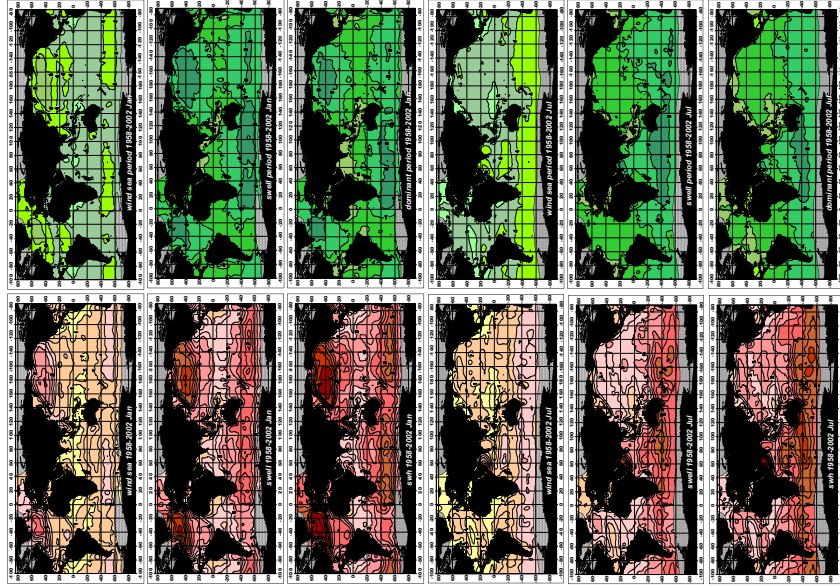




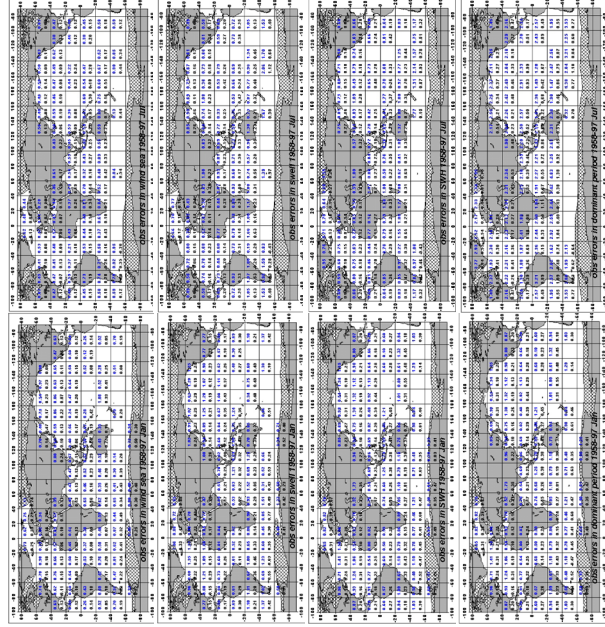
Overview of the uncertainties of visual wave data from VOS

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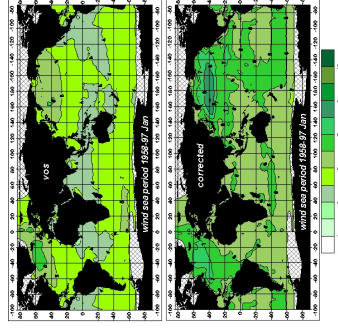
A global climatology of basic wave parameters is based on the voluntary observing ship (VOS) data from the ICOADS. Climatology covers the period 1958-2002 and presents heights and periods for the wind sea, swell and significant wave height (SWH) over the Global Ocean on 2x2 degree spatial resolution. Significant wave height has been derived from separate sea and swell estimates by taking square root of the sum of squares for the seas and swells propagating approximately in the same direction, and assuming SWH to be equal to the higher of the two components in all other cases. Special algorithms of corrections were applied to minimize some biases, inherent in visual wave data. Particularly, we corrected overestimation of small seas, underestimation of periods, and also analysed separation between sea and swell.



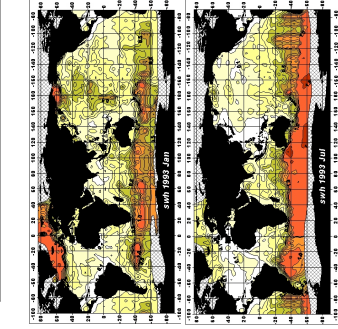
We estimated random observational errors for 20x20 degree boxes for the World Ocean for different months of the year using a semivariogram approach. At most locations, random observational uncertainties of the wind sea periods vary from 1 to 2 s (20 to 35% of the mean values). Typical observational errors of the swell periods are from 2 to 2.5 s, which is usually less than 30% of the mean values. The largest errors in both swell periods and dominant periods are observed in the Southern Ocean, where they exceed 3 seconds. Thus, random observational errors in basic wave variables are usually smaller than 20-30% of the mean values, except for some poorly sampled areas where the relative error can reach 50%.



The random observational uncertainties of monthly means were derived from the random errors in individual observations dividing them by a factor of $n^{1/2}$, where n is the number of reports. We assumed that the estimate for 20x20 degree boxes is valid for all 2 cells and scaled them with the square root of the number of samples for each 2x2 degree box. Thus, our estimates are given for individual monthly means rather than for climatological monthly means, for which they will be smaller due to the averaging over a number of years.



Biases associated with inadequate sampling were quantified using the data from high resolution WAM hindcast for the period 1979-1993. The highest sampling biases are observed in the South Ocean, where wave height may be underestimated by 1-1.5 m due to poor sampling, primarily associated with a fair-weather bias of ship routing and observation.



Estimation of the errors associated with the inappropriate determination of the true period and direction from the relative periods has been done using ship course and velocity and the results of questionnaire on the observational practices.