Reply on RC2

Julian Sievers et al.

Author comment on "An integrated marine data collection for the German Bight – Part 1: Subaqueous geomorphology and surface sedimentology (1996–2016)" by Julian Sievers et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-47-AC2, 2021

General Comment 1:

One minor complaint, at least in the online map viewer, for some variables there were no units visible neither in the legend nor in the metadata (e.g. for the d50.).

Reply/Action:

WMS legends now contain units for sedimentological data (mm for d50, dim.less for porosity, skewness and sorting).

Specific comment 1 (chapter 2.2) – PART 1

With regards to the temporal interpolation, the authors state that it is sufficient to only use the closest time points in both directions. Have the authors checked if using average changes or trends over a longer time period lead to different results when interpolating the data? If so it might be usefull to go a little bit further into detail here.

Reply/Action:

Advanced interpolation methods were evaluated and would have provided a potential benefit in areas where high morphological activity is expected but the data base is scarse. However, highly active areas are also densly sampled in this project area. Regionally, fairways are assessed at least once a month, occasionally even higher frequencies are present. Considering the time frame of EasyGSH-DB, where 20 years are analysed, this would lead to at least ~250 data sets per point in the most frequently sampled regions. To prevent "overshooting" as could be possible in regular polynomial solutions, a bicubic spline interpolation was necessary to investigate further benefitsof advanced interpolation methods. As this spline would need to spatially interpolate elevations on each single data set it utilizes to generate one elevation value at a desired point in time (plus generation of the spline component itself and general database/network traffic), the computation time would increase up to roughly 300 to 400-fold, while there is, due to high temporal sampling density, very little gained. Under the aspect of "cost-benefit"-analysis regarding compational time versus modeled elevation quality, a linear interpolation between the two closest datasets was deemed sufficient. Generally, areas with high morphological activity – where advanced interpolation methods would be useful – are also more frequently sampled, thus decreasing the "cost-benefit"-factor of more complex methods further.

Additional explanation concerning "cost-benefit" will be added to revised manuscript.

Specific comment 1 (chapter 2.2) – PART 2

For example in wave dominated areas single extreme storm events can have effects on bathymetric changes that are much larger then during average years. Or the slow movement of large scale bedforms can be observed in bathymetric data while not necessarily indicative of long term erosion/deposition. Allthough these are mostly small scale effects and might not apply to large parts of the data domain, at least mentioning these aspects might help to put the dataset in context.

Reply/Action:

EasyGSH-DBs DTMs are only valid for the points in time they are created for, in this case 1st of July of each year between 1996 and 2016. This is a compromise between temporal resolution, data availability, and usability for numerical models. Catastrophic storm events can only be displayed if their influence on bathymetric information used for interpolation is present, e.g. if they happened (shortly) before 1st of July.

If, regionally, there is a suffiecient bathymetric data base, more models, e.g. two per

year, four per year or more, could be generated and used in numerical modelling or morphodynamic analyses to accommodate singular extreme events.

To adress long term changes as best as possible, we chose a 20 year period to create the basic models and carry out analyses, as the German Bight and coast line is especially influenced by the 18.6 year cycle of different constellations of Sun, Moon and Earth, which can produce abnormally high or low tides.

Additional explanation concerning short term extreme and long term gradual events will be added to revised manuscript.

Specific comment 2 (chapter 2.3)

The part about the temporal availability of samples (L157-160) is somewhat hard to understand/confusing. For example the authors write "all samples for the same point in time" while to my understanding mean something more like "samples for one point from different times" or even "utilizing all samples regardless of their respective date". This part should be made clearer.

Reply/Action:

"utilizing all samples regardless of their respective date" is very concise and makes it much clearer.

Rephrasing based on referees suggestion, will be changed in revised manuscript.

Specific comment 3 (chapter 3.3)

I assume these products are for the whole period (1996-2016). This should be made clear here again.

Some additional explanation about the calculation of the morphological drive would be helpful. It is not obvious how it helps to differentiate between gradual and sudden changes. Especially since the unit of m per year could also be interpreted as average yearly changes.

Reply/Action:

They indeed are for the whole period. Specification in the text plus adding a short clarification of what we understand as morphological drive.

Technical correction 1:

L 45: that for numerical models --> for use in numerical models

Reply/Action:

Will be changed in revised manuscript.

Technical correction 2:

L 103: and a consequence --> and as a consequence

Reply/Action:

Will be changed in revised manuscript.

Technical correction 3:

L 166: (see Sect. 2.3) --> I think this should be 2.4

Reply/Action:

Will be changed in revised manuscript.

Technical correction 4:

L 213: was used 21 DTMs --> was used for 21 DTMs

Reply/Action:

Will be changed in revised manuscript.

Technical correction 5:

L 229: isoline --> isolines

Reply/Action:

Will be changed in revised manuscript.

Technical correction 6:

L 266: component --> components.

Reply/Action:

Will be changed in revised manuscript.