



Nimbus Image Dissector Camera System Visible Imagery L1, HDF5, Version 1

USER GUIDE

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Gallaher, D. and G. Campbell. 2013. *Nimbus Image Dissector Camera System Visible Imagery L1, HDF5, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/NIMBUS/NmIDCS1H>. [Date Accessed].

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National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

NSIDC researchers and staff scanned black-and-white Image Dissector Camera System (IDCS) images that were acquired by the Nimbus 3 and Nimbus 4 satellites between 23 April, 1969 and 08 April, 1971 from archival rolls of 70 mm, black-and-white film. Each data file contains an array of 8-bit gray scale values, plus estimates of the latitude and longitude for each pixel and a gray scale calibration map. Browse images are also available.

1.1 Format

Data are provided as HDF5-formatted files. HDF-EOS (Hierarchical Data Format - Earth Observing System) is a self-describing file format based on HDF that was developed specifically for distributing and archiving data collected by NASA EOS satellites. For more information, visit the [HDF-EOS Tools and Information Center](#). Browse images are also available.

1.2 File Naming Convention

This section explains the file naming convention used for NmIDCS1H data files.

Example file name:

NmIDCS1H.[OOOO].YYYY.[MM].[DD].[HH].[MI].[SS].[DDD].[Tx.Ty].[Tn].Q[n].[varies].crc.hdf

Refer to Table 1 for descriptions of the file name variables listed above.

Table 1. File Naming Convention Variables and Descriptions

Variable	Description
OOOO	Orbit number
YYYY	Year (1969 or 1970)
MM	Month
DD	Day
HH	Hour
MI	Minute
SS	Second
DDD	Day of year
[Tx.Ty]	Tx = image center, x-direction, from fiducial mark Ty = image center, y-direction, from fiducial mark
Tn	Frame number on film reel
Q[n]	Quality (Q1 = failed; Q2 = passed)
Varies	Internal use. May not be present.

1.3 File Size

Data files typically range between 7 MB - 10 MB.

1.4 Spatial Coverage

Coverage is global, however some regions (parts of Alaska, for example) are not available due to technological limitations at the time of the mission. Individual images cover approximately 2000 km x 2000 km.

1.4.1 Spatial Resolution

Roughly 2 km.

1.4.2 Projection and Grid Description

Estimated latitude and longitude is provided for each pixel.

1.5 Temporal Coverage

Intermittent coverage is available from 23 April, 1969 to 08 April, 1971. Appendix A lists the number of granules that were recovered for each of the period of record.

1.5.1 Temporal Resolution

Successive images are separated in time by 210 seconds. Note that due to the IDCS's rotating scan system successive images overlap each other in space by 50 percent. Refer to Section 3.1 Data Acquisition Methods for details.

1.6 Parameter or Variable

Table 2 describes the data fields and corresponding attributes stored in NmIDCS1H data files.

Table 2. NmIDCS1H Data Fields

Data Field	Description	Attributes	Value
brightness	Calibrated 8-bit gray scale values (see Section Gray Scale Calibration)	DOI	10.5067/NIMBUS/NmIDCS1H
		ESDT	NmIDCS1H (data set short name)
		long_ESDT	Nimbus Image Dissector Camera System Visible Imagery L1, HDF5 (data set long name)

Data Field	Description	Attributes	Value
		units	1
byte cosine sun zenith angle	Estimated sun zenith angles (cosine)	–	–
byte cosine view angle	Estimating view angles (cosine)	–	–
latitude	Estimated latitudes	nav_info	standard navigation
		units	degrees_north
long scan line time since 1970	Image acquisition date and time in seconds since 00:00:00, 01 January 1970	–	–
longitude	Estimated longitudes	nav_info	standard navigation
		units	degrees_east
raw_brightness	Raw 8-bit gray scale values	–	–

2 SOFTWARE AND TOOLS

HDF-compatible software packages, such as [HDFView](#) and [Panoply](#), can be used to read, extract, and display NmIDCS1H data files.

3 DATA ACQUISITION AND PROCESSING

3.1 Data Acquisition Methods

To obtain the along-track scan, the IDCS rotated the sensor counter to the motion of the satellite for 200 seconds (the cross-track scan was acquired by a drift tube sensor). After 200 seconds, the sensor returned to the starting position to begin the next acquisition 210 seconds after the previous image. As a result, successive images overlap each other in space by 50 percent.

The IDCS output was stored as brightness levels on a tape recorder and transmitted as an analog signal to ground stations within range of the satellite and eventually to Goddard Space Flight Center (GSFC). At GSFC, the images were reconstructed on a television picture tube and captured on black-and-white 70 mm film. The film images were then duplicated onto long reels and archived at NASA (and later NOAA). The film rolls remained in storage for some 40 years until NSIDC investigators undertook the task of digitizing the images for new climate research and preservation.

3.2 Derivation Techniques and Algorithms

3.2.1 Trajectory and Attitude Data

Navigation parameters were derived from the user guide description of the instrument. Satellite ephemeris and image times were used to estimate the cosine of the sun zenith angle and viewing angle and latitude and longitude for every pixel. Although the images contained tick marks indicating lines of latitude and longitude, the investigators believe the calculated positions better align the images with identifiable landmarks.

3.2.2 Processing Steps

The PIs received the IDCS images on 300-foot rolls of 70 mm, black-and-white film comprising many days of data. NSIDC researchers and staff scanned the film images, including margins, to 8-bit TIFF files. The 8-bit scanning depth exceeds the true gray scale resolution. The images were also oversampled in space to ensure a strong correlation between adjacent pixels.

The digitized images were first trimmed and then evaluated with specially written software that allowed an operator to identify the center point from fiducial marks and read the image time. Latitudes and longitudes were then estimated for every pixel based on satellite ephemeris and image acquisition time. Intermediate files were inspected visually and flagged for quality, and then final images were written to HDF5-formatted files.

3.2.2.1 Gray Scale Calibration

To reduce differences in brightness between images due to variations in film developing, the investigators constructed individual histograms from all images in an orbit and matched histograms between many orbits.

3.2.3 Error Sources

3.2.3.1 Navigation

None of the original Nimbus calibration programs have survived. Furthermore, the navigation accuracy is limited by the satellite attitude control, which was no better than 1 degree, and no further information about the attitude is available. By eye, the navigation and continental boundaries line up with some random error.

However, due to ambiguity in the user guide description of the instrument, the navigation has systemic errors that produce noticeable mismatches between images showing the same geographic features. This error may have arisen because the roll, pitch, and yaw of the satellite

were not recorded. Based on a review of many images of the Mediterranean, navigation accuracy is better in equatorial regions.

3.2.3.2 Image Quality

The investigators estimate that the effective gray scale resolution is 4-bit, a result of the initial sensitivity of the IDCS degraded by accumulated photo processing and digitization. However, the resolution is sufficient to at least qualitatively recognize clouds, ocean, land, and ice. Albedos and optical depths are likely irretrievable.

3.3 Quality Assessment

These data should be considered semi-quantitative. Features such as ocean and land areas and weather and sea ice variations are typically distinguishable. Subtle changes in the land surface, however, have been lost due to variations in photographic processing and should be treated with caution. For example, although these data can reveal historical storm tracks and sea ice boundaries, they would not be suitable for radiation budget studies.

3.4 Sensor or Instrument Description

The Image Dissector Camera System (IDCS) was a shutterless, electronic scan and step tube mounted behind a 108-degree wide-angle, 5.7 mm focal length lens. The camera was installed on the bottom of the satellite sensory ring and pointed vertically down toward the earth at all times. The optical field of view was 73.6 degree in the direction of flight and 98.2 degree in the plane perpendicular to flight. The instrument optics focused the image on the dissector tube's photosensitive surface, while a line-scanning beam scanned the surface at 4 Hz with a frame period of 200 seconds. At the nominal spacecraft altitude of 1100 km, the resulting pictures covered approximately 1400 km on a side with a ground resolution of 3 km at nadir. Scanning and stepping functions occurred continuously as the satellite progressed along its orbital path. Pictures were either transmitted to ground stations in real time or stored on magnetic tape for subsequent transmission.

For additional information about the Nimbus IDCS, see the National Space Science Data Center's [Image Dissector Camera System \(IDCS\)](#) web page.

3.5 Version History

Table 3. Version History

Version (Date)	Details
V1.1 (11 December 2014)	Nimbus-4 data added.
V1 (11 July 2013)	Initial release.

4 REFERENCES AND RELATED PUBLICATIONS

4.1 References

Gallaher, D., G. G. Campbell, and W. N. Meier. In Press. Anomalous Variability in Antarctic Sea Ice Extents During the 1960's with the Use of Nimbus Satellite Data. *Journal of Selected Topics in Applied Earth Observations and Remote Sensing*.

Meier, W. N., D. Gallaher, and G. G. Campbell. 2013. New Estimates of Arctic and Antarctic Sea Ice Extent During September 1964 from Recovered Nimbus I Satellite Imagery. *The Cryosphere Discuss* 7:35-53. doi: [10.5194/tcd-7-35-2013](https://doi.org/10.5194/tcd-7-35-2013).

4.2 Related Data Sets

See the [Nimbus Data Rescue Project | Data Sets](#) page.

4.3 Related Websites

- [NASA Science | Missions: Nimbus](#)
- [Advanced Vidicon Camera System \(AVCS\)](#)
- [High-Resolution Infrared Radiometer \(HRIR\)](#)
- [Image Dissector Camera System \(IDCS\)](#)

5 CONTACTS AND ACKNOWLEDGMENTS

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5.2 Acknowledgments

The Nimbus Data Rescue Project: Nimbus 1, 2, 3 was supported by NASA contract #NNG08HZ07C as a subtask to NSIDC at the University of Colorado. The PIs also wish to thank Alex Calder, Carl Gallaher, and Anna Schroeder for their contributions to this project, and NSIDC student workers William Harris and Amy Randall.

6 DOCUMENT INFORMATION

6.1 Publication Date

December 2014

6.2 Date Last Updated

13 November 2020

APPENDIX A – GRANULES BY DAY

Intermittent coverage is available from 23 April 1969 to 08 April 1971. Table A - 1 and Table A - 2 list the number of granules that were recovered for each day of the period of record for Nimbus 3 (23 April 1969 to 21 January 1970) and Nimbus 4 (30 April 1970 to 08 April 1971), respectively.

Table A - 1. Nimbus 3 Granules Produced by Day/Date

Year	Day of Year	Granules Produced	Month	Day
1969	113	17	4	23
1969	114	140	4	24
1969	115	133	4	25
1969	116	164	4	26
1969	117	133	4	27
1969	118	155	4	28
1969	119	115	4	29
1969	120	136	4	30
1969	121	147	5	1
1969	122	107	5	2
1969	123	157	5	3
1969	124	139	5	4
1969	125	124	5	5
1969	129	74	5	9
1969	130	135	5	10
1969	131	142	5	11
1969	132	128	5	12
1969	133	114	5	13
1969	134	75	5	14
1969	135	68	5	15
1969	136	124	5	16
1969	137	117	5	17
1969	138	119	5	18
1969	139	130	5	19
1969	140	136	5	20
1969	141	131	5	21
1969	142	132	5	22
1969	143	75	5	23
1969	144	91	5	24

Year	Day of Year	Granules Produced	Month	Day
1969	145	99	5	25
1969	146	98	5	26
1969	147	73	5	27
1969	148	131	5	28
1969	149	143	5	29
1969	150	135	5	30
1969	151	132	5	31
1969	152	140	6	1
1969	153	133	6	2
1969	168	128	6	17
1969	169	99	6	18
1969	170	138	6	19
1969	171	143	6	20
1969	172	131	6	21
1969	173	145	6	22
1969	174	135	6	23
1969	175	123	6	24
1969	176	132	6	25
1969	177	102	6	26
1969	178	123	6	27
1969	179	110	6	28
1969	180	120	6	29
1969	181	129	6	30
1969	182	128	7	1
1969	183	144	7	2
1969	184	129	7	3
1969	185	139	7	4
1969	186	116	7	5
1969	187	130	7	6
1969	188	125	7	7
1969	189	143	7	8
1969	190	157	7	9
1969	191	115	7	10
1969	192	128	7	11
1969	193	138	7	12

Year	Day of Year	Granules Produced	Month	Day
1969	194	131	7	13
1969	195	89	7	14
1969	196	111	7	15
1969	197	126	7	16
1969	198	91	7	17
1969	199	116	7	18
1969	200	9	7	19
1969	201	132	7	20
1969	202	131	7	21
1969	203	107	7	22
1969	204	129	7	23
1969	205	118	7	24
1969	206	134	7	25
1969	207	132	7	26
1969	208	127	7	27
1969	209	120	7	28
1969	210	159	7	29
1969	211	142	7	30
1969	212	149	7	31
1969	213	144	8	1
1969	214	128	8	2
1969	215	154	8	3
1969	216	136	8	4
1969	217	127	8	5
1969	218	116	8	6
1969	219	118	8	7
1969	220	116	8	8
1969	221	137	8	9
1969	222	138	8	10
1969	223	119	8	11
1969	224	128	8	12
1969	225	142	8	13
1969	226	154	8	14
1969	227	120	8	15
1969	228	134	8	16

Year	Day of Year	Granules Produced	Month	Day
1969	229	156	8	17
1969	230	118	8	18
1969	231	128	8	19
1969	232	149	8	20
1969	233	145	8	21
1969	234	141	8	22
1969	235	147	8	23
1969	236	154	8	24
1969	237	148	8	25
1969	238	96	8	26
1969	241	12	8	29
1969	242	146	8	30
1969	243	102	8	31
1969	245	131	9	2
1969	246	160	9	3
1969	247	148	9	4
1969	248	155	9	5
1969	249	154	9	6
1969	250	150	9	7
1969	251	152	9	8
1969	252	118	9	9
1969	253	144	9	10
1969	254	154	9	11
1969	255	148	9	12
1969	256	153	9	13
1969	257	159	9	14
1969	258	155	9	15
1969	259	146	9	16
1969	260	135	9	17
1969	261	137	9	18
1969	262	114	9	19
1969	263	130	9	20
1969	264	146	9	21
1969	265	122	9	22
1969	266	121	9	23

Year	Day of Year	Granules Produced	Month	Day
1969	267	117	9	24
1969	268	119	9	25
1969	269	119	9	26
1969	270	124	9	27
1969	271	121	9	28
1969	272	131	9	29
1969	273	132	9	30
1969	274	108	10	1
1969	275	123	10	2
1969	276	147	10	3
1969	277	152	10	4
1969	278	135	10	5
1969	279	149	10	6
1969	282	37	10	9
1969	283	94	10	10
1969	284	148	10	11
1969	285	147	10	12
1969	286	139	10	13
1969	287	137	10	14
1969	288	133	10	15
1969	289	139	10	16
1969	292	44	10	19
1969	293	142	10	20
1969	294	153	10	21
1969	295	140	10	22
1969	296	154	10	23
1969	297	144	10	24
1969	298	149	10	25
1969	299	144	10	26
1969	300	159	10	27
1969	301	127	10	28
1969	302	139	10	29
1969	303	138	10	30
1969	304	134	10	31
1969	305	135	11	1

Year	Day of Year	Granules Produced	Month	Day
1969	306	121	11	2
1969	307	135	11	3
1969	308	132	11	4
1969	309	142	11	5
1969	310	105	11	6
1969	311	133	11	7
1969	312	113	11	8
1969	313	147	11	9
1969	314	106	11	10
1969	315	102	11	11
1969	316	133	11	12
1969	318	91	11	14
1969	319	134	11	15
1969	320	134	11	16
1969	321	144	11	17
1969	322	48	11	18
1969	323	107	11	19
1969	324	92	11	20
1969	325	106	11	21
1969	326	109	11	22
1969	327	122	11	23
1969	328	118	11	24
1969	329	113	11	25
1969	330	121	11	26
1969	331	104	11	27
1969	332	94	11	28
1969	333	14	11	29
1969	334	35	11	30
1969	335	14	12	1
1969	336	53	12	2
1969	337	43	12	3
1969	338	45	12	4
1969	339	36	12	5
1969	340	40	12	6
1969	341	38	12	7

Year	Day of Year	Granules Produced	Month	Day
1969	342	44	12	8
1969	343	56	12	9
1969	344	42	12	10
1969	345	43	12	11
1969	346	42	12	12
1969	347	56	12	13
1969	348	53	12	14
1969	349	27	12	15
1969	351	54	12	17
1969	352	48	12	18
1969	353	80	12	19
1969	354	69	12	20
1969	355	54	12	21
1969	356	54	12	22
1969	364	51	12	30
1969	365	54	12	31
1970	1	53	1	1
1970	2	52	1	2
1970	3	26	1	3
1970	4	27	1	4
1970	6	12	1	6
1970	7	12	1	7
1970	8	27	1	8
1970	9	40	1	9
1970	10	38	1	10
1970	11	14	1	11
1970	12	51	1	12
1970	13	21	1	13
1970	14	39	1	14
1970	15	62	1	15
1970	16	34	1	16
1970	17	55	1	17
1970	18	51	1	18
1970	19	50	1	19
1970	20	26	1	20

Year	Day of Year	Granules Produced	Month	Day
1970	21	28	1	21
Total	-	26439	-	-

Table A - 2. Nimbus 4 Granules Produced by Day/Date

Year	Day of Year	Granules Produced	Month	Day
1970	120	103	4	30
1970	121	136	5	1
1970	122	105	5	2
1970	123	119	5	3
1970	124	121	5	4
1970	125	118	5	5
1970	126	122	5	6
1970	127	106	5	7
1970	128	119	5	8
1970	129	121	5	9
1970	130	108	5	10
1970	131	99	5	11
1970	132	105	5	12
1970	133	114	5	13
1970	134	85	5	14
1970	135	119	5	15
1970	136	107	5	16
1970	137	102	5	17
1970	138	136	5	18
1970	139	117	5	19
1970	140	133	5	20
1970	141	96	5	21
1970	142	119	5	22
1970	143	107	5	23
1970	144	102	5	24
1970	145	142	5	25
1970	146	121	5	26
1970	147	135	5	27
1970	148	112	5	28

Year	Day of Year	Granules Produced	Month	Day
1970	149	138	5	29
1970	150	126	5	30
1970	151	124	5	31
1970	152	125	6	1
1970	153	112	6	2
1970	154	142	6	3
1970	155	114	6	4
1970	156	127	6	5
1970	157	93	6	6
1970	158	147	6	7
1970	159	126	6	8
1970	160	119	6	9
1970	161	126	6	10
1970	162	111	6	11
1970	163	113	6	12
1970	164	124	6	13
1970	165	123	6	14
1970	166	131	6	15
1970	167	121	6	16
1970	168	150	6	17
1970	169	99	6	18
1970	170	123	6	19
1970	171	109	6	20
1970	172	88	6	21
1970	173	87	6	22
1970	174	91	6	23
1970	175	85	6	24
1970	176	91	6	25
1970	177	107	6	26
1970	178	88	6	27
1970	179	116	6	28
1970	180	111	6	29
1970	181	108	6	30
1970	182	98	7	1
1970	183	89	7	2

Year	Day of Year	Granules Produced	Month	Day
1970	184	97	7	3
1970	185	75	7	4
1970	186	79	7	5
1970	187	81	7	6
1970	188	89	7	7
1970	189	87	7	8
1970	190	122	7	9
1970	191	123	7	10
1970	192	127	7	11
1970	193	113	7	12
1970	194	123	7	13
1970	195	113	7	14
1970	196	142	7	15
1970	197	123	7	16
1970	198	137	7	17
1970	199	126	7	18
1970	200	98	7	19
1970	201	131	7	20
1970	202	116	7	21
1970	203	138	7	22
1970	204	116	7	23
1970	205	134	7	24
1970	206	123	7	25
1970	207	118	7	26
1970	208	116	7	27
1970	209	120	7	28
1970	210	139	7	29
1970	211	135	7	30
1970	212	139	7	31
1970	213	116	8	1
1970	214	108	8	2
1970	215	117	8	3
1970	216	110	8	4
1970	217	88	8	5
1970	218	96	8	6

Year	Day of Year	Granules Produced	Month	Day
1970	219	123	8	7
1970	220	121	8	8
1970	221	133	8	9
1970	222	123	8	10
1970	223	99	8	11
1970	224	123	8	12
1970	225	98	8	13
1970	226	115	8	14
1970	227	103	8	15
1970	228	103	8	16
1970	229	155	8	17
1970	230	124	8	18
1970	231	139	8	19
1970	232	128	8	20
1970	233	144	8	21
1970	234	149	8	22
1970	235	133	8	23
1970	236	153	8	24
1970	237	124	8	25
1970	238	150	8	26
1970	239	146	8	27
1970	240	148	8	28
1970	241	149	8	29
1970	242	142	8	30
1970	243	146	8	31
1970	244	119	9	1
1970	245	147	9	2
1970	246	113	9	3
1970	247	148	9	4
1970	248	137	9	5
1970	249	130	9	6
1970	250	146	9	7
1970	251	128	9	8
1970	252	153	9	9
1970	253	129	9	10

Year	Day of Year	Granules Produced	Month	Day
1970	254	150	9	11
1970	255	150	9	12
1970	256	145	9	13
1970	257	138	9	14
1970	258	145	9	15
1970	259	153	9	16
1970	260	135	9	17
1970	261	136	9	18
1970	262	150	9	19
1970	263	132	9	20
1970	264	155	9	21
1970	265	126	9	22
1970	266	130	9	23
1970	267	124	9	24
1970	268	149	9	25
1970	269	146	9	26
1970	270	146	9	27
1970	271	147	9	28
1970	272	133	9	29
1970	273	151	9	30
1970	274	130	10	1
1970	275	148	10	2
1970	276	139	10	3
1970	277	135	10	4
1970	278	138	10	5
1970	279	62	10	6
1970	280	128	10	7
1970	281	103	10	8
1970	282	143	10	9
1970	283	143	10	10
1970	284	111	10	11
1970	285	124	10	12
1970	286	142	10	13
1970	287	134	10	14
1970	288	117	10	15

Year	Day of Year	Granules Produced	Month	Day
1970	289	143	10	16
1970	290	150	10	17
1970	291	136	10	18
1970	292	131	10	19
1970	293	146	10	20
1970	294	153	10	21
1970	295	144	10	22
1970	296	142	10	23
1970	297	108	10	24
1970	298	150	10	25
1970	299	141	10	26
1970	300	117	10	27
1970	301	158	10	28
1970	302	131	10	29
1970	303	155	10	30
1970	304	148	10	31
1970	305	139	11	1
1970	306	150	11	2
1970	307	136	11	3
1970	308	147	11	4
1970	309	157	11	5
1970	310	128	11	6
1970	311	160	11	7
1970	312	146	11	8
1970	313	129	11	9
1970	314	146	11	10
1970	315	144	11	11
1970	316	157	11	12
1970	317	151	11	13
1970	318	155	11	14
1970	319	140	11	15
1970	320	155	11	16
1970	321	151	11	17
1970	322	160	11	18
1970	323	146	11	19

Year	Day of Year	Granules Produced	Month	Day
1970	324	135	11	20
1970	325	156	11	21
1970	326	151	11	22
1970	327	152	11	23
1970	328	133	11	24
1970	329	162	11	25
1970	330	158	11	26
1970	331	154	11	27
1970	332	148	11	28
1970	333	153	11	29
1970	334	139	11	30
1970	335	152	12	1
1970	336	162	12	2
1970	337	159	12	3
1970	338	155	12	4
1970	339	149	12	5
1970	340	156	12	6
1970	341	153	12	7
1970	342	154	12	8
1970	343	148	12	9
1970	344	159	12	10
1970	345	144	12	11
1970	346	123	12	12
1970	347	154	12	13
1970	348	153	12	14
1970	349	153	12	15
1970	350	150	12	16
1970	351	131	12	17
1970	352	143	12	18
1970	353	142	12	19
1970	354	143	12	20
1970	355	134	12	21
1970	356	135	12	22
1970	357	149	12	23
1970	358	137	12	24

Year	Day of Year	Granules Produced	Month	Day
1970	359	148	12	25
1970	360	133	12	26
1970	361	154	12	27
1970	362	146	12	28
1970	363	142	12	29
1970	364	156	12	30
1970	365	100	12	31
1971	1	138	1	1
1971	2	162	1	2
1971	3	162	1	3
1971	4	151	1	4
1971	5	144	1	5
1971	6	157	1	6
1971	7	140	1	7
1971	8	164	1	8
1971	9	157	1	9
1971	10	143	1	10
1971	11	146	1	11
1971	12	141	1	12
1971	13	135	1	13
1971	14	144	1	14
1971	15	149	1	15
1971	16	136	1	16
1971	17	145	1	17
1971	18	89	1	18
1971	19	105	1	19
1971	20	109	1	20
1971	21	116	1	21
1971	22	96	1	22
1971	23	97	1	23
1971	24	90	1	24
1971	25	96	1	25
1971	26	17	1	26
1971	27	94	1	27
1971	28	99	1	28

Year	Day of Year	Granules Produced	Month	Day
1971	29	97	1	29
1971	30	105	1	30
1971	31	103	1	31
1971	32	106	2	1
1971	33	104	2	2
1971	34	107	2	3
1971	35	96	2	4
1971	36	128	2	5
1971	37	112	2	6
1971	38	97	2	7
1971	39	119	2	8
1971	40	83	2	9
1971	41	110	2	10
1971	42	98	2	11
1971	43	111	2	12
1971	44	97	2	13
1971	45	113	2	14
1971	46	99	2	15
1971	47	106	2	16
1971	48	96	2	17
1971	49	128	2	18
1971	50	116	2	19
1971	51	96	2	20
1971	52	88	2	21
1971	53	104	2	22
1971	54	93	2	23
1971	55	94	2	24
1971	56	99	2	25
1971	57	118	2	26
1971	58	91	2	27
1971	59	111	2	28
1971	60	104	3	1
1971	61	109	3	2
1971	62	105	3	3
1971	63	98	3	4

Year	Day of Year	Granules Produced	Month	Day
1971	64	93	3	5
1971	65	97	3	6
1971	66	111	3	7
1971	67	102	3	8
1971	68	108	3	9
1971	69	95	3	10
1971	70	82	3	11
1971	71	105	3	12
1971	72	83	3	13
1971	73	95	3	14
1971	74	103	3	15
1971	75	97	3	16
1971	76	109	3	17
1971	77	102	3	18
1971	78	131	3	19
1971	79	111	3	20
1971	80	111	3	21
1971	81	120	3	22
1971	82	157	3	23
1971	83	160	3	24
1971	84	150	3	25
1971	85	157	3	26
1971	86	174	3	27
1971	87	174	3	28
1971	88	184	3	29
1971	89	156	3	30
1971	90	180	3	31
1971	91	171	4	1
1971	92	175	4	2
1971	93	170	4	3
1971	94	174	4	4
1971	95	168	4	5
1971	96	166	4	6
1971	97	178	4	7
1971	98	113	4	8

Year	Day of Year	Granules Produced	Month	Day
Total	-	43718	-	-