UNIVERSITY OF BOLOGNA
Course on Coastal Engineering

Exercise – Estimation of design wave height

The student is required to estimate the significant wave height at the recording station of Canaveral East, that is located 120 nautical miles East of Cape Canaveral (a nautical mile is a unit of measurement defined as exactly 1852 meters). Wave data for the station are available at the web page:

 http://www.ndbc.noaa.gov/station_history.php?station=41010

Student is required to use significant wave height data collected in the years from 2005 to 2009. Data are recorded every half hour, but missing values might be present. Missing values may be either not listed in the record or may be indicated with a value of 99. Details about data collection are provided at the above web site and in particular at the web page http://www.ndbc.noaa.gov/measdes.shtml

Design value of significant wave height should be estimated for a return period of 10 years. The peak over threshold method (POT) should be used, by checking that the selected wave storm are independent (which means that the threshold value for the peak over threshold is appropriate).

Data should be fitted by using the Generalised Pareto Distribution (GPD), by checking the goodness of the fit through the following goodness of fit tests:

- Probability plot
- Q-Q plot
- Density plot
- Return level plot

Additional plots should be produced when necessary or useful.