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A MATLAB Toolbox Associated with Spectral Wave Modelling

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ABSTRACT

A MATLAB toolbox with capabilities for visualizations data pre and post processing has been designed and associated with the state of the art spectral numerical wave models. At its first level, this computational environment facilitates the visualization and transformation of the main input fields (bathymetry, wind, current and tide), usually required by the wave models. At the second level, after running the wave model, the interface allows the visualization of the model output both in space and time frames. Some additional wave parameters in relationship with the standard model output are also computed in the post processing phase. The proposed system was designed first for SWAN, bringing the advantage of a quick model implementation in a specific site combined with a comprehensive visualization of the simulation results. The MATLAB interface was further extended by adapting it for the generation models WAM and WW3, and in present can be easily associated with any other existent wave model. Moreover, connections with ocean and coastal circulation models, like POM or SHORECIRC, have been also accomplished. A special module for analysis in the time domain that allows both direct comparisons with in situ or remotely sensed measurements and statistical analyses was also developed. Moreover, a direct link with other MATLAB toolboxes available in the public domain and with the R environment for statistical computing and graphics, was also accomplished enlarging in this way considerably the area of applicability of this tool.

Keywords*: Matlab interface, wave models, visualizations, quick model implementation*

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