



# IceBridge Paroscientific L1B Pressure Altimeter Time-Tagged Air Pressure, Version 1

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## USER GUIDE

### How to Cite These Data

As a condition of using these data, you must include a citation:

Blankenship, D. D., S. D. Kempf, and D. A. Young. 2012, updated 2014. *IceBridge Paroscientific L1B Pressure Altimeter Time-Tagged Air Pressure, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: <https://doi.org/10.5067/N1F4NBFMIREJ>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/IAPRS1B>



National Snow and Ice Data Center

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# 1 DETAILED DATA DESCRIPTION

## 1.1 Format

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The data files are in space-delimited ASCII text format, with a header offset by # leading characters, corresponding to the NASA Aerogeophysical ASCII data standard. Each data file is paired with an associated XML file. The XML files contain location, platform, and instrument metadata.

## 1.2 File and Directory Structure

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Data are available on the HTTPS site in the following directory:

<https://n5ei101u.ecs.nsidc.org/ICEBRIDGE/IAPRS1B.001/>

Within this directory are folders organized by date, for example /2013.01.26/.

Data stored in the /2008.12.29/ and /2008.12.31/ folders were collected as part of the 2009 campaign.

## 1.3 File Naming Convention

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Files are named according to the following convention and as described in Table 1:

IAPRS1B\_2013025\_ICP5\_JKB2h\_RIGGS1c\_pressure.txt

IAPRS1B\_2013025\_ICP5\_JKB2h\_RIGGS1c\_pressure.txt.xml

IAPRS1B\_YYYYDOY\_AAAA\_JKBnx\_XXXX\_pressure.xxx

Table 1. Naming Convention

| Variable | Description   |
|----------|---|
| IAPRS1B  | Short name for IceBridge Paroscientific L1B Pressure Altimeter Time-Tagged Air Pressure |
| YYYY     | Four-digit year of survey   |
| DOY      | Day of year of survey   |
| AAAA     | Geographic area   |
| JKBnx    | Host platform   |
| XXXX     | Geographic track line   |
| pressure | Static pressure   |

|      |  |
|------|--|
| .xxx | Indicates ASCII text file (.txt), or XML file (.xml) |
|------|--|

## 1.4 File Size

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The data files range from approximately 10 KB to 5 MB.

XML files range from approximately 10 KB to 63 KB.

## 1.5 Volume

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The entire data set is approximately 933 MB.

## 1.6 Spatial Coverage

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Spatial coverage for this data set is Antarctica, represented by this extent:

Southernmost Latitude: 90° S

Northernmost Latitude: 53° S

Westernmost Longitude: 180° W

Easternmost Longitude: 180° E

### 1.6.1 Spatial Resolution

20 meters along track. 150 meters along track for late 2011 field season.

### 1.6.2 Projection and Grid Description

WGS-84 ellipsoid; ITRF 2008

## 1.7 Temporal Information

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### 1.7.1 Temporal Coverage

These data were collected from 29 December 2008 to 26 January 2013 as part of ICECAP, NSF, NERC, and Operation IceBridge funded campaigns. Data collected in late December 2008 are part of the 2009 campaign.

## 1.7.2 Temporal Resolution

ICECAP campaigns were conducted on an annual basis. East Antarctic campaigns for this data set typically extend from November to early January.

## 1.8 Parameter or Variable

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### 1.8.1 Parameter Description

The L1B Pressure Altimeter Time-Tagged Air Pressure data files contain fields as described in Table 2.

Table 2. File Parameter Description

| Parameter    | Description                    | Units                  |
|--------------|--------------------------------|------------------------|
| YEAR         | Year of survey                 | UTC                    |
| DOY          | Day of Year of survey          | UTC                    |
| SOD          | Second of day                  | UTC                    |
| SEC          | Packet Sequence Number         | n/a                    |
| LON          | Longitude                      | Decimal degrees WGS-84 |
| LAT          | Latitude                       | Decimal degrees WGS-84 |
| AC_ELEVATION | Aircraft elevation             | Meters WGS-84          |
| ROLL         | Roll, right wing down positive | Degrees                |
| PITCH        | Pitch, nose up positive        | Degrees                |
| HEADING      | Heading w.r.t north            | Degrees                |
| PRESSURE     | Static pressure                | kiloPascals            |

Note: Positions are interpolated from the real time GPS feed and have an accuracy of several meters.

### 1.8.2 Sample Data Record

Figure 1 shows the first ten records from the data file IAPRS1B\_2013025\_ICP5\_JKB2h\_RIGGS1c\_pressure.txt.

```
# YEAR DOY SOD SEQ LON LAT AC_ELEVATION ROLL PITCH HEADING PRESSURE
2013 25 85853.4651 70 170.512827 -78.338783 2754.92 0.20 1.10 -46.30 68.86740
2013 25 85853.7218 71 170.512116 -78.338654 2754.88 0.20 1.10 -46.30 68.86710
2013 25 85853.9784 72 170.511406 -78.338525 2754.80 0.20 1.10 -46.30 68.86740
2013 25 85854.2351 73 170.510697 -78.338396 2754.70 0.20 1.10 -46.20 68.86840
2013 25 85854.4918 74 170.509987 -78.338267 2754.67 0.20 1.10 -46.20 68.86870
2013 25 85854.7485 75 170.509276 -78.338138 2754.64 0.20 1.10 -46.20 68.86800
2013 25 85855.0051 76 170.508567 -78.338010 2754.62 0.30 1.10 -46.20 68.86770
2013 25 85855.2618 77 170.507857 -78.337881 2754.61 0.30 1.20 -46.30 68.86770
2013 25 85855.5185 78 170.507146 -78.337753 2754.59 0.30 1.20 -46.30 68.86870
2013 25 85855.7751 79 170.506437 -78.337624 2754.58 0.20 1.20 -46.30 68.86900
```

Figure 1. Sample data record from IAPRS1B\_2013025\_ICP5\_JKB2h\_RIGGS1c\_pressure.txt.

## 2 SOFTWARE AND TOOLS

### 2.1 Software and Tools

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No special tools are required for the ASCII text files.

## 3 DATA ACQUISITION AND PROCESSING

### 3.1 Theory of Measurements

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Outside air pressure is directed into a commercial off the shelf pressure transducer (Paroscientific). The pressure transducer internally digitizes the pressure measurements and outputs a serial data packet at regular intervals. This data set is acquired to assist with atmospheric corrections for laser altimetry, and to validate vertical acceleration data.

### 3.2 Data Acquisition Methods

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Static air was piped from a port on the exterior right side of the cockpit, via a sealed rubber hose to the pressure transducer. RS-232 packets are output at a rate of 4 Hz with the calibrated pressure value in millibars to the ELSA acquisition system.

### 3.3 Derivation Techniques and Algorithms

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The only processing was to time register the samples and to convert the units to International System (SI) units (kiloPascals).

### 3.3.1 Trajectory and Attitude Data

Trajectory and attitude data were interpolated to this product from the [IceBridge GPS L1B Time-Tagged Real-Time Position and Attitude Solution \(IPUTN1B\)](#) product.

### 3.3.2 Processing Steps

Missing values have been replaced by "nan".

### 3.3.3 Version History

On 02 May 2012, V01 2011 Antarctica data were replaced by V01.1. In V01.1, additional fields were added containing low-precision real-time position and orientation data resampled to match the times of the existing geophysical samples.

On 26 April 2013, the 2009, 2010, and 2011 Antarctica data were replaced. The format of 2009 and 2010 Antarctica data was revised to that of the 2011 Antarctica data, ensuring the time stamps are UTC year, day, and time, and adding georeferencing fields including real time position, roll, pitch and heading. For some campaigns V01.2 includes more flights than V01.1.

### 3.3.4 Errors and Limitations

Resolution on the instrument data is 1 Pa (Pascal); observed jitter between consecutive samples is on the order of 1.3 Pa. Total range of the instrument is 0 to 103.4 kPa; the vendors quoted uncertainty is 10 Pa.

During the late 2011 field season, the raw output unit of the sensor was set to pounds per square inch, and the sample rate was set to 0.67 Hz.

## 3.4 Sensor or Instrument Description

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Paroscientific Pressure Altimeters consist of a Digiquartz pressure transducer and a digital interface board in an integral package. Commands and data requests are sent via two-way RS-232 serial interfaces. Digital outputs are provided directly in engineering units with typical accuracy of 0.01 per cent over a wide temperature range. Output pressure is fully thermally compensated using a quartz crystal temperature signal. All intelligent transmitters are pre-programmed with calibration coefficients for full plug-in interchangeability.

## 4 REFERENCES AND RELATED PUBLICATIONS

### 4.1 Related Data Collections

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- [IceBridge Paroscientific L0 Pressure Altimeter Raw Air Pressure](#)

### 4.2 Related Websites

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- [IceBridge Product Web Site](#)
- [IceBridge Web site at NASA](#)
- [ICESat/GLAS Web site at NASA Wallops Flight Facility](#)
- [ICESat/GLAS Web site at NSIDC](#)
- [University of Texas Institute for Geophysics Web site](#)

## 5 CONTACTS AND ACKNOWLEDGMENTS

### 5.1 Contacts

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## 6 DOCUMENT INFORMATION

### 6.1 Publication Date

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10 December 2014



