

# C-RISe: Wind and wave analysis software overview

Ellis Ash, SatOC  
8 May 2018

## Introduction

This note outlines the software used for the C-RISe wind and wave training.

All code is written in python and requires the following python packages:

- os
- fnmatch
- numpy
- netCDF4
- matplotlib.pyplot
- mpl\_toolkits.basemap
- scipy.stats

These packages mostly come with Anaconda (or miniconda) python, with the netCDF4, scipy and mpl\_toolkits.basemap packages needing separate installation (using “conda install netcdf4”, “conda install scipy”, “conda install -c conda-forge basemap”). A special command is needed to get the latest development version of basemap.

## Data sources

Data	Description
Globwave Monthly Gridded Sea State ~/Data/WindWave/waves/	Consolidated monthly files of global wave statistics from satellite altimetry on a 1-degree grid. Monthly files from 1992 to 2013 Filename example: GW_L4_ALT_1DEG_1M_199201.nc is data for January 1992 Source is GlobWave <a href="http://globwave.ifremer.fr">http://globwave.ifremer.fr</a>
Scatterometer Monthly Mean Winds ~/Data/WindWave/winds/	Consolidated monthly files of global wind statistics from satellite scatterometry on a 0.25-degree grid. Monthly files from May 2007 to January 2017 Filename example: 2007-51612_1mm-ifremer-L4-EWSB-wind_gridded-GLO-20110902152154NRT-02.0.nc is data for May 2007 (given by first 6 characters) Source is Copernicus <a href="http://marine.copernicus.eu">http://marine.copernicus.eu</a>
Example Wave Buoy Data ~/Data/WindWave/buoy/	Example wave buoy data in the Pacific (buoy 46006). Annual files from 1992 to 2013 with hourly data. Filename example: 46006h1993.txt for 1993

Source is NDBC <http://www.ndbc.noaa.gov>

## Table of software, inputs and outputs

Program name	Description
wavestats_point.py	Plots a graph of the monthly mean, standard deviation and maximum sampled measurement of significant wave height for a 1-degree area based on the 21-year data archive. Plots a histogram of distribution of significant wave height for a region, together with the log-normal distribution estimate from the data. Plots the cumulative distribution of the measurements and log-normal cumulative distribution estimate from the data.
wavestats_region.py	Plots maps of mean, standard deviation and maximum sampled measurement for a region, for a given month on a 1-degree resolution grid.
windstats_point.py	Plots a graph of the monthly mean and standard deviation wind speed for a 0.25-degree area based on the 10-year data archive.
windstats_region.py	Plots a map of mean wind speed (larger areas) and mean wind speed and direction (smaller areas) for a region, for a given month on a 0.25-degree resolution grid.
buoystats.py	Plots a graph of the monthly mean, standard deviation and maximum measurement of significant wave height for a single buoy (example data is from a location in N Pacific).

Program name	Inputs	Outputs
wavestats_point.py	Globwave Monthly Gridded Sea State ~/Data/WindWave/waves/	Curve of monthly mean, standard deviation and maximum sampled measurement of significant wave height. Histogram of distribution of significant waveheight with continuous log-normal distribution estimate. Cumulative distribution of significant wave height with cumulative log-normal distribution estimate.
wavestats_region.py	Globwave Monthly Gridded Sea State ~/Data/WindWave/waves/	Map of mean significant wave height. Map of standard deviation of significant wave height.

		Map of maximum sampled significant wave height.
windstats_point.py	Scatterometer Monthly Mean Winds ~/Data/WindWave/winds/	Curve of monthly mean and standard deviation of wind speed.
windstats_region.py	Scatterometer Monthly Mean Winds ~/Data/WindWave/winds/	Map of mean wind speed (larger areas) or mean wind speed and direction (smaller areas). Map of standard deviation of wind speed.
buoystats.py	Example Wave Buoy Data ~/Data/WindWave/buoy/	Curve of monthly mean, standard deviation and maximum sampled measurement of significant wave height. Curve of log-normal distribution estimate from the data.