

National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 6355 (DSI-6355)

Upper Air Russian Ice Island

December 9, 2002

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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1. Abstract: Russian North Pole Raobs, 1950 - 1991, NCAR, Data Support

Section. The [National Center for Atmospheric Research](#) (NCAR) [Data Support Section](#) (DSS) received a version of the Russian North Pole Raobs in November 1999. We had processed previous versions of this collection, but in earlier versions each sounding was in two separate parts, a lower part with data at 3km and below and an upper part with data above 3km. It was nearly impossible to insure that the two parts were combined correctly due to differences in the way times were recorded and the lack of any overlapping data. This new version included the complete soundings in one part and DSS ran comparisons to other data sources to see if the parts seemed to be combined correctly. Additional checks on the data were run by DSS to investigate some of the problems we had noticed in earlier versions. These checks involved checking to insure that the times on the observations seemed correct after converting to GTS. The original times on the soundings were a local time that seemed to cause some confusion with these moving platforms. We checked data by seeing if times looked reasonable, by comparing times on the upper air data to times on the surface data from these same stations, and by comparing the data against these same observations from other sources where we could find them.

Time of Observations

For the data to be useful for Reanalysis, we must know the time of the observation in UTC. The information we had on this latest shipment was that the times are a derived local time, based on using the current longitude and adjusting from Moscow time. For our adjustments we used a longitude of 37deg 34min for Moscow. To get UTC we used 3 hours as the Moscow time difference. The actual longitude difference is about 2.5 hours. We assumed the most likely time for observations based on Russian practice is 1/2 hour before the standard synoptic hours.

We made plots of date versus time of ob to identify the preferred ob time. The plots show the time recorded with the data (local time) and the time after a conversion to Moscow time. Separate plots were made adjusting directly to GMT (using 0 longitude) rather than Moscow time. In general the Moscow plots give better-looking results, but there are a number of questions. A sample plot is shown in figure 1, and the full set of plots is available in a separate document.

For Raobs prior to July 1957, the main upper air synoptic ob times were 03Z and 15Z. The times derived from the local times for data in this period seem to be more like 00:30Z and 12:30Z. Station 04 seems to change ob times to about 13:30Z and 01:30Z in September 1956. Station 06 starts reporting at 13:30Z and 01:30Z (Jun 1956) and switches to 11:30Z and 23:30Z after July 1957.

Stations 07 through 11 seem to report at the expected 1/2 hour before the synoptic hour. Stations 12 through 22 and 28 seem to all report a full hour before the synoptic hour. It is interesting to note that if you convert local time to Greenwich Time directly for stations 12 through 22 and 28 you do get ob times of about 1/2 hour before the synoptic hour.

Stations 26, 30, and 31 have varying ob times and include 1 hour before, 1/2 hour before and right on the synoptic hour.

These plots seem to confirm that the original times are a local time in most cases. The variations are hard to sort out and probably do not have a major

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impact on the usefulness of the data. We accepted the conversions and used the Moscow time as the basis for converting to GMT.

Date-Time Checks

The pressure from surface level of the soundings and the surface pressure from the separate surface observations were plotted versus date-time for each station. These plots usually show good agreement but they also show periods when there seems to be a time shift, periods where there is an apparent offset, and periods of general poor agreement. Plots of the differences in pressure and plots of the pressure values from both sources on the same graph were made. The former show offsets and other problems while the latter show the time offsets. Sample plots are given in figures 2 and 3 and the complete set of plots is available in a separate document. Information on stations with apparent problems follows.

For station 04, there seems to be a number of short periods with one-day offsets. These seem to be related to dateline crossings, but not all crossings cause a shift. This station has many dateline crossings.

For station 08, observations beginning on 23May1960 seem to have a 1-day offset. The upper air observations are assigned a date which is one day later than the surface observations. There is a one-day gap in the upper air data at the beginning of this period which would indicate the problem is probably in the upper-air data. The problem disappears on 12June1960 and then begins again 22July1960 and ends on 25 August1960. These dates correspond to dates when the station crossed the dateline so the problem is almost certainly related to the convention used at the dateline. The local times show no jumps when the station crosses the dateline so it looks as if the dateline was ignored and only the time-of-day was adjusted to Moscow time. It is interesting to note that at a later dateline crossing for this same station the date 17SEP1960 appears twice as one would expect when crossing the dateline moving eastward.

Station 09 seems to have a pressure offset between surface and upper air observations. Beginning on about 17August1960, the upper air pressure tends to be 1.5 to 2 mb lower than the surface pressure. The problem continues until 16 October1960. This station also shows a time shift starting 26FEB1961 and running to the end of the period of record for this station on 11March1961. This again appears to be related to a dateline crossing.

Station 14 from 01JUN1965 to about 10JUN1965 seems to have a one-day shift in ob time. It does seem to be related to a dateline crossing.

Station 15 shows a time shift at the beginning of its record, 11May1966 and continuing through 30June1966. In this case, the upper air appears to have a date one day earlier than the surface data and there is no related dateline crossing. There is also no gap near the end so it is unclear how to handle this case.

Station 16 shows a time shift starting on 4September1968 and ending on 29October1968. Again the shift is linked to a dateline crossing, however this station has a number of other crossings which don't seem to lead to time shifts. Two more that do seem to cause shifts are 30June1969-18July1969 and 29-30November1969.

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Station 26 seems to have a one-day shift, but only for a short period of about 26-28Jul1984. It appears they crossed the dateline and then corrected for the crossing a few days after the actual crossing. This could be caused by uncertainty about the exact position.

Station 30 has a short period 20-22May1989 where the upper-air pressures are up to 5mb above the surface pressures. This occurs after a several day gap in the data and pressures before the gap were in the range of the ones that look bad. The four or five observations should probably be removed.

Station 31 has very poor agreement with the surface pressures for much of its period of record. In general the pressures are 4 to 5 mb higher in the upper-air observations in the beginning of its record with agreement improving to about 1-2mb on about 15APR1990. More investigation is needed on this station.

We did some spot compares to the data from GTS and the surface agrees with surface GTS and upper-air agrees with upper-air GTS.

After applying corrections for the shifts detected above, further checking on poor agreement between surface pressure from the surface observations and the lowest pressure in the Raob it was discovered that there were many short periods involving most stations where the dates were out of order after conversion to Greenwich time. This was traced to the dateline problem, but many of the periods were too short or pressure changes too gradual to be noticed on the plots. It appears that the longitude with the data may not be the same as the longitude used when local date-time was determined and stored with the data. This results in many cases where the day is either one day earlier or one day later because the conversion to local time assumed the station was on one side of the dateline and our conversion to Greenwich from local time using the longitude with the data assumed the station was on the other side of the dateline.

Station NP02 required no day corrections.

Station NP03 required no day corrections.

Station NP04 required 24 day corrections.

Station NP05 required no day corrections.

Station NP06 required 1 day correction.

Station NP07 required 5-day corrections. Station NP07 seems to have a number of observations either out of order or with improper ID lines. This seems to usually occur when the ob frequency changes from twice daily to four times daily or vice-versa. A day change and moving one ob seems to fix this problem.

Station NP08 required 112 day corrections.

Station NP09 required 22-day corrections. This station also had two identical observations on 18Junel962. Also on this same date, a period of 3 mb offset between surface and upper air pressures begins. It ends on about 15 Oct 1960.

Observations with this offset were left in the archive.

Station NP10 required no day corrections. Station NP10 has at least two occurrences where the levels in two consecutive observations have identical values at 3km and below but different values above 3km. This would seem to

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indicate that there was some merging of upper and lower parts and it was not always done correctly. The observations most likely in error were removed from the set.

Station NP11 required no day corrections.

Station NP12 required 1 day correction.

Station NP13 required no day corrections.

Station NP14 required 10 day corrections.

Station NP15 required 1 1/2 day correction.

Station NP16 required 171 day corrections. Station NP16 had two identical obs on 20July1968 and one was removed

Station NP17 required no day corrections.

Station NP19 required 5 day corrections.

Station NP21 required 2 day corrections.

Station NP22 required 3 day corrections.

Station NP26 required 10 day corrections. Station NP26 had one ob on 09JUL1983 that was out of order. It was moved.

Station NP28 required 12 day corrections. Station NP28 had one ob out of order on 20APR1988. It was moved.

Station NP30 required no day corrections. Station NP30 had four observations with very poor agreement with the surface pressure. These observations, 23Z19May1989 - 11Z21May1989 were removed from the record.

Station NP31 required no day corrections. Station NP31 had one ob out of order on 11Z10FEB1991. It was moved. NP31 has problems with offset from surface pressures. See earlier comments.

2. **Element Names and Definitions:** No information provided with original documentation.

3. **Start Date:** 19509999

4. **Stop Date:** 19919999

5. **Coverage:** Around the North Pole.

6. **How to Order Data:**

Ask NCDC's Climate Services about the cost of obtaining this data set.

Phone: 828-271-4800

FAX: 828-271-4876

E-mail: NCDC.Orders@noaa.gov

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7. **Archiving Data Center:**

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

8. **Technical Contact:**

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

9. **Known Uncorrected Problems:** None.

10. **Quality Statement:** Comparison to a separate source for the same data might detect a variety of problems including incorrect times on the soundings and discrepancies in data values. Especially in the earlier NCEP decode files it is not easy to identify the Russian polar stations. Raobs were pulled from the NCEP archives for all stations that might be Russian Polar stations. The earliest data is from 1962 and the data is very sparse (once every few weeks) until the mid seventies and especially 1978 when data is more complete. Until May 1979, the Russian polar data does not have a unique ID in the NCEP decode files. It is also noted that the NCEP files occasionally appear to have incorrect locations on the observations, usually a hemisphere swap (E-W).

Due to the sparseness of the data and the difficulty in identifying the stations, only manual spot checks were made. Comparison files were made and merged together based on time of ob. These were then manually inspected.

No station before station 10 could be compared. Stations 10, 12, 13, and 14 all compared favorably except that the time assigned from the NCEP decode files was always 3 hours later than the time in the Russian archive. The NCEP times tend to be 03 and 15Z and Russian times tend to be around 00 and 12. Since this is well after the date when official ob times were switched to 00 and 12 it seems likely the Russian times are correct. No evidence of improper merging of sound parts was found.

There was a gap in polar data from the NCEP files in the mid 60s and no data was available for comparing stations 15, 16, and 17.

Stations 21, 22, 26, 28, 30, and 31 showed good time agreement and good data compares. No evidence of improper merging of sounding parts was found.

Other Checks

We started to make comparisons of this set to the final set released by John Kahl. There was quite extensive disagreement in the initial comparisons and it wasn't clear what would be gained by pursuing these comparisons. In the interest of saving time, we abandoned these comparisons at least for now

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A quick scan for unreasonable locations was made. One ob from station 7 on 58/11/08 had a bad longitude which was corrected and the GMT time was adjusted to reflect the new longitude. There also seem to be about 8 cases where there are two observations within 30 minutes of one another. The positions are different and this can result in a very unreasonable speed of movement calculation because of the small time gap. No attempt has been made to fix these, but they may also be dateline related.

The first observation of each pair is listed below.

station	date-time (GMT)
NP4	5611 4 14.6
NP6	56 7 9 13.9
NP6	56 710 1.9
NP10	62 821 23.8
NP26	84 9 8 23.9
NP26	84 9 9 11.9
NP28	88 2 7 23.4
NP28	88 2 8 11.4

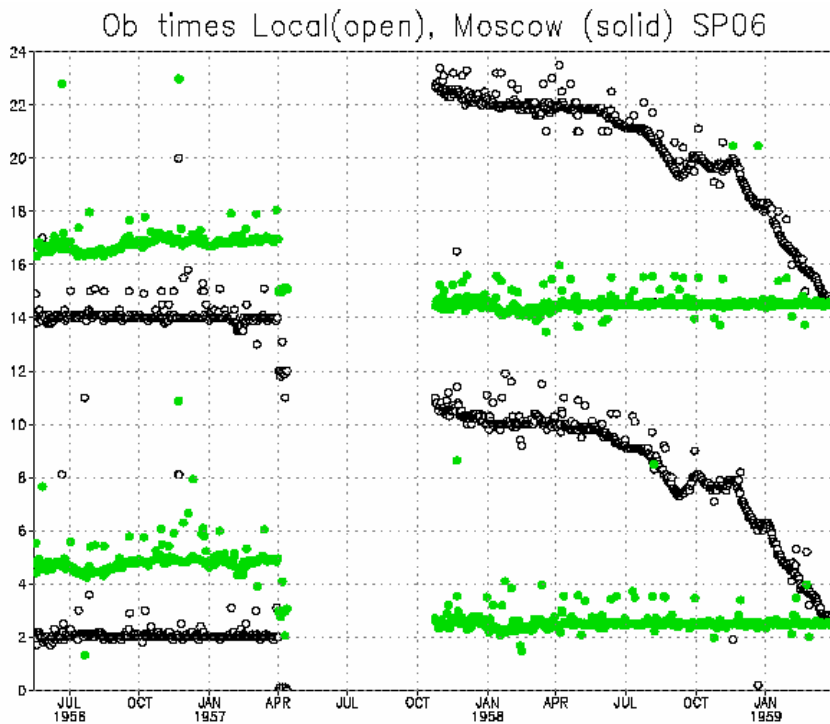


Figure 1. Comparison of time of observation to time after conversion to Moscow time. Note observation time change in July and the much more consistent observation times after conversion to Moscow time.

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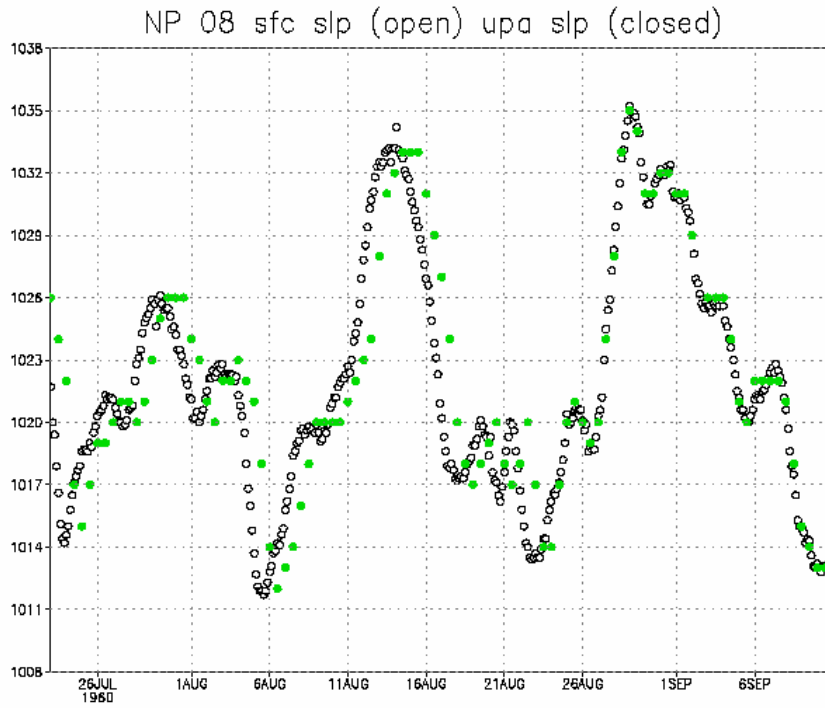


Figure 2. Plot of surface pressure from upper air and surface observations showing a time shift.

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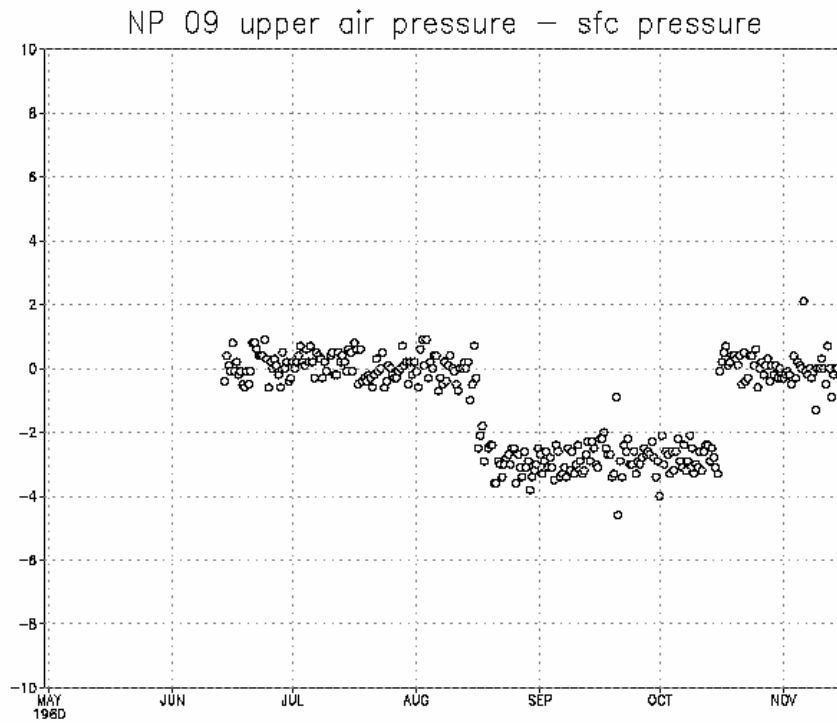


Figure 3. Difference between pressure from surface and upper air observations showing an offset in the pressures.

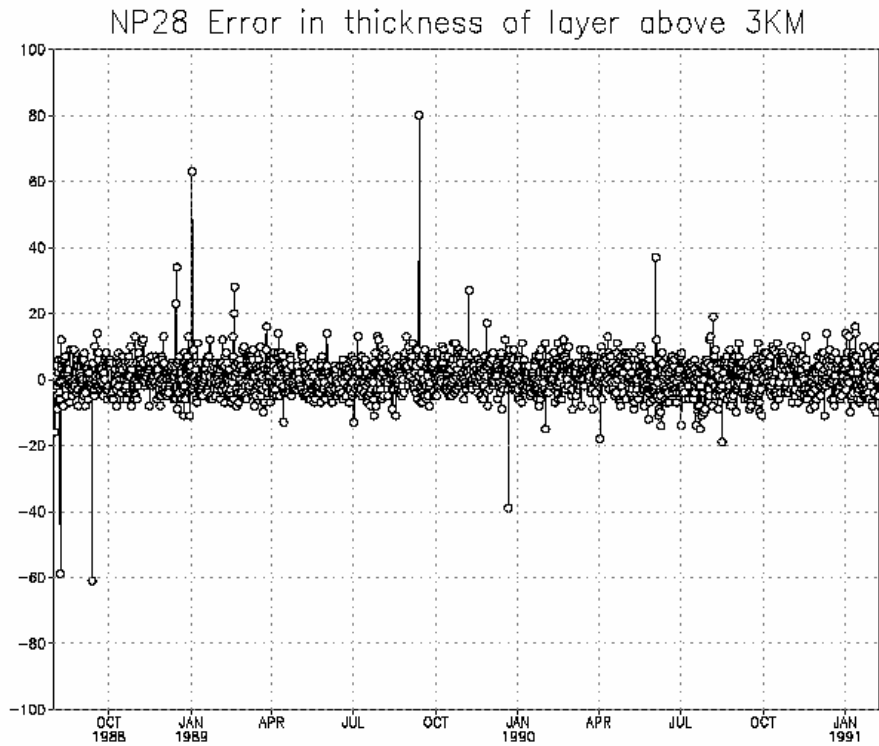


Figure 4. Differences between computed and actual thickness of layer immediately above 3km.

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11. **Essential Companion Datasets:** None.

12. **References:** No information provided with original documentation. Files in this directory include:

- ice.tar - Original data collection as received by DSS in November 1999.
- allnps-v1.0 - Collection with times in UTC and various QC steps applied relating mostly to time or location.
- allnps-v1.1 - Levels out-of-order corrected by making obvious changes to the data, removing a level, or moving a level.
- allnps-v2.0 - 1000 meter levels above 200mb removed (top and bottom levels never removed).

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