National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

Hydrographic Datums

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Tidal Datums

- Tidal datums are determined from analysis of a long record from a tide gauge with sea level expressed relative to a BM (or Station Datum or a Land Datum)
- In principle the datums are defined as an average over 18.6 years (or the National Tidal Datum Epoch in the US).
- Tidal analysis of the record gives us an average MSL and its tidal content information.
- The tidal information tells us how much MHW, MHW etc. relate to MSL, and therefore also to the BM (or Station datum) i.e.

Most Used Hydrographic Datums

- HAT Highest Astronomical Tide
- MHWS Mean High Water Springs
- MHW Mean High Water
- MHWN Mean High Water Neaps
- MSL Mean Sea Level
- MLWN Mean Low Water Neaps
- MLW Mean Low Water
- MLWS Mean Low Water Springs
- LAT Lowest Astronomical Tide

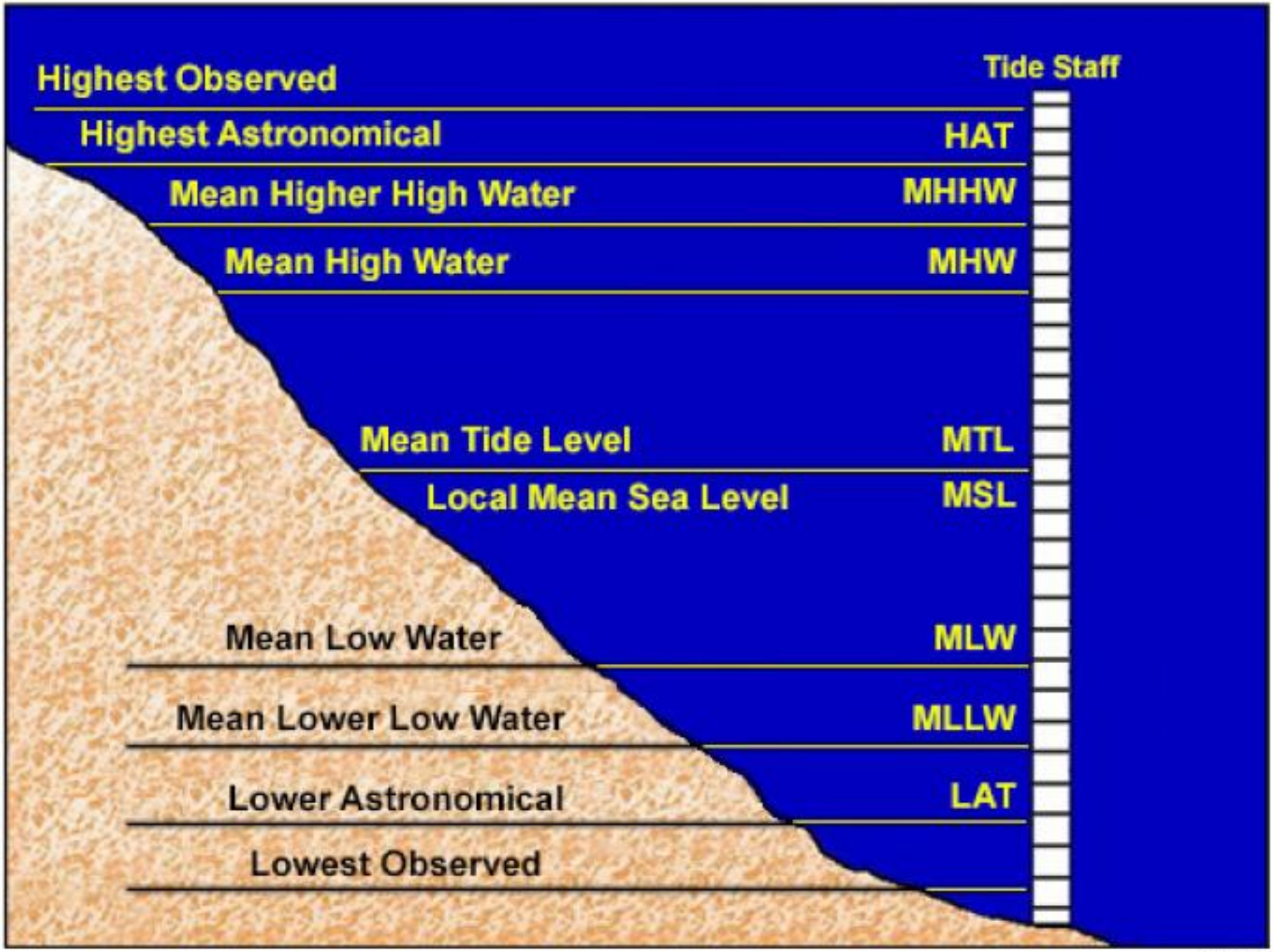
For discussion see e.g. Admiralty Tide Tables.

Hydrographic Tidal Datums

- Mean Sea Level (arithmetic average of sea level values) above the datum
- Mean High Water (average HW) above datum etc.
- Lowest Astronomical Tide (LAT) – the lowest value the water level falls due to the astronomical tide.
- LAT corresponds to Chart Datum (CD) in most places.

Hydrographic Datums

- All of these are Calculations, and sometimes Definitions, of datums (i.e. reference levels) with respect to the BM (or Station Datum)
- They are recalculated/redefined from time to time by hydrographic agencies.


Tide Staff
Highest Observed
Highest Astronomical
HAT
Mean Higher High Water
MHHW
Mean High Water
MHW
Mean Tide Level
MTL
Local Mean Sea Level
MSL
Mean Low Water
MLW
Mean Lower Low Water
MLLW
Lower Astronomical
LAT
Lowest Observed
NOAA

J Geod
DOI 10.1007/s00190-016-0938-1

ORIGINAL ARTICLE

Differences between mean tide level and mean sea level

P. L. Woodworth[1]

Les Îles-de-la-Madeleine | Datums - NOAA Tides &

https://tidesandcurrents.noaa.gov/datums.html?units=1&epoch=0&id=8518750&name=The+Battery&state=NY

Datums for 8518750, The Battery NY

Elevations on Station Datum

Station: 8518750, The Battery, NY
Status: Accepted (Nov 19 2012)
Units: Meters
T.M.: 75
Epoch: 1983-2001
Datum: STND

Datum	Value	Description
MHHW	2.543	Mean Higher-High Water
MHW	2.445	Mean High Water
MTL	1.755	Mean Tide Level
MSL	1.785	Mean Sea Level
DTL	1.773	Mean Diurnal Tide Level
MLW	1.065	Mean Low Water
MLLW	1.002	Mean Lower-Low Water
NAVD88	1.848	North American Vertical Datum of 1988
STND	0.000	Station Datum
GT	1.542	Great Diurnal Range
MN	1.380	Mean Range of Tide
DHQ	0.099	Mean Diurnal High Water Inequality
DLQ	0.063	Mean Diurnal Low Water Inequality

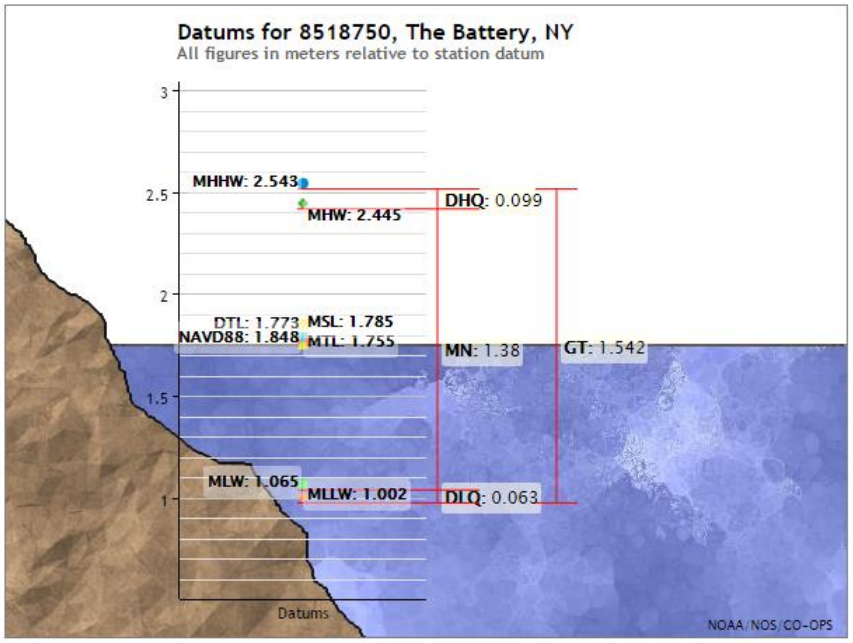


Fig-E.2.ai | Trends3b.jpg | Trends2b.jpg | Trends1b.jpg | Correlations5b.jpg | Show all

17:50
28/09/2016

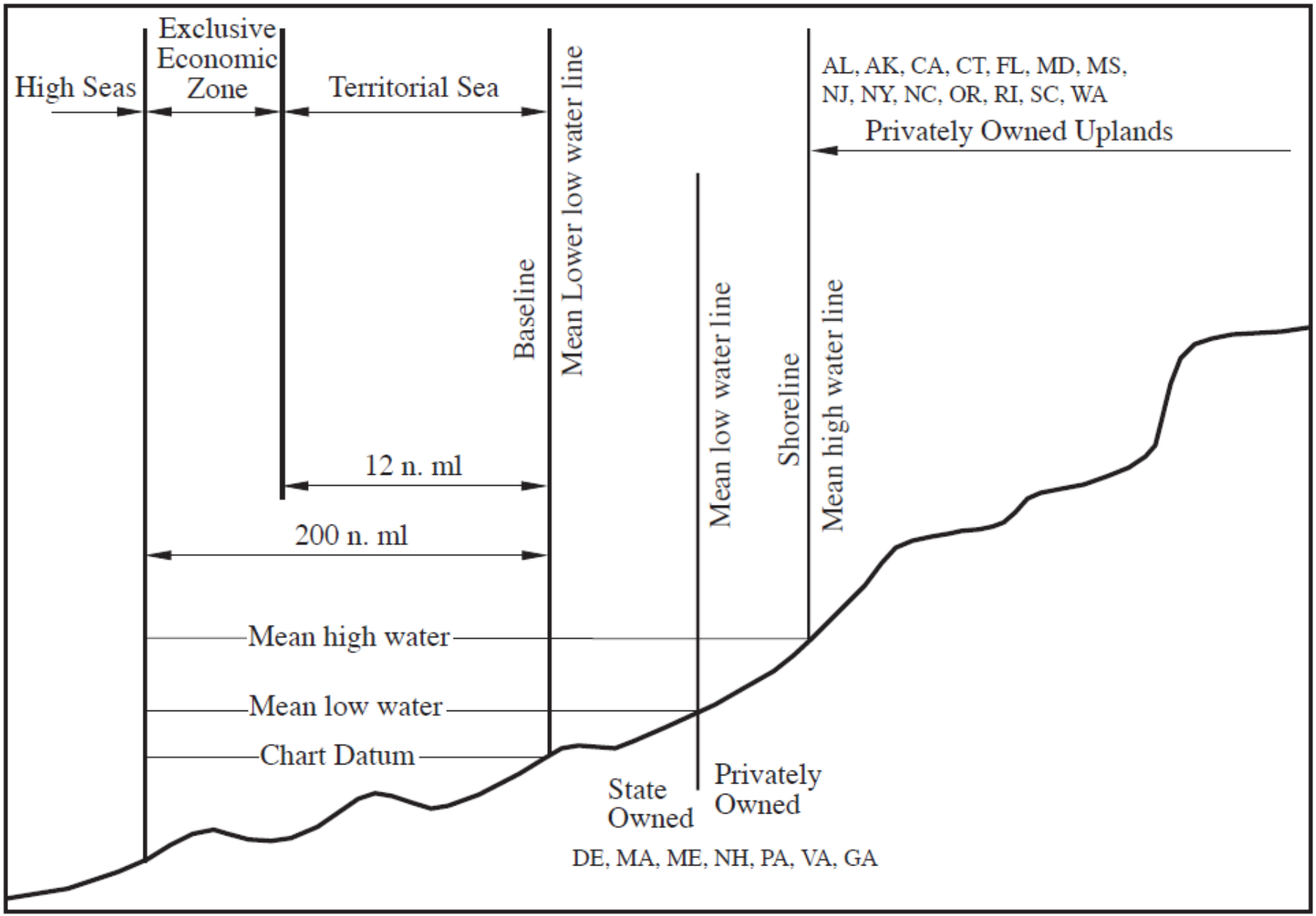
Tidal Datums

- Remember that all of these MSL, MHW, LAT etc. datums are ultimately Definitions of working levels in terms of the original benchmarks.
- They are important for surveyors, navigation etc. and also they can have legal importance (see below).
- They are generally speaking not used much in scientific research because scientists know that MSL etc. is constantly changing.

Appendix E Legal definitions in the coastal zone

In Chapters 2 and 9 we looked at different tidal levels and their use as zero or Datum Levels [1]. Tidal datums are also used to define shorelines, adopted as the state, national and international boundaries shown on maps. Generally the important levels are some form of High Tide, or some form of Low Tide, depending on locally adopted definitions. The determination of these levels, and their projection to mapped shorelines may require long records of sea-level measurements.

Appendix E in Pugh and Woodworth (2014) 'Sea-Level Science'


High Seas
Exclusive Economic Zone
Territorial Sea
Baseline
Mean Lower low water line
Mean low water line
Shoreline
Mean high water line
AL, AK, CA, CT, FL, MD, MS,
NJ, NY, NC, OR, RI, SC, WA
Privately Owned Uplands
12 n. ml
200 n. ml
Mean high water
Mean low water
Chart Datum
State Owned
Privately Owned
DE, MA, ME, NH, PA, VA, GA