

# J-CAD Drifting Buoy Data, Arctic Ocean, 2000-2002

## Summary

This data set contains drifting buoy measurements taken from the Japan Marine Science and Technology Center (JAMSTEC) Compact Arctic Drifters (J-CADs). The J-CAD buoys drift with the ice pack, collecting navigational, atmospheric, and oceanographic measurements, and transmitting the data via satellite. Since 2000, investigators have been conducting operations of the J-CADs to measure the structure of upper-ocean currents and water properties under the multi-year ice of the Arctic Ocean for a better understanding of the role the Arctic Ocean plays in global climate. This data set contains measurements from J-CAD buoys 1, 3, and 4, from years 2000-2002.

Please visit the [JAMSTEC J-CAD](#) web site and the [North Pole Environmental Observatory \(NPEO\)](#) web site for a complete description of the program.

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## Citing These Data

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### Overview Table

Category	Description
<a href="#">Data format</a>	Data files are in ASCII text format, documentation files are in html format
<a href="#">Spatial coverage and resolution</a>	Southernmost Latitude: 68.22° N Northernmost Latitude: 89.68° N Westernmost Longitude: 130.33° W Easternmost Longitude: 82.85° E
<a href="#">Temporal coverage and resolution</a>	Data range from 2000-04-24 to 2002-04-26
<a href="#">File naming convention</a>	Individual data files are named according to the J-CAD number, the date of collection and the type of data collected
<a href="#">File size</a>	File sizes range from 27 KB to 1029 KB.
<a href="#">Parameter(s)</a>	Barometric pressure, air temperature, water depth, current. wind speed and direction, conductivity, and salinity

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## **1. Contacts and Acknowledgments**

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## 2. Detailed Data Description

The following information on the J-CAD buoys 1, 3, and 4 was taken from the [JAMSTEC J-CAD web site](http://www.jamstec.go.jp/arctic/J-CAD_e/jcadindex_e.htm) URL: [http://www.jamstec.go.jp/arctic/J-CAD\\_e/jcadindex\\_e.htm](http://www.jamstec.go.jp/arctic/J-CAD_e/jcadindex_e.htm) . Please refer to that site, and the other ARCSS projects, for more complete information. URL: <http://data.eol.ucar.edu/codiac/projs?ARCSS>

### JCAD-1

The J-CAD 1 was installed near the North Pole (89.685°N, 130.334°W) on April 24, 2000, in collaboration with the NPEO project. It was the first J-CAD buoy to deploy and operate in the multiyear ice zone of the Arctic Ocean. The J-CAD 1 drifted southward through the Amundsen Basin, the Arctic Mid Ocean Ridge, and the Fram Strait (in early January 2001) to the Greenland Sea. The data transmission from the J-CAD 1 ceased on April 6, 2001, near the Denmark Strait in the southern part of the Greenland Sea.

J-CAD 1 had three Conductivity-Temperature (CT) sensors, one Conductivity-Temperature-Depth (CTD) sensor, and one WH-Acoustic Doppler Current Profiler (ADCP) 300kHz as underwater sensors. Each of three CT sensors and one CTD sensor were set at depths of 20, 130, 175, and 250 m. The CT/CTD sensors measured data until April 3, 2001, with the data failure period between November 2-27, 2000. The WH-ADCP of the J-CAD 1, mounted at 10 m, faced downward and measured ocean velocities between 22 m and 142 m at intervals of 20 m. The data-sampling period of the ADCP was from its deployment until December 12, 2000, but the data transmission from the ADCP failed between November 2-30, 2000.

The J-CAD 1 also measured meteorological data and buoy status data from the deployment to the final data transmission. However, the data deficit occurred between November 2, 2000 and February 9, 2001, and during this period, investigators substituted the position data of the Cold Regions Research and Engineering Laboratory (CRREL) ice buoy, simultaneously deployed near the J-CAD 1, for the J-CAD 1 location data.

## JCAD-3

The J-CAD 3 was deployed at 89.6°N, 78.5°E on April 9, 2001 and started oceanographic and meteorological observations in the Eurasian Basin of the Arctic Ocean. The J-CAD 3 was equipped with four CT, two CTD, and two ADCP sensors.

All observational data was sent to the laboratory after the deployment of the J-CAD 3. However, on May 6, 2001, the J-CAD 3 started sending data that included increased numerical values of the inclination degree of the J-CAD platform, as measured by the inclinometer. Since then, the data transmissions from the ORBCOMM and the underwater sensors have ceased. The inclinometer finally surpassed the maximum value on May 14, 2001. Investigators concluded that the sea ice where the J-CAD 3 was placed probably formed a ridge. For that reason, the underwater sensors were able to measure the data only until May 6, 2001. Meteorological and buoy status data were observed using the Argos satellite communication system. Barometric data of the J-CAD 3 was recorded and transmitted until March 11, 2002.

## JCAD-4

The J-CAD 4 was deployed in the center of Amundsen Basin (88.51°N 76.93°E) on April 26, 2002. The J-CAD 4 drifted across the Arctic Mid Ocean Ridge in the summer of 2002, went into the Nansen Basin, and was over the Yermak Plateau in mid-February 2003.

Four CTs, two CTDs, and one WH-ADCP were attached to the J-CAD 4 as underwater sensors. In addition, a 3-axis fluxgate magnetometer, the Watson Compass, was co-mounted with the WH-ADCP to determine the correct ADCP heading, pitch, and roll. The J-CAD 4 sent all meteorological and buoy status data to the laboratory.

## Format

Data files are in ASCII text format; documentation files are in html format. The data and documentation files are available for FTP download as a .zip file.

## File and Directory Structure

Data for each J-CAD (1, 3, and 4) are contained in separate directories (listed below) and are documented with accompanying html (browse) files.

NPEO2000\_JCAD-1

NPEO2000\_JCAD-3

NPEO2000\_JCAD-4

## File Naming Convention

Individual data files are named according to the J-CAD number, the date of collection and the type of data collected. For example, **j4\_200204\_met.txt** contains meteorological data from J-CAD 4, collected in April, 2002.

## File Size

File sizes range from 27 KB to 1029 KB.

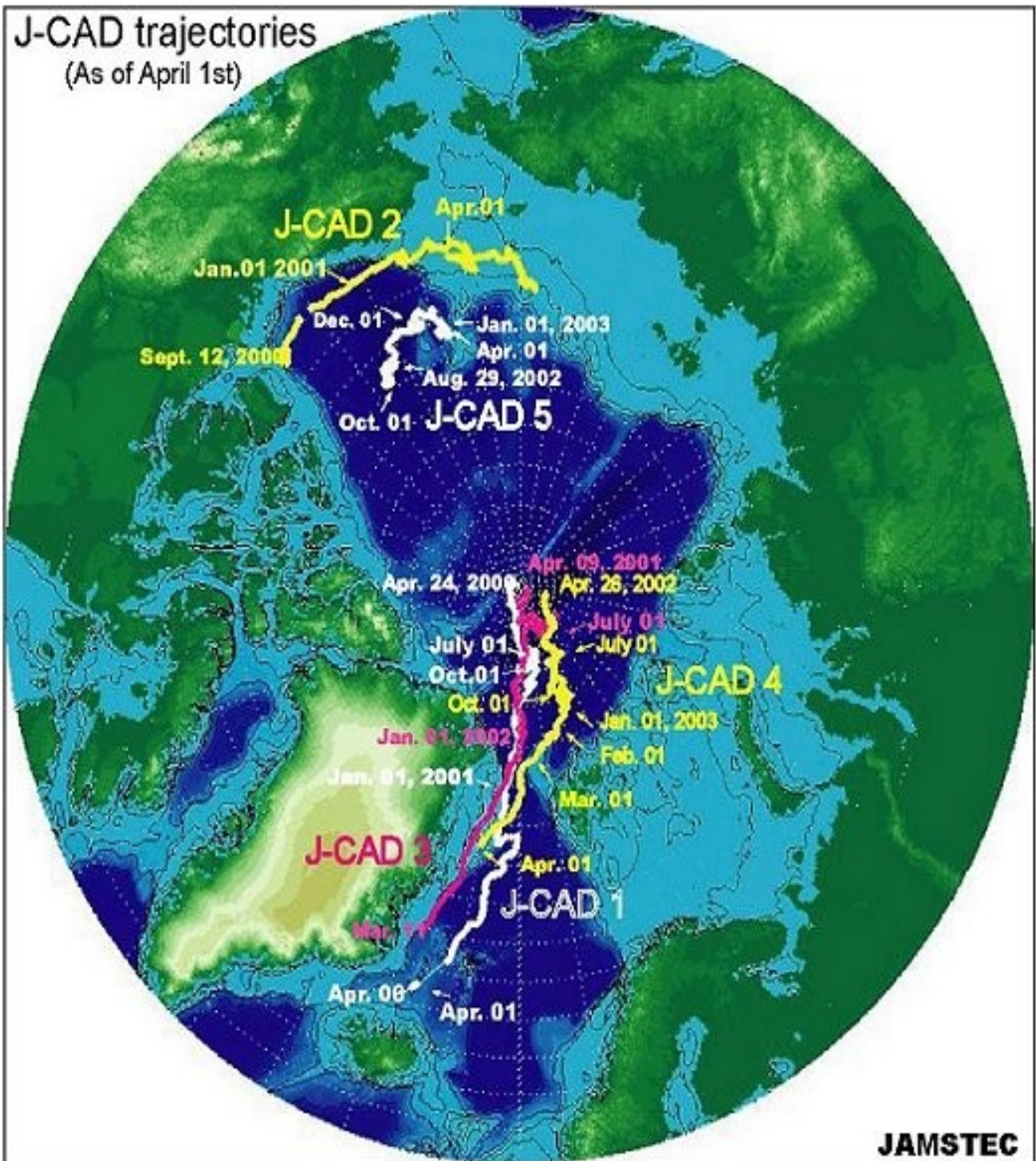
## Spatial Coverage

The following table summarizes the data-sampling period and location.

J-CAD number	First (deployment) position / date	Last position / date
J-CAD 1	89.68°N, 130.33°W / 2000 04 24	68.22°N, 18.09°W / 2001 04 06
J-CAD 3	89.57°N, 82.85°E / 2001 04 08	71.58°N, 17.07°W / 2002 03 11
J-CAD 4	88.51°N, 76.93°E / 2002 04 26	70.67°N 12.09°W / 2003 10 08

### Spatial Coverage Map

The figure below displays trajectories of J-CAD as of 2003-04-01.



## Temporal Coverage

The table below displays dates of data collection.

J-CAD number	Met./Buoy status data	CT/CTD data	ADCP 1 & 2 data
J-CAD 1	2000/04/24 - 2001/04/06 (*1)	2000/04/24 - 2001/04/03 (*2)	1: 2000/04/24 - 2000/12/12 (*3)
J-CAD 3	2001/04/09 - 2002/03/11 (*4)	2001/04/09 - 2001/05/06	1: 2001/04/09 - 2001/05/06 2: 2001/04/11 - 2001/05/06
J-CAD 4	2002/04/26 -	2002/04/26 -	1: 2002/04/26 - 2003/10/08

\*1 Data deficit period (no data collected): 2000/11/20 - 2001/02/09

\*2 Data deficit period (no data collected): 2000/11/02 - 27

\*3 Data deficit period (no data collected): 2000/11/02 - 30

\*4 Air temperature, wind speed and direction data sampling ended in 2001/07/22.

## Parameter or Variable

### Parameter Description

The measurements and their units reported by the J-CAD buoys are listed below:

Air temperature	Barometric pressure	Wind direction	Wind speed	Water temperature in the hull	Platform heading	Platform tilt	Latitude	Longitude	GPS drift speed	GPS drift direction
°C	hPa	deg	m/sec	°C	Pdeg	deg	°N	°E and °W	cm/sec	deg

CTD1 depth	CTD2 depth	ADCP bin velocity	ADCP intensity	ADCP percent good	ADCP heading	ADCP pitch, roll	ADCP temperature	Watson compass heading	Watson compass pitch, roll	Watson compass X, Y-magnetometer	Watson compass Z-magnetometer
m	m	cm/sec	none	none	deg	deg	°C	deg	deg	mGauss	mGauss

### Sample Data Record

The following data sample is from the file **j3\_200106\_stat.txt** (J-CAD 3, statistical data, collected during June, 2001).

Year, Month, Day, Hour, JCAD Number, Latitude, Longitude, Sea surface Temperature, Platform Heading, Platform Tilt, Battery Voltage, ORBCOMM Voltage, Time to first fix, GPS signal strength, GPS Drift Speed, GPS



Drift Direction,

Flg(position), Heading(nocorr)

2001, 6, 3, 6, 3, 88.4112, 0.65739, -2.85156, 220.227, 31.5, 17.10, 18.45, 25, 49, 12.0, 199.652, 0, 237.614,

2001, 6, 3, 7, 3, 88.4080, 0.61959, -2.85156, 220.200, 31.5, 17.10, 18.45, 30, 49, 8.5, 189.810, 0, 237.614,

2001, 6, 3, 8, 3, 88.4048, 0.59544, -2.85156, 220.186, 31.5, 17.10, 18.45, 25, 49, 11.5, 192.622, 0, 237.614,

2001, 6, 3, 9, 3, 88.397, 0.837, , , , , , , , , 2, ,

### **3. Data Access and Tools**

#### **Data Access**

Data are available via for ordering through NCAR.

<http://data.eol.ucar.edu/codiac/dss/id=106.ARCSS126>

### **4. Data Acquisition and Processing**

#### **Data Acquisition Methods**

Each sensor mounted on the J-CAD measures oceanographic, meteorological, and buoy status data every hour. The data obtained from each sensor are processed in the J-CAD and transmitted to the laboratory via the ORBCOMM and/or Argos satellite communications. The data received at JAMSTEC are automatically processed and compiled into each component of data in real time.

For complete information on data acquisition methods, please refer to other the ARCSS projects.

<http://data.eol.ucar.edu/codiac/projs?ARCSS>

#### **Processing Steps**

The J-CAD data are processed in the following order:

1. acquisition of data
2. conversion of data format
3. correction and estimation of time and position data
4. correction of abnormal data
5. updating monthly files made from raw data
6. creation of monthly component data file

### **5. References and Related Publications**

Please refer to the [JAMSTEC J-CAD](#) web site for a list of references and publications relating to the J-CAD program.

## **6. Document Information**

### **Acronyms**

**JAMSTEC:** Japan Marine Science and Technology Center

**J-CAD:** Compact Arctic Drifter

### **Document Creation Date**

9 March 2004

### **Document URL**

<http://data.eol.ucar.edu/codiac/dss/id=106.ARCSS126>