COSPPac Ocean Portal
About: WAVEWATCH III®

Introduction

WAVEWATCH III® is a wind-wave model originally developed by the National Oceanic and Atmospheric Administration (NOAA, USA – see link in Citations below). The Centre for Australian Weather and Climate Research (CAWCR) ran WAVEWATCH III® over the period 1979 – 2009. This portal presents a statistical summary of the resultant climatologies of significant wave height, mean wave direction, and mean wave peak period.

Data Source

The WAVEWATCH III® output (above) stored in monthly files containing data in six-hourly time-steps. The format is NetCDF.

Resolution

One degree in both latitude and longitude (i.e. 1˚ x 1˚) over all longitudes between latitudes 80 °S and 80 °N.

Coverage

1979 to 2009: 31-year climatology.

Update Frequency

At some stage in the next twelve months it is expected that a higher resolution dataset will be made available.

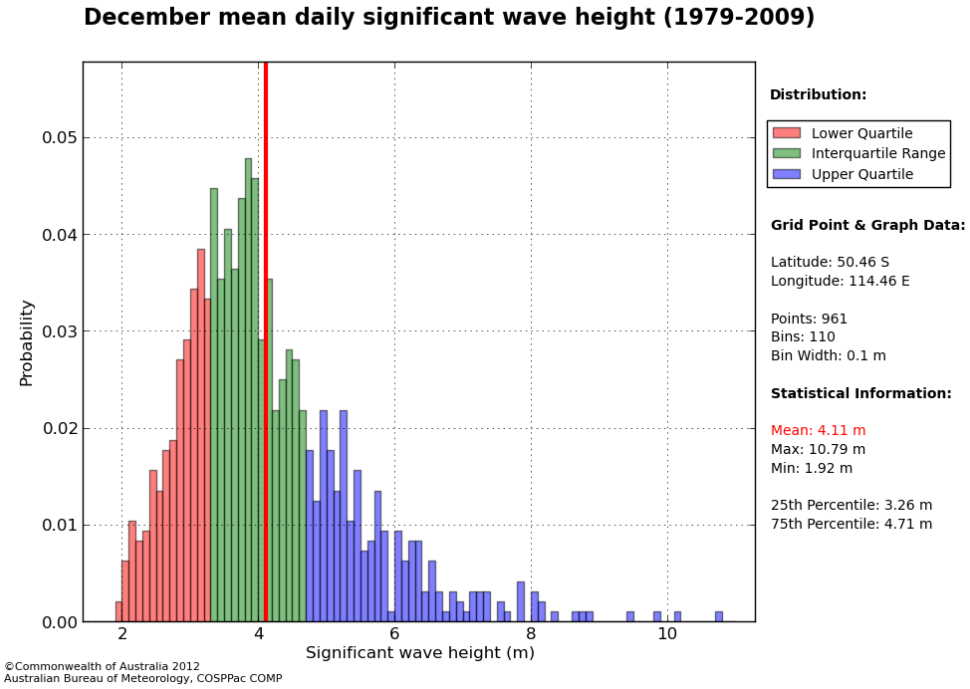
Description

The portal dynamically generates statistical wave data for individual locations, i.e. latitude and longitude. The data used are from the nearest available point to that selected by the user. The statistics displayed (diagrams and tables) show distributions of mean daily data for each month calculated from six-hourly data for the 31-year period. Example: For January, a daily mean (calculated from six-hourly data) is calculated for each day over the 31 years; that is 31 x 31 values = 961. The statistics and distribution of these 961 values will be shown in the images which are generated.

- **Significant Wave Height (SWH)**

  Significant wave height is the average height (peak to trough) of the upper one-third of all waves. SWH data are presented in a histogram of 10 cm ranges (bins); the total number of bins varies according to location.

  The histogram is coloured by quartile: red for the first quartile (Q1); blue for the fourth quartile (Q4); and green for the inter-quartile (IQ) range (quartiles two and three). The IQ represents the 'middle' 50% of all significant waves. Additionally, a red vertical line is used to display the mean of the significant wave heights over all days for the particular month.

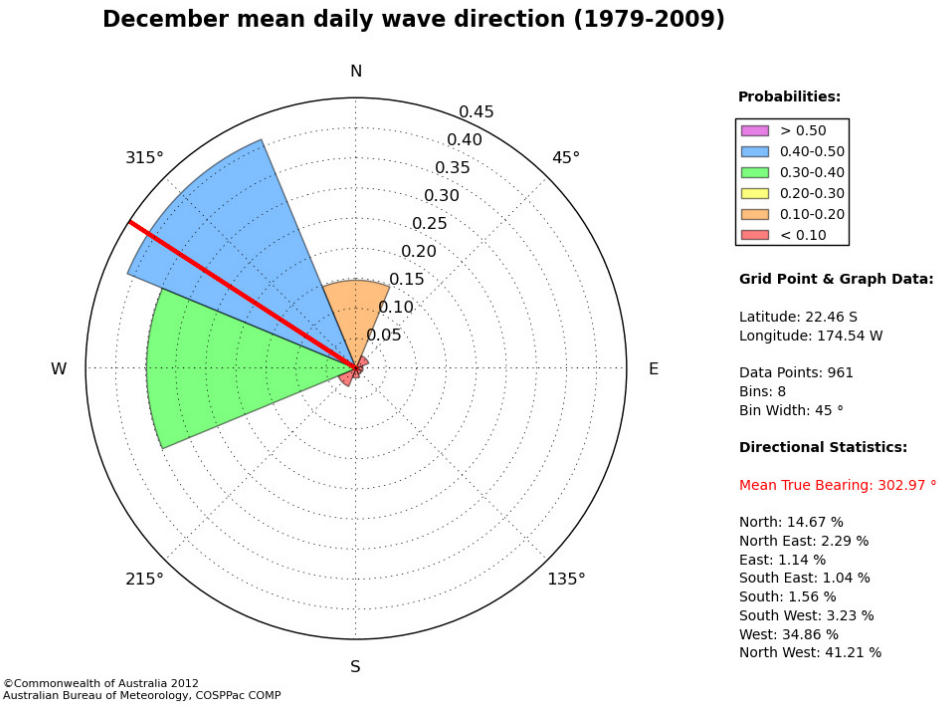


The information panel on the right displays important statistical information. Firstly, the latitude and the longitude of the nearest data point to the selected point are displayed, followed by the number of bins, the width of the bins and the total number of data points (days). Below this, the maximum and minimum mean daily significant wave heights are displayed along with the mean daily significant wave height.

- **Mean Wave Direction (MWD)**

The mean wave direction is the average direction of travel across the entire wave spectrum at a location. Mean wave direction is presented in a special kind of histogram known as a wind rose, which is useful for visually displaying angular data. The compass points on the wind rose indicate the direction towards which the waves are travelling. Note this oceanographic convention for wave direction is the opposite of the meteorological convention for wind direction.

The lengths of the 'petals', or bins, of the rose indicate the proportion of waves travelling in one of the eight standard compass directions (cardinal + ordinal points). Having a width of 45 degrees, these bins are centred on each of these compass directions.



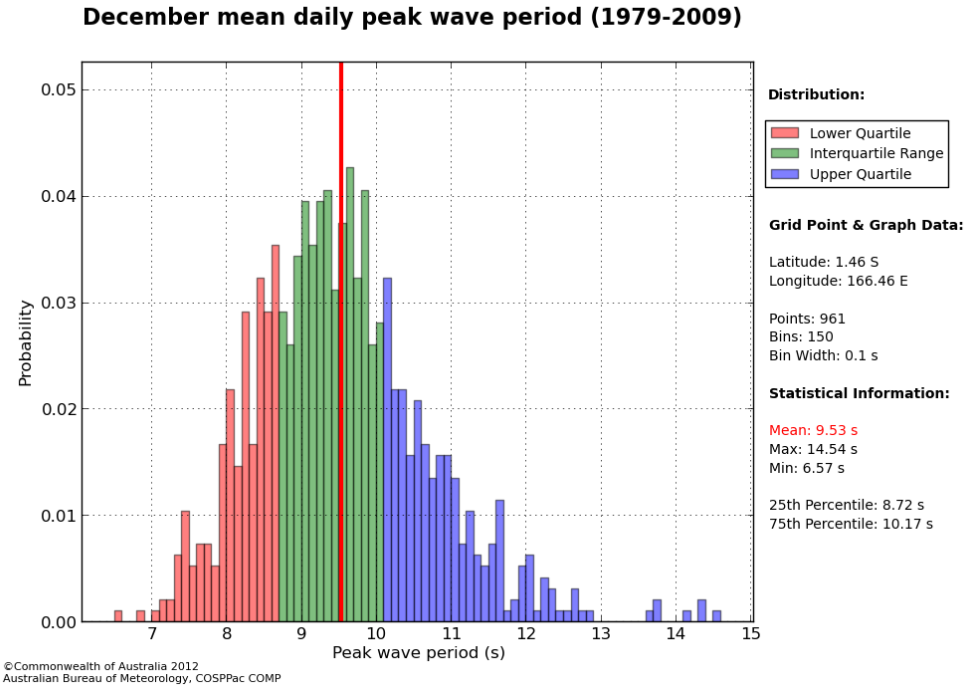
The mean of all wave directions is indicated by the red line. The information panel on the right displays statistical information, including the latitude and longitude of the nearest data point to the selected point, the numbers of points (days) and bins, and the bin width.

Finally, the mean of the peak wave directions (from north) is shown in red (corresponding to the red line), below which are tabulated the percentages of peak wave directions occurring in each of the eight compass directions.

- **Mean Wave Period (MWP)**

The wave period is the time interval between successive wave crests passing a point; the mean wave period is the average across the entire wave spectrum at a location. MWP data are presented in a similar way to SWH data, with bins of width 10 or 20 cm depending upon the spread of the data at the selected location.

As for SWH, the histogram of MWP data shows quartiles: lower quartile in red; upper quartile in blue; and the inter-quartile range in green. The mean daily MWP is shown by a vertical red line.



Future Updates

Data for later years may become available, but there are no firm plans on when this may happen. It is expected that the service may be expanded to encompass visualization of regional data (*e.g.* user-defined boxes), especially in the areas around Pacific Island Countries.

Limitations

Wind-wave models such as WAVEWATCH III® are only designed for predicting waves generated by wind. These models do not account for tsunamis, storm surges, tides and other similar phenomena. Waves generated by tropical cyclones are also not adequately represented. Wind-wave models are also able to provide statistical information (*e.g.* histogram above) about the waves in a region of ocean, but cannot be used to make predictions on the scale of individual waves.

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Acknowledgements, Citations and References

The dataset is a product of the PACCSAP[1] waves project, which is a joint venture between CSIRO and the Bureau of Meteorology.

The data provided in this portal may be used free of charge, provided that the Bureau, CSIRO, CAWCR and the portal are acknowledged when data obtained from the portal are used for publication purposes.

Tolman, 2009: User manual and system documentation of WAVEWATCH III™ version 3.14. NOAA / NWS / NCEP / MMAB Technical Note **276**, 194 pp + Appendices.

Link for model description:
http://polar.ncep.noaa.gov/waves/wavewatch/wavewatch.shtml

Contact

For more information, please email cosppac_comp_unit@bom.gov.au .
Ocean Portal URL: http://www.bom.gov.au/cosppac/comp/ocean-portal/

[1] The Pacific Australia Climate Change Science and Adaptation Planning(PACCSAP) Program under the Australian Government International Climate Change Adaptation Initiative (ICCAI)