**floodAR**

README file last updated by Christopher Piecuch, cpiecuch-at-whoi-dot-edu, Fri Oct 22 2021

**Basic description**

Citation

This code was generated to produce the results presented in the main text of:

Piecuch, C. G., S. Coats, S. Dangendorf, F. W. Landerer, J. T. Reager, P. R. Thompson, and T. Wahl, “High-Tide Floods and Storm Surges During Atmospheric Rivers on the US West Coast,” *Geophysical Research Letters*, xxx. (Preliminary version available here: https://www.essoar.org/doi/10.1002/essoar.10507817.2)

Please cite this reference when using this code.

**Contents**

Text files

* *Copyright*: copyright statement
* *License*: license statement
* *SIO\_R1\_1948-2017\_Comprehensive*: SIO R1 AR catalogue (from https://weclima.ucsd.edu/data-products/)
* *SIO-R1\_catalog\_description*: Description of SIO R1 AR catalogue

Word files

* *README*: this document

MATLAB .m scripts

* *analyzeHighTideFloods.m*: Produce Figures 2-3
* *analyzeStormSurges.m*: Produce Figures 1, 4-5, S1-S3
* *chrisSaveFigurePng.m*: Scripts to save out PNG files
* *createSensitivityStatistics.m*: Perform sensitivity analysis shown in Figure 3a
* *createStatistics.m*: Perform bulk of analyses from the paper
* *createTheoreticalCoefficients.m*: Compute theoretical coefficients as described in Supporting Information Text S4
* *downloadTideGaugeData.m*: Download all NOAA NOS data for all tide gauges
* *fitharmon\_err.m*: Fit OLS trend plus sinusoids to time series
* *noaaDatums.m*: Retrieve tide-gauge station datums from NOAA NOS
* *noaaSealevel.m*: Retrieve tide-gauge hourly water level observations from NOAA NOS
* *noaaTide.m*: Retrieve tide-gauge hourly tidal predictions from NOAA NOS
* *openNetCDF.m*: Open NetCDF file

MATLAB .mat data files

* *clr0.mat*: Colormap file
* *SIO\_R1\_1948-2017\_Comprehensive.mat*: \*.mat version of SIO R1 catalogue (above)

Subdirectories

* *ncepncarr1*: NCEP/NCAR R1 NetCDF files for daily zonal wind stress, meridional wind stress, sea level pressure, and precipitation during 1980-2016.

**Usage notes:**

This code should be self-contained and run “out of the box.” Download all files, change directory to the data directory, and execute the following \*.m files in the following order in your MATLAB Command Window to produce the figures shown in the paper. (NB: For the paper, we used MATLAB\_R2021a.)

1. createTheoreticalCoefficients.m
2. downloadTideGaugeData.m
3. createStatistics.m
4. createSensitivityStatistics.m
5. analyzeHighTideFloods.m
6. analyzeStormSurges.m