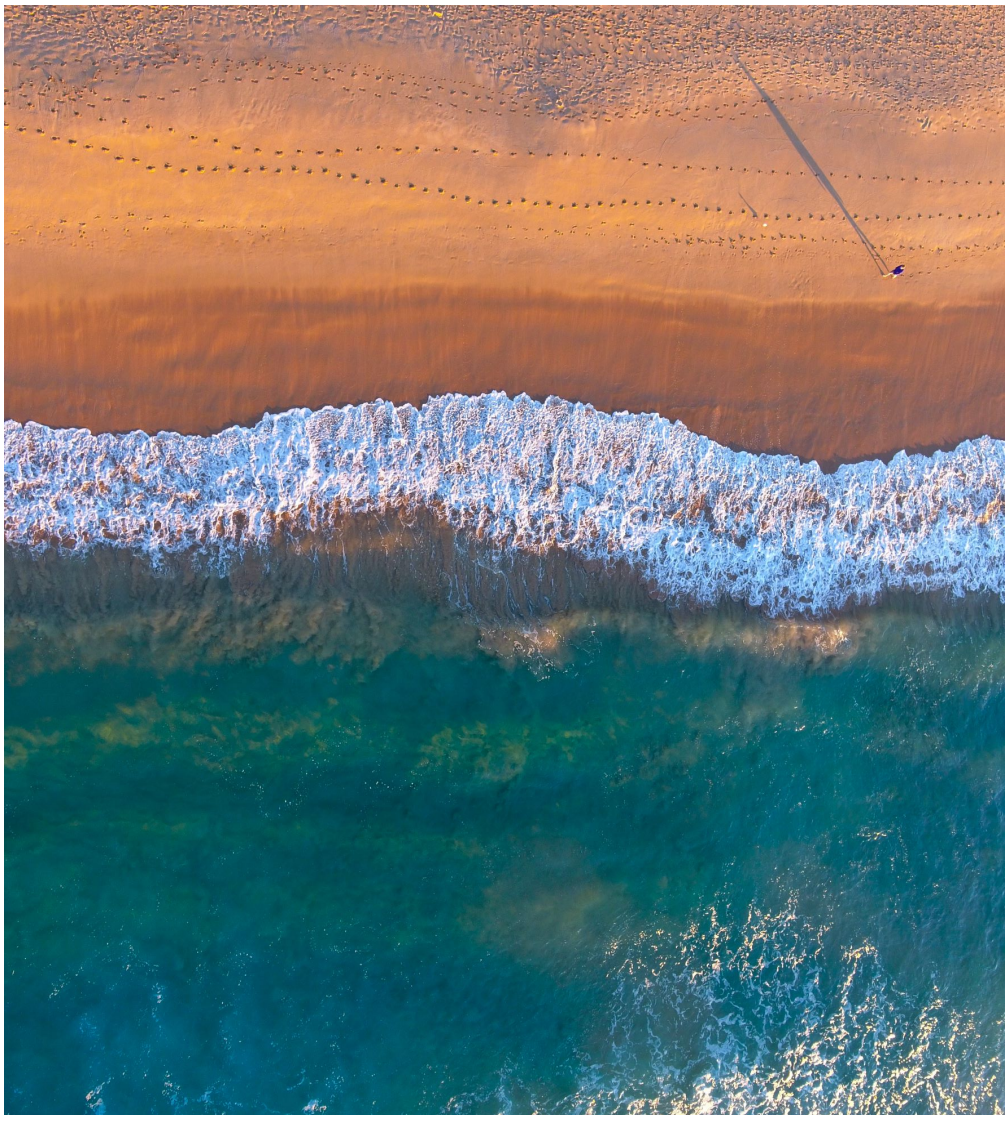
ICES CIEM

Data Guidelines and Policies

Guidelines for Moored Current Meter Data

Version No. 4 I September 2024

ICES GUIDELINES AND POLICIES



ICES INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA
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ICES Guidelines and Policies - Data

Guidelines for Moored Current Meter Data

Version No. 4 | September 2024

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Contents

i Background i
Guideline scope i
Changes since the last version i
Other relevant information i
1 Introduction 1
2 Receiving Data 2
2.1 Data standard 2
2.2 Format description 3
2.3 Collection details 3
3 Value Added Service 5
3.1 Quality control 5
3.2 Problem resolution 5
3.3 History documentation 5
4 Providing Data and Information Products 6
4.1 Data description 6
4.2 Data history 6
4.3 Referral service 6
References 7
Annex 1: Detailed version history 8
Annex 2: Mooring and Instrument Log Sheets 9
Annex 3: Alternative Mooring and Instrument Log Sheets 12

i Background

Guideline scope

ICES Data Guidelines exist to support and promote expert science and, when properly adopted, ensure data are more efficiently handled and accurately managed. ICES Data and Information Group (DIG) has developed guidelines to assist those involved in the collection, processing, quality control and exchange of various types of oceanographic data. These guidelines have been adopted by ICES Data Centre and are recommended to the ICES community. Each guideline addresses the data and metadata requirements of a specific data type. This guideline addresses the data and metadata requirements of data collected using a moored current meter.

Changes since the last version

Location	Change description
i Guideline scope	Added new guideline scope to align with new format requirements
Section 1: Introduction	Moved opening text to a new introduction section to align with new format requirements; added opening sentence to clarify the purpose of ICES Data Guidelines
Section 2.2 Format description	Removed reference to out-of-date format and broken hyperlink
Section 2.3: Collection details	Added new details to be recorded (e.g. instrument details, mooring details)
Annex 2	New section

Other relevant information

The ICES data type guidelines are written, updated and maintained by DIG. The guidelines are reviewed from time to time by ICES expert groups.

1 Introduction

ICES Data Guidelines exist to support and promote expert science and, when properly adopted, ensure data are more efficiently handled and accurately managed. ICES Data and Information Group (DIG) have developed guidelines to assist those involved in the collection, processing, quality control, and exchange of various types of oceanographic data. Each guideline addresses the data and metadata requirements of a specific data type. This guideline addresses the data and metadata requirements of data collected using a moored current meter.

2 Receiving Data

Data centres require the following information from the data supplier together with the data. When receiving data, the data centres of the ICES community shall strive to meet the following guidelines.

2.1 Data standard

Raw and quality-controlled data should, whenever possible, be stored at the original sampling frequency.

All parameters must be clearly specified and described. If parameter codes are used, then the source data dictionary must be specified. Parameter units must be clearly stated. Parameter scales must be noted where applicable. If computed values are included, the equations used in the computations should be stated.

All relevant calibrations should be applied to the data, including laboratory and field calibrations. Instrument calibration data should be included in the data file. The data should be fully checked for quality and flagged for erroneous values, such as spikes or gaps. An explicit statement should be made of the checks and edits applied to the data. If any data values have been removed, the times of the removed values should be noted.

In particular:

- All data values should be expressed in oceanographic terms, which should be clearly stated.
- Depending on the method of measurement, current velocity may be expressed in terms of speed and direction and/or in terms of east and north components.
- A clear statement should be made on whether the data have been corrected for magnetic variation. If so, the magnetic variation that was assumed should be stored alongside the data. Compass calibration details should be supplied with the data.
- The time zone in use should be clearly stated, and each data cycle should include date/time of observation (without loss of precision). It is recommended that UTC be used.
- Other parameters measured as part of the series, e.g. temperature, pressure, and conductivity, should be included with the data.
- Estimate of final uncertainty in the data.

A brief description of the data calibration, quality, and processing (manufacturers and in-house) must be included and should contain information regarding:

- Filtering, de-spiking, or smoothing methods
- Editing or quality control methods
- Interpolation techniques
- Adjustments due to variations in calibration

If a cruise/data report is available describing the data collection and processing, this can be referenced. If possible, a copy should be supplied with the data.

2.2 Format description

Data should be supplied in a fully documented ASCII format. Individual fields, units, etc. should be clearly defined and the time zone stated. Time reported in UTC is strongly recommended. Ideally, all of the data from the instrument should be stored in a single file.

2.3 Collection details

Other pertinent information to be included in the data transfer to the data centres includes:

- Name of the country and organization responsible for the deployment, recovery, collection, and processing of the data. The name of the principal scientist should be included.
- Project, ship, mooring type, and mooring number.
- Dates and times of each instrument deployment and recovery.
- Dates and times of start and end of usable data for each instrument.
- Details of the instrument, e.g. manufacturer, instrument type, model number, serial number, any instrument modifications, accuracy, resolution and response range of individual sensors, and standard of calibration (method, quality, dates, calibration coefficients).
- Details of the mooring, e.g. description of structure, performance of mooring including condition on recovery, whether dragged or damaged, and any event that might have affected the data (e.g. wave action, knockdown).
- Precise time interval between successive data cycles in the series.
- Original sampling interval – for cases where the processed observation is derived/extracted from higher-resolution data (optional).
- Originator's reference numbers/identifiers for mooring and series.
- Latitude and longitude; method of position fix, e.g. DGPS, GPS.
- Water column depth (specify method: e.g. sounding and methodology, chart).
- Instrument depth or height (specify which).

Example mooring placement and recovery log sheets are provided in Annexes 2 and 3.

Sufficient documentation should accompany each data series to ensure that the data are adequately qualified and may therefore be used with confidence by a secondary user. Such documentation should be stored alongside the data and, where applicable, should cover:

Instrument

- Instrument description: manufacturer, model, principle of measurement (each sensor)
- Instrument modifications and their effect on the data
- Accuracy, resolution, and response range of individual sensors
- Standard of calibration, e.g. method, quality, dates, calibration coefficients

Mooring

- Brief description of mooring structure
- Performance of mooring including condition on recovery, whether dragged or damaged, and any event that might have affected the data (e.g. wave action, knockdown)

Data sampling/processing

For each parameter, a description of the original sampling scheme and its relation to the final processed data – including, as appropriate:

- Type of sampling (e.g. instantaneous, averaged, burst recording)
- Sensing interval of meter (regarding raw data: whether it was vector-averaged, burst sampling, etc., with applicable time intervals)
- Duration of individual sample (raw data)
- Number of raw data samples used in processed value
- Nominal interval of processed data (excluding gaps resulting from editing, etc.)
- Methods of averaging, filtering, or compression

Report on data quality

Any additional information that may have affected the data or have a bearing on its subsequent use should also be included, e.g. effects of near surface buoyancy, sea state, fouling.

3 Value Added Service

When processing and quality-controlling data, the data centres of the ICES community shall strive to meet the following guidelines.

3.1 Quality control

A range of checks are carried out on the data to ensure that they have been imported into the data centre's format without any loss of information. For Moored Current Meter data, these should include:

- Check on accompanying information
- Automatic range check of each parameter
- Check on timing channel, correct number of scans between start and end times, etc.
- Visual inspection of the time-series (e.g. time-series plot, current vector scatter plot, progressive vector diagram)
- Harmonic analysis
- Flag spikes in the data
- Flag suspicious data or correct the data after consultation with the data supplier
- Check for fouling problems
- Check against other data collected on the same mooring, nearby moorings, and climatology
- Check that corrections/calibrations are applied
- Check latitude/longitude not on land

3.2 Problem resolution

The quality control procedures followed by the data centres will typically identify problems with the data and/or metadata. The data centre will resolve these problems through consultation with the originating principal investigator (PI) or data supplier. Other experts in the field or other data centres may also be consulted.

3.3 History documentation

All quality-control procedures applied to a dataset are fully documented by the data centre. In addition, all quality control applied to a dataset should accompany that dataset. All problems and resulting resolutions will also be documented with the aim to help all parties involved: the collectors, the data centre, and the users. A history record will be produced detailing any data changes (including dates of the changes) that the data centre may make.

4 Providing Data and Information Products

When addressing a request for information and/or data from the user community, the data centres of the ICES community shall strive to provide well-defined data and products. To meet this objective, the data centres will follow these guidelines.

4.1 Data description

The data centre shall aim to provide well-defined data or products to its clients. If digital data are provided, the data centre will provide sufficient self-explanatory information and documentation to accompany the data so that they are adequately qualified and can be used with confidence by scientists/engineers other than those responsible for their original collection, processing, and quality control. This is described in more detail below:

- A data format description fully detailing the format in which the data will be supplied
- Any ancillary parameters (e.g. temperature, salinity)
- Parameter and unit definitions; scales of reference
- Definition of flagging scheme (if flags are used)
- Relevant information included in the data file (e.g. latitude, longitude, water depth, instrument height/depth, project, mooring/instrument identifiers, start and end dates and times of deployment/good data, sampling interval, instrument type)
- Data history document (as described in Section 3.2)

4.2 Data history

A data history document will be supplied with the data, to include the following:

- A description of data collection and processing procedures as supplied by the data collector (as specified in sections 1.1 and 1.3)
- Quality-control procedures used to check the data (as specified in Section 2.1)
- Any problems encountered with the data and their resolution
- Any changes made to the data and the date of the change

Any additional information that may have affected the data or have a bearing on its subsequent use should also be included.

4.3 Referral service

ICES member research and operational data centres produce a variety of data analysis products and referral services. Better coverage is obtained by dividing ocean areas into regions of responsibility and by developing mutually agreed guidelines on the format, data quality, and content of the products. By having the scientific experts work in ocean areas with which they are familiar, the necessary local knowledge finds its way into the products. Data and information products are disseminated as widely as possible via a range of media.

If the data centre is unable to fulfil the client's needs, it will endeavour to provide the client with the name of an organization and/or a person who may be able to assist. In particular, assistance from the network of data centres within the ICES community will be sought.

References

Emery, W. J., and Thomson, R. E. 1998. Data Analysis Methods in Physical Oceanography, 1st edn. Elsevier Science, New York, NY, USA. 664 pp.

Howarth. M. J. (Ed.). 1989. Current meter data quality. ICES Cooperative Research Report, Vol. 165. 114 pp. https://doi.org/10.17895/ices.pub.7957

Annex 1: Detailed version history

Version	Authors	Date	Major changes
4	ICES Data and Information Group (DIG)	Jun/2024	Minor updates, new log sheet templates added
3	MDM	Apr/2009	Revised
2	MDM	Aug/2001	Revised
1	MDM	Oct/1999	Guidelines established

Annex 2: Mooring and Instrument Log Sheets

Mooring sheet

MOORING DESIGN	**SINGLE STRING / TWO POINT / U-SHAPED / OTHER**		
Sounding (metres)		**Mooring No.**	
Area/Project			
Target Position			
Deployment Position			
Mooring Hardware	**Notes / Serial Number / Position**		
Surface Buoyancy			
Other Buoyancy			
Frame			
Other			
Wire/Chains/Rope			
Pickup Lines			
Weight			
Deployment / Recovery	**s/n**	**Date/Time in water**	**… out water**
Sub-Surface Buoy			
Instrument			
Instrument			
Instrument			
Instrument			
Instrument			
Instrument			
Instrument			
Anchor Release			
Acoustic Release Type		**Serial No**	
Frequency / Mode		**Batteries installed**	
Interrogate /Range Codes		**Change batteries by**	

Release Code			
Satellite Beacon S/N		**Batteries installed**	
PTT or IMEI No		**Change batteries by**	
Deployment		**Initial (In):**	
Ship Name		**Cruise Number**	
Recovery		**Initial (Out):**	
Ship Name		**Cruise Number**	
Remarks			

* *Remember to keep an electronic record of this mooring record sheet as backup in case of loss or damage.*

Instrument sheet

Instrument Type		**Mooring No.**	
Instrument S/N			
Sampling Interval		**Parameters Sampled (e.g. Temperature, Conductivity)**	
Averaging Interval			

Instrument Position			
Area/Project			
Sounding (m)		**Instrument Depth (m)**	

	Date	**Time (GMT)**	
Switched ON			
Switched OFF			

Battery Check Volts			
Samples Expected		**Samples Received**	
Pre. Mooring Checks		**Post Recovery Checks**	

Deployment		**Initial (In):**	
Ship Name		**Cruise Number**	

Recovery		**Initial (Out):**	
Ship Name		**Cruise Number**	

Test and Configuration Files:

Readings and Remarks:

Annex 3: Alternative Mooring and Instrument Log Sheets

MOORING LOGSHEET **DEPLOYMENT**

Mooring Identifier Cruise

NB: all times recorded in GMT

Date_____ **Site arrival time**_____

Setup distance _____

Start time_____ **End time** _____

Start Position

Latitude_____ **Longitude**_____

Item	Serial No.	Comment	Time

Release #1 arm code _____

Release #1 release code _____

Release #2 arm code _____

Release #2 release code _____

Anchor Drop Position

Latitude _____ **Longitude** _____

Uncorrected water depth _____ (at anchor launch)

Corrected water depth _____ (at anchor launch)

MOORING LOGSHEET **RECOVERY**

Mooring Identifier Cruise

NB: all times recorded in GMT

Date _____ **Site arrival time _____**

Time of first ranging _____

Item	Serial No.	Comment	Time