

Comments by Member States with Chair TWCWG and IHO Secretariat replies

Belgium

The Flemish Hydrography can only approve the Resolution 01/2019 when changing the wording of Section 8.i back to the previous version, i.e.:

"It is recommended that the HO provide and display tidal sea level amplitude prediction with a minimum of either centimetre (for metric systems) or tenths of foot (for imperial systems) precision"

Reply: Considering the need to produce tidal prediction with an uncertainty of the order of centimetre and the I.T context, exploiting to the full the computing power will provide a greater precision than the one displayed today on digital tide tables. In this context, increasing the precision more than the current 2 digits, could help to better minimize the centimetric uncertainty in the final water level prediction provided and help to minimize the truncation effect.

In some cases, the current digital tide tables are displayed with a 0.01 m precision, but the computation are done with a precision better than 0.01m (0.001m).

The idea is to fit a centimetre precision on tide table, using and provide data with more than 2 digits, the WG suggested 3 digits.

Additional comment by the Flemish Hydrography:

In paragraph 8 i. the intention to 'provide and display tidal sea level amplitude prediction with a minimum of 4 decimals precision (for metric system)' is not clear.

If it signifies a fraction of 4 decimals, it leads to values that are no longer suitable for tidal publications. In the metric system this leads to a precision of 0,1 mm which is a too small increment to have a practical significance in tidal publications.

It should also be noted that none of the examples provided as attachment to the current CL provides the minimum 4 decimals precision, either as a fraction or otherwise.

Reply:

Considering the need to produce tidal predictions with an uncertainty of the order of centimetre and the computing environment, exploiting to the full the computing power will provide a greater precision than the one displayed today on digital tide tables. In this context, increasing the precision more than the current 2 digits in the international system units, could help to better minimize the centimetric uncertainty in the final water level prediction provided and helps to minimize the truncation effect.

In some cases, the current digital tide tables are displayed with a 0.01 m precision, but the computation are done with a higher precision.

For tide table, the objective is to fit a centimetre precision, using and providing data with more than 2 digits, it is suggested even 3 digits.

It should be kept in mind that resolution 01/2019 provides recommendations and is written to ease the future use of electronic tide information. These values could be used after by the tide table producer to apply harmonic analysis and produce tidal constituents.

However revised wording for 8i to accommodate the comments from the Flemish Hydrography are:

"It is recommended that the HO provide and display tidal sea level amplitude prediction with a minimum of either centimetre (for metric systems) or tenths of foot (for imperial systems) precision"

Brazil

Brazil suggests the following writing for the proposed new IHO Resolution 01/2019:

TITLE: DIGITAL TIDE AND TIDAL CURRENT TABLES

1 Hydrographic Offices (HOs) may authorize to publish their Tide and Tidal Current Tables in either paper format or digitally. If digitally, they can be distributed either through the HO's website, or representative complement or via portable media such as a DVD.

General Guidelines for Digital Tide and Tidal Current Tables

2 Digital Tide and Tidal Current Tables should adhere to all the same requirements as existing paper Tide and Tidal Current Tables as specified in IHO Work Programme 2 "Hydrographic Services and Standards".

3 The issuing office should provide documentation on how to install or read the electronic tables, minimum computer specifications how to obtain product support and general information on the Digital Tide and Tidal Current Tables. This information should be provided in either hardcopy written form (for example, on a separate sheet of paper or on the cover of the disk or other media), or electronically in a plain ASCII text 'readme.txt' type of file. This file should also include user license and/or condition of use information.

4 The issuing office should provide its formal name, mailing address; web url and point of contact information on the cover of the media. It should also provide information on the production of the tables (including both address and website), information on how to obtain annual updates, and how to obtain interim updates or errata information.

5 The Digital Tide and Tidal Current Tables should include a statement concerning the standing of the digital tables as meeting the applicable maritime regulations, either SOLAS and/or local country carriage requirements.

Formats for Digital Tide and Tidal Current Tables

6 There shall be two allowable formats for Digital Tide and Tidal Current Tables:

- a. Scanned Images of Tide and Tidal Current Tables: scanned images of the paper Tables.
- b. Electronically Generated Tide and Tidal Current Predictions: software and user interface that calculates tide and tidal current predictions from stored Harmonic Constituents or time and range offsets.

Detailed Specifications for Digital Tide Tables - Scanned Images of Tide Tables

7 Scanned Images of Tide Tables should have the following specifications:

- a. faithful reproduction of all the pages of printed Tide Tables,
- b. images formatted in a widely available, common format. Examples formats include, but not limited to PDF, TIFF, JPEG, GIF. If PDF files are provided, then information on how to download the Adobe Acrobat Reader software must be provided,
- c. if multiple books are published, then each book be located within its own folder and clearly

identified, and

d. no modification of the scanned images permitted by users.

Detailed Specifications for Digital Tide Tables - Electronically Generated Tide Predictions

8 Electronically Generated Tide Predictions should have the following specifications:

a. Station Selection: can either be map based or list based, and organized by water body,

b. Station Information:

- Station Name and Number (or ID) as appropriate,

- Body of Water Descriptor (if appropriate),

- Latitude and Longitude (following ISO 6709 convention, stated in degrees and 6 decimals),

- Horizontal and Vertical Datum convention,

- Location Map with nearby prediction stations identified,

- URL to station or data portal.

c. Earth-Moon-Sun Astronomical Calendar Information (tabular and/or integrated with graphical data output),

d. Sunrise/Sunset Calendar Information (tabular and/or integrated with graphical data output),

e. default reference datum is the Chart Datum used by the country. Furthermore, the capability for the user to reference predictions to other tidal datums supported by the HO (such as LAT, HAT, MHW, MSL) and the user identify datums such as a national geodetic or ellipsoidal datum or other coastal engineering or threshold datums that are pertinent,

f. data displays and tables can be toggled both in Metric or English units, with default depending upon country,

g. time displayed is the legal local time as default, with user selected option for UTC/GMT, daylight savings time, etc. Legal time includes daylight savings time if applicable. Furthermore, when time zone information is displayed it follows the convention that negative time zone offsets are used for east longitude and positive offsets for west longitude,

h. the following tide prediction source metadata information:

- Harmonic Constituents or Time and Range Correction to Reference Station,

- Dates of Harmonic Analyses time series used to create the set of Harmonic Constituents used in the prediction,

- Dates of the observations used to create time and height corrections (for nonharmonic based predictions) to a Reference Station,

- Links to the list of the Harmonic Constituents used in the Prediction. Furthermore, the display of the Harmonic Constituents should adhere to the IHO Resolution 2/1977 (NATIONAL TIDAL CONSTITUENT BANKS), and

- The name of the Harmonic Analysis program used to generate the Harmonic Constituents.

i. tidal sea level amplitude prediction provided and displayed with a minimum of 2 decimals precision (for metric system),

j. capability for the users to obtain output in common formats such as PDF, TXT, XML, CSV, S-112 single point formats,

k. special warning explaining areas of anomalous tidal conditions, special datums, or tidal based hazards to navigations (dual high or low waters, tidal bores, river flow dependencies and river datums, frequent non-tidal conditions, etc.), and

l. when applicable, estimates of uncertainty in the predicted times and heights of high and low waters.

Detailed Specifications for Graphical Display of Electronic Tide Predictions

9 Predictions must have the ability to obtain graphical and tabular output for desired time period (either historical and into the future) and should contain the following attributes with the objective not to prescribe a specific graphical view but rather to identify common elements that transcend all types of graphs:

- a. predictions displayed as discrete points or a continuous curve using a curve fit routine to times and heights of high and low waters or to the time series values,
- b. all axes clearly labelled,
- c. time series data with a minimum, 1-hour increments,
- d. times and heights of predicted high and low tides,
- e. default datum is the same as Chart Datum for the location of the prediction,
- f. default tidal height units are the same as the HO's printed tables,
- g. the display includes station information (as defined above),
- h. the display includes the name and/or the insignia of the source authority organization,
- i. the display has the option to view the tide prediction numerical values used to create the graphic, and
- j. the display of the graphical data is able to be adjusted to suit daytime, twilight, and night time viewing.

Detailed Specifications for Digital Tidal Current Tables

10 Digital Tidal Current Tables can be in the same two formats as Digital Tide Tables and the same requirements that apply to Digital Tide Tables pertain to Tidal Current Tables.

11 Electronically Generated Tidal Current Predictions should have the following additional specifications:

- a. depth of prediction and descriptor that the depth is either from the surface down or from the bottom up included in the metadata,
- b. if applicable, flood and ebb current direction (referenced to True North),
- c. default speed units in knots for graphical display of tidal currents, and
- d. default direction units in degrees (referenced to True North) for graphical display of tidal currents.

Reply: The Chair and Secretariat thank Brazil for their comprehensive comments, which have been taken into consideration when finalizing the text of the resolution.

China

Section 6 A that reads:

Scanned Images of Tide and Tidal Current Tables: This format consists of scanned images of the paper tide tables. This format should have the following attributes.

Should read:

Scanned Images of Tide and Tidal Current Tables:
images of the paper tide tables.

Reply: The proposed simplification is supported with the revision of paragraph 6a as presented.

Colombia

Taking into consideration the common approval and benefit of using GNSS technology in the tidal measurement during the hydrographic surveying, as well as the developments of some Offices to establish the vertical separation between the tidal datum and the ellipsoid of reference in territorial waters, Colombia proposes to include the following item:

12. It has been resolved that the models of separation Ellipsoid - Tidal datum can be included in a global database for general consultations according to the following details:
- Coverage polygon in digital format (SHP, KMZ, KML);
 - Metadata in TXT format (They must include the creation data, the spatial resolution; the available tidal data).

Reply: The Chair and the Secretariat thank Colombia for this suggested addition, however as the topic was not addressed by the TWCWG during the original drafting, it is felt that further discussion on the detail is necessary before inclusion as an amendment to the resolution.

India

National Hydrographic Office, India is not producing digital tide and tidal current table in either paper format or digitally.

Reply: The Secretariat thanks India for this information.

Saudi Arabia

Whilst Saudi Arabia approves the proposed new IHO Resolution 01/2019 some aspects of the content impacts on the National Security Policy with regards to the release of sensitive data, e.g. tide and stream constituents.

Hence Saudi Arabia will endeavour to present fullest data sets for Digital Tide and Tidal Current Tables where-ever possible to align with the proposal.

Reply: The resolution recommends the most common practices and the most common formats for officially delivered tidal products. The respect of national security policies is a concern shared within HO framework. The current IHO recommendation is providing best practices guidelines for a set of data that promote the hydrographic international knowledge and exchanges. This impacts tidal information systems interoperability and eventually the international tidal products for navigation. The resolution is a recommendation specifically dedicated to the data sets that are delivered or made public.

Sweden

Comments to the proposed IHO Resolution 01/2019:

Section 2: The reference should preferably refer to M-3 IHO Programme 2 "Hydrographic services and Standards" Section 2.2 - Tides and Water Levels

Section 8 h: The reference should preferably refer to M-3 IHO National Tidal Constituent Banks Resolution 2/1977 as amended 42/2000 A6:8. The web-link Points to an unofficial external website directory and should link to the IHO Website or be removed.

Reply: Agreed, both references have been amended.