Scatter Diagrams (H_s,T_e) (wave_scatterdiag_hst0m1.nc)

Scatter diagrams are summarizing the wave climate and are typically representing the joint probability of (wave height, wave period) combinations during the time period they are encompassing. Typical time periods are annual or seasonal. For marine energy applications, scatter diagrams providing the distribution of (H_s, T_e) are recommended. Alternatively, T_p, T_{02} or T_z can be used instead of T_e. They are presented in tabular form and are specific to the site where they have been established.
In our specific case, each bin of the table displays the cumulative occurrences of the (H_s, T_e) pairs. H (wave height) bins are defined in 0.5 m intervals, ranging from 0 to 15.5 m. H values are representing the CENTER OF THE BINS and take values of 0.25, 0.75, 1.25, …, 14.75, 15.5. T (wave period) bins are defined in 0.5 s intervals ranging from 0 to 25.5 s. T values are representing the CENTER OF THE BINS and take values of 0.25, 0.75, 1.25, …, 24.75, 25.25.

Scatter diagrams are the basics required to estimate the electricity produced from a wave energy device, once the power matrix of this device is known. Note that farm effects, directional sensitivity or spectral characteristics of the waves are note taken into account in the calculation of electricity outputs using scatter diagrams. Their use is therefore limited to a first order approximation of the energy produced by a single wave energy device.

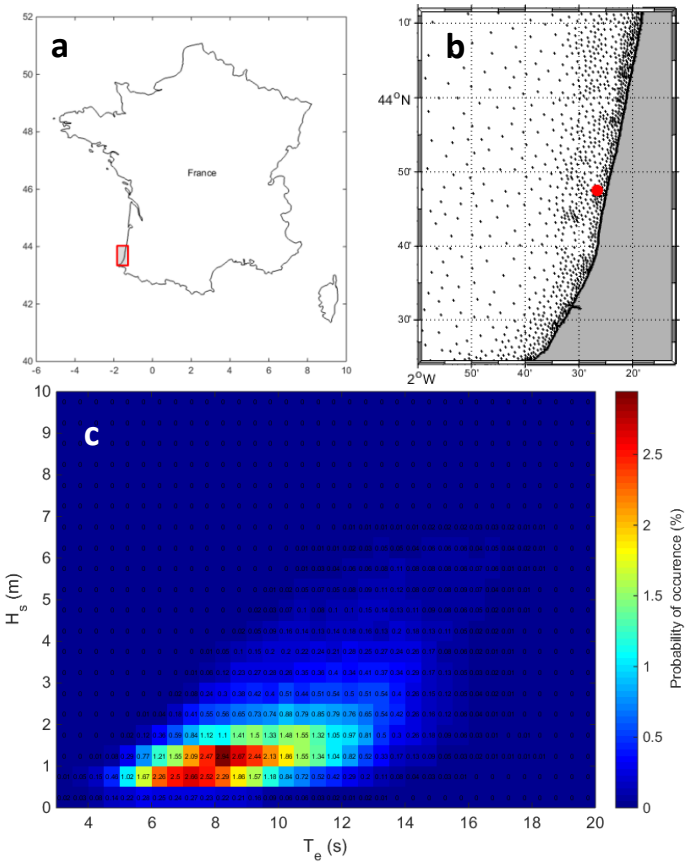

Figure: Example of (H_s,T_e) annual wave scatter diagram (c) at a specific geographic position (a and b, red dot) using data available from (website). This table was established based on 166560 (H_s,T_e) pairs, delivered by Homere hindcast (Boudière et al. 2013). Similar information is available from here at all points of the hindcast mesh (b, black dots) that is covering the entire western coast of France.

All the wave scatter diagrams have been computed based on the hourly outputs of the 19-year seastate hindcast Homere (Boudière et al. 2013). This hindcast was identified as the most

appropriate single source of sea state variables for precise characterization of marine resources for marine energy purposes along the western coast of France (Dubranna et al. 2015).

Data download: (H_s, T_e) scatter diagrams at every node of Homere's grid can be downloaded here using standard protocols (OPENDAP, HTTP, etc.). Note that for OPENDAP access, the "ScatterDiagram" variable has 3 dimensions, the first of which is related to the grid node number. It is therefore recommended that you collect the grid node number(s) of the area you are interested in before you make use of the OENDAP protocol. Step by step tutorial about how to access the grid node numbers is presented here.

Targeted end-users: Device developers, scientists, farm designers, grid operators, consulting agencies.

References

Boudière, E., C. Maisondieu, F. Ardhuin, M. Accensi, L. Pineau-Guillou, and J. Lepesqueur. 2013. A suitable metocean hindcast database for the design of Marine energy converters. International Journal of Marine Energy **3-4**: e40–e52.

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