG	W R
52495	BAYAN MOD	S
52533	JIUQUAN	S
52533	JIUQUAN	W R
52602	LENGHU	S
52652	ZHANGYE	S
52681	MINQIN	S
52681	MINQIN	W R
52713	DA-QAIDAM	S
52754	GANGCA	S
52818	GOLMUD	S
52818	GOLMUD	W R
52836	DULAN	S

52866	XINING	S
52866	XINING	W R
52889	LAN ZHOU	S
52889	LAN ZHOU	W R
53068	ERENHOT	S
53068	ERENHOT	W R
53083	NARAN BULAG	S
53149	MANDAL	S
53192	ABAG QI	S
53231	HAILS	S
53276	JURH	S
53336	HALIUT	S
53391	HUADE	S
53463	HOHHOT	S
53463	HOHHOT	W R
53502	JARTAI	S
53513	LINHE	S
53513	LINHE	W R
53529	OTOG QI	S
53543	DONGSHENG	S
53564	HEQU	S
53588	WUTAI SHAN	S
53614	YINCHUAN	S
53614	YINCHUAN	W R
53646	YULIN	S
53723	YANCHI	S
53772	TAIYUAN	S
53772	TAIYUAN	W R
53798	XINGTAI	S
53845	YAN AN	S
53845	YAN AN	W R
53915	PINGLIANG	S
53915	PINGLIANG	W R
53959	YUNCHENG	S
54012	XI UJIMQIN QI	S
54026	JARUD QI	S
54027	LINDONG	S
54094	MUDANJIANG	S
54102	XILIN HOT	S
54102	XILIN HOT	W R
54135	TONGLIAO	S
54161	CHANGCHUN	S
54161	CHANGCHUN	W R
54208	DUOLUN	S
54218	CHIFENG	S
54218	CHIFENG	W R
54236	ZHANGWU	S
54273	HUADIAN	S
54292	YANJI	S
54292	YANJI	W R
54337	JIN ZHOU	W R
54337	JINZHOU	S
54342	SHENYANG	S
54342	SHENYANG	W R
54374	LINJIANG	S
54374	LINJIANG	W R
54377	JI'AN	S
54401	ZHANGJIAKOU	S
54423	CHENGDE	S
54471	YINGKOU	S
54497	DAN DONG	W R
54497	DANDONG	S

54511	BEIJING	S
54511	BEIJING	W R
54539	LETING	S
54618	POTOU	S
54662	DALIAN	S
54662	DALIAN	W R
54753	LONGKOU	S
54776	CHENGSHANTOU	S
54823	JINAN	S
54823	JINAN	W R
54843	WEIFANG	S
54857	QINGDAO	S
54857	QINGDAO	W R
54909	DINGTAO	S
55228	SHIQUANHE	S
55279	BAINGOIN	S
55299	NAGQU	S
55299	NAGQU	W R
55472	XAINZA	S
55578	XIGAZE	S
55591	LHASA	S
55591	LHASA	W R
55664	TINGRI	S
55696	LHUNZE	S
55773	PAGRI	S
56004	TUOTUOHE	S
56018	ZADOI	S
56021	QUMARLEB	S
56029	YUSHU	S
56029	YUSHU	W R
56033	MADOI	S
56046	DARLAG	S
56079	RUO'ERGAI	S
56080	HEZUO	S
56080	HEZUO	W R
56096	WUDU	S
56106	SOG XIAN	S
56116	DENGQEN	S
56137	QAMDO	S
56137	QAMDO	W R
56146	GARZE	W R
56152	SERTAR	S
56172	BARKAM	S
56182	SONGPAN	S
56247	BATANG	S
56294	CHENGDU	S
56294	CHENGDU	W R
56312	NYINGCHI	S
56444	DEQEN	S
56462	JIULONG	S
56492	YIBIN	S
56571	XICHANG	S
56571	XICHANG	W R
56651	LIJING	S
56691	WEINING	S
56691	WEINING	W R
56739	TENGCHONG	S
56739	TENGCHONG	W R
56778	KUNMING	S
56778	KUNMING	W R
56951	LINCANG	S
56964	SIMAO	S

56964	SIMAO	W R
56969	MENGLA	S
56985	MENGZI	S
56985	MENGZI	W R
57036	XI'AN	S
57036	XI'AN	W R
57067	LUSHI	S
57083	ZHENGZHOU	S
57083	ZHENGZHOU	W R
57127	HANZHONG	S
57127	HANZHONG	W R
57178	NANYANG	S
57245	ANKANG	S
57265	GUANGHUA	S
57297	XINYANG	S
57328	DA XIAN	S
57411	NANCHONG	S
57447	ENSHI	S
57447	ENSHI	W R
57461	YICHANG	S
57461	YICHANG	W R
57494	WUHAN	S
57494	WUHAN	W R
57516	CHONGQING	S
57516	CHONGQING	W R
57633	YOUYANG	S
57662	CHANGDE	S
57679	CHANGSHA	W R
57687	CHANGSHA	S
57745	ZHIJIANG	S
57749	HUAIHUA	W R
57799	JI'AN	S
57816	GUIYANG	S
57816	GUIYANG	W R
57866	LINGLING	S
57902	XINGREN	S
57957	GUILIN	S
57957	GUILIN	W R
57972	CHENZHOU	S
57972	CHENZHOU	W R
57993	GANZHOU	S
57993	GANZHOU	W R
58027	XUZHOU	S
58027	XUZHOU	W R
58040	GANYU	S
58102	BOXIAN	S
58144	QINGJIANG	S
58150	SHEYANG	S
58150	SHEYANG	W R
58203	FUYANG	S
58203	FUYANG	W R
58221	BENGBU	S
58238	NANJING	S
58238	NANJING	W R
58251	DONGTAI	S
58265	LUSI	S
58314	HUOSHAN	S
58362	SHANGHAI	S
58362	SHANGHAI	W R
58424	ANQING	S
58424	ANQING	W R
58457	HANGZHOU	S

58457	HANGZHOU	W R
58472	SHENGSI	S
58477	DINGHAI	S
58527	JINGDEZHEN	S
58606	NANCHANG	S
58606	NANCHANG	W R
58633	QU XIAN	S
58633	QU XIAN	W R
58659	WENZHOU	S
58665	HONGJIA	W R
58666	DACHEN DAO	S
58725	SHAOWU	S
58725	SHAOWU	W R
58847	FUZHOU	S
58847	FUZHOU	W R
58921	YONG'AN	S
58968	TAIBEI	S
58968	TAIBEI	W R
58974	PENGJIA YU	S
59007	GUANGNAN	S
59023	HECHI	S
59082	SHAOGUAN	S
59117	MEI XIAN	S
59134	XIAMEN	S
59134	XIAMEN	W R
59211	BAISE	S
59211	BAISE	W R
59265	WUZHOU	S
59265	WUZHOU	W R
59280	QING YUAN	W R
59287	GUANGZHOU	S
59293	HEYUAN	S
59316	SHANTOU	S
59316	SHANTOU	W R
59358	TAINAN	S
59417	LONGZHOU	S
59431	NANNING	S
59431	NANNING	W R
59501	SHANWEI	S
59559	HENGCHUN	S
59644	BEIHAI	S
59663	YANGJIANG	S
59758	HAIKOU	S
59758	HAIKOU	W R
59792	DONGSHA DAO	S
59838	DONGFANG	S
59948	YAXIAN	S
59981	XISHA DAO	S
59981	XISHA DAO	W R
59985	SANHU DAO	S
59995	YONGSHUJIAO	S
59997	NANSHA DAO	S

**DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA**

47003	SENBONG	S
47005	SAMJIYON	S
47008	CHONGJIN	S
47014	CHUNGGANG	S
47016	HYESAN	S
47020	KANGGYE	S
47022	PUNGSAN	S
47025	KIMCHAEK	S

47028	SUPUNG	S
47031	CHANGJIN	S
47035	SINUJU	S
47037	KUSONG	S
47039	HUICHON	S
47041	HAMHEUNG	S
47041	HAMHEUNG	W R
47046	SINPO	S
47050	ANJU	S
47052	YANGDOK	S
47055	WONSAN	S
47058	PYONGYANG	S
47058	PYONGYANG	W R
47060	NAMPO	S
47061	CHANGJON	S
47065	SARIWON	S
47067	SINGYE	S
47068	RYONGYON	S
47069	HAEJU	S
47070	KAESONG	S
47075	PYONGGANG	S

**HONG KONG, CHINA**

45004	KOWLOON	W R
45007	HONG KONG INTERNATIONAL AIRPORT	S

**INDIA**

42027	SRINAGAR	S
42027	SRINAGAR	W R
42071	AMRITSAR	S
42101	PATIALA	S
42101	PATIALA	W R
42111	DEHRADUN	S
42131	HISSAR	S
42165	BIKANER	S
42182	NEW DELHI/SAFDARJUNG	S
42182	NEW DELHI/SAFDARJUNG	W R
42189	BAREILLY	S
42260	AGRA	S
42309	NORTH LAKHIMPUR	S
42314	DIBRUGARH /MOHANBARI	S
42314	DIBRUGARH /MOHANBARI	W R
42328	JAISALMER	S
42339	JODHPUR	S
42339	JODHPUR	W R
42348	JAIPUR / SANGANER	S
42361	GWALIOR	S
42361	GWALIOR	W R
42369	LUCKNOW/AMAUSI	S
42369	LUCKNOW/AMAUSI	W R
42379	GORAKHPUR	S
42379	GORAKHPUR	W R
42397	SILIGURI	W R
42398	SILIGURI	S
42410	GAUHATI	S
42410	GAUHATI	W R
42415	TEZPUR	S
42452	KOTA AERODROME	S
42452	KOTA AERODROME	W
42475	ALLAHABAD/BAMHRAULI	S
42492	PATNA	S

42492	PATNA	W R
42559	GUNA	S
42571	SATNA	S
42587	DALTONGANJ	S
42591	GAYA	S
42591	GAYA	W
42623	IMPHAL	S
42623	IMPHAL	W
42634	BHUJ-RUDRAMATA	S
42634	BHUJ-RUDRAMATA	W
42647	AHMADABAD	S
42647	AHMADABAD	W R
42667	BHOPAL/BAIRAGARH	S
42667	BHOPAL/BAIRAGARH	W R
42675	JABALPUR	S
42675	JABALPUR	W
42701	M.O. RANCHI	S
42701	M.O. RANCHI	W R
42706	BANKURA	S
42724	AGARTALA	S
42724	AGARTALA	W R
42734	JAMNAGAR	W
42737	RAJKOT	S
42874	PBO RAIPUR	W R
42886	JHARSUGUDA	S
42895	BALASORE	S
42909	VERAVAL	S
42909	VERAVAL	W
42920	NASIK OZAR	S
42934	AKOLA	S
42971	BHUBANESWAR	S
42971	BHUBANESWAR	W R
42977	SANDHEADS	S
43003	BOMBAY / SANTACRUZ	S
43003	BOMBAY / SANTACRUZ	W R
43014	AURANGABAD CHIKALTHAN AERODROME	S
43014	AURANGABAD CHIKALTHAN AERODROME	W R
43041	JAGDALPUR	S
43041	JAGDALPUR	W R
43063	POONA	S
43086	RAMGUNDAM	S
43110	RATNAGIRI	S
43117	SHOLAPUR	S
43128	HYDERABAD AIRPORT	S
43128	HYDERABAD AIRPORT	W R
43150	CWC VISHAKHAPATNAM/ WALT AIR	S
43150	CWC VISHAKHAPATNAM/ WALT AIR	W R
43185	MACHILIPATNAM	S
43185	MACHILIPATNAM	W R
43189	KAKINADA	S
43192	GOA/PANJIM	S
43198	BELGAUM/SAMBRA	S
43201	GADAG	S
43213	KURNOOL	S
43226	HONAVAR	S
43233	CHITRADURGA	S
43237	PBO ANANTAPUR	S
43245	NELLORE	S
43279	MADRAS/MINAMBAKKAM	S
43284	MANGALORE/BAJPE	S

43285	MANGALORE/PANAMBUR	W R
43295	BANGALORE	S
43295	BANGALORE	W R
43311	M.O. AMINI	S
43314	KOZHIKODE	S
43321	COIMBATORE/PEELAMEDU	S
43329	CUDDALORE	S
43333	PORT BLAIR	S
43333	PORT BLAIR	W R
43344	TIRUCHCHIRAPALLI	S
43346	KARAIKAL	S
43346	KARAIKAL	W R
43353	COCHIN/WILLINGDON	S
43369	MINICOY	S
43369	MINICOY	W R
43371	THIRUVANANTHAPURAM	S
43371	THIRUVANANTHAPURAM	W R

**IRAN, ISLAMIC REPUBLIC OF**

40700	PARS ABAD MOGHAN	S
40701	MAKKO	S
40703	KHOY	S
40704	AHAR	S
40706	TABRIZ	S
40706	TABRIZ	W R
40708	ARDEBIL	S
40710	SARAB	S
40712	ORUMIEH	S
40713	MARAGHEH	S
40716	MEYANEH	S
40718	ANZALI	S
40719	RASHT	S
40721	MARAVE-TAPPEH	S
40723	BOJNOURD	S
40726	MOHABAD	S
40727	SAGHEZ	S
40729	ZANJAN	S
40731	GHAZVIN	S
40732	RAMSAR	S
40734	NOSHAHR	S
40736	BABULSAR	S
40737	GHARAKHIL	S
40738	GORGAN	S
40739	SHAHRUD	S
40740	GHUCHAN	S
40741	SARAKHS	S
40743	SABZEVAR	S
40745	MASHHAD	S
40745	MASHHAD	W R
40747	SANANDAJ	S
40754	TEHRAN-MEHRABAD	S
40754	TEHRAN-MEHRABAD	W R
40757	SEMNAN	S
40762	TORBAT-HEYDARIEH	S
40763	KASHMAR	S
40766	KERMANSHAH	S
40766	KERMANSHAH	W R
40768	HAMEDAN	S
40769	ARAK	S
40780	ILAM	S
40782	KHORRAM ABAD	S
40783	ALI-GOODARZ	S

40785	KASHAN	S
40789	KHOR	S
40791	TABAS	S
40792	FERDOUS	S
40794	SAFI-ABAD DEZFUL	S
40798	SHAHRE-KORD	S
40800	ESFAHAN	S
40800	ESFAHAN	W R
40809	BIRJAND	S
40809	BIRJAND	W R
40811	AHWAZ	S
40812	MASJED-SOLEYMAN	S
40818	ABADEH	S
40821	YAZD	S
40827	NEHBANDAN	S
40829	ZABOL	S
40831	ABADAN	S
40833	OMIDIEH	S
40835	GACH SARAN DU GUNBADAN	S
40836	YASOGE	S
40841	KERMAN	S
40841	KERMAN	W R
40848	SHIRAZ	S
40848	SHIRAZ	W R
40851	SIRJAN	S
40853	BAFT	S
40854	BAM	S
40856	ZAHEDAN	S
40856	ZAHEDAN	W
40857	BUSHEHR	S
40859	FASA	S
40872	BANDAR DAYYER	S
40875	BANDARABBASS	S
40875	BANDARABBASS	W R
40877	KAHNUJ	S
40878	SARAVAN	S
40879	IRANSHAHR	S
40882	KISH ISLAND	S
40883	BANDAR LENGEH	S
40889	SIRI ISLAND	S
40890	ABU MUSA	S
40893	JASK	S
40897	KONARAK	S
40898	CHAHBAHAR	S

**IRAQ**

40608	MOSUL	S
40608	MOSUL	W R
40621	KIRKUK	S
40634	HADITHA	S
40637	KANAQIN	S
40642	RUTBAH	S
40650	BAGHDAD	W R
40658	NUKAIB	S
40665	KUT-AL-HAI	S
40672	DIWANIYA	S
40676	NASIRIYA	S
40676	NASIRIYA	W
40684	AL-SALMAN	S
40686	BUSSAYA	S
40689	BASRAH	W

**JAPAN**

47401	WAKKANAI	S
47401	WAKKANAI	W R
47407	ASAHIKAWA	S
47409	ABASHIRI	S
47412	SAPPORO	S
47412	SAPPORO	W R
47418	KUSHIRO	S
47420	NEMURO	S
47420	NEMURO	W R
47421	SUTTTSU	S
47426	URAKAWA	S
47430	HAKODATE	S
47570	WAKAMATSU	S
47575	AOMORI	S
47582	AKITA	W R
47582	AKITA	S
47585	MIYAKO	S
47590	SENDAI	S
47590	SENDAI	W R
47598	ONAHAMA	S
47600	WAJIMA	S
47600	WAJIMA	W R
47602	AIKAWA	S
47605	KANAZAWA	S
47618	MATSUMOTO	S
47624	MAEBASHI	S
47636	NAGOYA	S
47646	TATENO	W R
47648	CHOSHI	S
47655	OMAEZAKI	S
47662	TOKYO	S
47663	OWASE	S
47675	OSHIMA	S
47678	HACHIJOJIMA	S
47678	HACHIJOJIMA/OMURE	W R
47740	SAIGO	S
47741	MATSUE	S
47744	YONAGO	W R
47746	TOTTORI	S
47750	MAIZURU	S
47755	HAMADA	S
47772	OSAKA	S
47778	SHIONOMISAKI	S
47778	SHIONOMISAKI	W R
47800	IZUHARA	S
47807	FUKUOKA	S
47807	FUKUOKA	W R
47815	OITA	S
47817	NAGASAKI	S
47827	KAGOSHIMA	S
47827	KAGOSHIMA	W R
47830	MIYAZAKI	S
47837	TANEGASHIMA	S
47843	FUKUE	S
47887	MATSUYAMA	S
47891	TAKAMATSU	S
47898	SHIMIZU	S
47899	MUROTOMISAKI	S
47909	NAZE	S
47909	NAZE/FUNCHATOGE	W R

47918	ISHIGAKIJIMA	S
47918	ISHIGAKIJIMA	W R
47927	MIYAKOJIMA	S
47936	NAHA	S
47936	NAHA	W R
47945	MINAMIDAITOJIMA	S
47945	MINAMIDAITOJIMA	W R
47971	CHICHIJIMA	S
47971	CHICHIJIMA	W R
47991	MINAMITORISHIMA	S
47991	MINAMITORISHIMA	W R

**KAZAKHSTAN (IN ASIA)**

28679	PETROPAVLOVSK	S
28766	BLAGOVESCHENKA	S
28867	URITSKY	S
28879	KOKSHETAY	S
28952	KOSTANAY	S
28952	KOSTANAY	W R
28966	RUZAEVKA	S
28978	BALKASHINO	S
28984	SHCHUCHINSK	S
29802	MIKHAIEOUKA	S
29807	IRTYSHSK	S
35067	ESIL'	S
35078	ATBASAR	S
35085	AKKOL'	S
35108	URALSK	S
35173	ZHALTYR	S
35188	ASTANA	S
35217	DZHAMBEJTY	S
35229	AKTOBE	S
35229	AKTOBE	W R
35302	CHAPAEVO	S
35358	TONGAI	S
35376	BERLIK	S
35394	KARAGANDA	S
35394	KARAGANDA	W R
35406	TAIPAK	S
35416	UIL	S
35426	TEMIR	S
35497	ZHARYK	S
35532	MUGODZARSKAJA	S
35576	KZYLZHAR	S
35686	ALGAZY OSTROV	S
35699	BEKTAU-ATA	S
35671	ZHEZKAZGAN	S
35671	ZHEZKAZGAN	W R
35700	ATYRANU	S
35700	ATYRANU	W R
35746	ARALSKOE MORE	S
35796	BALHASH	S
35849	KAZALINSK	S
35925	SAM	S
35953	DZHUSALY	S
35969	ZLIKHA	S
36003	PAVLODAR	S
36003	PAVLODAR	W R
36152	SEMIJARKA	S
36177	SEMIPALATINSK	S
36208	LENINOGORSK	S
36397	ZHANGIZTOBE	S

36428	BOL'SHE NARYMSKOE	S	
36535	KOKPEKTY	S	
36639	URDZHAR	S	
36821	BAKANAS	S	
36859	ZHARKENT	S	
36864	OTAR	S	
36870	ALMATY	S	
36870	ALMATY	W R	
38001	FORT SHEVCHENKO	S	
38062	KYZYLORDA	S	
38069	CHIILI	S	
38196	ACHISAJY	S	
38198	TURKESTAN	S	
38222	TOLE BI	S	
38232	AKKUDUK	S	
38328	SHYMKENT	S	
38334	AUL TURARA RYSKULOVA	S	
38341	ZHAMBYL	S	
38341	ZHAMBYL	W R	
38343	KULAN	S	
38439	CHARDARA	S	
<b>KUWAIT</b>			
40570	AL-SALMI	S	
40582	KUWAIT INTERNATIONAL AIRPORT	S	
40582	KUWAIT INTERNATIONAL AIRPORT	W R	
<b>KYRGYZSTAN</b>			
36911	TOKMAK	S	
36974	NARYN	S	
36982	TIAN-SHAN'	S	
38345	TALAS	S	
38353	BISHKEK	S	
38616	KARA-SUU	S	
<b>LAO PEOPLE'S DEMOCRATIC REPUBLIC</b>			
48924	LUANG NAMTHA (M.SING)	S	
48926	HOUEI-SAI *	S	
48927	VIENGSAY	S	
48930	LUANG-PRABANG	S	
48935	PLAINE DES JARRES (XIENKHOANG)	S	
48940	VIENTIANE	S	
48940	VIENTIANE	W R	
48947	SAVANNAKHET	S	
48952	SARAVANE	S	
48955	PAKSE	S	S
48957	ATTOPEU	S	
<b>MACAO, CHINA</b>			
45011	TAIPA GRANDE	S	
<b>MALDIVES</b>			
43533	KANIMAADHOO	S	
43555	MALE	S	
43555	MALE	W	
43577	KADHDHOO	S	
43599	GAN	S	
43599	GAN	W	

**MONGOLIA**

44203	RINCHINLHUMBE	S
44207	HATGAL	S
44212	ULAANGOM	S
44212	ULAANGOM	W R
44213	BARUUNTURUUN	S
44214	ULGI	S
44215	OMNO-GOBI	S
44218	HOVD	S
44230	TARIALAN	S
44231	MUREN	S
44231	MUREN	W R
44232	HUTAG	S
44239	BULGAN	S
44241	BARUUNHARAA	S
44256	DASHBALBAR	S
44259	CHOIBALSAN	S
44259	CHOIBALSAN	W R
44265	BAITAG	S
44272	ULIASTAI	S
44277	ALTAI	S
44277	ALTAI	W R
44282	TSETSERLEG	S
44284	GALUUT	S
44285	HUJIRT	S
44287	BAYANHONGOR	S
44288	ARVAIHEER	S
44288	ARVAIHEER	W R
44292	ULAANBAATAR	S
44292	ULAANBAATAR	W R
44294	MAANTI	S
44298	CHOIR	S
44302	BAYAN-OVOO	S
44304	UNDERKHAAN	S
44305	BARUUN-URT	S
44313	KHALKH-GOL	S
44314	MATAD	S
44336	SAIKHAN-OVOO	S
44341	MANDALGOBI	S
44347	TSOGT-OVOO	S
44352	BAYANDELGER	S
44373	DALANZADGAD	S

**MYANMAR**

48001	PUTAO	S
48004	HKAMTI	S
48008	MYITKYINA	S
48008	MYITKYINA	W R
48010	HOMALIN	S
48018	KATHA	S
48019	BHAMO	S
48024	KALEMYO	W
48025	KALEWA	S
48035	LASHIO	S
48037	MONYWA	S
48042	MANDALAY	S
48045	MINDAT	S
48053	MEIKTILA	S
48053	MEIKTILA	W R
48057	TAUNGGYI	S
48060	KENGTUNG	S
48060	KENGTUNG	W

48062	SITTWE		S
48062	SITTWE		W R
48064	MINBU		S
48071	KYAUKPYU		S
48077	PROME		S
48078	TOUNGOO		S
48080	SANDOWAY		S
48094	PATHEIN		S
48094	PATHEIN		W
48096	MINGALADON		S
48097	YANGON		W R
48099	HPA-AN		S
48107	YE		S
48108	DAWEI	S	
48109	COCO ISLAND		S
48109	COCO ISLAND		W
48110	MERGUI		S

**NEPAL**

44416	SURKHET		S
44424	JUMLA		S
44438	BHAIRAWA AIRPORT		S
44454	KATHMANDU AIRPORT		S
44454	KATHMANDU AIRPORT		W R
44477	DHANKUTA		S
44478	BIRATNAGAR AIRPORT		S

**OMAN**

41240	KHASAB		S
41242	DIBA *		S
41244	BURAIMI		S
41246	SOHAR MAJIS		S
41253	RUSTAQ		S
41254	SAIQ		S
41255	NIZWA *		S
41256	SEEB, INT'L AIRPORT		S
41256	SEEB, INT'L AIRPORT		W R
41257	SAMAIL		S
41258	MINA SULTAN QABOOS		S
41262	FAHUD		S
41263	BAHLA		S
41264	ADAM		S
41265	IBRA		S
41267	QALHAT		S
41268	SUR		S
41275	QARN ALAM		S
41288	MASIRAH		S
41304	MARMUL		S
41312	MINA SALALAH		S
41314	THUMRAIT		S
41315	QAIROON HAIRITI		S
41316	SALALAH		S
41316	SALALAH		W R

**PAKISTAN**

41504	GUPIS		S
41506	CHITRAL		S
41508	DIR		S
41515	DROSH		S
41516	GILGIT		S
41517	SKARDU		S
41518	BUNJI		S

41519	CHILLAS	S
41520	ASTORE	S
41523	SAIDU SHARIF	S
41530	PESHAWAR	S
41530	PESHAWAR	W R
41532	MUZAFFAR ABAD	S
41533	RISALPUR	S
41535	KAKUL	S
41536	BALAKOT	S
41560	PARACHINAR	S
41564	KOHAT	S
41565	CHERAT	S
41568	MINHAS	S
41570	DHAMIAL ARMY	S
41571	ISLAMABAD AIRPORT	S
41573	MURREE	S
41577	ISLAMABAD SRRC	S
41592	MIANWALI	S
41594	SARGODHA	S
41594	SARGODHA	W R
41598	JHELUM	S
41600	SIALKOT	S
41620	ZHOB	S
41624	DERA ISMAIL KHAN	S
41630	FAISAL ABAD	S
41640	LAHORE CITY	W R
41641	LAHORE AIRPORT	S
41660	QUETTA AIRPORT	S
41661	QUETTA (SHEIKH MANDA)	W R
41672	RAFIQUI	S
41675	MULTAN	S
41675	MULTAN	W R
41678	BAHAWALNAGAR	S
41685	BAR KHAN	S
41700	BAHAWALPUR	S
41710	NOKKUNDI	S
41712	DAL BANDIN	S
41715	JACOBABAD	S
41715	JACOBABAD	W
41718	KHANPUR	S
41739	PANJGUR	S
41739	PANJGUR	W
41744	KHUZDAR	S
41749	NAWABSHAH	S
41756	JIWANI	S
41756	JIWANI	W
41768	CHHOR	S
41768	CHHOR	W
41780	KARACHI AIRPORT	S
41780	KARACHI AIRPORT	W R

**QATAR**

41170	DOHA INTERNATIONAL AIRPORT	S
41170	DOHA INTERNATIONAL AIRPORT	W R

**REPUBLIC OF KOREA**

47101	CHUNCHEON	S
47105	GANGNEUNG	S
47108	SEOUL	S
47115	ULLEUNGDO	S
47122	OSAN AB	W R
47133	DAEJEON	S

47138	POHANG	S
47158	GWANGJU AB	W R
47159	BUSAN	S
47165	MOKPO	S
47168	YEOSU	S
47184	JEJU	S
47185	JEJU UPPER/RADAR	W R

**RUSSIAN FEDERATION (IN ASIA)**

20046	POLARGMO IM. E.T. KRENKELJA	S
20046	POLARGMO IM. E.T. KRENKELJA	W R
20069	OSTROV VIZE	S
20087	OSTROV GOLOMJANNYJ	S
20292	GMO IM.E.K. FEDOROVA	S
20292	GMO IM.E.K. FEDOROVA	W R
20667	IM. M.V. POPOVA	S
20674	OSTROV DIKSON	S
20674	OSTROV DIKSON	W R
20744	MALYE KARMAKULY	W R
20744	MALYE KARMAKULY	S
20891	HATANGA	S
21432	OSTROV KOTEL'NYJ	S
21432	OSTROV KOTEL'NYJ	W R
21647	MYS SHALAUROVA	S
21647	MYS SHALAUROVA	W R
21802	SASKYLAH	S
21824	TIKSI	S
21824	TIKSI	W R
21908	DZALINDA	S
21921	KJUSJUR	S
21931	JUBILEJNAJA	S
21946	CHOKURDAH	S
21946	CHOKURDAH	W R
21965	OSTROV CHETYREHSTOLBOVOY	S
21982	OSTROV VRANGELJA	S
21982	OSTROV VRANGELJA	W R
23022	AMDERMA	S
23022	AMDERMA	W R
23032	MARESALE	S
23074	DUDINKA	S
23205	NAR'JAN-MAR	S
23205	NAR'JAN-MAR	W R
23219	HOSEDA-HARD	S
23256	TAZOVSKOE	S
23274	IGARKA	S
23330	SALEHARD	S
23330	SALEHARD	W R
23331	RA-IZ	S
23383	AGATA	S
23405	UST'-CIL'MA	S
23412	UST'-USA	S
23418	PECHORA	S
23418	PECHORA	W R
23426	MUZI	S
23472	TURUHANSK	S
23472	TURUHANSK	W R
23552	TARKO-SALE	S
23552	TARKO-SALE	W R
23606	UHTA	S
23625	SOSVA	S
23631	BEREZOVO	S
23678	VERHNEIMBATSK	S

23711	TROICKO-PECHERSKOE	S	
23724	NJAKSIMVOL'	S	
23734	OKTJABR'SKOE	S	
23803	UST'-KULOM	S	
23804	SYKTYVKAR	S	
23804	SYKTYVKAR	W R	
23849	SURGUT	S	
23884	BOR	S	
23884	BOR	W R	
23891	BAJKIT	S	
23909	GAJNY	S	
23914	CHERDYN'	S	
23921	IVDEL'	S	
23921	IVDEL'	W R	
23933	HANTY-MANSIJSK	S	
23933	HANTY-MANSIJSK	W R	
23955	ALEKSANDROVSKOE	S	
23955	ALEKSANDROVSKOE	W R	
23966	VANZIL'-KYNAK	S	
23973	VOROGOVO	S	
23975	SYM	S	
23987	JARCEVO	S	
24105	ESSEJ	S	
24125	OLENEK	S	
24125	OLENEK	W R	
24143	DZARDZAN	S	
24266	VERHOJANSK	W R	
24266	VERHOJANSK	S	
24329	SELAGONCY	S	
24343	ZHIGANSK	S	
24343	ZHIGANSK	W R	
24382	UST'-MOMA	S	
24507	TURA	S	
24507	TURA	W R	
24639	NJURBA	S	
24641	VILJUJSK	S	
24641	VILJUJSK	W R	
24652	SANGARY	S	
24656	BATAMAJ	S	
24671	TOMPO	S	
24688	OJMJAKON	S	
24688	OJMJAKON	W R	
24724	CHERNISHEVSKIJ	S	
24726	MIRNVY	W R	
24738	SUNTAR	S	
24768	CURAPCA	S	
24817	ERBOGACEN	S	
24817	ERBOGACEN	W R	
24908	VANAVARA	S	
24908	VANAVARA	W R	
24923	LENSK	S	
24944	OLEKMINSK	S	
24944	OLEKMINSK	W R	
24951	ISIT'	S	
24959	JAKUTSK	S	
24959	JAKUTSK	W R	
24962	AMGA	S	
24966	UST'-MAJA	S	
24988	ARKA	S	
25123	CHERSKIJ	S	
25173	MYS SHMIDTA		S
25173	MYS SHMIDTA		W R

25248	ILIRNEJ	S
25325	UST'-OLOJ	S
25378	EGVEKINOT	S
25399	MYS UELEN	S
25399	MYS UELEN	W R
25400	ZYRJANKA	S
25400	ZYRJANKA	W R
25428	OMOLON	S
25428	OMOLON	W R
25538	VERHNEE PENZINO	S
25551	MARKOVO	S
25563	ANADYR'	S
25563	ANADYR'	W R
25621	KEDON	S
25703	SEJMCHAN	S
25703	SEJMCHAN	W R
25744	KAMENSKOE	S
25913	MAGADAN	S
25913	MAGADAN	W R
25954	KORF	S
25954	KORF	W R
25956	APUKA	S
28009	KIRS	S
28044	SEROV	S
28049	GARI	S
28064	LEUSI	S
28076	DEM'JANSKOE	S
28116	KUDYMKAR	S
28144	VERHOTUR'E	S
28214	GLAZOV	S
28225	PERM'	W R
28240	NIZHNYJ TAGIL	S
28255	TURINSK	S
28275	TOBOL'SK	S
28275	TOBOL'SK	W R
28319	NOZOVKA	S
28321	OHANSK	S
28334	SAMARY	S
28367	TJUMEN'	S
28382	UST'-ISIM	S
28411	IZHEVSK	S
28419	JANAUL	S
28434	KRASNOUFIMSK	S
28440	EKATERINBURG	S
28445	VERHNEE DUBROVO	W R
28481	VIKULOVO	S
28491	BOL'SIE UKI	S
28493	TARA	S
28506	ELABUGA	S
28552	SADRINSK	S
28573	ISIM	S
28593	BOL'SHERECH'E	S
28621	BIRSK	S
28642	CHELJABINSK-BALANDINO	S
28661	KURGAN	S
28661	KURGAN	W R
28666	MAKUSINO	S
28698	OMSK	S
28698	OMSK	W R
28711	BUGUL'MA	S
28722	UFA	S
28722	UFA	W R

28748	TROIJK	S
28786	POLTAVKA	S
28797	ODESSKOE	S
28799	CERLAK	S
28807	SAMARA (SNYSLJAEVKA)	S
28825	STERLITAMAK	S
28838	MAGNITOGORSK	S
29023	NAPAS	S
29111	SREDNY VASJUGAN	S
29122	KARGASOK	S
29209	MAJSK	S
29231	KOLPASEVO	S
29231	KOLPASEVO	W R
29253	LOSINOBORSKOE	S
29263	ENISEJSK	S
29263	ENISEJSK	W R
29282	BOGUCANY	S
29282	BOGUCANY	W R
29313	PUDINO	S
29328	BAKCHAR	S
29348	PERVOMAJSKOE	S
29405	KYSTOVKA	S
29418	SEVERNOE	S
29430	TOMSK	S
29471	BOL'SHAJA MURTA	S
29481	DZERZHINSKOE	S
29524	KRESCHENKA	S
29551	MARIINSK	S
29553	BOGOTOL	S
29562	KEMCHUG	S
29570	KRASNOJARSK OPYTNOE POLE	S
29572	EMEL'JANOVO	W R
29581	KANSK	S
29594	TAJSHET	S
29602	CHANY	S
29605	TATARSK	S
29612	BARABINSK	S
29612	BARABINSK	W R
29631	KOLYVAN'	S
29634	NOVOSIBIRSK	S
29634	NOVOSIBIRSK	W R
29636	TOGUCHIN	S
29653	UZUR	S
29654	CENTRAL'NYJ RUDNIK	S
29675	KOLBA	S
29676	AGINSKOE	S
29698	NIZHNEUDINSK	S
29698	NIZHNEUDINSK	W R
29706	KUPINO	S
29712	ZDVINSK	S
29724	KOCHKI	S
29726	ORDYNSKOE	S
29736	MASLJANINO	S
29759	KOMMUNAR	S
29766	IDRINSKOE	S
29789	VERHNJAJA GUTARA	S
29814	KARASUK	S
29827	BAEVO	S
29838	BARNAUL	S
29839	BARNAUL	W R
29846	NOVOKUZNETSK	S
29862	HAKASSKAJA	W R

29864	UYBAT	S
29869	ERMAKOVSKOE	S
29923	REBRIHA	S
29937	ALEJSKAJA	S
29939	BIJSK ZONAL'NAJA	S
29956	TASTYP	S
29998	ORLIK	S
30054	VITIM	S
30054	VITIM	W R
30117	UST'-ILIMSK	S
30230	KIRENSK	S
30230	KIRENSK	W R
30253	BODAJBO	S
30309	BRATSK	S
30309	BRATSK	W R
30328	ORLINGA	S
30337	KAZACHINSK	S
30372	CHARA	S
30372	CHARA	W R
30385	UST'-NJUKZHA	S
30393	CUL'MAN	S
30405	TANGUJ	S
30433	NIZHNEANGARSK	S
30455	UAKIT	S
30469	KALAKAN	S
30493	NAGORNYJ	S
30499	TYNDA	S
30504	TULUN	S
30521	ZHIGALOVO	S
30521	ZHIGALOVO	W R
30542	TASSA	S
30549	KARAFTIT	S
30554	BAGDARIN	S
30554	BAGDARIN	W R
30603	ZIMA	S
30612	BALAGANSK	S
30622	KACUG	S
30627	BAJANDAJ	S
30635	UST'-BARGUZIN	S
30635	UST'-BARGUZIN	W R
30650	ROMANOVKA	S
30664	TUNGOKOCEN	S
30669	ZILOVO	S
30673	MOGOCA	S
30673	MOGOCA	W R
30683	EROFEJ PAVLOVIC	S
30692	SKOVORODINO	S
30692	SKOVORODINO	W R
30695	DZALINDA	S
30703	INGA	S
30710	IRKUTSK	S
30715	ANGARSK	W R
30731	GORJACINSK	S
30739	HORINSK	S
30741	ZAMOKTA	S
30745	SOSNOVO-OZERSKOE	S
30758	CHITA	S
30758	CHITA	W R
30764	USUGLI	S
30781	URJUPINO	S
30802	MONDY	S
30823	ULAN-UDE	S

30829	NOVOSELENGINSK	S	
30838	PETROVSKIJ ZAVOD	S	
30844	HILOK	S	
30846	ULETY	S	
30859	AGINSKOE	S	
30862	SHILKA	S	
30879	NERCHINSKIJ ZAVOD	S	
30925	KJAHTA	S	
30935	KRASNYJ CHIKOJ	S	
30935	KRASNYJ CHIKOJ	W R	
30949	KYRA	S	
30957	AKSA	S	
30965	BORZJA	S	
30965	BORZJA	W R	
30967	SOLOV'EVSK	S	
30975	PRIARGUNSK	S	
31004	ALDAN	S	
31004	ALDAN	W R	
31054	UST'-JUDOMA	S	
31088	OHOTSK	S	
31088	OHOTSK	W R	
31123	CJUL'BJU	S	
31137	TOKO	S	
31168	AJAN	S	
31168	AJAN	W R	
31174	BOL'SOJ SANTAR	S	
31199	UNAHA	S	
31253	BOMNAK	S	
31263	LOKSAK	S	
31295	MAGDAGACI	S	
31300	ZEJA	S	
31300	ZEJA	W R	
31329	EKIMCHAN	S	
31329	EKIMCHAN	W R	
31348	BURUKAN	S	
31369	NIKOLAEVSK-NA-AMURE	S	
31369	NIKOLAEVSK-NA-AMURE	W R	
31371	CHERNJAEVO	S	
31388	NORSK	S	
31416	IM POLINY OSIPENKO		S
31418	VESELAJA GORKA	S	
31439	BOGORODSKOE	S	
31442	SIMANOVSK	S	
31445	SVOBODNYJ	S	
31459	VERHNJAJA TOM'	S	
31474	UST'-UMAL'TA	S	
31478	SOFIJSKIJ PRIISK	S	
31484	HULARIN	S	
31489	GORIN	S	
31510	BLAGOVESENSK	S	
31510	BLAGOVESENSK	W R	
31521	BRATOLJUBOVKA	S	
31527	ZAVITAJA	S	
31532	CEKUNDA	S	
31534	SEKTAGLI	S	
31538	SUTUR	S	
31587	POJARKOVO	S	
31594	ARHARA	S	
31632	KUR	S	
31655	TROICKOE	S	
31702	OBLUC'E	S	
31707	EKATERINO-NIKOL'SKOE	S	

31713	BIROBIDZHAN	S
31725	SMIDOVICH	S
31735	HABAROVSK	S
31736	HABAROVSK	W R
31754	TIVJAKU	S
31801	GVASJUGI	S
31825	AGZU	S
31829	ZOLOTOJ	S
31845	KRASNYJ JAR	S
31866	SOSUNOVO	S
31873	DAL'NERECHENSK	S
31873	DAL'NERECHENSK	W R
31878	KIROVSKIJ	S
31909	TERNEJ	S
31909	TERNEJ	W R
31915	POGRANICHNYJ	S
31921	ASTRAHANKA	S
31959	RUDNAJA PRISTAN'	S
31960	VLADIVOSTOK	S
31969	POS'ET	S
31977	VLADIVOSTOK (SAD GOROD)	W R
31981	ANUCINO	S
31987	PARTIZANSK	S
31989	PREOBRAZHENIE	S
32027	POGIBI	S
32053	NOGLIKI	S
32061	ALEKSANDROVSK-SAHALINSKIJ	S
32061	ALEKSANDROVSK- SAHALINSKIJ	W R
32069	PIL'VO	S
32076	POGRANICHNOE	S
32098	PORONAJSK	S
32121	ILYINSKIY	S
32150	JUZHNO-SAHALINSK	S
32150	JUZHNO-SAHALINSK	W R
32165	JUZHNO-KURIL'SK	S
32195	SIMUSIR	S
32207	MATUA	S
32215	SEVERO-KURIL'SK	S
32215	SEVERO-KURIL'SK	W R
32252	UST'-VOJAMPOLKA	S
32389	KLJUCHI	S
32389	KLJUCHI	W R
32408	UST'-KAMCHATSK	S
32411	ICA	S
32509	SEMJACHIK	S
32540	PETROPAVLOVSK-KAMCHATSKIJ	W R
32583	PETROPAVLOVSK-KAMCHATSKIJ	S
32594	OZERNAJA	S
32618	NIKOL'SKOE	S
32618	NIKOL'SKOE	W R
35026	ZILAIR	S
35121	ORENBURG	S
35121	ORENBURG	W R
36021	KLJUCI	S
36022	VOLCIHA	S
36034	RUBCOVSK	S
36038	ZMEINOGORSK	S
36058	CEMAL	S
36061	TUROCAK	S
36096	KYZYL	S
36096	KYZYL	W R

**SAUDI ARABIA**

40356	TURAIF	S
40357	ARAR	S
40360	GURIAT	S
40361	AL-JOUF	S
40362	RAFHA	S
40369	HAQL	S
40373	AL-QAISUMAH	S
40373	AL-QAISUMAH	W R
40375	TABUK	S
40375	TABUK	W R
40377	HAFR AL-BATIN	S
40386	AL-HULAIFAH	S
40394	HAIL	S
40394	HAIL	W R
40400	AL-WEJH	S
40405	GASSIM	S
40416	DHAHRAN	S
40417	K.F.I.A. (KING FAHAD INT. AIRPORT) DAMMAM	W R
40420	AL-AHSA	S
40430	AL-MADINAH	S
40430	AL-MADINAH	W R
40432	UQLAT AL-SUQOR	S
40435	AL-DAWADAMI	S
40437	KING KHALED INT. AIRPORT	S
40437	KING KHALED INT. AIRPORT	W R
40438	RIYADH OBS. (O.A.P.)	S
40439	YENBO	S
41006	MUWAIH	S
41010	LAYLA	S
41014	OBAYLAH	S
41016	SHAWALAH	S
41024	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	S
41024	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	W R
41036	AL-TAIF	S
41061	WADI AL-DAWASSER AIRPORT	S
41080	AL-QUNFUDAH	S
41084	BISHA	S
41112	ABHA	S
41112	ABHA	W R
41114	KHAMIS MUSHAIT	S
41128	NAJRAN	S
41136	SHARORAH	S
41140	GIZAN	S

**SRI LANKA**

43415	VAVUNIYA	S
43418	TRINCOMALEE	S
43424	PUTTALAM	S
43436	BATTICALOA	S
43450	KATUNAYAKE	S
43466	COLOMBO	S
43473	NUWARA ELIYA	S
43495	GALLE	S
43497	HAMBANTOTA	S

**TAJIKISTAN**

38599	KHUDJAND	S
38609	ISFARA	S

38713	URA-TYUBE	S	
38836	DUSHANBE	S	
38836	DUSHANBE	W R	
38933	KURGAN-TYUBE	S	
38937	SHAARTUZ	S	
38943	KULYAB	S	
38944	PARKHAR	S	
38947	PYANDJ	S	
38954	KHOROG	S	
38954	KHOROG	W R	

**THAILAND**

48300	MAE HONG SON	S	
48303	CHIANG RAI	S	
48325	MAE SARIANG		S
48327	CHIANG MAI	S	
48327	CHIANG MAI	W R	
48328	LAMPANG	S	
48330	PHRAE	S	
48331	NAN	S	
48351	UTTARADIT	S	
48353	LOEI	S	
48354	UDON THANI	S	
48354	UDON THANI	W	
48356	SAKON NAKHON	S	
48375	MAE SOT	S	
48376	TAK	S	
48377	BHUMIBOL DAM	S	
48378	PHITSANULOK	S	
48378	PHITSANULOK	W	
48379	PHETCHABUN	S	
48381	KHON KAEN	S	
48383	MUKDAHAN	S	
48400	NAKHON SAWAN	S	
48405	ROI ET	S	
48407	UBON RATCHATHANI	S	
48407	UBON RATCHATHANI	W R	
48421	THONG PHA PHUM	S	
48426	LOP BURI	S	
48431	NAKHON RATCHASIMA	S	
48431	NAKHON RATCHASIMA	W	
48432	SURIN	S	
48455	BANGKOK	S	
48455	BANGKOK	W R	
48456	DON MUANG	S	
48462	ARANYAPRATHET	S	
48475	HUA HIN	S	
48477	SATTAHIP	S	
48477	SATTAHIP	W	
48480	CHANTHABURI	S	
48480	CHANTHABURI	W	
48500	PRACHUAP KHIRIKHAN	S	
48500	PRACHUAP KHIRIKHAN	W	
48501	KHLONG YAI	S	
48517	CHUMPHON	S	
48532	RANONG	S	
48551	SURAT THANI	S	
48551	SURAT THANI	W	
48552	NAKHON SI THAMMARAT	S	
48565	PHUKET AIRPORT	S	
48567	TRANG	S	
48568	SONGKHLA	W R	

48569	HAT YAI	S
48583	NARATHIWAT	S
<b>TURKMENISTAN</b>		
38388	EKEZHE	S
38392	DASHKHOVUZ	W R
38392	DASHKHOVUZ	S
38507	TURKMENBASHI	S
38507	TURKMENBASHI	S
38511	CHAGYL	S
38545	DARGANATA	S
38647	GAZANDZHYYK	S
38656	ERBENT	S
38687	CHARDZHEV	S
38750	ESENGYLY	S
38763	GYZYLARBAT	S
38774	BAKHERDEN	S
38799	UCHADZHY	S
38806	BYRDALYK	S
38880	ASHGABAT KESHI	S
38886	TEDZHEN	S
38895	BAJRAMALY	S
38911	KERKI	S
38915	CARSANGA	S
38974	SARAGT	S
38987	GYSHGY	S
<b>UNITED ARAB EMIRATES</b>		
41184	RAS AL KHAIMAH INTERNATIONAL AIRPORT	S
41194	DUBAI INTERNATIONAL AIRPORT	S
41196	SHARJAH INTER. AIRPORT	S
41198	FUJAIRAH	S
41216	ABU DHABI BATEEN AIRPORT	S
41217	ABU DHABI INTER. AIRPORT	S
41217	ABU DHABI INTER. AIRPORT	W R
41218	AL AIN INTERNATIONAL AIRPORT	W R
<b>UZBEKISTAN</b>		
38141	JASLYK	S
38149	KUNGRAD	S
38178	AK-BAJTAL	S
38262	CHIMBAJ	S
38264	NUKUS	S
38264	NUKUS	W
38396	URGENCH	S
38396	URGENCH	W
38403	BUZAUBAJ	S
38413	TAMDY	S
38457	TASHKENT	S
38457	TASHKENT	W R
38462	PSKEM	S
38565	NURATA	S
38579	DZIZAK	S
38583	SYR-DAR'JA	S
38611	NAMANGAN	S
38618	FERGANA	S
38683	BUHARA	S
38683	BUHARA	W
38696	SAMARKAND	S
38812	KARSHI	S
38812	KARSHI	W

38927	TERMEZ	S
<b>VIETNAM</b>		
48803	LAO CAI	S
48806	SON LA	S
48808	CAO BANG	S
48820	HA NOI	S
48820	HA NOI	W R
48823	NAM DINH	S
48826	PHU LIEN	S
48830	LANG SON	S
48839	BACH LONG VI	S
48840	THANH HOA	S
48845	VINH	S
48848	DONG HOI	S
48852	HUE	S
48855	DA NANG	S
48855	DA NANG	W R
48860	HOANG SA (PATTLE)	S
48870	QUY NHON	S
48877	NHA TRANG	S
48887	PHAN THIET	S
48892	SONG TU TAY (SOUTH WEST CAY)	S
48900	TAN SON HOA	S
48900	TAN SON HOA	W R
48914	CA MAU	S
48914	CA MAU	W
48916	THO CHU	S
48917	PHU QUOC	S
48918	CON SON	S
48919	HUYEN TRAN	S
48920	TRUONG SA	S
<b>YEMEN</b>		
41372	SAADA	S
41396	SEIYOUN	S
41398	AL-GHAIDAH	S
41404	SANA'A	S
41404	SANA'A	W R
41407	MARIB	S
41416	KAMARAN	S
41431	HODEIDAH	S
41437	ATAQ	S
41443	RIYAN	S
41443	RIYAN	W
41466	TAIZ	S
41480	ADEN	S
41480	ADEN	W R
41494	SOCOTRA	S
41494	SOCOTRA	W R

**Legend:**

S = Surface Observations      1244  
W = Radiowind Observations      33  
R = Radiosonde Observations      294

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## ANNEX IV

### PROPOSED LIST OF STATIONS COMPRISING THE REGIONAL BASIC CLIMATOLOGICAL NETWORK (RBCN) IN RAII

<u>INDEX</u>	<u>STATION NAME</u>	<u>CLIMAT</u>	<u>CLIMAT TEMP</u>	<u>GSN</u>	<u>GUAN</u>
<b>AFGHANISTAN, ISLAMIC STATE OF</b>					
40930	NORTH SALANG	X		X	
40938	HEART	X	X		
40942	CHAKHCHARAN	X			
40948	KABUL AEROPORT		X		
40990	KANDAHAR AEROPORT	X			
<b>BAHRAIN</b>					
41150	BAHRAIN INT. AIRPORT	X		X	
<b>BANGLADESH</b>					
41859	RANGPUR	X			
41883	BOGRA	X	X		
41891	SYLHET	X			
41923	DAKKA		X		
41936	JESSORE	X			
41950	BARISAL	X			
41992	COX'S BAZAR	X			
<b>CAMBODIA</b>					
48966	SIEMREAP	X			
48991	PHNOM-PENH	X	X		
<b>CHINA</b>					
50527	HAILAR	X	X	X	X
50745	QIQIHAR	X		X	
50963	TONGHE	X			
51076	ALTAY	X	X	X	
51243	KARAMAY	X			
51431	YINING	X	X		
51463	URUMQI	X	X	X	
51644	KUQA	X			
51656	KORLA	X			
51709	KASHI	X	X	X	X
51747	TAZHONG	X			
51777	RUOQIANG	X	X	X	
51828	HOTAN	X	X	X	
52203	HAMI	X	X	X	
52267	EJIN QI	X			
53323	MAZONG SHAN	X			
52418	DUNHUANG	X			
52495	BAYAN MOD	X			
52533	JIUQUAN	X	X	X	
52681	MINQIN	X	X		X
52818	GOLMUD		X		
52836	DULAN	X		X	
52866	XINING	X			
52889	LANZHOU	X	X	X	
53068	ERENHOT	X	X	X	X
53336	HALIUT	X			
53463	HOHHOT	X	X		
53614	YINCHUAN	X	X	X	
53772	TAIYAN	X	X	X	
53845	YAN AN	X			
54026	JARUD QI	X			
54102	XILIN HOT	X	X		

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54161	CHANGCHUN	X	X		
54218	CHIFENG	X			
54292	YANJI	X			
54342	SHENYANG	X	X	X	
54511	BEIJING	X	X	X	
54662	DALIAN	X	X		
54823	JINAN	X	X		
54857	QINGDAO	X	X	X	
55228	SHIQUANHE	X			
55299	NAGQU		X		X
55472	XAINZA	X			
55591	LHASA	X	X	X	
56004	TUOTUONE	X			
56029	YUSHU	X	X		
56046	DARÇAG	X			
56079	RUO'ERGAI	X			
56106	SOG XIAN	X			
56137	QAMDO	X		X	
56294	CHENGDU	X	X	X	
56444	DEQEN	X			
56571	XICHANG	X		X	
56739	TENG CHONG	X	X	X	
56778	KUNMING	X	X		X
56964	SIMAO	X			
56985	MENGZI	X		X	
57036	XI'AN	X	X	X	
57083	ZHENGZHOU	X	X	X	
57127	HANZHONG	X			
57461	YICHANG	X	X	X	X
57494	WUHAN	X	X		
57516	CHONGQING	X			
57687	CHANGSHA	X			
57745	ZHIJIANG	X		X	
57749	HUAIHUA		X		
57816	GUIYANG	X	X		
57993	GANZHOU	X		X	
58027	XUZHOU	X			
58238	NANJING	X	X		
58362	SHANGHAI	X	X	X	
58606	NANCHANG	X		X	
58633	QU XIAN	X	X		
58666	DACHEN DAO	X			
58847	FUZHOU	X	X		
58968	TAIBEI	X	X		
59211	BAISE	X			
59280	QING YUAN		X		
59287	GUANGZHOU	X		X	
59316	SHANTOU	X		X	
59358	TAINAU	X			
59431	NANNING	X	X	X	
59758	HAIKOU	X	X	X	
59792	DONGSHA DAO	X			
59948	YAXIAN	X			
59981	XISHA DAO	X	X		
<b>DPR OF KOREA</b>					
47014	CHUNGGANG	X		X	
47016	HYESAN	X			
47025	KIMCHAEK	X			
47035	SINUIJU	X			
47055	WONSAN	X			
47058	PYONGYANG	X	X		
47069	HAEJU	X			
<b>HONG KONG, CHINA</b>					
45004	KOWLOON	X	X		X

**INDIA**

42027	SRINAGAR	X	X	X
42071	AMRITSAR	X		
42083	SHIMLA	X		X
42147	MUKTESWAR	X		
42165	BIKANER	X		X
42182	NEW DELHI/SARDARJUNG	X	X	X
42295	DARJEELING	X		X
42314	DIBRUGARH	X		
42339	JODHPUR	X	X	
42369	LUCKHOW/AMAUSI		X	
42379	GORAKHPUR	X		
42410	GUWAHATI	X	X	X
42452	KOTA AERODROME	X		
42475	ALLAHABAD/BAMHRAULI	X		
42492	PATNA		X	
42515	CHERRAPUNJI	X		X
42539	DEESA	X		X
42587	DALTONGANJ	X		X
42619	SILCHAR	X		
42647	AHMADABAD	X	X	
42671	SAGAR	X		X
42731	DWARKA	X		X
42754	INDORE	X		
42779	PENDRA ROAD	X		X
42798	JAMSHEDPUR	X		
42807	CALCUTTA/ALIPORE	X		
42809	CALCUTTA/DUM DUM		X	
42867	NAGPUR SONEGA	X	X	
42909	VERAVAL	X		
42933	AKOLA	X		
42971	BHUBANESWAR	X	X	
42977	SANDHEADS	X		
43003	BOMBAY/SANTACRUZ		X	
43041	JAGDALPUR	X		X
43057	BOMBAY/COLABA	X		
43063	POONA	X		X
43128	HYDERABAD AIRPORT	X	X	X
43149	VISHAKHAPATNAM	X		
43150	CWC VISHAKHAPATNAM		X	
43185	MACHILIPATNAM	X		
43192	GOA/PANJIM	X	X	
43198	BELGAUM/SAMBRA	X		
43279	MADRAS/MINAMBAKKAM	X	X	X
43285	MANGALORE/PANAMBUR		X	
43295	BANGALORE	X		X
43311	AMINI DIVI	X		
43314	KOSHIKODE	X		
43333	PORT BLAIR	X	X	X
43339	KODAIKANAL	X		X
43346	KARAIKAL		X	
43363	PAMBAN	X		X
43369	MINICOY	X	X	X
43371	THIRUVANANTHAPURAM	X	X	
<b>IRAN, ISLAMIC REPUBLIC OF</b>				
40706	TABRIZ	X	X	X
40712	OROMIEH	X		
40718	ANZALI	X		
40745	MASHHAD	X	X	X
40754	TEHRAN-MEHRABAD	X		
40766	KERMANSHAH	X		
40800	ESFAHAN	X		
40827	NEHBANDAN	X		
40831	ABADAN	X		
40841	KERMAN	X	X	X

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40848	SHIRAZ	X		X	
40879	IRANSHAHR	X			
<b>IRAQ</b>					
40608	MOSUL	X			
40621	KIRKUK	X			
40634	HADITHA	X			
40637	KANAQIN	X			
40642	RUTBAN	X			
40650	BAGHDAD		X		
40665	KUT-AL-HAI	X		X	
40676	NASIRIA	X			
<b>JAPAN</b>					
47401	WAKKANAI	X	X	X	
47407	ASAHIKAWA	X			
47409	ABASHIRI	X			
47412	SAPPORO	X	X		X
47418	KUSHIRO	X			
47420	NEMURO	X	X	X	
47421	SUTTSU	X			
47426	URAKAWA	X			
47430	HAKODATE	X			
47570	WAKAMATSU	X			
47575	AOMORI	X			
47582	AKITA	X	X	X	
47585	MIYAKO	X			
47590	SENDAI	X	X		
47598	ONAHAMA	X			
47600	WAJIMA	X	X	X	
47602	AIKAWA	X			
47605	KANAZAWA	X			
47618	MATSUMOTO	X			
47624	MAEBASHI	X			
47636	NAGOYA	X			
47646	TATENO		X		X
47648	CHOSHI	X		X	
47655	OMAEZAKI	X			
47662	TOKYO	X			
47663	OWASE	X			
47675	OSHIMA	X			
47678	HACHIJOJIMA/OMURE	X	X		
47740	SAIGO	X			
47741	MATSUE	X			
47744	YONAGO		X		
47746	TOTTORI	X			
47750	MAIZURU	X			
47755	HAMADA	X			
47772	OSAKA	X			
47778	SHIONOMISAKI	X	X	X	
47800	IZUHARA	X			
47807	FUKUOKA	X	X		
47815	OITA	X		X	
47817	NAGASAKI	X		X	
47827	KAGOSHIMA	X	X		X
47830	MIYAZAKI	X			
47837	TANEGASHIMA	X			
47843	FUKUE	X			
47887	MATSUYAMA	X			
47891	TAKAMATSU	X			
47898	SHIMIZU	X			
47899	MUROTOMISAKI	X			
47909	NAZE/FUNCHATOGE	X	X		
47918	ISHIGAKIJIMA	X	X		
47927	MIYAKOJIMA	X		X	
47936	NAHA	X	X	X	X
47945	MINAMIDAITOJIMA	X	X	X	

47971	CHICHIJIMA	X	X	X	X
47991	MINAMITORISHIMA	X	X	X	X
<b>KAZAKHSTAN</b>					
28679	PETROPAVLOVSK	X			
28766	BLAGOVESHCHENKA	X			
28879	KOKSHETAV	X			
28952	KOSTANAY	X	X		X
28966	RUZAEVKA	X			
29807	IRTYSHSK	X			X
35067	ESIL'	X			
35078	ATBASAR	X			X
35108	URALSK	X			X
35188	ASTANA	X			
35217	DZHAMBEJTY	X			
35229	AKTOBE	X	X		
35376	BERLIK	X			
35394	KARAGANDA	X	X		X
35406	TAIPAK	X			
35416	UIL	X			X
35426	TEMIR	X			
35671	ZHEZKAZGAN		X		
35700	ATYRAU	X	X		
35746	ARALSKOE MORE	X			
35796	BALHASH	X			X
35849	KAZALINSK	X			X
35925	SAM	X			X
35953	DZHYSALY	X			
36003	PAVLODAR	X	X		
36177	SEMIPALATINSK	X			X
36208	LENINOGORSK	X			
36428	BOL'SHE NARYMSKOE	X			
36535	KOKPEKTY	X			X
36859	ZHARKENT	X			X
36870	ALMATY	X	X		X
38062	KYZYLORDA	X			
38069	CHIILI	X			
38328	SHYMKENT	X			
38334	AUL TURARA	X			
	RYSKULOVA				
38341	ZHAMBYL	X	X		
38343	KULAN	X			
38439	CHARDARA	X			
<b>KUWAIT</b>					
40582	KUWAIT INT'L AIRPORT	X	X		X
<b>KYRGYZSTAN</b>					
36911	TOKMOK	X			
36974	NARYN	X			X
36982	TIAN-SHAN	X			
38345	TALAS	X			
38353	BISHKEK		X		
38616	KARA-SUU	X			
<b>LAO PDR</b>					
48930	LUANG-PRABANG	X			
48940	VIENTIANE	X	X		
48947	SAVANNAKHET	X			
48955	PAKSE	X			
<b>MACAU, CHINA</b>					
45011	TAIPA GRANDE	X			
<b>MALDIVES</b>					
43555	MALE	X	X		X
43599	GAN	X			
<b>MONGOLIA</b>					
44203	RINCHINLHUMB	X			
44207	HATGAL	X			
44212	ULAAN-GOM	X	X		X

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44213	BARUUNTURUUN	X		
44214	UIGI	X		
44215	OMNO-GOBI	X		
44218	HOVD	X		X
44230	TARIALAN	X		
44231	MUREN	X	X	X
44232	HUTAG	X		
44239	BULGAN	X		X
44241	BARUUNKHARAA	X		
44256	DASHBALBAR	X		
44259	CHOIBALSAN	X	X	X
44265	BAITAG	X		
44272	ULIASTAI	X		X
44277	ALTAI	X	X	
44282	TSETSERLEG	X		
44284	GAIUUT	X		
44285	HUJIRT	X		
44287	BAYANHONGOR	X		
44288	ARVAIHEER	X	X	X
44292	ULAAN-BAATOR	X	X	
44294	MAANTI	X		
44298	CHOIR	X		
44302	BAYAN-OVOO	X		
44304	UNDERKHAAN	X		
44305	BARUUN-URT	X		
44313	KHAEKH-GOL	X		
44314	MATAD	X		
44317	ERDENE-TSAGAAN	X		X
44336	SAIKHAN-OVOO	X		
44341	MANDALGOVI	X		X
44347	TSOGT-OVOO	X		
44352	BAYANDELGER	X		
44373	DALANZADGAD	X		X
<b>MYANMAR</b>				
48008	MYITKYINA	X		
48042	MANDALAY	X		X
48053	MEIKTILA		X	
48062	SITTWE	X		X
48097	YANGON	X	X	X
48112	VICTORIA POINT	X		
<b>NEPAL</b>				
44454	KATHMANDU AIRPORT	X	X	
44477	DHANKUTA	X		
<b>OMAN</b>				
41246	MAJIS (SOHAR)	X		
41253	RUSTAQ	X		
41254	SAIQ	X		X
41256	SEEB, INT'L AIRPORT	X	X	
41262	FAHUD	X		
41264	ADAM	X		
41265	IBRA	X		
41268	SUR	X		
41288	MASIRAH	X		X
41304	MARMUL	X		
41314	THUMRAIT	X		
41316	SALALAH	X	X	X
<b>PAKISTAN</b>				
41515	DROSH	X		
41530	PESHAWAR	X	X	
41560	PARACHINAR	X		X
41571	ISLAMABAD AIRPORT	X		
41594	SARGODHA	X	X	
41598	JHELUM	X		
41600	SIALKOT	X		
41620	ZHOB	X		X

41624	DERA ISMAIL KHAN	X		
41640	LAHORE CITY	X		X
41660	QUETTA AIRPORT	X		
41675	MULTAN	X	X	
41685	BAR KHAN	X		
41710	NOKKUNDI	X		
41712	DAL BANDIN	X		X
41715	JACOBABAD	X		
41718	KHANPUR	X		
41739	PANJGUR	X		
41744	KHUZDAR	X		
41749	NAWABSHAH	X		
41756	JIWANI	X		
41759	PASNI	X		X
41764	HYDER ABAD	X		X
41768	CHHOR	X		
41780	KARACHI AIRPORT	X	X	
<b>QATAR</b>				
41170	DOHA INT'L AIRPORT	X	X	
<b>REPUBLIC OF KOREA</b>				
47101	CHUNCHON	X		
47105	KANGNUNG	X		
47108	SEOUL	X		
47112	INCHON	X		X
47115	ULLUNGDO	X		X
47122	OSAN AB		X	
47133	TAEJON	X		
47138	POHANG	X	X	
47158	KWANGJU AB		X	
47159	PUSAN	X		
47165	MOKPO	X		X
47168	YOSU	X		
47184	CHEJU	X		
47185	CHEJU UPPER/RADAR		X	
<b>RUSSIAN FEDERATION (IN ASIA)</b>				
20046	POLAR GMO IM. E.T. KRENKELJA	X	X	X
20069	OSTROV VIZE	X		X
20087	OSTROV GOLOMJANNYJ	X		X
20292	GMO IM. E.K. FEDOROVA	X	X	X
20667	IM. M.V. POPOVA	X		X
20674	OSTROV DIKSON	X	X	X
20744	MALYE KARMAKULY	X		X
20891	HATANGA	X	X	X
21432	OSTROV KOTEL'NYJ	X	X	X
21647	MYS SHALAUROVA	X		X
21802	SASKYLAH	X		
21824	TIKSI		X	
21921	KJUSJUR	X		X
21931	JUBILEJNAJA	X		X
21946	CHOKURDAH	X		X
21982	OSTROV VRANGELJA	X	X	X
23074	DUDINKA	X		X
23146	MYS KAMENNYJ	X		
23205	NAR'JAN-MAR	X	X	X
23219	HOSEDA-HARD	X		
23330	SALEHARD	X	X	X
23405	UST'-CIL'MA	X		X
23472	TURUHANSK	X	X	X
23552	TARKO-SALE	X		X
23631	BEREZOVO	X		X
23711	TROICKO-PECERSKOE	X		X
23724	NJAKSIMVOL'	X		X
23804	SYKTYVKAR	X	X	X
23884	BOR	X	X	X
23891	BAJKIT	X		X

## ANNEX IV, p. 8

23914	CHERDYN'	X		X	
23933	HANTY-MANSIJSK	X	X	X	
23955	ALEKSANDROVSKOE	X	X	X	
24105	ESSEJ	X		X	
24125	OLENEK	X	X	X	
24143	DZARDZAN	X		X	
24266	VERHOJANSK	X	X	X	X
24329	SELAGONCY	X		X	
24343	ZHIGANSK	X	X	X	
24382	UST'-MOMA	X		X	
24507	TURA	X	X	X	
24641	VILJUJSK	X		X	
24671	TOMPO	X		X	
24688	OJMJAKON	X		X	
24738	SUNTAR	X		X	
24817	ERBOGACEN	X		X	
24908	VANAVARA	X	X	X	
24944	OLEKMINSK	X		X	
24959	JAKUTSK	X	X	X	
24966	UST'-MAJA	X		X	
25173	MYS SHMIDTA	X	X	X	
25248	ILIRNEJ	X		X	
25325	UST'-OLOJ	X		X	
25399	MYS UELEN	X		X	
25400	ZYRJANKA	X	X	X	
25551	MARKOVO	X		X	
25563	ANADYR'	X	X	X	
25621	KEDON	X		X	
25703	SEJMCHAN	X	X	X	
25913	MAGADAN	X	X	X	
25954	KORF	X	X	X	
28009	KIRS	X			
28064	LEUSI	X		X	
28138	BISER	X		X	
28224	PERM'	X			
28275	TOBOL'SK	X		X	
28411	IZHEVSK	X			
28440	EKATERINBURG	X			
28445	VERHNEE DUBROVO		X		
28493	TARA	X		X	
28661	KURGAN	X		X	
28698	OMSK	X	X	X	X
28711	BUGUL'MA	X			
28722	UFA	X		X	
28838	MAGNITOGORSK	X			
29231	KOLPASEVO	X	X	X	
29263	ENISEJSK	X		X	
29282	BOGUCANY	X		X	
29570	KRASNOJARSK	X			
29572	EMEL'JANOVO		X		
29612	BARABINSK	X		X	
29634	NOVOSIBIRSK		X		
29654	CENTRAL'NYI RUDNIK	X			
29698	NIZHNEUDINSK	X		X	
29838	BARNAUL	X		X	
29866	MINUSINSK	X		X	
30054	VITIM	X		X	
30230	KIRENSK	X	X	X	X
30309	BRATSK	X			
30372	CHARA	X	X	X	
30393	CUL'MAN	X		X	
30469	KALAKAN	X			
30521	ZHIGALOVO	X			
30554	BAGDARIN	X		X	
30635	UST'-BARGUZIN	X		X	

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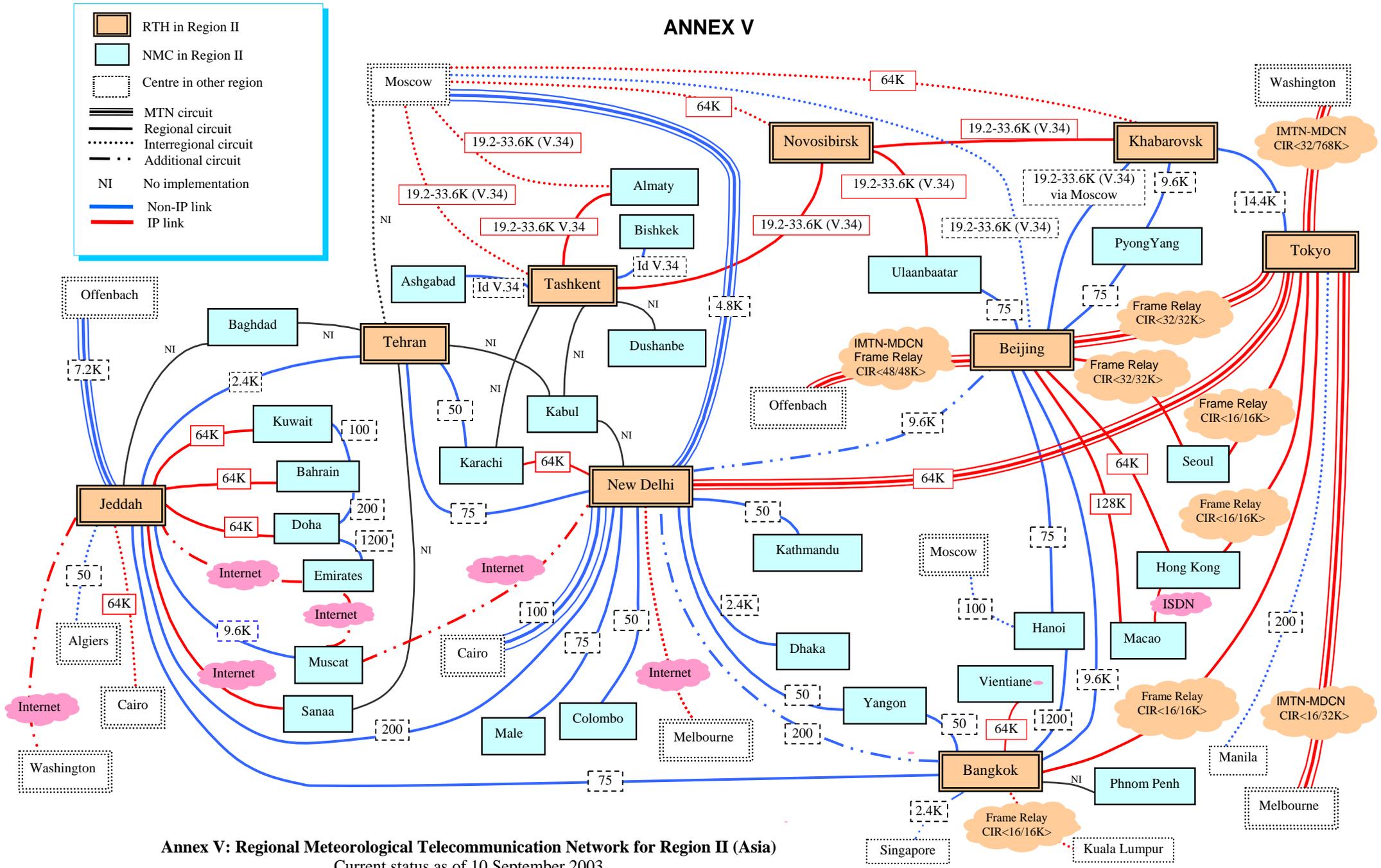
30673	MOGOGA	X		X	
30692	SKOVORODINO	X		X	
30710	IRKUTSK	X		X	
30758	CHITA	X	X		
30879	NERCHINSKIJ ZAVOD	X		X	
30925	KJAHTA	X		X	
30949	KYRA	X		X	
30965	BORZJA	X		X	
31004	ALDAN	X	X	X	
31088	OHOTSK	X	X	X	
31123	CJUL'BJU	X			
31168	AJAN	X	X	X	
31253	BOMNAK	X		X	
31329	EKIMCHAN	X		X	
31369	NIKOLAEVSK-NA-AMURE	X		X	
31416	IM POLINY OSIPENKO	X		X	
31510	BLAGOVESCENSK	X	X		
31538	SUTUR	X			
31707	EKATERINO-NIKOL'SKOE	X		X	
31735	HABAROVSK	X		X	
31736	HABAROVSK		X		
31829	ZOLOTOJ	X		X	
31909	TERNEJ	X		X	
31960	VLADIVOSTOK	X	X	X	
32061	ALEKSANDROVSK-SAHALINSKIJ	X	X		
32098	PORONAJSK	X		X	
32150	JUZHNO-SAHALINSK	X	X		
32195	SIMUSIR	X		X	
32215	SEVERO-KURIL'SK	X	X		
32252	UST-VOJAMPOLKA	X		X	
32389	KLJUCHI	X	X	X	
32411	ICA	X		X	
32540	PETROPAVLOVSK-KAMCHATKIJ		X		X
32583	PETROPAVLOVSK-KAMCHATSKIJ	X			
32618	NICOL'SKOE	X		X	
35121	ORENBURG	X	X	X	X
36061	TUROSAN	X			
<b>SAUDI ARABIA</b>					
40356	TURAIF	X			
40357	ARAR	X			
40360	GURIAT	X			
40361	AL-JOUF	X		X	
40362	RAFHA	X			
40373	AL-QAISUMAH	X	X		
40375	TABUK	X	X		
40377	HAFR AL-BATIN	X			
40394	HAIL	X	X	X	
40400	AL-WEJH	X			
40405	GASSIM	X			
40410	KHAYBER	X			
40416	DHAHRAN	X			
40417	KING FAHAD INT'L AEROPORT		X		
40420	AL-AHSA	X			
40430	AL-MADINAH	X	X	X	
40435	AL-DAWADAMI	X			
40437	KING KHALED AEROPORT	X	X		
40438	RIYADH OBS.	X		X	
40439	YENBO	X			
41006	MUWAIH	X			
41024	JEDDAH	X	X	X	
41030	MAKKAH	X			
41036	AL-TAIF	X			
41055	AL-BAHA	X			
41061	WADI AL-DAWASSER AIRPORT	X			
41084	BISHA	X			

41112	ABHA	X	X		X
41114	KHAMIS MUSHA IT	X			
41128	NAJLAN	X			
41136	SHARORAH	X			
41140	GIZAN	X			
41141	GIZAN	X		X	
<b>SRI LANKA</b>					
43418	TRINCOMALEE	X			
43424	PUTTALAM	X			
43466	COLOMBO	X	X		
43473	NUWARA ELIYA	X		X	
43497	HAMBANTOTA	X		X	
<b>TAJIKISTAN</b>					
38599	KHUDJAND	X			
38836	DUSHANBE	X	X		
38933	KURGAN-TYUBE	X		X	
38954	KHOROG	X		X	
<b>THAILAND</b>					
48303	CHIANG RAI	X		X	
48327	CHIANG MAI	X	X		
48354	UDON THANI	X			
48378	PHITSANULOK	X			
48400	NAKHON SAWAN	X		X	
48407	UBON RATCHATHANI	X	X	X	
48431	NAKHON RATCHASIMA	X			
48455	BANGKOK	X	X		X
48462	ARANYAPRATHET	X		X	
48480	CHANTHABURI	X			
48500	PRACHUAP KHIRIKHAN	X		X	
48517	CHUMPHON	X			
48568	SONGKHLA	X	X	X	X
<b>TURKMENISTAN</b>					
38388	YEKEJE	X			
38392	DASHOGUZ	X			
38507	TURKMENBASHI	X		X	
38511	CHAGYL	X			
38545	DARGANATA	X			
38656	YERBENT	X			
38687	TURKMENABAT	X			
38750	ESENGULY	X		X	
38763	SERDAR	X		X	
38880	ASHGABAT	X	X		X
38895	BAYRAMALY	X		X	
38915	KOYTENDAG	X		X	
38974	SARAGT	X			
<b>UNITED ARAB EMIRATES</b>					
41194	DUBAI INT'L AIRPORT	X			
41196	SHARJAH INT'L AIRPORT	X		X	
41216	ABU DHABI BATEEN AIRPORT	X			
41217	ABU DHABI INT'L AIRPORT	X	X		X
<b>UZBEKISTAN</b>					
38178	AK-BAJTAL	X			
38262	CHIMBAJ	X		X	
38396	URGENCH	X			
38403	BUZAUBAJ	X			
38413	TAMDY	X		X	
38457	TASHKENT	X	X	X	
38611	NAMANGAN	X	X		
38618	FERGANA	X			
38683	BUHARA	X			
38696	SAMARKAND	X			
38812	KARSHI	X			
38927	TERMEZ	X	X		
<b>VIETNAM</b>					
48806	SON LA	X			

48808	CAO BANG	X		
48820	HA NOI	X	X	
48826	PHU LIEN	X		
48830	LANG SON	X		
48840	THANH HOA	X		
48845	VINH	X		
48848	DONG HOI	X		
48852	HUE	X		
48855	DA NANG	X	X	X
48870	OUY NHON	X		
48877	NHA TRANG	X		
48887	PHAN THIET	X		
48892	SONG TU TAY	X		
48900	HO CHI MINH	X		X
48914	CA MAU	X		
48920	TRUONG SA	X		
<b>YEMEN</b>				
41407	MARIB	X		
41443	RIYAN	X		X
41480	ADEN	X	X	X
41494	SOCOTRA	X	X	

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# ANNEX V



**Annex V: Regional Meteorological Telecommunication Network for Region II (Asia)**  
 Current status as of 10 September 2003

## ANNEX V (continued)

