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Title	MEDIN data guideline for tidal elevation data
MEDIN Discipline	Marine Geology; Physical Oceanography
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Date reviewed	17 October 2018
Version	2.0
Date approved and published on MEDIN website	17 October 2018
Date last checked for accuracy	17 October 2018
Summary	This guideline defines the format of data and information produced from the observation and recording of tidal elevation data and corrections to specified bathymetry chart datum in support of Marine Hydrographic and Geophysical Survey. Used correctly the guideline facilitates easy use and reuse of the data. An Excel template is also provided if required.
Keywords	Hydrography, Geology, Tides, Tidal Height

Change history		
Version	Date	Change
1.0	19/09/2012	First draft of document
1.1	25/01/2012	QC release
1.2	02/02/2012	INSPIRE assessment finalised
1.3	12/02/2012	Changed incorporated following QC process; Draft for MEDIN review release
1.4	29/03/2012	Changes incorporate following review process; final release
2.0	17/10/2018	Updated to new MEDIN Data Guideline format

1 Introduction

1.1 What are MEDIN compliant data?

There are 3 requirements to ensure that supplied benthic data are MEDIN compliant:

- 1) **Collectors supply General Metadata about the data** – See [Appendix A](#)
- 2) **Detailed Metadata are supplied with the data** – *This may be included in a survey/cruise report or as additional metadata* – See [Appendix B](#)
- 3) **The data are in a format that MEDIN accepts** – See [Appendix C](#)

Example of a MEDIN compliant species dataset:

A file containing General Metadata ([Appendix A](#)),
Detailed Metadata ([Appendix B](#)) and
Data ([Appendix C](#))

1.2 Scope

This guideline covers the observed/recorded tidal elevation data and corrections to specified bathymetry chart datum for the reduction of soundings acquired during hydrographic and geophysical survey, and is complementary to tidal stream and current observations. It covers the raw data, methodologies used and the derived processed data.

The guideline does not cover the derived data products from the acquisition of bathymetry; these are covered in the following guideline:

MEDIN data guideline for bathymetry data

Note: the information provided in this guideline could also be relevant for reducing bathymetric data processed from seismic data acquisition.

This guideline does not specify methodological principles and standards for tidal reduction, however the following operational guidelines and discussion are recommended:

Title	Link
IHO S-44 Standards for Hydrographic Surveys	https://www.iho.int/iho_pubs/standard/S-44_5E.pdf
IHO Manual on Hydrography Chapter 5 - Water Levels and Flow	https://www.iho.int/iho_pubs/CB/C-13/english/C-13_Chapter_5.pdf

Tidal data utilised for the reduction of soundings falls into three categories:

- Prediction of elevations and application of co-tidal and meteorological (barometric pressure) corrections. In North West Europe predicted tides are formulated for a defined port and co-tidal and co-range charts used to correct the tides at the offshore location for reduced tidal range and time lead/lag. Predicted tides are often generated using software applications.
- Observed data from shore-based tide gauge or from seabed-mounted water level recorder (WLR), corrections for meteorological effects, separation of “surge” interpolation or other modelling and derivation of chart datum. Where observed data are used for the reduction of bathymetry there is either a single point or multipoint co-tidal model used to provide what is in effect a time series of depth corrections at the instant vessel positions.
- GNSS measurements of elevation of the vessel and transducer above ellipsoid, correction to geoid and to chart datum. Typically Real Time Kinematic (RTK) methods are used to obtain precise geodetic heights over the duration of the survey. Work has been undertaken to observe and compute accurate mean tidal surfaces globally, such as mean sea level or geoid models, and the height variations can be measured against these datum models. Other corrections are applied post processing such as heave, pitch and roll for the vessel.

The guideline builds upon previous data specification work undertaken by BODC and ICES, SAIC GSF and also refers to industry formats.

1.3 Archiving Data

The British Oceanographic Data Centre (BODC) is the MEDIN Data Archive Centre (DAC) responsible for the archiving of tidal elevation data.

Contact Details:

British Oceanographic Data Centre

E-mail: enquiries@bodc.ac.uk

Tel: +44 (0)151 795 4884

Summary of the information required

A General Metadata:

This section lists the general metadata that should be provided with the data.

Users can use the form [here](#) to record General Metadata and can find additional information in [Appendix A](#)

The General Metadata fields are common throughout all MEDIN data guidelines and only need to be given once and referenced if your data set is composed of many data types and therefore conforms to a number of MEDIN Data Guidelines. If your collection of data forms part of a wider project or time series then the **Project Information** must be recorded but if the work is a small survey then project details may not be required.

What is a Survey/Project?

A **survey** is a uniquely identifiable programme of data collection such as a research cruise, moored instrument deployment or survey event. This information is likely to be the same for all sample events and subsamples in a given data set such as a cruise. Note that in the event that these are not common to all sample events then they should be specified for each one.

A **project** is a collection of surveys that have been completed for a common purpose. For example: an environmental impact assessment composed of a number of separate surveys; scientific research composed of a number of different research cruises; a legislative monitoring programme which is conducted each year over several years. A project is usually funded by the same organization(s) for its lifetime.

Survey Information:

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

1. [surveyName](#)
2. [surveyType](#)
3. [surveyAbstract](#)
4. [surveyCode](#)
5. [originator](#)
6. [owner](#)
7. [surveyStartDate](#)
8. [timeZone](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Survey Information:

1. [surveyEndDate](#)
2. [platformName](#)
3. [platformType](#)
4. [cruiseReportReference](#)
5. [surveyReportReference](#)
6. [confidentiality](#)
7. [surveyMetadataURL](#)

Project Information:

Please provide as much of the following information as possible if the survey forms part of a wider project:

1. [projectName](#)
2. [projectCode](#)
3. [projectStartDate](#)
4. [projectEndDate](#)
5. [projectWebsite](#)
6. [projectMetadataURL](#)

B Detailed Metadata:

This section lists the detailed metadata that should be collected with the data. The detailed metadata contains information about the methods used during the survey, any calibrations applied to the data and the personnel who carried out the sampling. Users can use the form [here](#) to record Detailed Metadata and can find additional information in [Appendix B](#).

The Detailed Metadata fields are specific to each data guideline and should be completed for each type of data. The information requested here may be supplied as additional metadata or may be supplied in a cruise or survey report, provided that all required information is included in the report.

Method Information

Details of any method or instruments used to collect the data are required in this section. This information is mandatory and **must** be supplied with the data to ensure they can be reused:

1. [methodID](#)
2. [tidalAdjustment](#)
3. [installationDetails](#)
4. [spatialCRS](#)
5. [positionFix](#)
6. [horizontalAccuracy](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

1. [originalCRS](#)
2. [transformation](#)
3. [depthCRS](#)
4. [verticalAccuracy](#)
5. [rangeFactor](#)
6. [highWaterDifference](#)
7. [lowWaterDifference](#)
8. [reductionLevel](#)
9. [processingOrganisation](#)
10. [sensorDetails](#)
11. [serialNumber](#)
12. [calibrationDetails](#)
13. [quotedAccuracy](#)
14. [operatingRanges](#)
15. [processingSoftware](#)
16. [processingSoftwareVersion](#)
17. [processingPersonnel](#)
18. [processingNotes](#)
19. [processingQCNotes](#)
20. [proceduresUsed](#)

C Data:

This section gives a summary of the required data content and format for

Tidal Elevation data. It covers:

Station Information

Sample Event Information,

Summary or Predicted Tidal Data (Processed Data),

Observed Water Level/ Tidal Data (Processed Data),

GNSS Tidal Data (Processed Data)

Users can use the form [here](#) to record the data and can find additional information in [Appendix C](#).

Format

The preferred format for the supply of tidal data should be provided in ASCII format. This guideline specifies tables most suitable for tidal data exchange by comma or tab delimited ASCII text file i.e. *.csv, *.txt, *.asc, *.dat. This is essentially a system independent file format which renders the data more readily reusable by MEDIN stakeholders and is the preferred exchange format for DAC.

Where tidal data are supplied to a DAC as part of the survey data package it is recommended that the data are incorporated within a standard documented folder structure as this reduces data archiving costs. For an example folder structure refer to the BGS Offshore Acquisition Folder Structure at <http://www.bgs.ac.uk/downloads/start.cfm?id=2256>.

An inventory of files and their respective sizes, and supply formats and media should be provided to the DAC. This can also be incorporated within the folder structure if necessary e.g. as part of the data processing log.

Tidal data can take the form of raw observed tides and processed tides ready for application of tidal reduction to soundings. Tide files normally take the form of summary files with date, time and tidal correction, or tide heights supplied as part of a set of oceanographic observations, or are logged within an acquired bathymetry data using GNSS navigation information. With all tidal data it is important that the time zone for the tidal data are recorded in order to ensure that the data are applied in the correct time frame.

BODC Ocean Data View (ODV) format provides a suitable standard for providing tide data in ASCII format; ODV is a flexible format which can be adapted to replicate the download file format for oceanographic instruments. See https://www.bodc.ac.uk/data/codes_and_formats/odv_format/.

The SAIC Generic Sensor Format (GSF) standard demonstrates the incorporation of GNSS tidal data into the file record. See <http://www.saic.com/maritime/gsf/>

Processed tidal data may be provided in GIS formats compliant with the following geometries/ data types:

- Point geometry for location of the tidal station utilised, or for storage of tidal observations along a route.
- In some GIS formats the Z value of the point can be stored with the point geometry. This can be used to store elevation levels or tidal values where applicable.
- Where data are submitted using industry and GIS formats the information specified in the [survey information](#), [project information](#), [method information](#), [station information](#) (optional) and [sample event information](#) sections should be provided to accompany the data.

Content

What is a Station?

A station refers to a specific target location of sampling, such as a fixed mooring or defined area of seabed being surveyed. It is useful to record the station position in addition to the sample event information, for example if you are returning to a fixed target station as a basis for repeat replicate sample events and for repeat monitoring surveys. This is optional information.

What is a Sample Event?

A sample event is the collection of a sample at a specific time, date and location.

Station Information:

Please provide as much of the following information as possible if the sampling takes place at defined stations:

1. [stationID](#)
2. [geometry](#)
3. [primaryXCoordinate](#)
4. [primaryYCoordinate](#)
5. [methodID](#)
6. [secondaryXCoordinate](#)
7. [secondaryYCoordinate](#)
8. [stationName](#)
9. [stationNotes](#)

Sample Event:

This table holds information on the location/extents, time and local conditions for the tidal observation. The observation is either taken at a single location, or as an underway logging through GNSS data. Where underway data are provided sample events can be depicted by track files and detailed in the MEDIN data guideline for navigation and positioning data (track). Use of geometric representations will replace the coordinate and spatial elements.

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

1. [sampleEventID](#)
2. [surveyCode](#)
3. [methodID](#)
4. [depthDatum](#)

5. [startDateTime](#)
6. [startXCoordinate](#)
7. [startYCoordinate](#)
8. [endDateTime](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

1. [endXCoordinate](#)
2. [endYCoordinate](#)
3. [timeZone](#)
4. [trackData](#)
5. [profileData](#)
6. [waterDepth](#)
7. [sampleRate](#)
8. [localGravity](#)
9. [magneticVariation](#)
10. [stationID](#)
11. [startKP](#)
12. [endKP](#)
13. [samplingPersonnel](#)
14. [sampleNotes](#)
15. [remarks](#)
16. [eventName](#)

Summary or Predicted Tidal Data (Processed Data):

When providing the tidal data it must be clearly linked to the sample event information for a given file set and replicate. Summary or predicted tide files are normally generated as a simple ASCII file of date, time and water level. This format is also used in summarising observed data to apply tidal reduction in software.

This information is mandatory and **must** be supplied to ensure it can be reused:

1. [dateTime](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

1. [waterLevel](#)
2. [tidalVariation](#)
3. [sampleEventID](#)

Observed Water Level/ Tidal Data (Processed Data):

When providing observed water level/tidal data it must be clearly linked to the sample event information for a given file set and replicate. Observed water level/ tidal data are normally downloaded in the instrument manufacturer's format using the instrument manufacturer's software suite; these can include header information similar to that defined in the project information, survey information, station information and sample event information sections. ODV format provided by BODC at https://www.bodc.ac.uk/data/codes_and_formats/odv_format/ provides a configurable format which also encompasses metadata columns storing data found in the project information, survey information, station information and sample event information

sections. The format below is provided for completeness to document the typical content logged by tide gauges/water level recorders.

This information is mandatory and **must** be supplied to ensure it can be reused:

1. [dateTime](#)
2. [depth](#)
3. [computedTide](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

1. [atmosphericPressure](#)
2. [adjustedDepth](#)
3. [adjustedDepthQC](#)
4. [datumAdjustedDepth](#)
5. [temperature](#)
6. [heading](#)
7. [pitch](#)
8. [roll](#)
9. [sampleEventID](#)

GNSS Tidal Data (Processed Data)

When providing observed tidal data it must be clearly linked to the sample event information for a given file set and replicate. GNSS navigation data are normally output in NMEA format (see http://www.nmea.org/content/nmea_standards/nmea_083_v_400.asp) and tidal correction deduced and logged with the data i.e. within the processed MBES files. The GNSS navigation data will provide the height information for processing against the selected datum; the tidal reduction data are essentially incorporated into the track/sensor file. The output information may be similar to the formats discussed in Summary or Predicted Tidal Data and Observed Water Level/ Tidal Data sections, or encompass the following in a logged data file (based on SAIC GSF, see <ftp://ftp.soest.hawaii.edu/pibhmc/website/webdocs/documentation/GSF-Specification.pdf>).

This information is mandatory and **must** be supplied to ensure it can be reused:

1. [dateTime](#)
2. [xCoordinate](#)
3. [yCoordinate](#)
4. [ellipsoidalHeight](#)
5. [computedTide](#)

Additional items:

Please provide as much of the following information as possible to help others assess the data:

1. [ellipsoidalHeightAndSelectedDatumSeparation](#)
2. [heightOfVesselWaterlineAboveEllipsoid](#)
3. [heaveDirection](#)
4. [heaveCorrection](#)
5. [pitchCorrection](#)
6. [rollCorrection](#)
7. [sampleEventID](#)

Appendix A

General Metadata:

This section describes the general metadata that should be provided with the data.

Users can use the form [here](#) to record General Metadata

To return to the summary above, click [here](#)

The General Metadata fields are common throughout all MEDIN data guidelines and only need to be given once and referenced if your dataset is composed of many data types and therefore conforms to a number of MEDIN guidelines. If your collection of data forms part of a wider project or time series then the **project information** must be recorded but if the work is a small survey then project details may not be required.

A.1 Guidance:

Detailed descriptions and examples are given below to help you create General Metadata to accompany your data.

Survey Information

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
surveyName	M	Title of the survey	Free text;	Dec 2015 – Jan 2016 Sea Level and Bottom Pressure Measurements in Drake Passage and the Southern Ocean
surveyType	M	Give the type of survey	Free text or Controlled Vocabulary; IOGP SSDM WORK_CATEGORIES Domain at https://www.iogp.org/Geomatics/#ssdm	Oceanographic; ASS - Hydrography/Geophysical Survey (Analogue Survey-Echo Sounder, Pinger, Profiler, Boomer, Sparker, Sidescan).

surveyAbstract	M	Brief description of the purpose of the survey and other types of measurements that were made for the survey.	Free text;	The purpose of the survey was to deploy tide gauges to monitor sea level over time.
surveyCode	M	A unique code for the survey to allow links to be built between this and sample event data, (the cruise identifier code could be used). To ensure uniqueness, it is recommended that the website of the organization responsible for the work is used followed by a unique code designated by the responsible organization.	Free text;	http://www.noc.ac.uk/JR15003 ;
originator	M	The organization that has created the dataset. If the organization is not in EDMO please contact enquiries@oceannet.org to add it. If a person who is not associated with any organization generated the data then please provide the name in the sample event table.	Controlled vocabulary: European Directory of Marine Organizations (EDMO) at http://seadatanet.maris2.nl/edmo/	28: Centre for Environment, Fisheries and Aquaculture Science, Lowestoft Laboratory 2588: ABP Marine Environmental Services Ltd
owner	M	Organization that owns the data set. If the organization is not in EDMO please contact enquiries@oceannet.org to add it.	Controlled vocabulary: European Directory of Marine Organizations (EDMO) at http://seadatanet.maris2.nl/edmo/	78: Department of Environment Fisheries and Rural Affairs; 53: BP Exploration and Production
surveyStart Date	M	The date and time that the survey started.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2015-12-15 12:33:00

timeZone	M	Give the time zone in which the date and time of the data acquisition is made (preferably Coordinated Universal Time (UTC))	Free text;	UTC
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Additional Items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
surveyEndDate	C	The date and time that the survey ended. May be left null if the survey is ongoing.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	15/12/2016 16:33:00
platformName	C	Mandatory if a vessel was used for the survey. The name of the ship from which the sampling device was deployed. If your ship is not on the list please contact mailto:accessions@ices.dk	Controlled Vocabulary; ICES Reference Codes, Table C17 at https://www.bodc.ac.uk/resources/vocabularies/vocabulary_search/C17/	74LG: Lough Foyle AA30: Unspecified Ship 74E9: Cefas Endeavour AA36: Unspecified Fishing Vessel AA33: Unspecified Self-Propelled Small Boat
platformType	O	The platform type (e.g. Research Vessel) from which the sampling device was deployed.	Controlled vocabulary: Platform Classes, Table L06 at https://www.bodc.ac.uk/data/code_s_and_formats/vocabulary_search/L06/	31: Research Vessel; 13: beach/intertidal zone structure; 48: mooring; 71: human

cruiseReport Reference	○	Cruise report or boat log reference if applicable.	Free text; in reference format.	Cruise JR15003, 15 December 2015 – 15 January 2016 Sea Level and Bottom Pressure Measurements in Drake Passage and the Southern Ocean. National Oceanography Centre-former Proudman Oceanographic Laboratory Cruise Report, No 58.
surveyReport Reference	○	Survey report reference if applicable.	Free text; in reference format.	McGarrigle, P. et al. 2014. UK Coastal Monitoring and Forecasting: Annual Report for 2014 for the UK National Tide Gauge Network. UKCMF Annual Tide Gauge Report, 148pp.
confidentiality	○	Note if the survey is confidential. If not noted, the data will be assumed to be releasable to the public.	Free text;	Restricted access; Public;
surveyMetadata URL	○	A URL which links to the metadata for the survey.	URL.	http://portal.oceannet.org/portal/start.php#details?tpc=006_b729a6e516f45a70b0a5a2ed19e2b08c

Project Information

Please provide as much of the following information as possible if the survey forms part of a wider project

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
projectName	M	The nationally/ internationally accepted version of the project name.	Free text;	UK Tide Gauge Network; SIMORC HMC Malampaya wave and tide; Ocean Regulation of Climate by Heat and Carbon Sequestration and Transports (ORCHESTRA).
projectCode	M	Provide a code to uniquely identify the project and allow links to be made between the tables. To ensure uniqueness, it is recommended that the website of the data owner is used, followed by a unique code which should reflect the code used by the funding organization where possible.	Free text;	http://www.dassh.ac.uk/ME102 ; http://www.bodc.ac.uk/RCC ; http://www.environment-agency.gov.uk/78949
projectStartDate	M	The date that the project started which is from when the funding was in place to start. Use the 1 st of the month if the exact date is not known.	Date; yyyy-mm-dd;	2012-01-24;
projectEndDate	C	The date that the project finished or is due to finish. Use the 1 st of the month if the exact date is not known.	Date; yyyy-mm-dd;	2015-01-24;

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projectWebsite	C	If a project website exists give the address (URL). This should be the web address of the environmental survey and not, in the case of environmental impact assessments, the engineering development.	URL;	http://www.southampton.ac.uk/oe/research/projects/rapid_meridional_overturning_circulation_moc.page
project MetadataURL	O	A URL which links to the metadata for the project.	URL.	http://portal.oceanet.org/search/full/catalogue/dassh.ac.uk_ME_DIN_2.3_9bc028bba91772eae38e3e6310f00fe4.xml

Appendix B

Detailed Metadata:

This section describes the detailed metadata that should be collected with the data. It contains specific information about the methods used, the people/organisations that carried out the work and any calibrations that have been applied to the data.

Users can use the form [here](#) to record Detailed Metadata

To return to the summary above, click [here](#)

The Detailed Metadata fields are specific to each data guideline and should be completed for each type of data. The information requested here may be supplied as additional metadata or may be supplied in a cruise or survey report, provided all the required information is included in the report.

B.1 Guidance:

Detailed descriptions and examples are given below to help users create Detailed Metadata to accompany their data.

Method Information

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
methodID	M	Method Identifier. A unique code for the methods to allow links to be built between this and sample event data.	Free text;	TIDE1234
tidalAdjustment	M	State the type of tide adjustment.	Free Text;	Observed tides at port gauge. Observed tides at site Tides deduced from GNSS Predicted tides.

installationDetails	M	Describe installation details, if predicted tides are used give details of port used.	Free text;	Predicted at Standard Port Aberdeen Bubbler Gauge deployed at survey site Tide pole at Great Yarmouth
spatialCRS	M	Spatial coordinate reference system. Describes the system of spatial referencing i.e. the datum used to supply the decimal latitudes and longitudes. There are additional fields to indicate the datum of the original data if the coordinates have been transformed.	Controlled Vocabulary; EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org	WGS84: EPSG::4326; British National Grid (projected): EPSG::27700; ETRS89 / UTM zone 28N: EPSG::25828; ETRS89 / UTM zone 29N: EPSG::25829; ED50: EPSG::4230; UTM31N: EPSG::23031
positionFix	M	Position fix and method and source. Give the method and source of the position fix instrument.	Free Text.	Differential GPS taken from the ships navigation equipment; 4 point satellite fix achieved.
horizontalAccuracy	M	How accurate the spatial positions are likely to be.	Decimal; units = metres	15.2

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
originalCRS	C	Datum of original coordinates if different from the one used to supply data	Controlled vocabulary; EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org or other defined coordinate reference system register	WGS84: EPSG:: 4326; British National Grid (projected): EPSG:: 27700; ETRS89 / UTM zone 28N: EPSG:: 25828; ETRS89 / UTM zone 29N: EPSG:: 25829; ED50: EPSG:: 4230; UTM31N: EPSG:: 23031
transformation	C	Transformation used to create decimal degrees if transformation undertaken.	Free Text.	ED50 to WGS84 seven parameter transformati on 18 = EPSG:: 1311
depthCRS	C	Give the reference to which the depth has been calculated e.g. Ordnance Datum Newlyn; Highest Astronomical Tide. Mandatory if seabed depths are given for each sample.	Controlled Vocabulary; EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org	Ordnance Datum Newlyn code: EPSG:: 5701; Malin Head height code: EPSG:: 5731

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verticalAccuracy	C	Vertical positional accuracy. How accurate the vertical resolution is. Must be provided if seabed depths are given.	Decimal; units = metres	0.5
rangeFactor	C	Range factor applied.	Decimal Number (zero if not required);	0.45
highWaterDifference	C	High water time lag/ projection used.	Time +/-hh:mm (00:00 if not required)	+00:45
lowWaterDifference	C	Low water time lag/ projection used.	Time +/-hh:mm (00:00 if not required)	-00:30
reductionLevel	C	Indicate the vertical datum or reference for any tidal variation computations.	Controlled vocabulary; use EPSG Geodetic Parameter Dataset http://www.epsg-registry.org or other defined coordinate reference system register or free text;	Chart Datum Ramsgate (UK) Mean Sea Level = EPSG::5100 VORF LAT
processing Organisation	C	The organization(s) that processed the data if different from the collector identified in 2.2 Originator. Contact MEDIN to add an organization to this list.	Term List; European Directory of Marine Organisations at http://seadatanet.maris2.nl/vedmo/welcome.asp	2588 ABP Marine Environmental Services Ltd
sensorDetails	C	State the name of the sensor used if applicable.	Controlled Vocabulary; SeaVOX Device Catalogue, Table L22 at https://www.bodc.ac.uk/data/codes_and_formats/vocabulary_sea_rch/L22/ or Free text if new system	TOOL0014: Munro tide gauge

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serialNumber	<input type="radio"/>	Serial Number of tide gauge if known.	Free text;	s/n1234
calibrationDetails	<input type="radio"/>	Provide calibration details for sensor.	Free text;	Calibrated in laboratory 29-01-2011
quotedAccuracy	<input type="radio"/>	State the quoted accuracy for the sensor.	Free text;	+/- 0.01 m
operatingRanges	<input type="radio"/>	State operating ranges for the system e.g. temperature and depths. If more than one use semi-colon separated list.	Free text;	10-50 Degrees C; 1375 m/s to 1900 m/s
processing Software	<input type="radio"/>	State extraction/processing software used.	Free text;	Nortek SeaReport
processing SoftwareVersion	<input type="radio"/>	State extraction/processing software version.	Free text;	v1.1
processing Personnel	<input type="radio"/>	Names of the personnel who were involved in processing the tidal data.	Free text; personnel name(s) separated by semi-colon if more than one personnel involved; indicate organisation name in brackets if more than one organisation involved.	Joe Bloggs (MarConsulting) Tide data generation
processingNotes	<input type="radio"/>	Any further notes on data processing that may be of relevance.	Free text;	This tide file was used KP 0-1 along route
processingQC Notes	<input type="radio"/>	Any further notes on data processing that may be of relevance.	Free text;	QC procedure applied using Integrated Management System procedures

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proceduresUsed	O	Any written methodology used should be referenced and linked. If the methodology is not referenced then provide a full description here.	Free text;	Methodology follows <survey company> internal procedures from quality management system
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Appendix C

Data:

This section gives a summary of the required data content and format for

Tidal Elevation data. It covers:

Station Information

Sample Event Information,

Summary or Predicted Tidal Data (Processed Data),

Observed Water Level/ Tidal Data (Processed Data),

GNSS Tidal Data (Processed Data)

Users can use the form [here](#) to record the data

To return to the summary above, click [here](#)

C.1 Guidance:

Detailed descriptions and examples are given below to help users to produce data in the preferred format.

Station Information

If the data collection took place at target stations, this information **must** be supplied with the data to ensure it can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
stationID	M	Station identifier. A unique identifier for the station.	Free text.	Stanton_Bank_s tation_4 (point); EastChan_Inner dover_se04; Liverpool_Dubli n_ferry_route1 (Video Transect); Lagan_Estuary (area)

geometry	M	Description of station spatial form. Describe if the fixed station is a point, transect (curve) or an area (surface).	Controlled Vocabulary; Geospatial Feature Type, Table L02 at https://www.bodc.ac.uk/data/codes_and_formats/vocabulary_search/L02/	004: Point; 003: Curve; 005: Surface;
primary XCoordinate	M	The primary X coordinate for the station as per the defined spatial coordinate reference system in the Detailed Metadata. For a point, this field is set to the point X coordinate; for a transect it is set to the X coordinate of the start of the transect; for an area it is set to the western edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	-3.476363, 234865.55
primary YCoordinate	M	The primary Y coordinate for the station as per the defined spatial coordinate reference system in the Detailed Metadata. For a point, this field is set to the point Y coordinate; for a transect it is set to the Y coordinate of the start of the transect; for an area it is set to the southern edge of the box. If supplying latitude, units are positive north (south is negative, north is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	54.583736, 5963487.00
methodID	M	Method identifier. Provides a link to methods including the relevant spatial coordinate reference system (copy from the Detailed Metadata Table).	Free text.	TIMES4376; 02465, 02896

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
secondary XCoordinate	C	The secondary X coordinate for the station as per the defined spatial coordinate reference system in the Detailed Metadata. For a point, this field is set to the point X coordinate; for a transect it is set to the X coordinate of the end of the transect; for an area it is set to the eastern edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	-3.476363, 234865.55
secondary YCoordinate	C	The secondary Y coordinate for the station as per the defined spatial coordinate reference system in the Detailed Metadata. For a point, this field is set to the point X coordinate; for a transect it is set to the Y coordinate of the end of the transect; for an area it is set to the northern edge of the box. If supplying latitude, units are positive north (south is negative, north is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	54.583736, 5963487.00
original Coordinates	C	If coordinates were transformed from a different reference system then the original coordinate and original coordinate reference system should be given, the method used to transform is linked by the methodID.	Free text;	SX498476
stationName	O	The name by which a particular station is known	Free text.	L4 Stannock Head
stationNotes	O	Any further notes on the station that may be of relevance can be added here.	Free text;	Rocky reef, west of West Maiden; Also known as Hell's Mouth

Sample Event Information

The observation is either taken at a single location, or as an underway logging through GNSS data. Where underway data are provided sample events can be depicted by track files and detailed in the MEDIN data guideline for navigation and positioning data (track). Use of geometric representations will replace the coordinate and spatial elements marked^{1*}.

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
sampleEventID	M	Sample Event Identifier. A unique identifier for the sample under consideration. Replicate identifiers should be suffixed to the end of a sample identifier using an underscore such as <code>_1</code> or <code>_a</code>	Free text;	E5, PHJ7936, GB004_1, GB004_3
surveyCode	M	The survey code must be stated to allow links to be built between this table and the survey metadata. The cruise identifier code could be used. Copy from General Metadata table.	Free text;	http://www.noc.ac.uk/JCR3022 ; http://www.bennett.ac.uk/RIBJULY_03_01
methodID	M	Method identifier. Provide the identifier for the methods (copy from the Detailed Metadata Table). If multiple methods were used separate codes using a comma.	Free text;	TIDES4376; 02465, 02896
depthDatum	M	Indicate the chart datum or reference for the water levels. Normally defined as Mean Sea Level = EPSG::5100.	Controlled Vocabulary; EPSG Geodetic Parameter Dataset at http://www.epsg-registry.org or other defined coordinate reference system Or Free text;	Mean Sea Level = EPSG::5100 Or Chart Datum Ramsgate (UK)
startDateTime	M	The date of sample collection.	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2014-01-24 13:33:00

startX Coordinate*	M	The X coordinate for the start point or station position of the sample as per the defined spatial coordinate reference system in the Detailed Metadata. For an area it is set to the western edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	-3.476363, 234865.55
startY Coordinate*	M	The Y coordinate for the start point or station position of the sample as per the defined spatial coordinate reference system in the Detailed Metadata. For an area it is set to the southern edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	54.583736, 5963487.00
endDateTime	M	The end date/time of the sample.	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2014-01-24 18:45:00

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
endX Coordinate*	C	The X coordinate for the end point or station position of the sample as per the defined spatial coordinate reference system in the Detailed Metadata. For an area it is set to the western edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	-3.476363, 234865.55

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endY Coordinate*	C	The Y coordinate for the end point or station position of the sample as per the defined spatial coordinate reference system in the Detailed Metadata. For an area it is set to the southern edge of the box. If supplying longitude, units are positive east (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	54.583736, 5963487.00
startOriginal Coordinates	C	If coordinates were transformed from a different reference system then the original coordinate for the start of a transect, or point coordinate, and original coordinate reference system should be given, the method used to transform is linked by the methodID.	Free text;	SX498476
endOriginal Coordinates	C	If coordinates were transformed from a different reference system then the original coordinate for the end of the transect and original coordinate reference system should be given, the method used to transform is linked by the methodID.	Free text;	SX498476
timeZone	C	Give the time zone in which the date and time of the sample/ file is made if different to that of survey.	Free Text;	UTC
trackData	C	Link to method identifier for track data; relevant for GNSS data.	Free Text;	POS1234
profileData	C	Link to method identifier for speed of sound correction where required.	Free Text;	CTD1234
waterDepth	C	Mean water depth at location, or water depth range and how this was derived.	Free Text;	80 m taken from Admiralty Chart 100-120 m from survey MBES
sampleRate	C	Sampling rate set for the sample when using observed tides.	Free Text;	5 minutes
localGravity	C	Local gravity considerations, applicable to some tide gauges.	Free Text;	9.812 m/s ²

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magnetic Variation	C	Local magnetic considerations, applicable to some tide gauges.	Free Text;	1° 24'W
stationID	C	Station Identifier if applicable. Copy from Station Table.	Free text	Stanton Bank site 4, PS74926
startKP*	C	Start chainage according to kilometre post (KP) scheme or length and direction of programmed line/ transect. May be negative value if data logging commences before start of line is reached. This can be used if relevant i.e. tidal predictions or observations are made or taken to cover certain KP ranges or GNSS tides are used.	Decimal kilometres for KP scheme. Decimal metres for distance scheme.	0.001. -1.005
endKP*	C	End chainage according to kilometre post (KP) scheme or length and direction of programmed line/ transect. May be greater than programmed line length when logging finishes after end of line. This can be used if relevant i.e. tidal observations are taken to cover certain KP ranges or GNSS tides are used.	Decimal kilometres for KP scheme. Decimal metres for distance scheme	125.023. 1010.005
sampling Personnel	O	Names or the personnel who were involved in collecting and field processing the samples	Free text; full personnel names separated by semi-colon if a team collated the data;	Joe Bloggs; Brian Begger collected and field processed samples
sampleNotes	O	Any further notes on the sample collection that may be of relevance.	Free text	Some turbidity due to sea state.
remarks	O	Any other remarks required.	Free Text;	Settling period to 2009-01-24 14:43:00
eventName	O	The name of the sampling location.	Free text	Colwyn Bay West; Hand Deeps; inner Orwell Estuary

Summary or Predicted Tidal Data (Processed Data)

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
dateTime	M	Date and time of the observation/ prediction.	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2014-01-24 13:33:00

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
waterLevel	C	Observed/ predicted water level.	Decimal number Units = metres	1.2
tidalVariation	C	Reduced water level to a defined datum if field waterLevel used to store the mean sea level.	Decimal number Units = metres	1.2
sampleEvent ID	O	Unique identifier/ code/ number for tidal data acquisition; may not be possible for some software applications; can be incorporated into the file name as an alternative.	Free text.	TIDE1234

Observed Water Level/ Tidal Data (Processed Data)

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
dateTime	M	Date and time of observation.	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2009-01-24 13:33:00

depth	M	Measured depth.	Decimal number Units = metres	167.8
computedTide	M	Calculated sea level variation about mean sea level calculated from adjusted observations or modelled surface representing a vertical datum.	Decimal number Units = metres	3.5

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
atmospheric Pressure	C	Atmospheric pressure where logged.	Decimal number Units = hectoPascal	1013.2
adjusted Depth	C	Depth adjusted for atmospheric pressure (depth – atmosphericPressure).	Decimal number Units = metres	171.2
adjusted DepthQC	C	Depth adjusted after QC procedures to provide correction.	Decimal number Units = metres	170.8
datum Adjusted Depth	C	Depth adjusted according to a tidal datum where known.	Decimal number Units = metres	170.8
temperature	C	Water temperature if logged.	Decimal number; Units = degrees celsius	12.2
heading	C	Heading of gauge if applicable.	Decimal number; Units = degrees	180
pitch	C	Pitch of gauge if applicable.	Decimal number; Units = degrees	8
roll	C	Roll of gauge if applicable.	Decimal number; Units = degrees	20
sampleEvent ID	O	Unique identifier/ code/ number for tidal data acquisition; may not be possible for some software applications.	Free text;	TIDE1234

GNSS Tidal Data (Processed Data)

This information is mandatory and **must** be supplied with the data to ensure they can be reused:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
dateTime	M	Date and time of observation	yyyy-mm-dd or yyyy-mm-dd hh:mm:ss	2009-01-24 13:33:00
xCoordinate	M	The X coordinate for sampling as per the defined spatial coordinate reference system in the Detailed Metadata. If supplying longitude, units are positive East (West is negative, East is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	-3.4763, 234865.55
yCoordinate	M	The Y coordinate for sampling as per the defined spatial coordinate reference system in the Detailed Metadata. If supplying latitude, units are positive North (South is negative, North is positive).	Decimal degrees; minimum of four decimal places or Decimal Number if not degrees;	54.5837, 5963487.00
ellipsoidal Height	M	Height above reference ellipsoid/ spheroid such as WGS84 logged by GNSS antenna	Decimal Number; Units = metres	168.23
computedTide	M	Calculated tidal variation at given location based on modelled sea level or vertical datum and height of waterline	Decimal number; Units = metres	-0.103

Additional items:

Please provide as much of the following information as possible to help others assess the data:

Field Title	M C O	Description	Recommended Controlled Vocabulary or Format	Examples
ellipsoidal HeightAnd Selected Datum Separation	C	Theoretical ellipsoid to tidal surface datum separation at given location	Decimal Number; Units = metres	57.63

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heightOf Vessel Waterline Above Ellipsoid	C	Height of vessel water line reference point above reference ellipsoid/ spheroid such as WGS84; corrected for offset	Decimal Number; Units = metres	164.23
heave Direction	C	Heave direction when logged	Decimal Number; Units = degrees	128.3
heave Correction	C	Correction for heave	Decimal Number; Units = metres	0.26
pitch Correction	C	Correction for pitch, if not included in heave	Decimal Number; Units = metres	0.15
rollCorrection	C	Correction for roll, if not included in heave	Decimal Number; Units = metres	0.2
sampleEvent ID	O	Unique identifier/ code/ number for tidal data acquisition; may not be possible for some software applications	Free text;	TIDE1234