Benchmark 1: Input Data Files for Modeling Crescent City Harbor

This document describes the input data files for Crescent City case studies used in Yamashita et al. (2022).

Data Format for Uniform Grid Data files

All data files described below are the z data format files with uniform grid. The following Matlab codes in each DEM directory plot any z data format file:
`plot_z_crescent_0p3sec_501x361.m` at `/crescent_city/DEM/`
`plot_z_hirota_0p2sec_1567x1387.m` at `/hirota/DEM/`

To plot the other z data format files using these m files, you may need to change the following parameters.

(1) Essential parameters to run the code
Line 8: input file name, `z_file`

Line 14: the number of gird points along the longitude, `ix(-)`
Line 15: the number of grid points along the latitude, `jy(-)`

Line 18: grid space, d`x(°)`

Line 22: longitude at the west end, `xmin(°)`
Line 24: latitude at the south end, `ymin(°)`

(2) Optional parameters
Line 30: increment to plot z data, `inc(-)`

Line 51: vertical exaggeration, `zFC(-)`

Line 55: minimum value for the colorbar, `zminC(m)`
Line 56: maximum value for the colorbar, `zmaxC(m)`

Line 106: change the light angle

Crescent City Modeling Data Files

- Nested-grid Setup (in `/crescent_city/`)
  `crescent_city_5GN_setup_2023_0601.xlsx` shows the nested-grid setup to model Crescent City Harbor including the grid points, space, and coverage of each computational domain.

- DEM data (m) (in `/crescent_city/DEM`)
  Domain 1: `north_pacific_2min_GEBCO14_MSUW_3301x1321_2018_12_DDGW.dat`
  Domain 2: `US_westcoast_30sec_1441x2281_2018_12_ver1_DDGW.dat`
  Domain 3: `crescent_city_7.5sec_481x577_2018_12_ver1_DDGW.dat`
  Domain 4: `crescent_city_1.5sec_421x481_2018_12_ver1_DDGW.dat`
  Domain 5: `crescent_city_0.3sec_NCEI_NOAA_501x361_2018_12_ver1_DDGW.dat`

- Manning's roughness coefficient
  The value of 0.025 $m^{-1/3}s$ is used in hydrodynamic and sediment transport models

- Land-use Map (in `/crescent_city/`)
  Domain 5: `lc_CC_0.3sec_NCEI_NOAA.dat`
  0: water body(erodible)
  1: land(non-erodible)

- Initial Deposition Thickness (cm) (in `/crescent_city/`)
  Domain 5: `is_CC_NCEI_NOAA_03sec_25deg.dat`
  The initial sediment layer, which is assumed to be 20 m thick, tapers off over a 25° gradient to the boundaries of non-erodible surfaces.

- Pier structure
  Domain 5: `pier_03sec_Crescent_City.dat`
  The pier structure data consist of 0 or 1. The data of "1" indicates the location of a pile array in the harbor. The equivalent roughness coefficient for a pile array is Eq.(14) in Yamashita et al. (2022, Mar. Geol.)

- Post event survey data within domain 5 (described in Wilson et al. 2012):
  dh_crescent_city_0.3sec_NOAA_USACE_501x361.dat

- Tide level: -74.0 cm

Reference

Yamashita, K., Yamazaki, Y., Bai, Y., Takahashi, T., Imamura, F., and Cheung, K.F. (2022). Modeling of sediment transport in rapidly-varying flow for coastal morphological changes caused by tsunamis. *Marine Geology,* 449, 106823, doi:10.1016/j.margeo.2022.106823.