

Liik
enne
vira
sto

**Definitions of MSL and
relevance of IHO TR:s to non-
tidal waters**

TWLWG2, Stavanger 27.-29.4.2010

Jukka Varonen

Finnish Transport Agency

Hydrographic Office

After TWLWG1

INSPIRE Coordinate System recommendation Sep 2009

- It was necessary to have LAT as one of height datum definitions
- However, the rest of INSPIRE recommendation is not understandable and leave all open on non-tidal areas
- Are IHO definitions and regulations understandable?
- Yes, they are, but not for the first time readers

The INSPIRE directive and the mission of IHO are equal in relation to survey data compatibility for other users

- this compatibility is difficult to achieve on tidal areas
- but on other areas it would be a benefit for both to have a common understanding on height datums

INSPIRE is only for Europe, what are the benefits for other areas?

INSPIRE Specification CRS v.3.0

“For depth values of the sea floor in marine areas with an appreciable tidal range, the use of the Lowest Astronomical Tide [IHO] is already mandated by Technical Resolution A2.5 of the International Hydrographic Organisation (IHO). In marine areas without an appreciable tidal range, in open oceans and effectively in waters deeper than 200m tide is not measured since it has no significant impact on the accuracy of the sounding.”

The definition of MSL

The definition shall be the same for both tidal and non-tidal waters

However this will lead to problems on non-tidal areas, where the effects of global ocean rise and land uplift (if exists) are much easier to distinguish from the total variation of sea level

What is the truth in difference between tidal and non-tidal waters?

Has somebody sometimes thought – well, the tidal range is less than 30 cm:s (1 feet) – is there any sense in observing such small variations at all – you should always be aware that your expectations for water level will be unsure within that range.

Is that really true? Is this the origin of mean sea approximation?

If this theory is true, there is one serious misunderstanding, which may lead to danger – although non-tidal area, the water level may vary in much wider range than ± 15 cm

The real difference between tidal and non-tidal waters

Are the underkeel margins the real criteria

- there may be MSL areas where people use similar margins as on tidal waters
- however, it is typical on certain non-tidal maritime areas that the underkeel margins are very small

On those maritime areas

- the water level in relation to Chart Datum is observed
- several other things are also considered
- the effect of wind and waves
- list of the ship on turns
- even dynamic squat effects
- clearances under bridges and other constructions

Accurate vertical navigation

Minimal underkeel clearances do not allow any uncertainty of water level observations (including Datum) neither during the survey nor in navigation decisions

This environment may be based only on accurate geodetic height datum

In this environment the existence and realization of the Datum for large areas (nationwide or even covering several countries) is important, the difference between the Datum zero and MSL has less importance

However, the mean sea level assumption shall be maintained.

MSL for non-tidal sea areas, not LW

Categories

Tidal areas

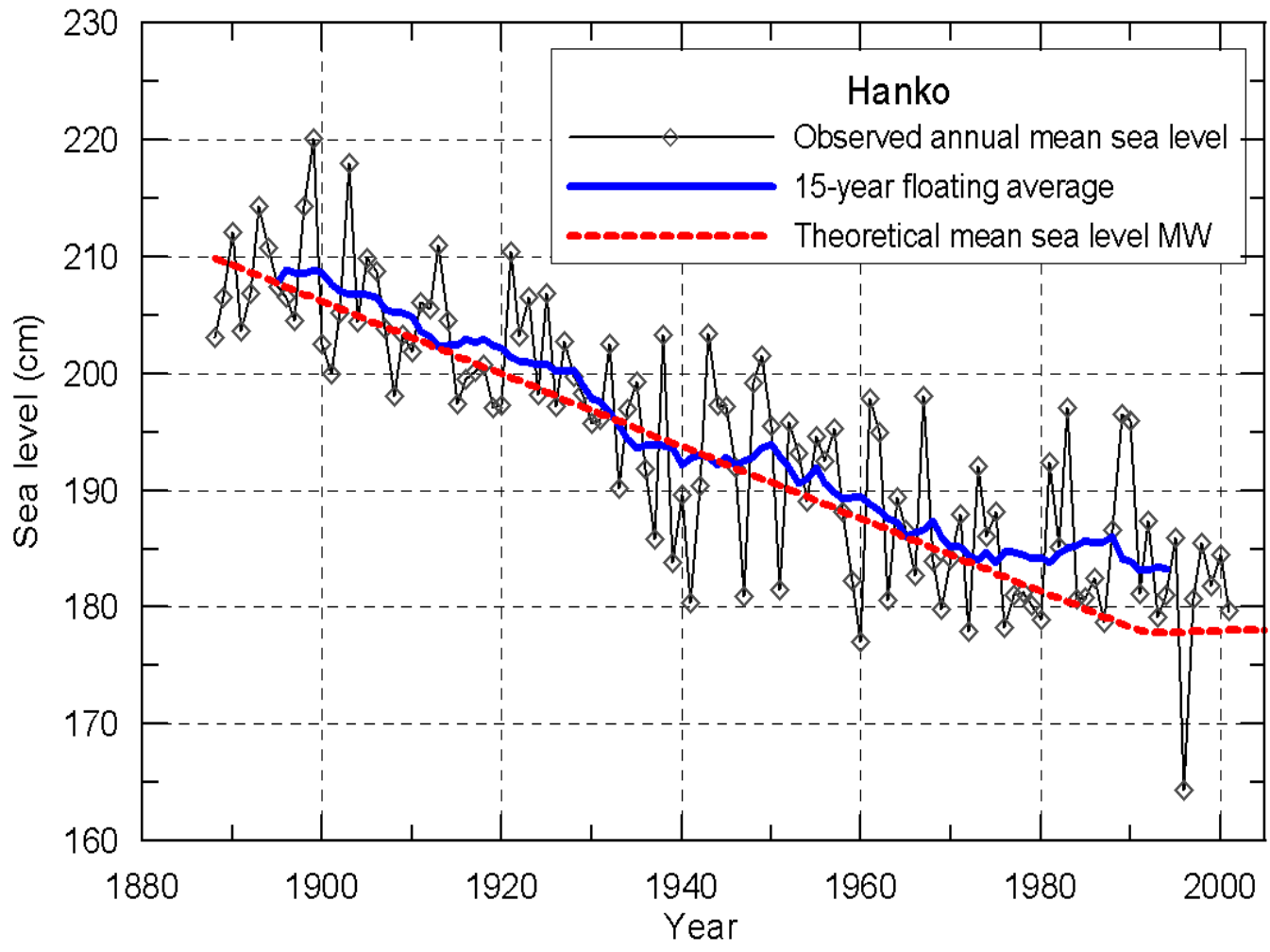
Non-tidal sea areas

Inland Waters

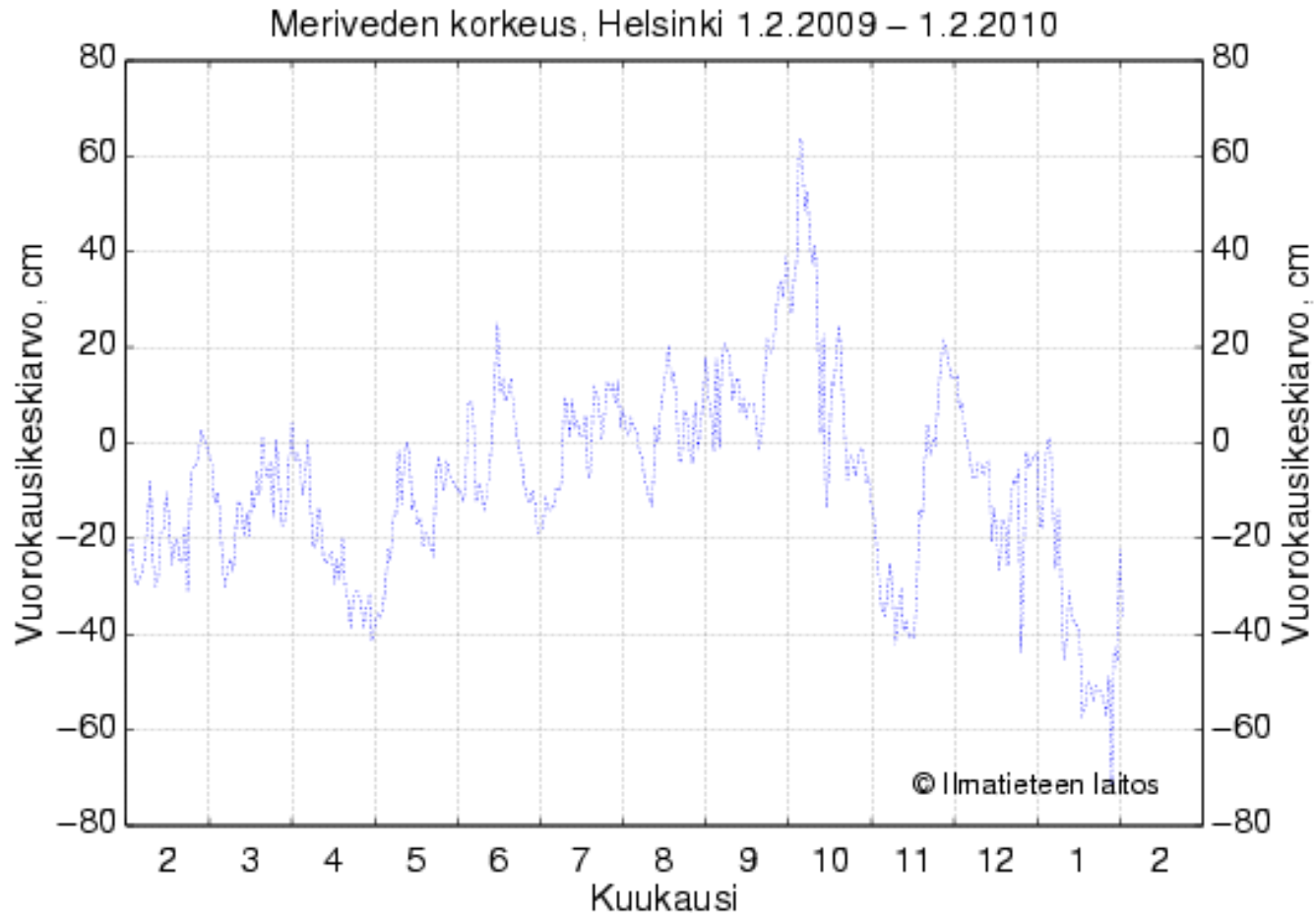
Rivers and estuaries?

Traditional navigation where the mariner is obliged to decide the safety marginal alone and based on insufficient information

Modern IT-based navigation (pre-programmed and controlled with most modern equipment)



Water level in Helsinki, one year period



Helsinki January 23. – 30. 2010

