**bayesFCT**

README file last updated by Christopher Piecuch, cpiecuch-at-whoi-dot-edu, Wed Nov 25 2020

**Basic description**

Citation

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

Piecuch, C. G. (2020), “Likely weakening of the Florida Current during the past century revealed by sea-level observations”, *Nature Communications*, 11, 3973, https://doi.org/10.1038/s41467-020-17761-w.

Please cite this reference when using this code.

**Contents**

Text files

* *Copyright*: copyright statement
* *License*: license statement

MATLAB .m files

* *autocorrelation.m*: computes sample autocorrelation of time series
* *bayes\_main\_code.m*: this is the main driver code of the model. Simply execute “bayes\_main\_code” in the MATLAB Command Window from the bayesFCT directory, and this code should run “out of the box”. See lines 26-47 of this code for adjustable input parameters. (Values occurring on these lines presently are the “default” values to reproduce results in Piecuch (2020)).
* *delete\_burn\_in.m*: delete “burn-in” (or “warm-up”) transients from model solution
* *determine\_clusters.m*: create matrix used in spatial covariance structure of relative sea level fluctuations
* *EarthDistances.m*: compute distances between latitude and longitude points on a spherical Earth
* *initialize\_output.m*: initialize output
* *prepare\_data.m*: format tide gauge data and bring into Bayesian model workspace
* *randraw.m*: draw random value from any of a number of distributions
* *set\_hyperparameters.m*: set hyperparameter values (i.e., parameters of the prior distributions)
* *set\_initial\_values.m*: set initial values of model solutions
* *update\_all\_arrays.m*: update model solutions

Subdirectories

* *rlr\_annual*: PSMSL (www.psmsl.org) tide-gauge records of relative sea level

**Note on usage of code and MATLAB release**

This code was written and executed (to produce results in Piecuch 2020) using the MATLAB release version MATLAB\_R2015b. The code is also compatible with the MATLAB\_R2016a release. However, it has come to my attention that there are issues with newer MATLAB releases, such that errors are incurred when the code is executed using MATLAB\_R2016b or later. I am currently investigating this issue and hope to provide updated codes, that are compatible with more recent MATLAB releases, as soon as possible.

More generally, if you have any questions or issues running the code, don’t hesitate to get in touch (see email address above).