



UPPER-AIR STATIONS OF Former USSR: Data availability estimates

**by Alex Sterin, RIHMI-WDC, Russia
Workshop Boulder 08-11 Feb 2005**

Anniversary of first radiosonde launch

- 30 January 2005 – 75th Anniversary of launch first in the world radiosonde by Prof. Pavel Molchanov in St.Petersburg, Russia
- 75 years ago, there was not idea to use radiosonde for climate studies
- Lots of stations subsets are named “climate subsets” (e.g. WMO RA regional climate networks, etc.) – some cofusions appear
- Anyway, success of future U/A Climate Reference Network depends on current status of global comprehensive networks and it’s subsets, especially on GUAN, on actions to improve their operability and data quality and access

General Information as on 01/01/2005

- Current status of russian U/A network – recovery after deep crisis of late 1990s.
- The total station list consists of 129 stations, among them 19 are announced as “in conserved state”
- The planned increase of radiosonde launches amount in 2005 is 32% more than in 2004
- The planned amount of launches per day in 2005 (excluding Antarctica stations): total 204, 00 UTC – 106, 12 UTC – 98
- The average for all soundings max height of radiosonde flight in Russia was about 24 km
- Most stations will come back to two-times sounding, and for essential part of them, it will be first time after almost 15 years of interrupts, irregularities and one-per-day sounding schedule

Sources of Information for estimates:

- The following estimates of data availability are based on
 - U/A Global radiosonde data collection at RIHMI-WDCB, Russian Federation, Obninsk:
 - CARDS Data Set (1948-2001)
 - Global U/A Data collected in Russia from GTS (2002-2003)
- IGRA Data Set (NCDC/NOAA)
- NOTE: not all observations could come to the archive, so the estimates should be considered as tentative. Nevertheless, the general tendencies are reflected well

GUAN GCOS Stations for Russian Federation and Former USSR

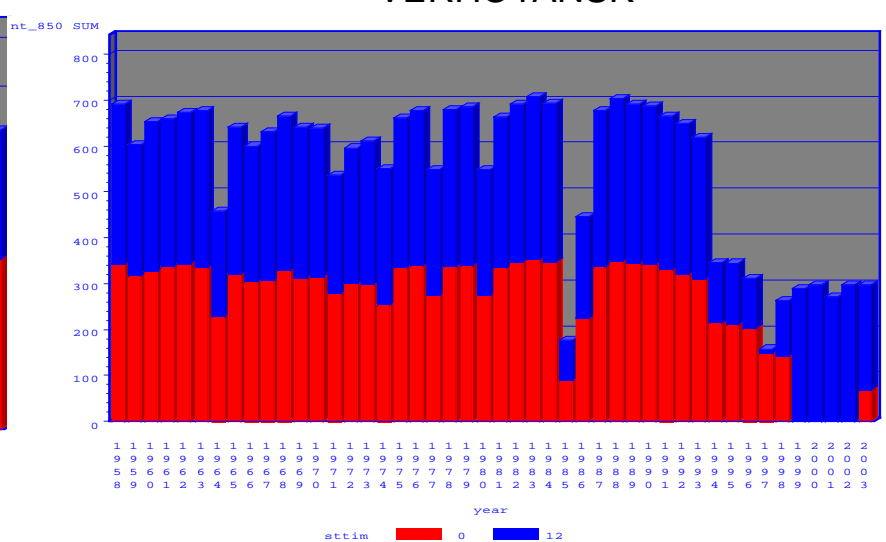
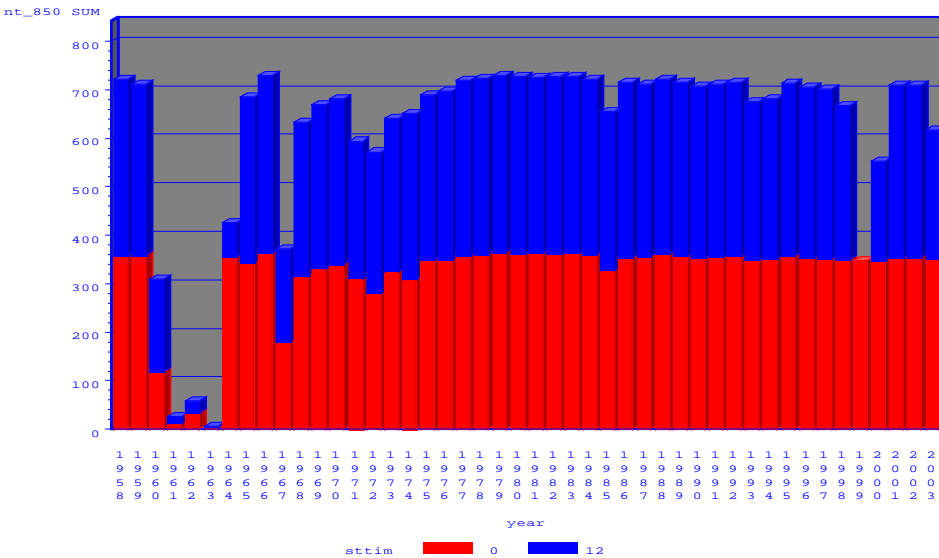
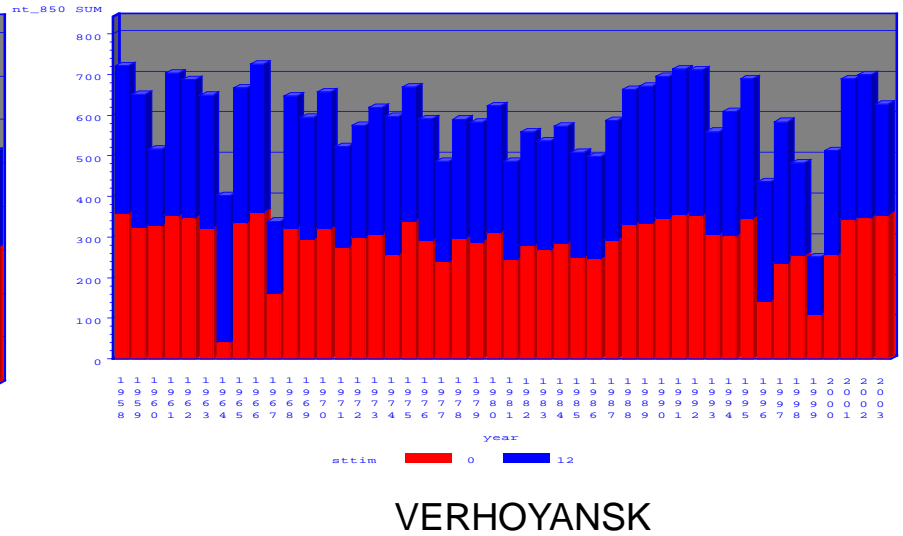
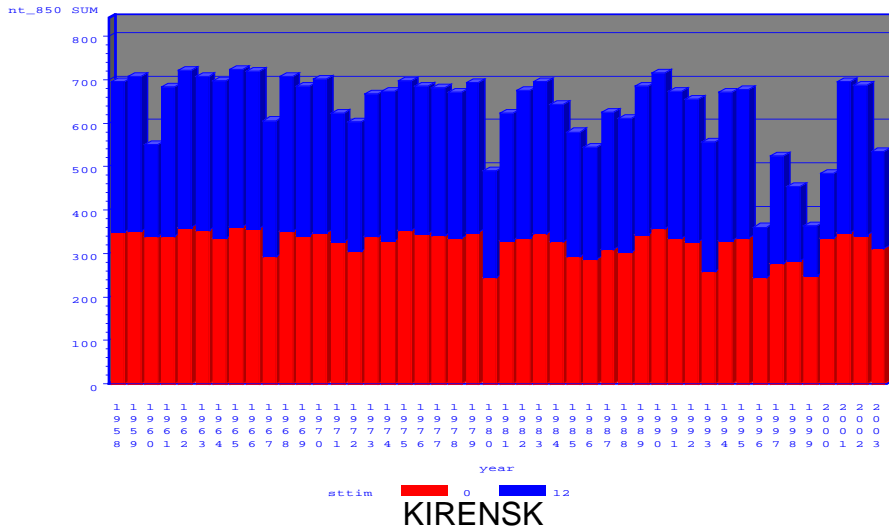
20674	OSTROV DIKSON	73 30N	80 24E
21982	OSTROV VRANGELJA	70 59N	178 29W
22550	ARHANGEL'SK	64 37N	40 30E
23472	TURUHANSK	65 47N	87 56E
24266	VERHOJANSK	67 34N	133 24E
28698	OMSK	54 56N	73 24E
30230	KIRENSK	57 46N	108 04E
32540	PETROPAVLOVSK- KAMCHATSKIJ	53 05N	158 35E
35121	ORENBURG	51 41N	55 06E
38880	ASHGABAT (Turkmenia)	37 58N	58 23E
33345	KYIV (Ukraine)	50 24N	30 34E
34731	ROSTOV-NA-DONU	47 15N	39 49E
89592	MIRNYJ	66 33S	93 01E
89512	NOVOLAZAREVSKAJA	70 46S	11 50E

GUAN GCOS Stations for Russian Federation and Former USSR (Yerevan is not included)

20674	OSTROV DIKSON	73 30N	80 24E	M2 3 Quarter, 00+12
21982	OSTROV VRANGELJA	70 59N	178 29W	Not operating
22550	ARHANGEL'SK	64 37N	40 30E	AVK, 00+12
27459	NIZHNII NOVGOROD			AVK, 00+12
23472	TURUHANSK	65 47N	87 56E	AVK, 00+12
23921	IVDEL'			AVK, 00+12
24266	VERHOJANSK	67 34N	133 24E	AVK, 00+12
28698	OMSK	54 56N	73 24E	AVK, 00+12
29862	KHAKASSKAYA (ABAKAN)			AVK oo
30230	KIRENSK	57 46N	108 04E	AVK, 00+12
31088	OKHOTSK			AVK-1M, 00+12
32540	PETROPAVLOVSK- KAMCHATSKIJ	53 05N	158 35E	AVK, 00+12
35121	ORENBURG	51 41N	55 06E	AVK, 00+12
38880	ASHGABAT (Turkmenia)	37 58N	58 23E	
33345	KYIV (Ukraine)	50 24N	30 34E	
34731	ROSTOV-NA-DONU	47 15N	39 49E	???????
89592	MIRNYJ	66 33S	93 01E	?????
89512	NOVOLAZAREVSKAJA	70 46S	11 50E	00, AVK

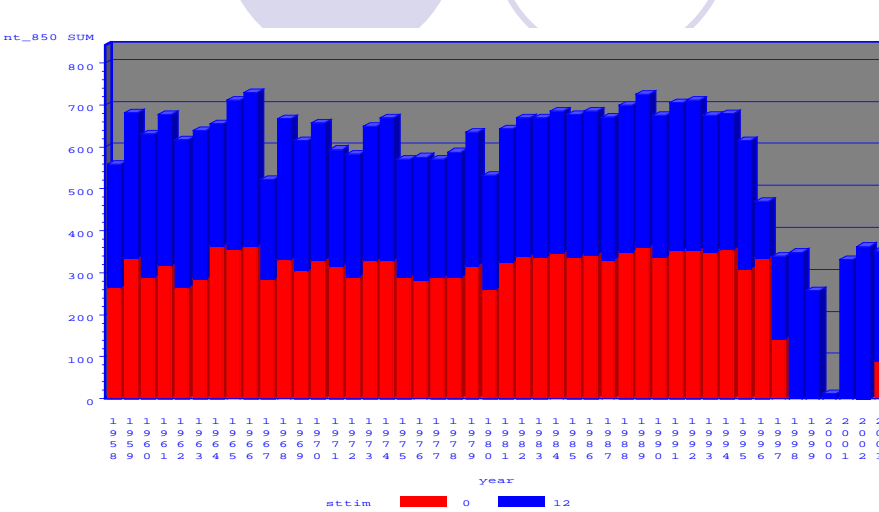
Data availability for some fUSSR GCOS stations

Annual total of OBS by OBS time (00 UTC –red, 12 UTC – blue) (as in RIHMI-WDC, CARDS +GTS)

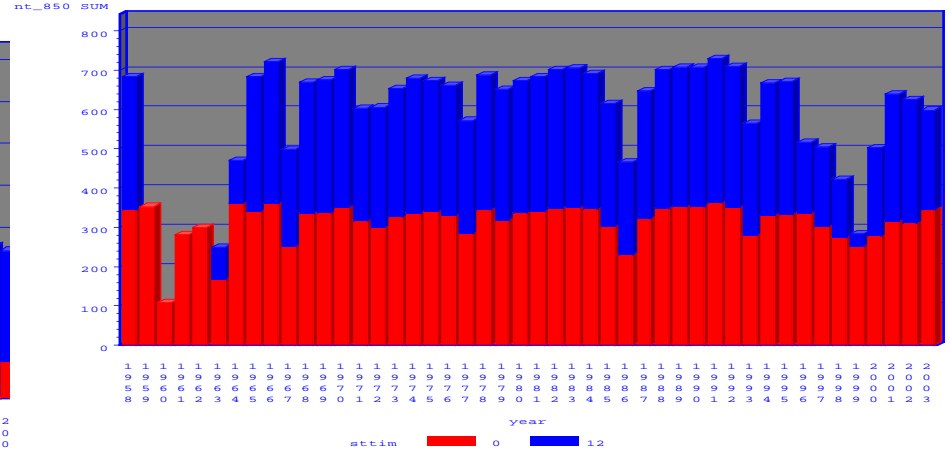


Data availability for some fUSSR GCOS stations

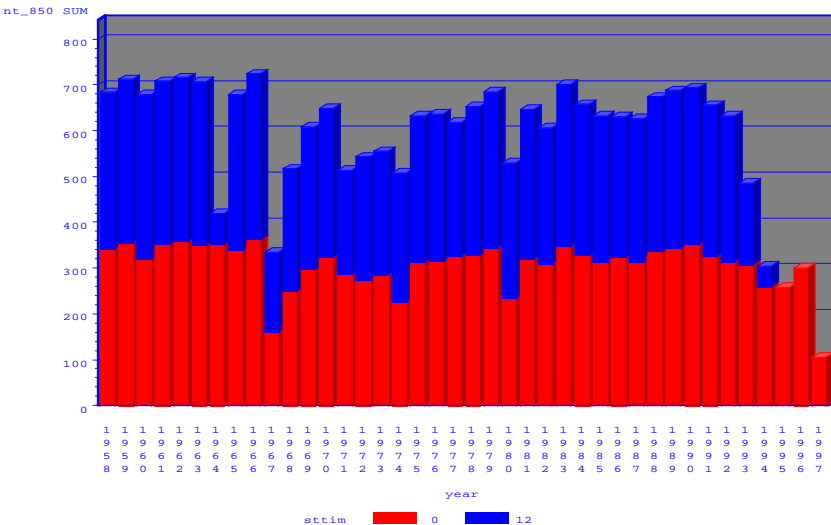
Annual total of OBS by OBS time (00 UTC –red, 12 UTC – blue) (as in RIHMI-WDC, CARDS +GTS)



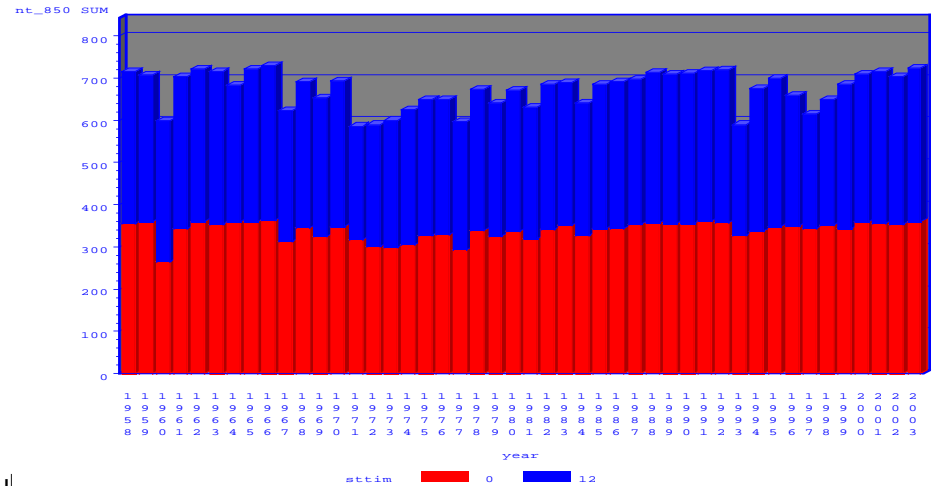
ORENBURG



TURUHANSK



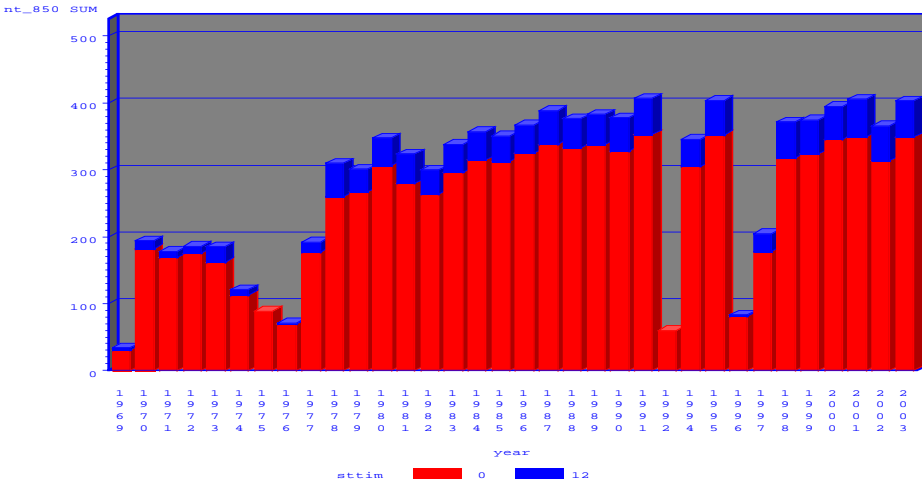
8/20/2018
ASHGABAT -Turkmenistan



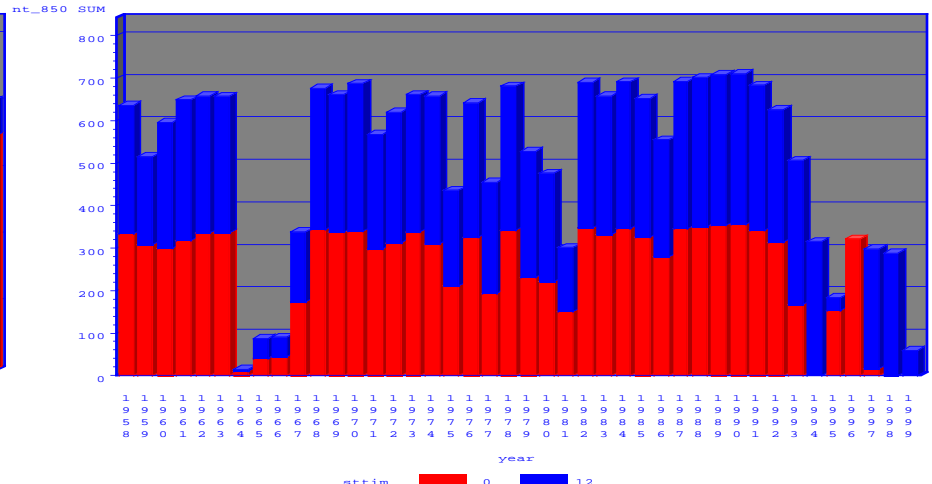
KYIV –Ukraine

Data availability for some fUSSR GCOS stations

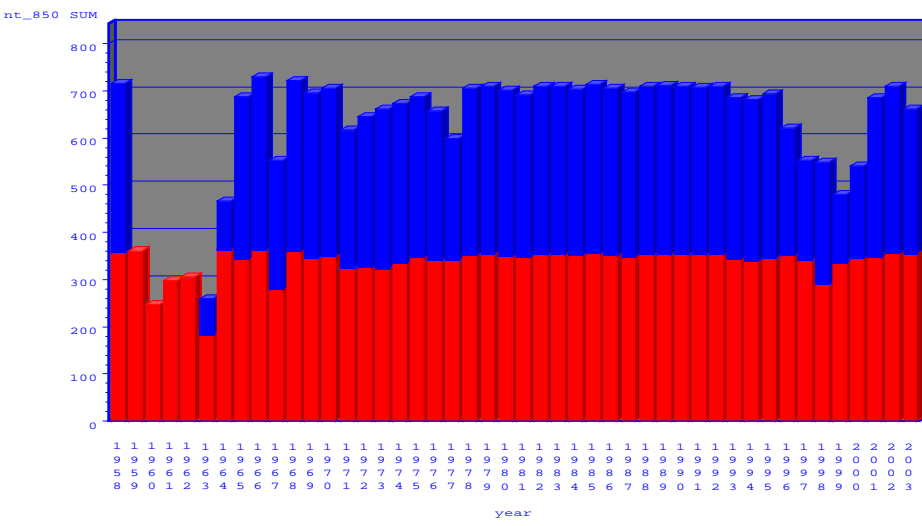
Annual total of OBS by OBS time (00 UTC –red, 12 UTC – blue) (as in RIHMI-WDC, CARDS +GTS)



NOVOLAZAREVSKAYA

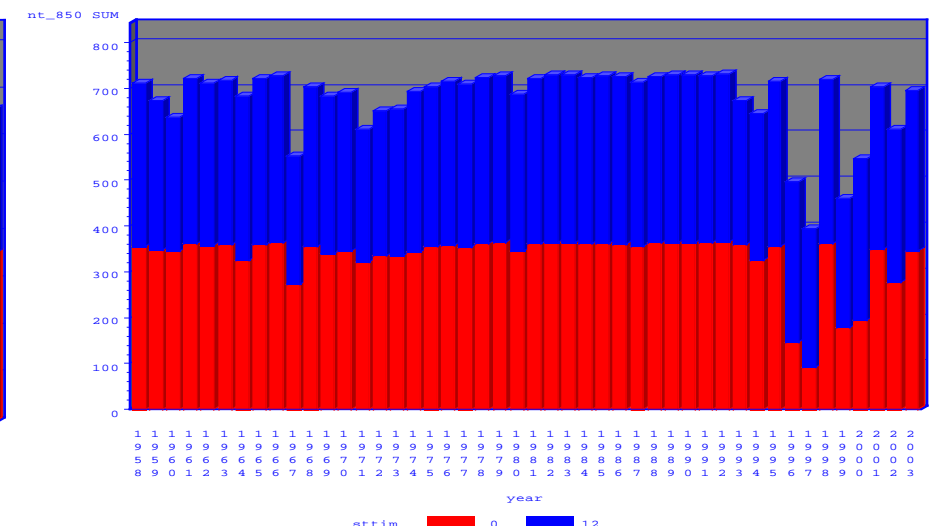


VRANGELYA ISL.



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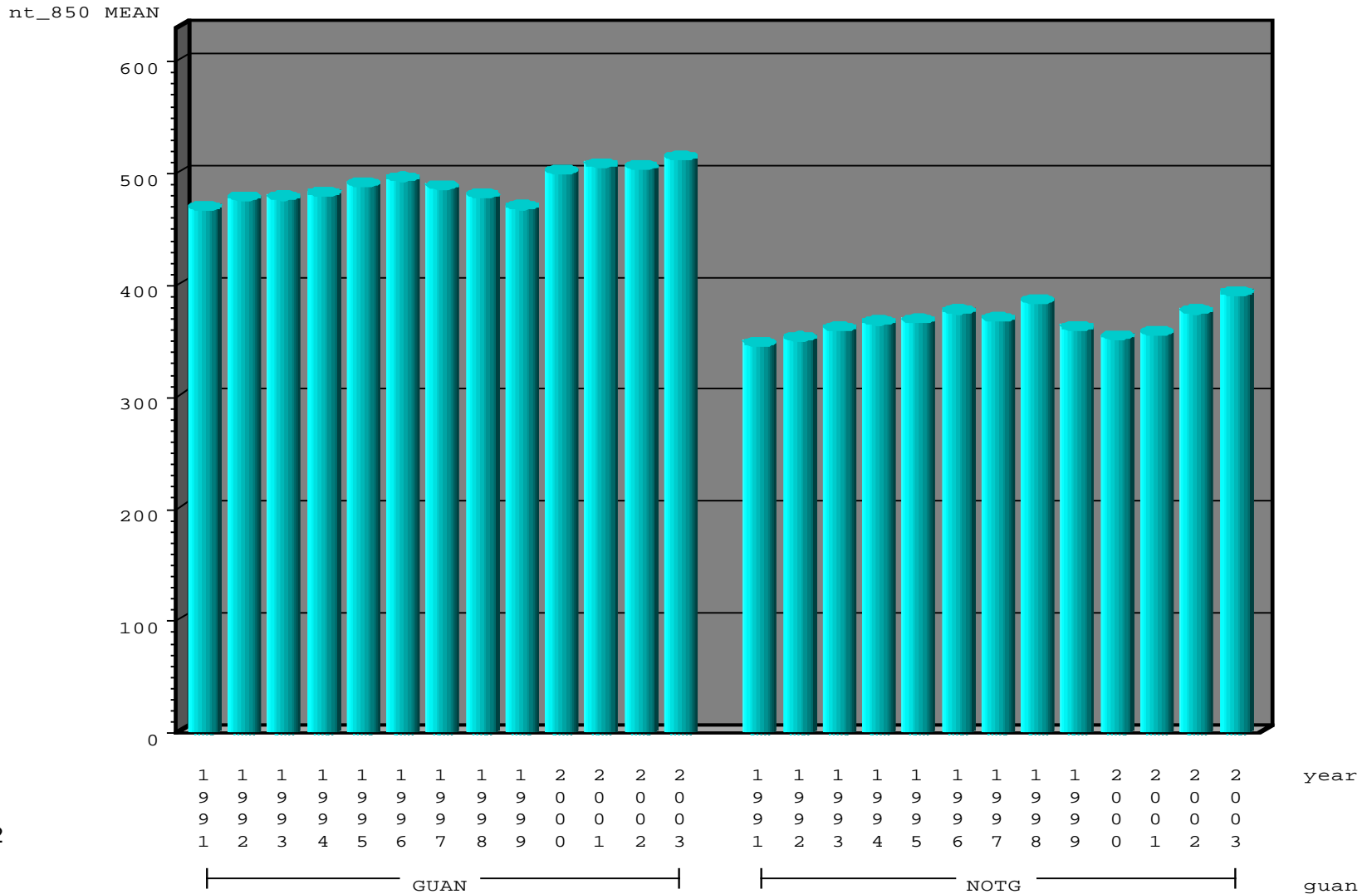
OMSK



PETROPAVLOVSK-KAMCHATSKII

Mean annual OBS number for non-FUSSR stations (per station, period 1991-2003, 00+12 UTC, max=730 obs):

GUAN GCOS – left group
NOT GUAN –right group



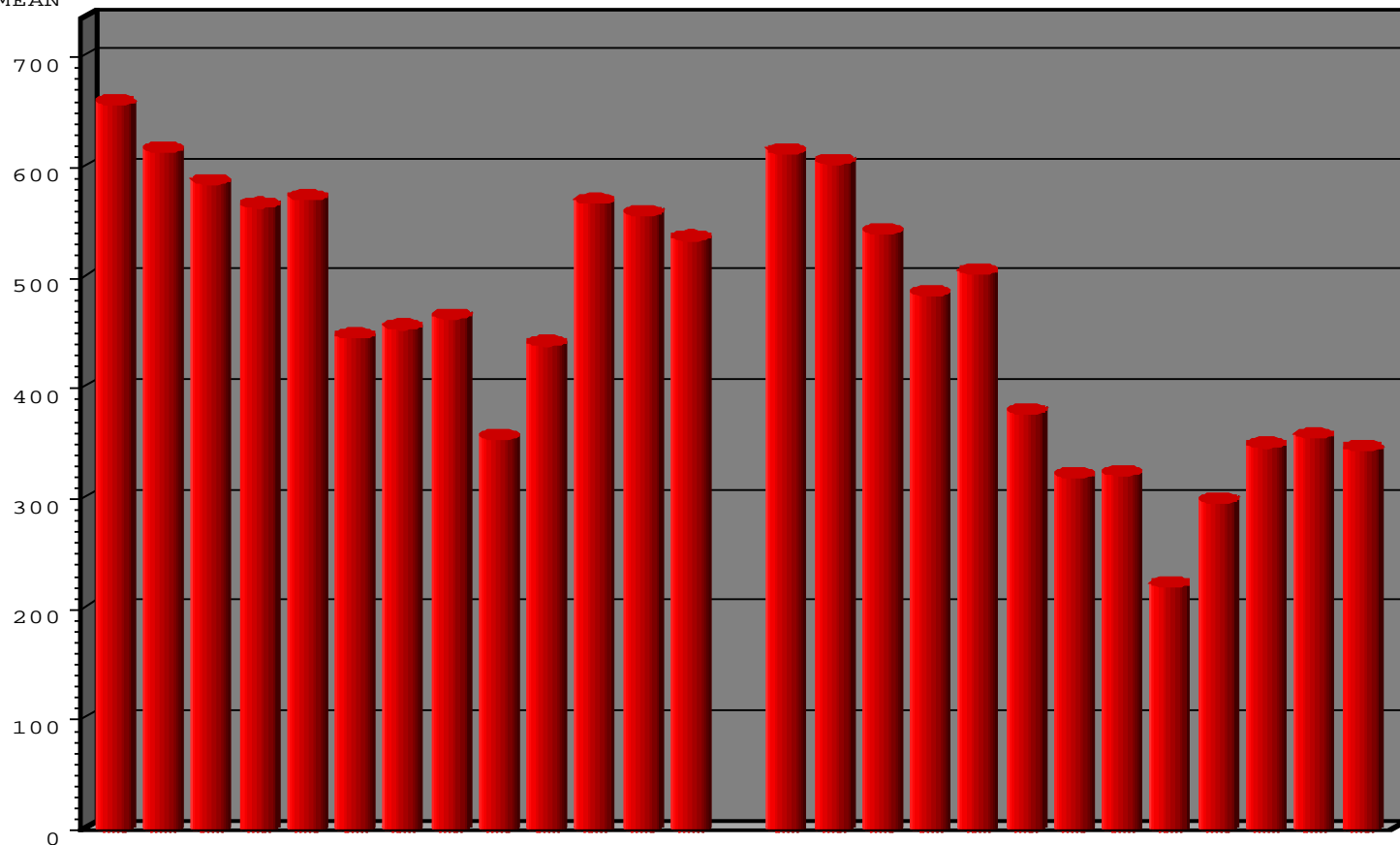
8/20/2

Mean annual OBS number per station for FUSSR stations (period 1991-2003, 00+12 UTC):

GUAN GCOS – left group

NON- GUAN –right group

nt_850 MEAN



1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	year		
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	0	0	0	0			
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	0	0	0	0			
1	2	3	4	5	6	7	8	9	0	1	2	3	1	2	3	4	5	6	7	8	9	0	1	2	3	guan

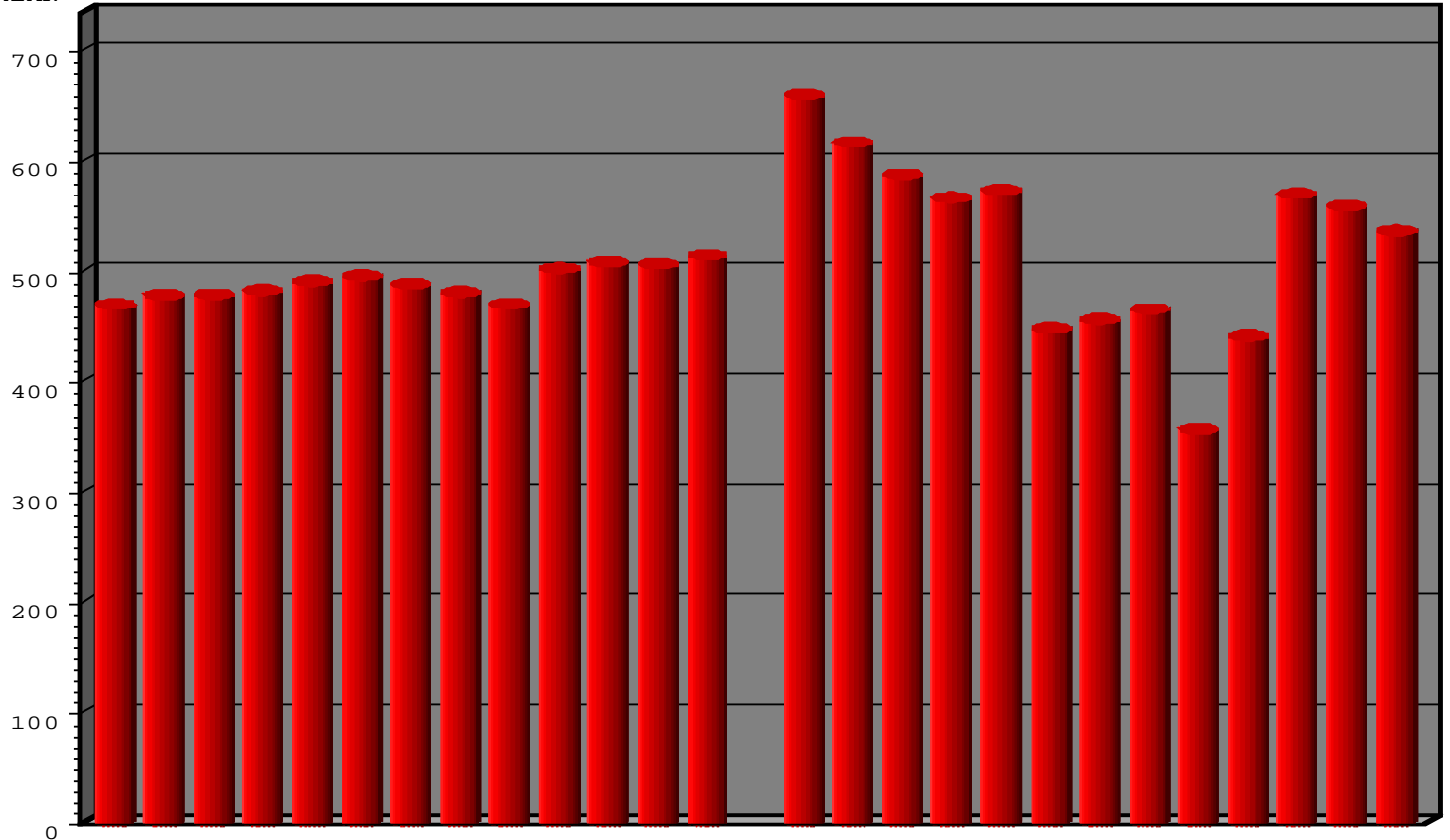
8/20/2

Mean annual OBS number per station for GUAN stations (period 1991-2003, 00+12 UTC):

Not RF + fUSSR – left group

RF + fUSSR –right group

nt_850 MEAN



1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	year	
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	9	0	0	0	0	
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	9	0	0	0	0	
1	2	3	4	5	6	7	8	9	0	1	2	3	1	2	3	4	5	6	7	8	9	0	1	2	3
----- NO -----													----- RF -----											cnt	

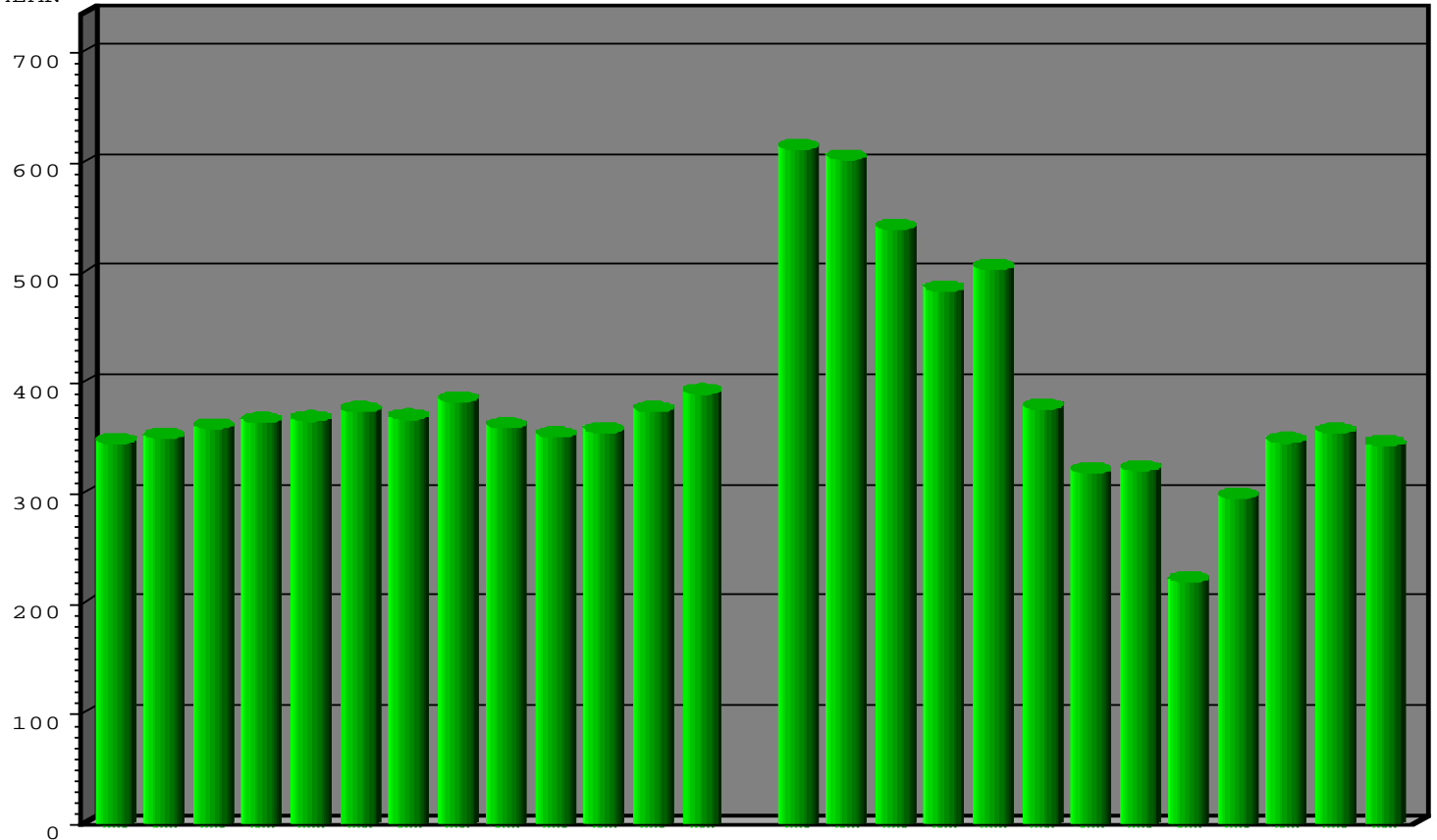
8/20/2

Mean annual OBS number per station for non-GUAN stations (period 1991-2003, 00+12 UTC):

Not RF + fUSSR – left group

RF + fUSSR –right group

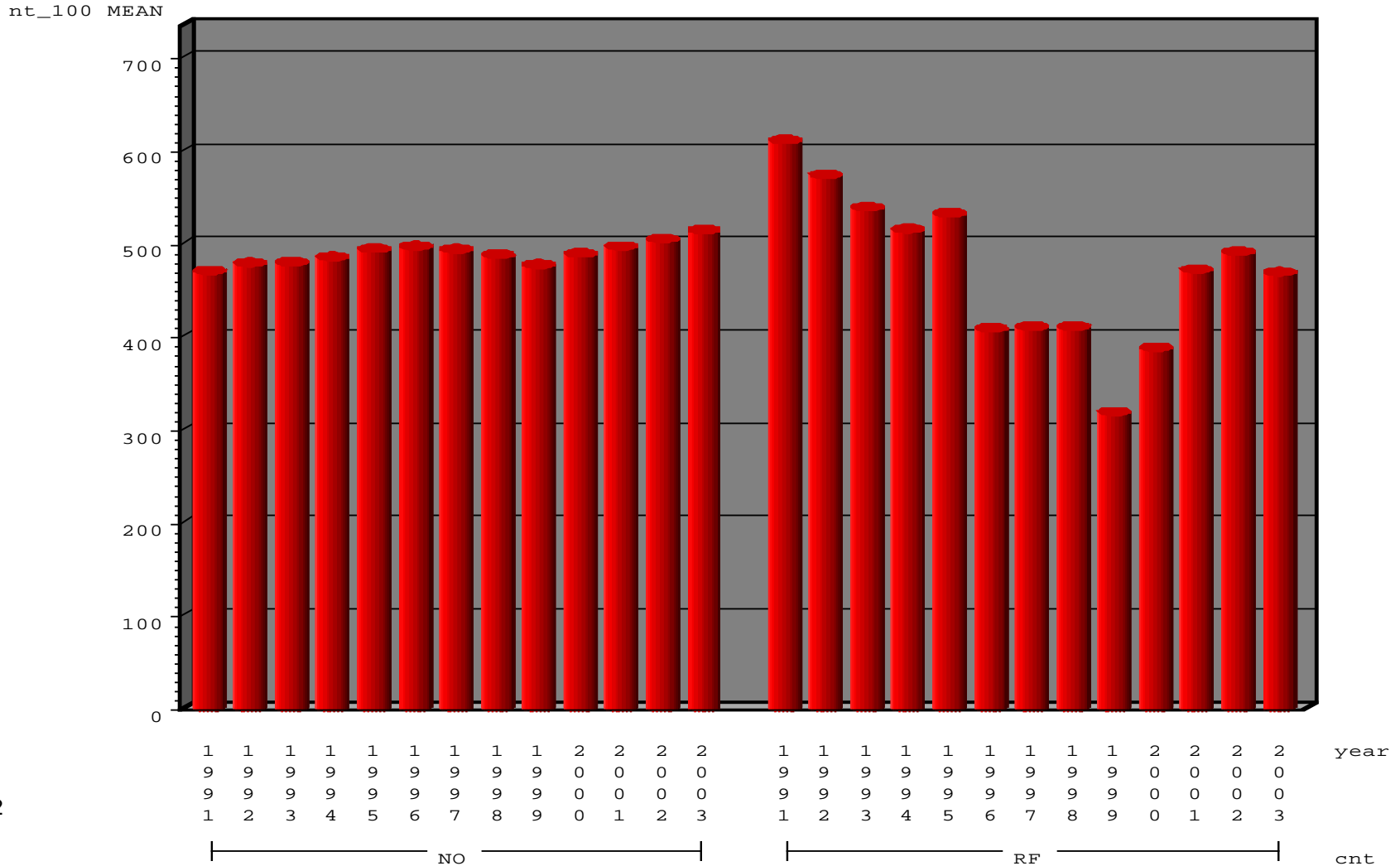
nt_850 MEAN



1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	year	
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	9	0	0	0	0	
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	9	0	0	0	0	
1	2	3	4	5	6	7	8	9	0	1	2	3	1	2	3	4	5	6	7	8	9	0	1	2	3
----- NO -----												----- RF -----											cnt		

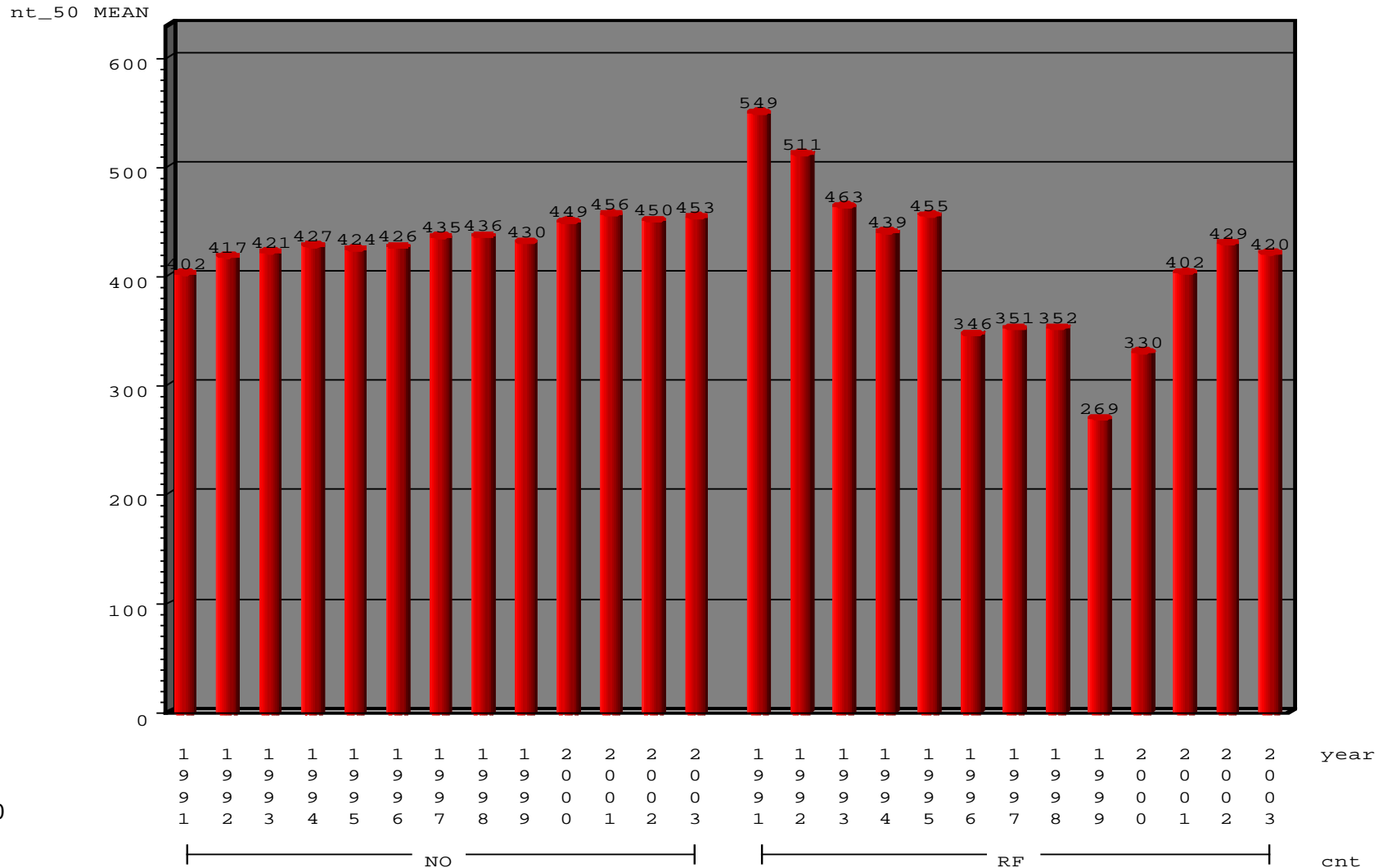
Mean annual 100 hPa T value number per station for GUAN stations (period 1991-2003, 00+12 UTC):

Not RF + fUSSR – left group
RF + fUSSR – right group



Mean annual 50 hPa T value number per station for GUAN stations (period 1991-2003, 00+12 UTC):

Not RF + fUSSR – left group
 RF + fUSSR –right group

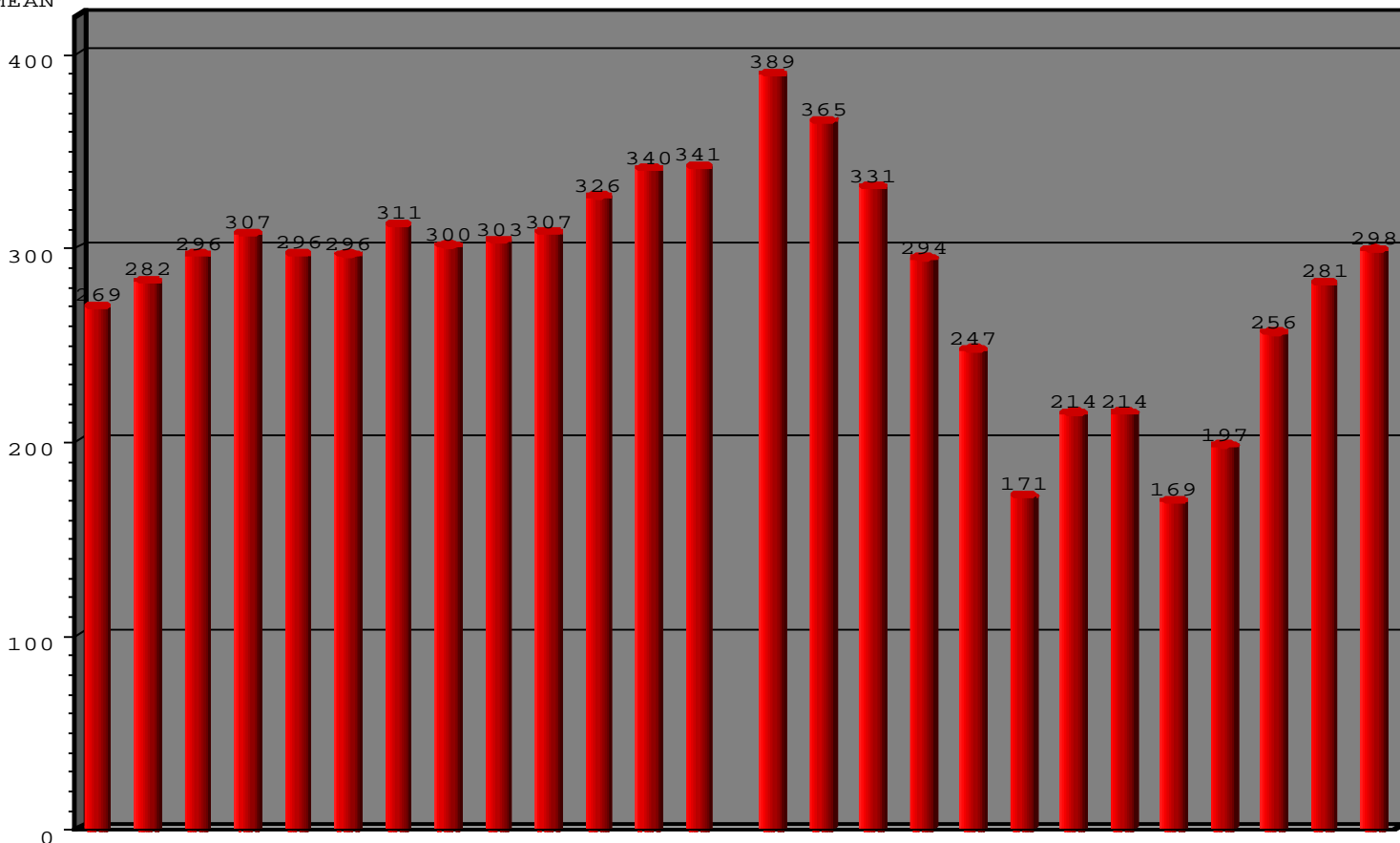


8/20/20

Mean annual 20 hPa T value number per station for GUAN stations (period 1991-2003, 00+12 UTC):

Not RF + fUSSR – left group
 RF + fUSSR –right group

nt_20 MEAN



1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	year	
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	0	0	0	0		
9	9	9	9	9	9	9	9	9	0	0	0	0	9	9	9	9	9	9	9	0	0	0	0		
1	2	3	4	5	6	7	8	9	0	1	2	3	1	2	3	4	5	6	7	8	9	0	1	2	3
----- NO -----													----- RF -----											cnt	

8/20/2

Very old historical radiosonde data

- There are very old radiosonde data (for 30s, 40s and 50s of past century) in hardcopies, in various countries, including Russia
- The amount of these data is not negligible, and their value for climate studies seems to be considerable
- Efforts are needed to create, based on digitizing these data, a climate related, high quality data set
- This must be more than simply digitizing process

Some concluding remarks

- **A dramatic crisis in Russian U/A observational network in second half of 1990s, affected availability of radiosonde obs from russian stations, both GUAN and non-GUAN stations**
- **Since 1999, Roshydromet did his best to provide recover after crisis for the Russian GUAN U/A stations, and these efforts were successful.**
- **Serious improvement in functioning russian U/A network, both GUAN and non-GUAN, is expected in 2005 (growth of radiosonde launches amount by 32%, recovery of 00+12 UTC observation schedule)**
- **Serious gaps in radiosonde data availability remain, both for GUAN and non-GUAN stations, for fUSSR and non-fUSSR stations**

Some concluding remarks: on way to U/A CRN

- **Priority #1 for future:**

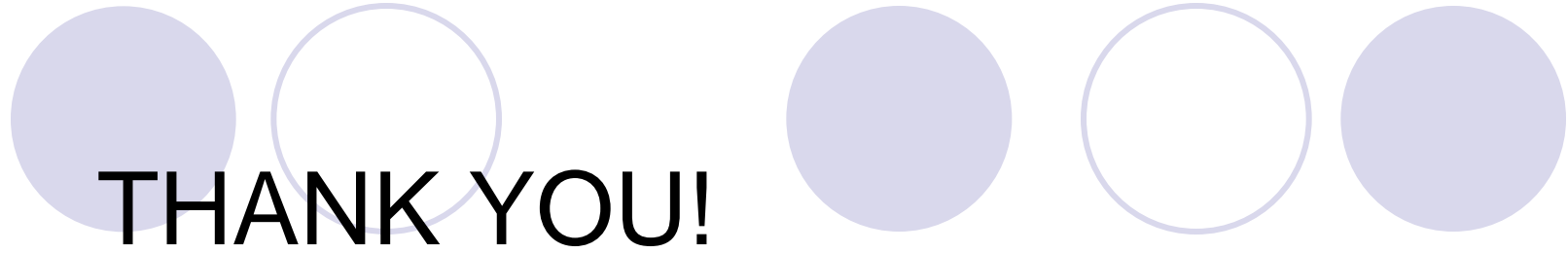
- To provide comprehensive and GUAN networks, as a heritage for future systems, in a better state than they are at this moment
- to improve the existing procedure of global radiosonde data utilization for climate research goals, including observational schedule, transfer and collection via GTS, quality check and improvement, analysis, etc.
- Progress in this should be maximally rapid

- **Priority #2:**

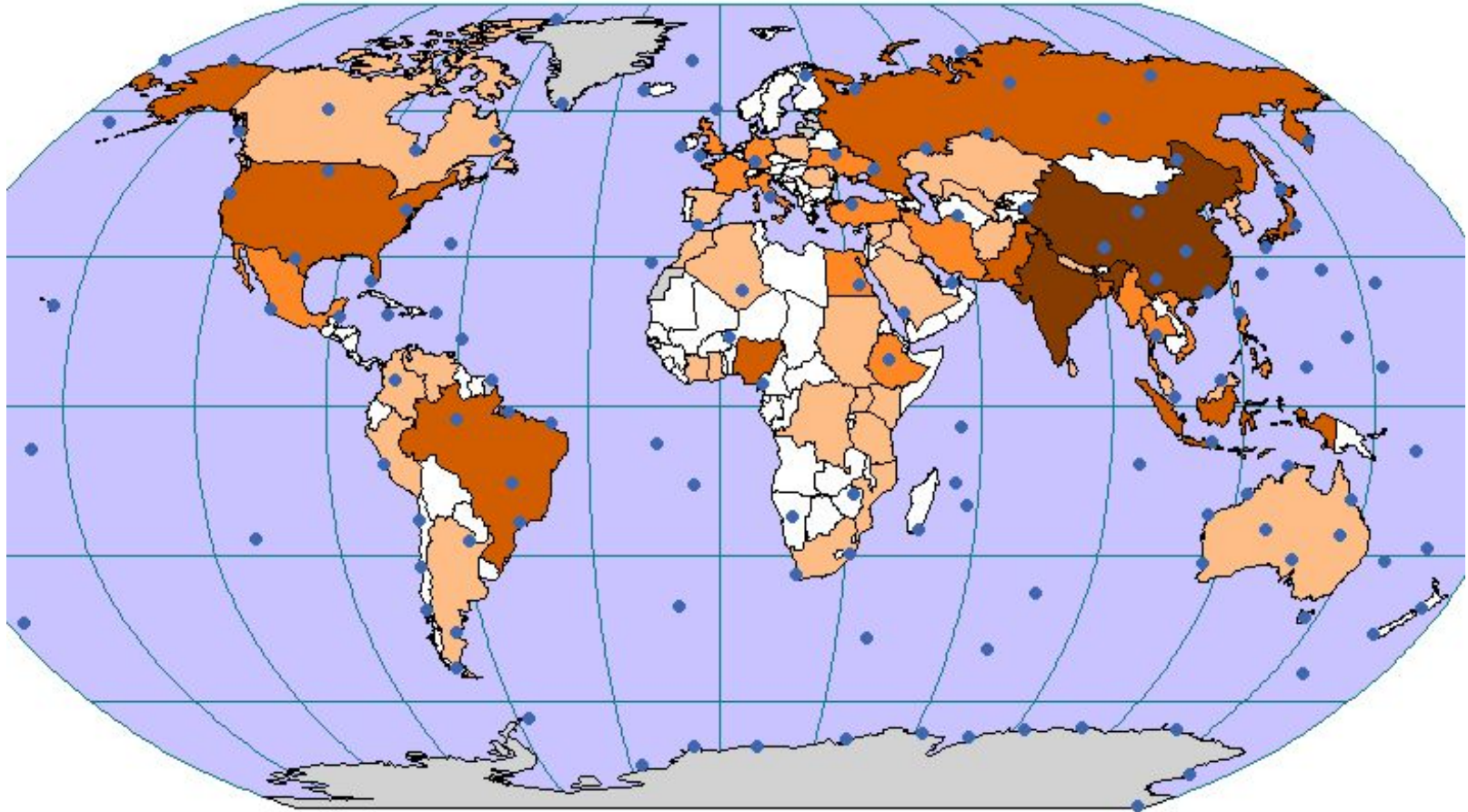
- To work out requirements for new observational instruments, first of all, for new models of sondes (Priority of Workshop 2)
- To take into account cost considerations and affordability of these new obs instruments for worldwide observers, especially for developing countries and those in transition
- The implementation of these new instruments must be step-by-step effort, must follow in time the results from Priority #1 efforts, and in no way should not conflict with efforts under Priority #1.

We offer:

- **To provide redundancy in efforts to collect, archive, quality assure, assess and disseminate the radiosonde data from global network**
- **With this in mind, to consider the RIHMI-WDC (Obninsk, Russia) as an additional center to collect, archive global radiosonde data**
- **To provide radiosonde-based data products that can serve as “bridges” between observational datasets of huge volume, on one hand, and highly averaged spatially and temporally outcomes, on other hand. The extended set of monthly radiosonde statistics (MONADS Version 2) is one of such “bridges” – an experimental fragment may be given to interested persons for critical review**



GUAN MAP

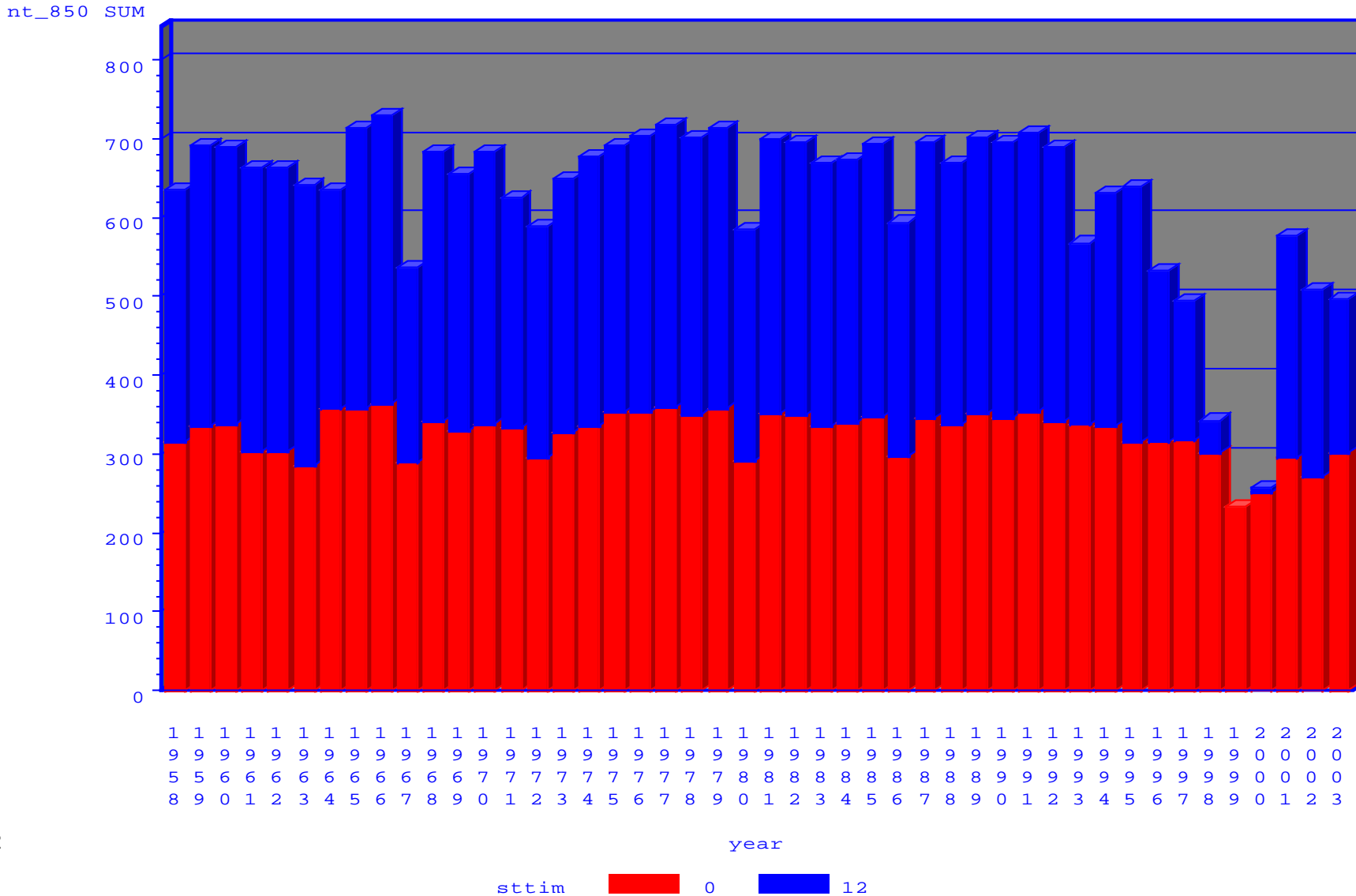


**Summarizing table: GUAN vs. non-GUAN stations of fUSSR and non-fUSSR
(mean annual number of OBS for 00 and 12 GMT per station)**

YEAR	fUSSR GUAN	fUSSR Non-GUAN	Non-fUSSR GUAN	Non-fUSSR Non-GUAN
1999	359	221	468	360
2000	420	297	500	352
2001	568	347	506	356
2002	557	355	504	375
2003	535	344	512	391

GUAN GCOS Stations for Russian Federation and FUSSR

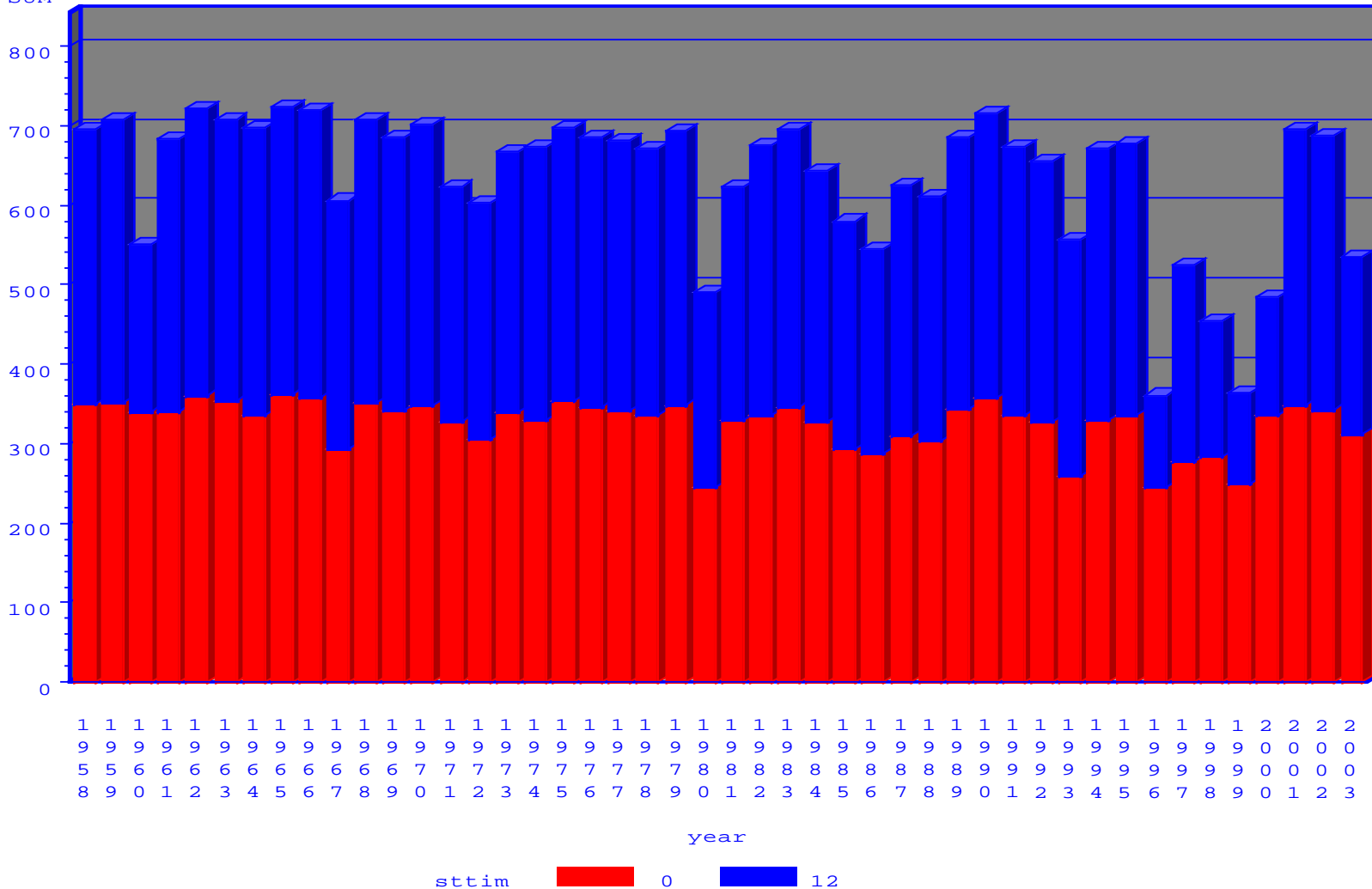
Station ROSTOV/DON (34731) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-



GUAN GCOS Stations for Russian Federation and FUSSR

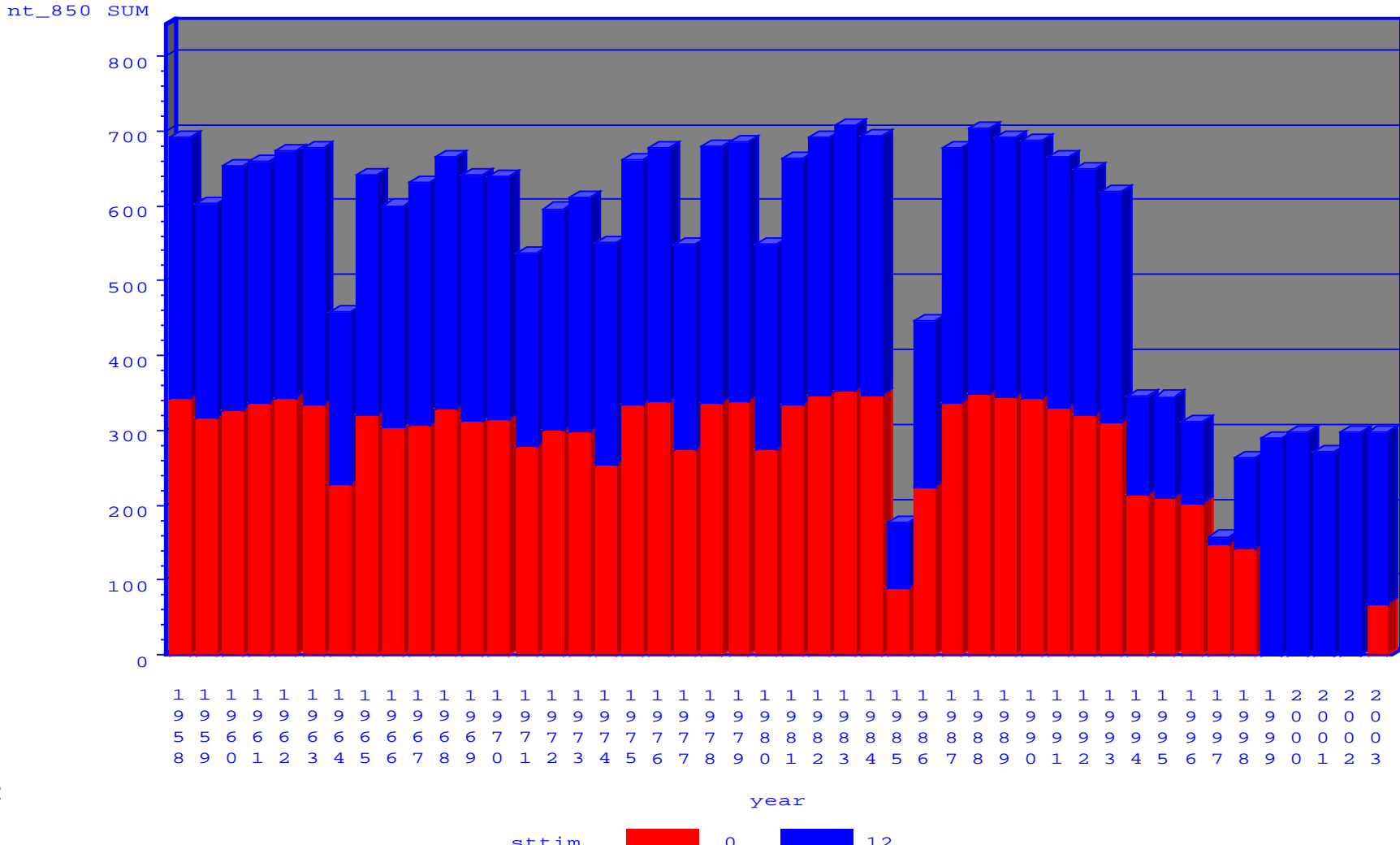
Station KIRENSK (30230) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS)

nt_850 SUM



GUAN GCOS Stations for Russian Federation and FUSSR

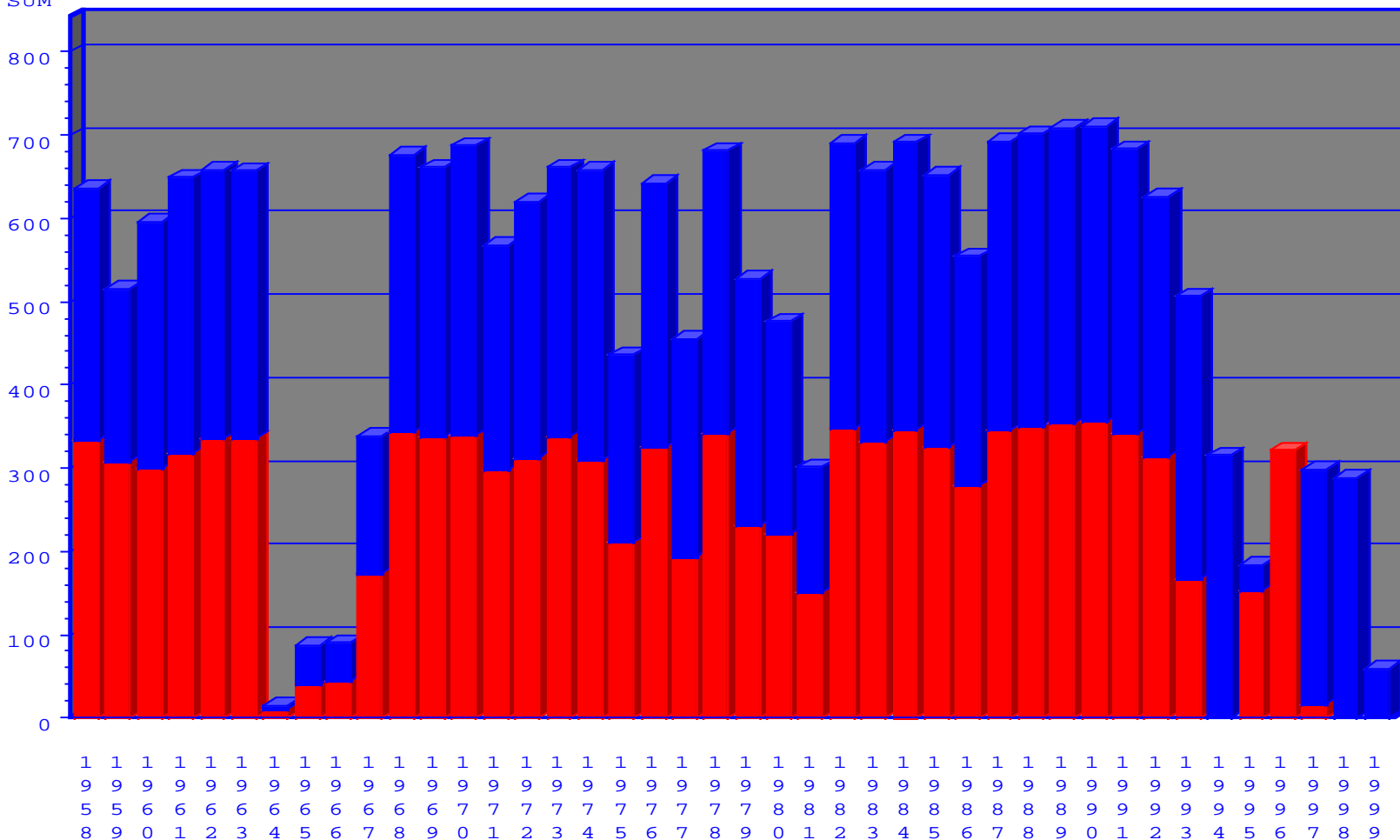
Station DIKSON ISL. (20674) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS)



GUAN GCOS Stations for Russian Federation and FUSSR

Station VRANGELYA ISL. (21982) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC CARDS+GTS) Beginning on 2000 not available

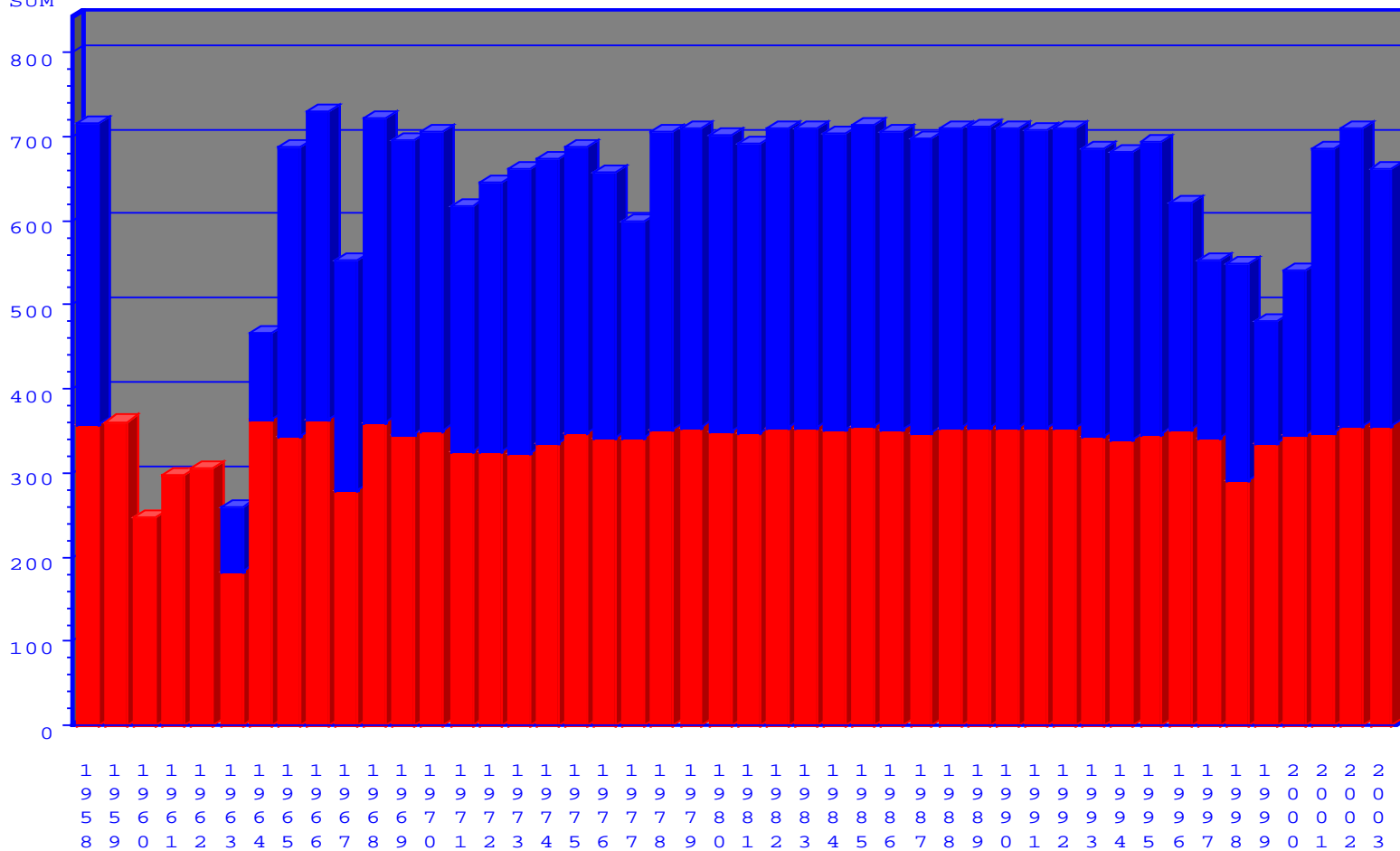
nt_850 SUM



GUAN GCOS Stations for Russian Federation and FUSSR

Station OMSK (28698) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS).

nt_850 SUM

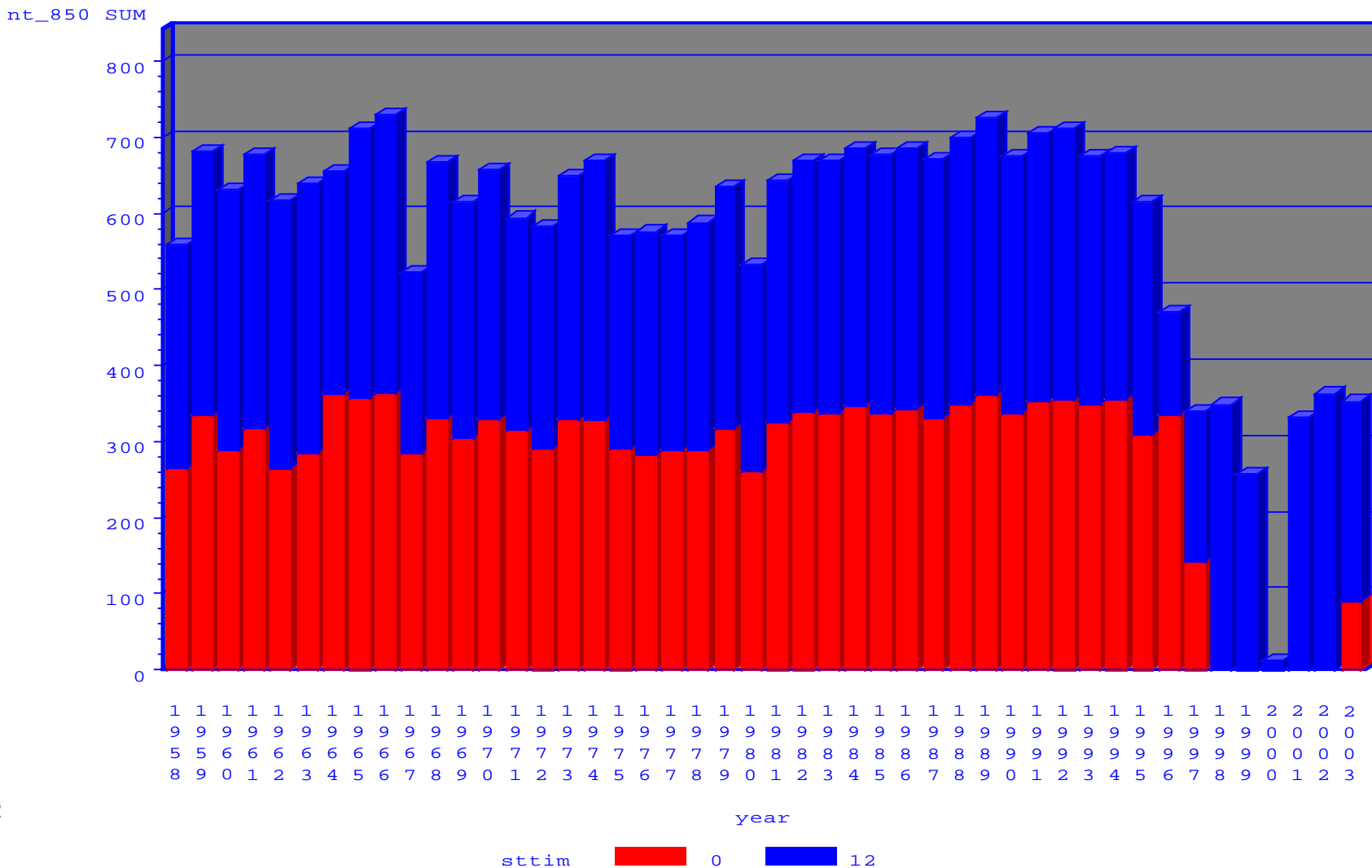


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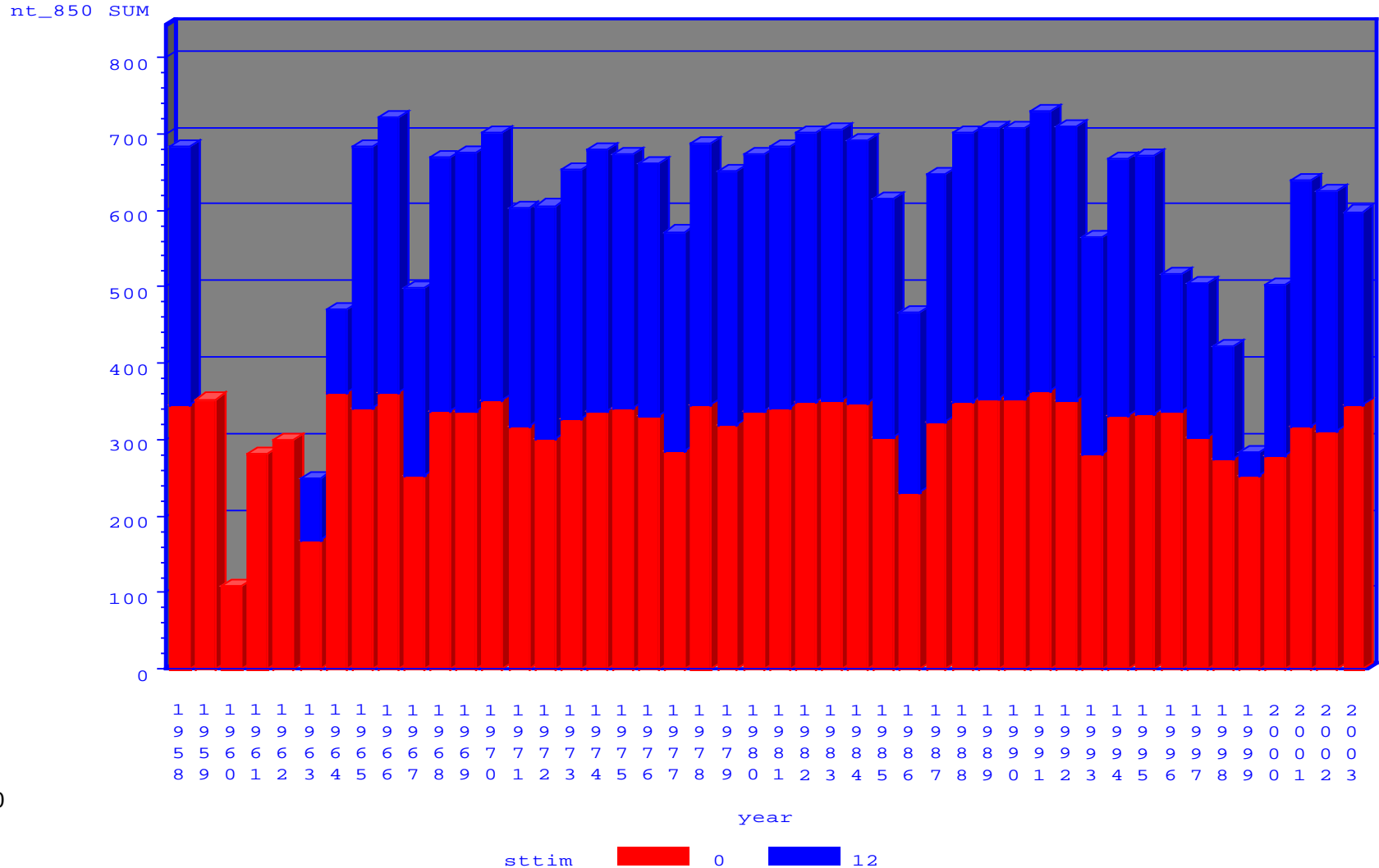
GUAN GCOS Stations for Russian Federation and FUSSR

Station ORENBURG (35121) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS).



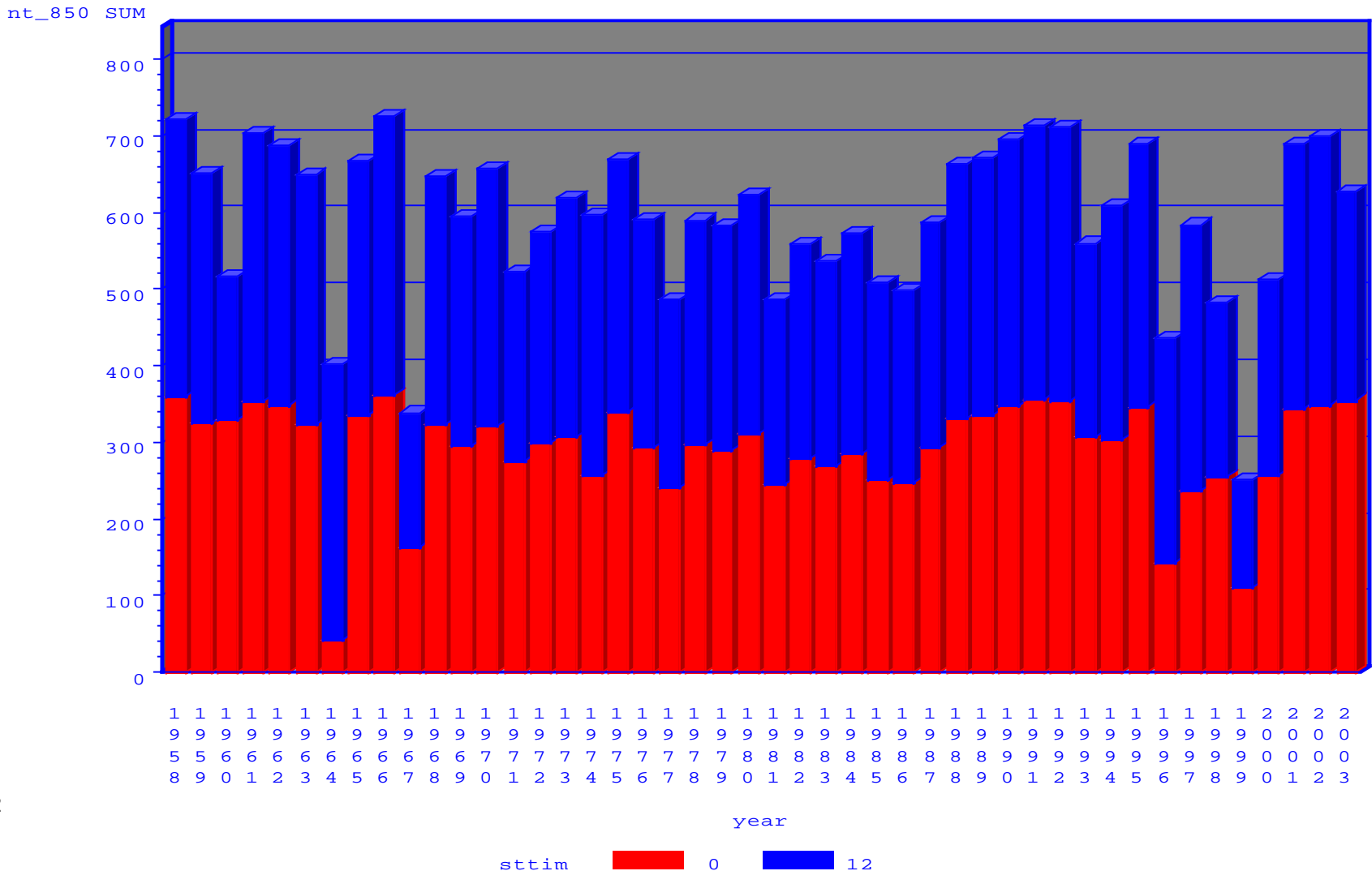
GUAN GCOS Stations for Russian Federation and FUSSR

Station TURUHANSK (23472) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS).



GUAN GCOS Stations for Russian Federation and FUSSR

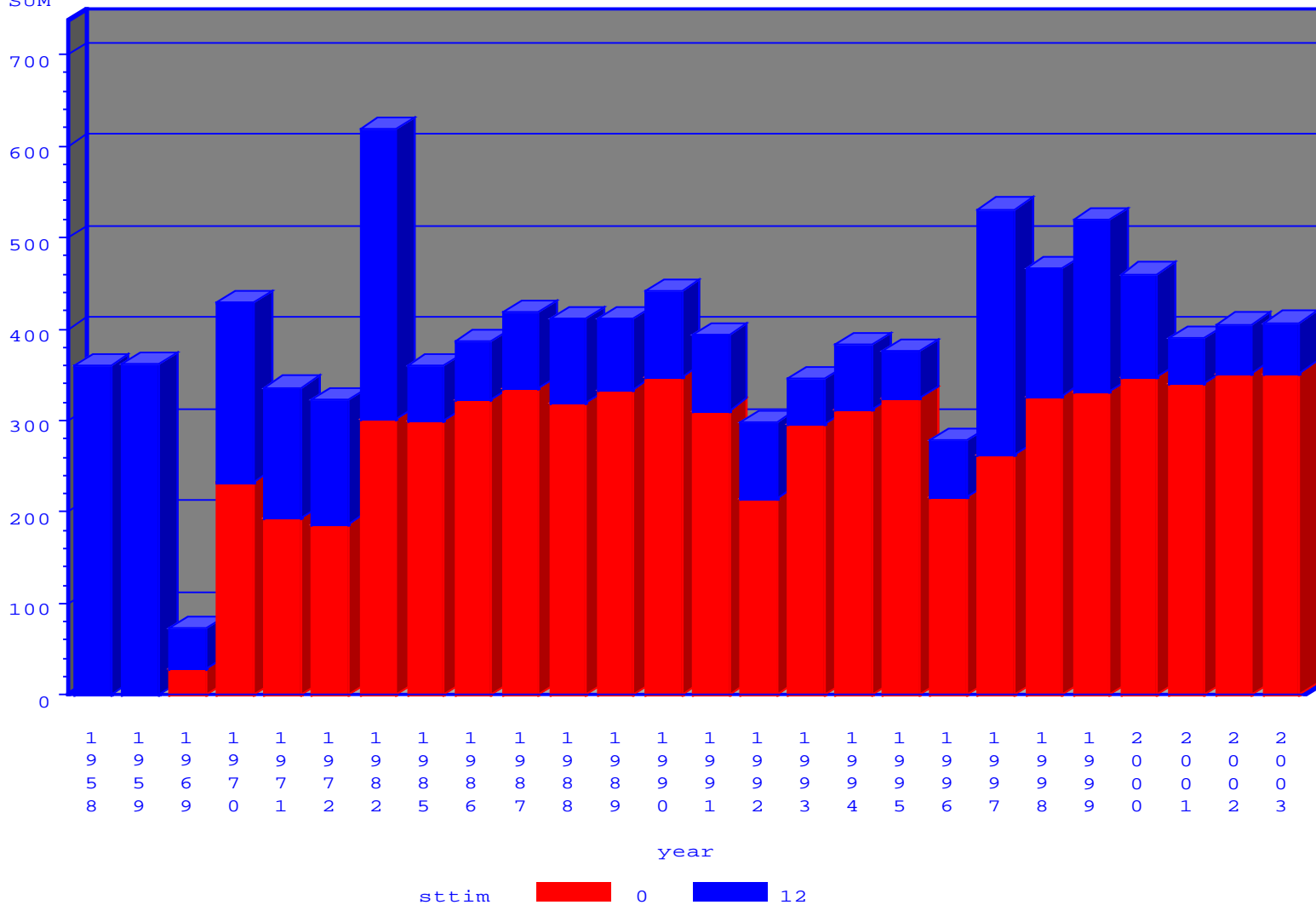
Station VERHOYANSK (24266) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (as in RIHMI-WDC, CARDS+GTS).



GUAN GCOS Stations for Russian Federation and FUSSR

Station MIRNII (89592) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (CARDS+GTS, not all years available)

nt_850 SUM

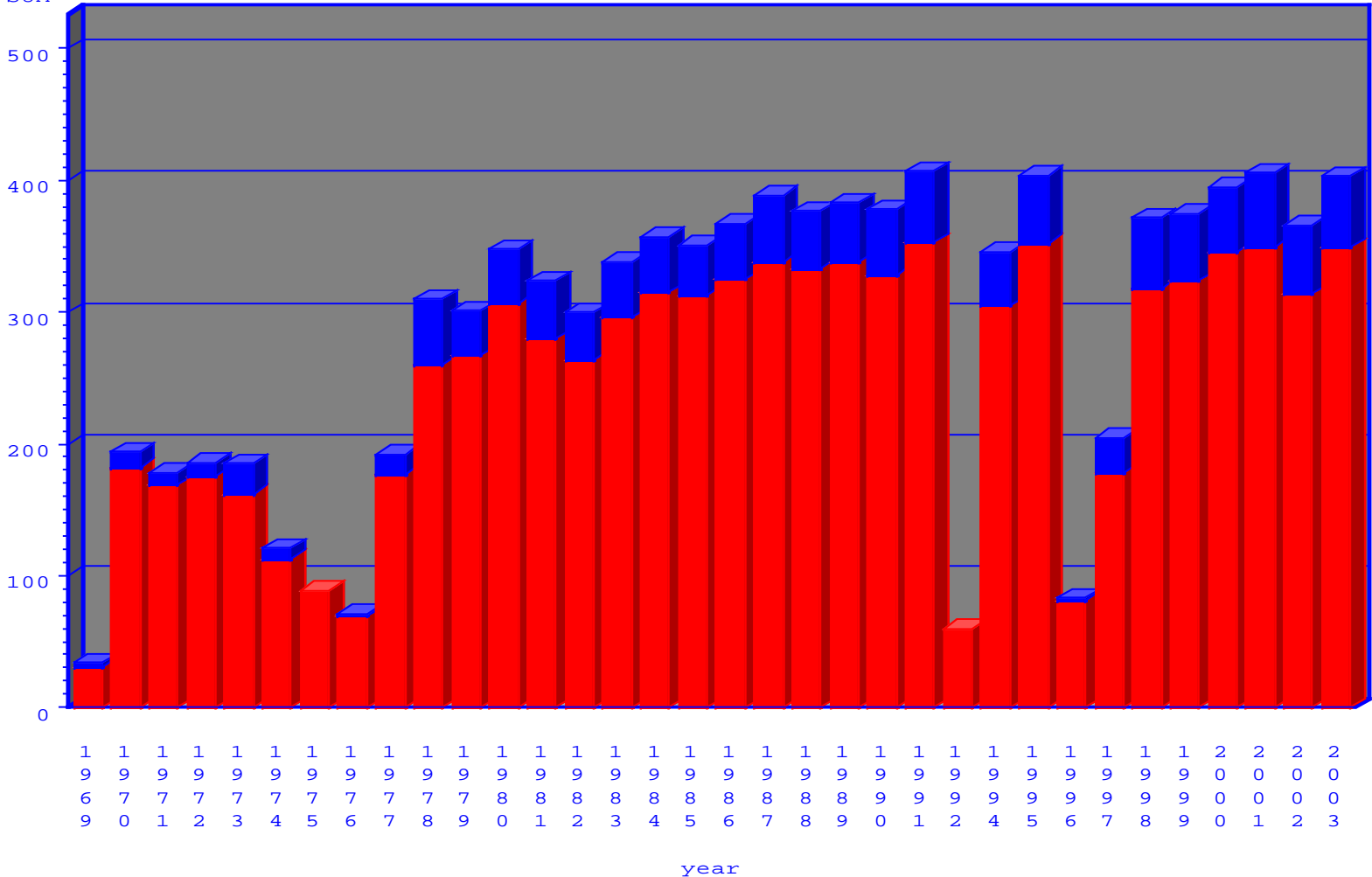


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GUAN GCOS Stations for Russian Federation and FUSSR

Station NOVOLAZAREVSKAYA (89512) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue)
(CARDS+GTS, not all years available)

nt_850 SUM

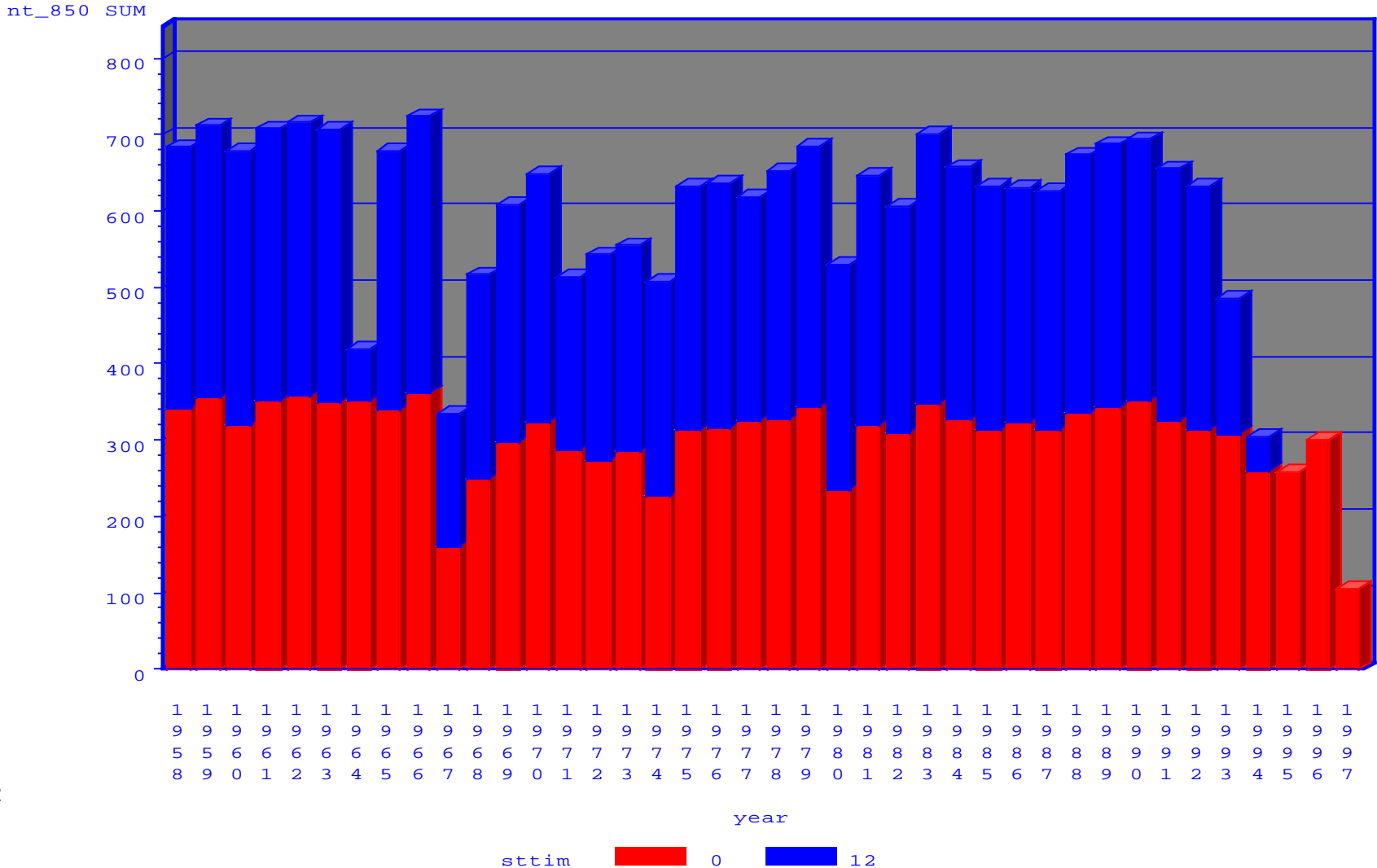


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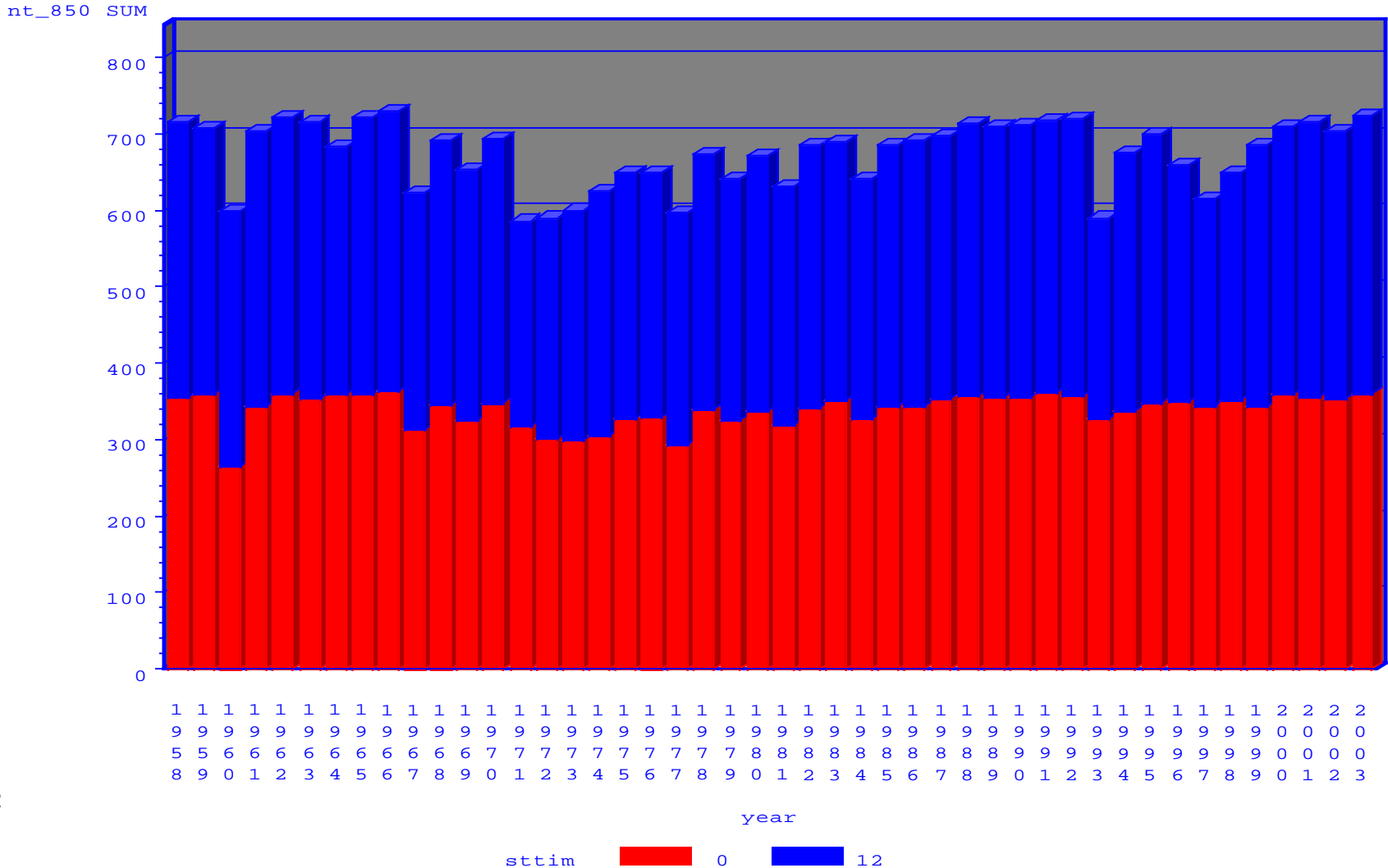
GUAN GCOS Stations for Russian Federation and FUSSR

Station **ASHGABAT -Turkmenistan (38880)** Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue) (CARDS+GTS, not all years available)



GUAN GCOS Stations for Russian Federation and FUSSR

Station KYIV –Ukraine (33345) Annual total of OBS by OBS time (00 GMT –red, 12 GMT – blue, CARDS+GTS)



Technical and technological reconstruction of World Meteorological Center Moscow

- Under Credit of World Bank, the reconstruction is planned to begin in 2005
- It will consider both the operational capacities and archival capacities of russian world centers, regional centers, as well as of russian observational network
- This is expected to improve the situation with russian hydromet service, including radiosonde observations and radiosonde data problems

Concluding remarks:

A serious crisis problem in Russian U/A observational network in second half of 1990s, affected russian stations, both GUAN and non-GUAN stations

Since 1999, Roshydromet did his best to provide recover after crisis for the Russian GUAN U/A stations, and these efforts were successful

In 2000-2003, the mean of OBS per station for 00+12 GMT, for fUSSR GUAN stations exceeded that for non-fUSSR GUAN stations

This value, however, for non-GUAN stations, still remains low both for fUSSR and non-fUSSR stations

The average availability of U/A OBS for higher levels of sounding (50 hPa, 20 hPa), in 2000-2003, for russian GUAN stations, was slightly lower, than that for non-russian GUAN stations

The problems to be resolved:

ASHGABAT operating

VRANGELYA ISL. Operating

Further worldwide efforts are needed to improve the operability and data availability from GUAN stations, both fUSSR and