ECMWF Report on ERS-2 SAR for November 2000

Title: Report on ERS-2 SAR wave height data.

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Overview:

This month about 350 SAR wave mode spectra arrived at ECMWF every 6 hours of which 14.6% have not been used. Data reception was significantly reduced during the 6-hour time slot centred around 18:00 UTC on November 21. Otherwise, the data coverage was very good (see Figure 1).

Wave Height Comparison (bias):

ERS-2 global: 0.07 m

ERS-2 northern hemisphere: 0.07 m

ERS-2 tropics: 0.04 m

ERS-2 southern hemisphere: 0.09 m

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Remarks:

- The SAR worked normally.
- The ECMWF operational forecast model has been upgraded to the TL511 with a horizontal resolution of about 40 km on 21 November 2000. Although the wave related data are still computed at about 55 km resolution, the spectral resolution has been upgraded to 30 frequency bins and 24 directional bins. Furthermore, wave computations make use of the enhanced wind speeds supplied at the finer horizontal resolution of 40 km.
- The bug reported in the "September 2000" report regarding the inversion of the SAR spectra has been fixed and introduced into the new operational system. The effect of this can be clearly seen in Figure 6 where the errors reduced significantly on 21 November.

Figure captions:

Figure 1: Time series of data reception for ERS-2 Altimeter data for November 2000.

Figure 2: Comparison of ECMWF wave height results with ERS-2 SAR wave height data for November 2000 (global).

Figure 3: Comparison of ECMWF wave height results with ERS-2 SAR wave height data for November 2000 (northern hemisphere)

Figure 4: Comparison of ECMWF wave height results with ERS-2 SAR wave height data for November 2000 (tropics)

Figure 5: Comparison of ECMWF wave height results with ERS-2 SAR wave height data for November 2000 (southern hemisphere)

Figure 6: ERS-2 SAR wave heights: Timeseries of bias (ERS-2 - model) and scatter index (SI)

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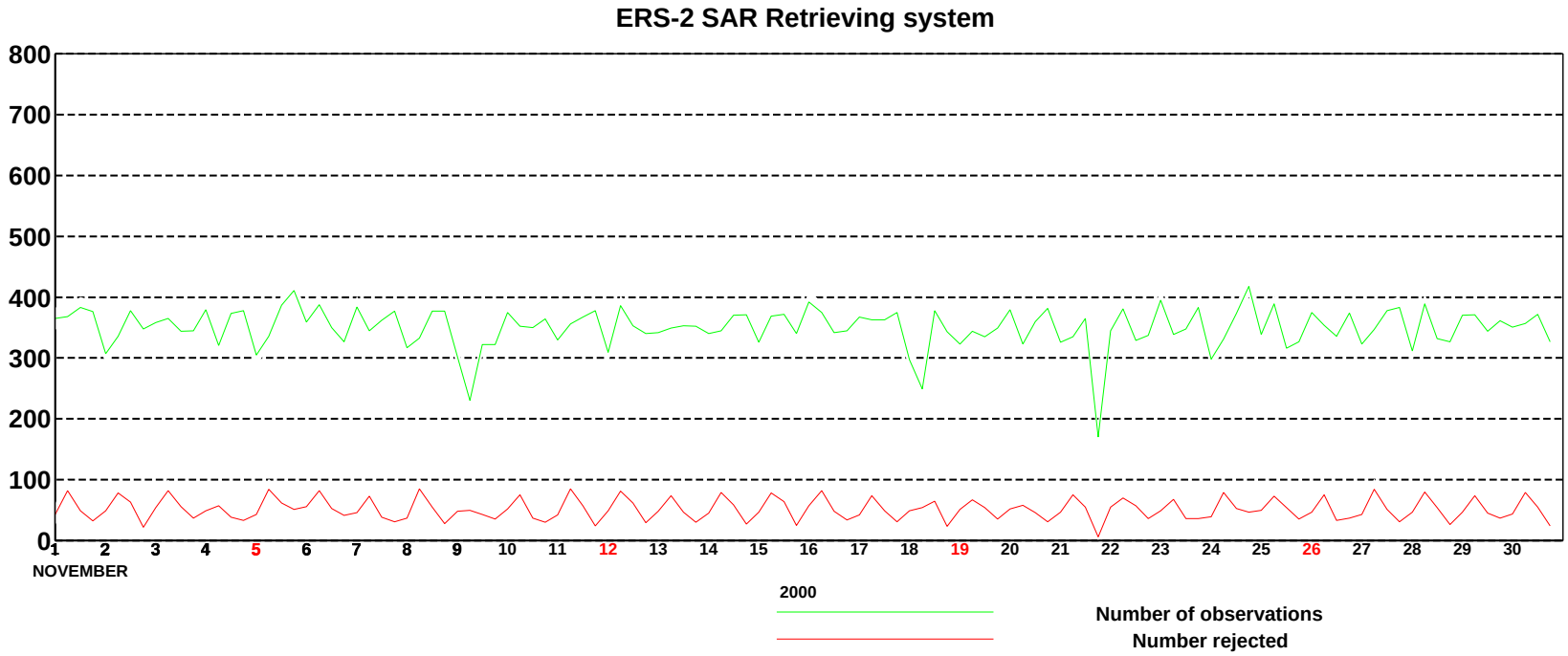

Figure 1: Time series of data reception for ERS-2 SAR wave mode spectra for November 2000

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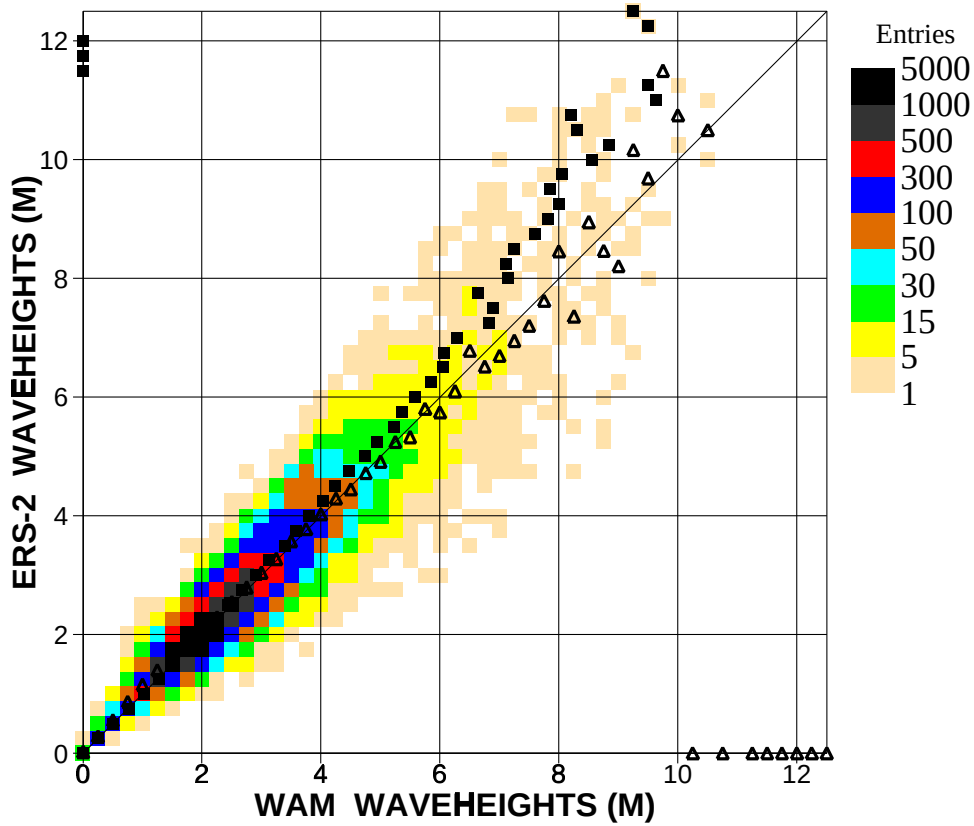

STATISTICS

ENTRIES	35803
MEAN WAM	2.3934
MEAN ERS-2	2.4593
BIAS (ERS-2 - WAM)	0.0659
STANDARD DEVIATION	0.3878
SCATTER INDEX	0.1620
CORRELATION	0.9328
SYMMETRIC SLOPE	1.0288(0.0020)
REGR. COEFFICIENT	0.9662(0.0020)
REGR. CONSTANT	0.1467(0.0051)

Figure 2: Comparison of ECMWF wave height results with ERS2 SAR wave height data for November 2000 (global)

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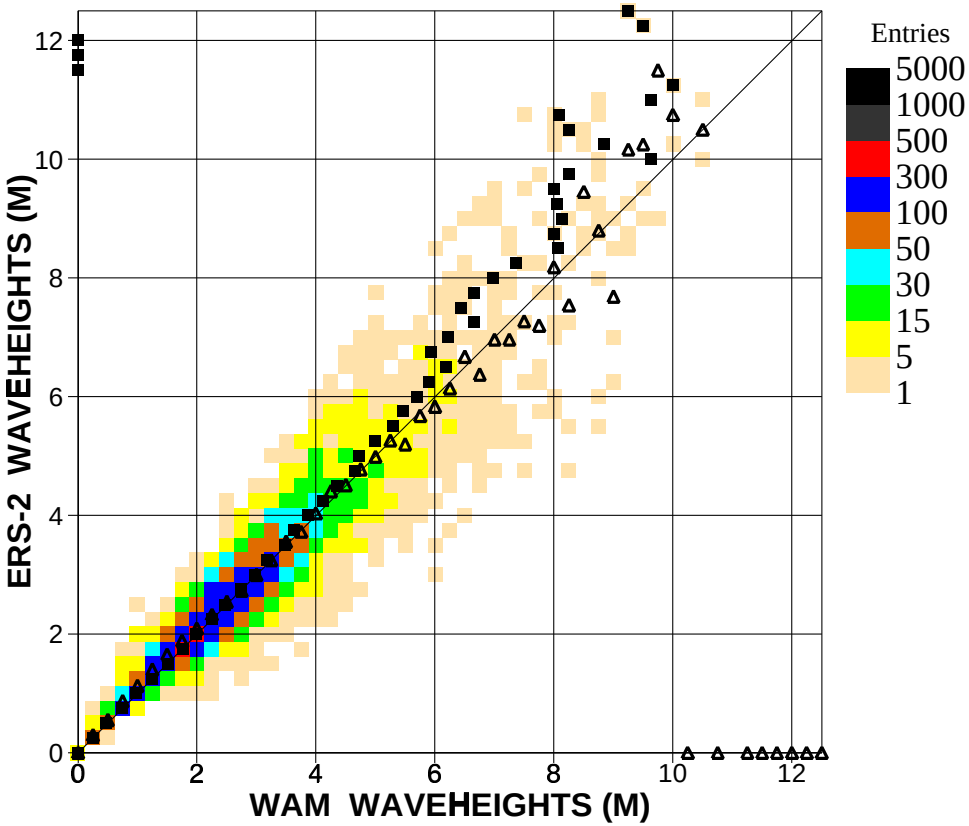

STATISTICS

ENTRIES	7976
MEAN WAM	2.6677
MEAN ERS-2	2.7239
BIAS (ERS-2 - WAM)	0.0563
STANDARD DEVIATION	0.4760
SCATTER INDEX	0.1784
CORRELATION	0.9387
SYMMETRIC SLOPE	1.0235 (0.0040)
REGR. COEFFICIENT	0.9698 (0.0040)
REGR. CONSTANT	0.1368 (0.0119)

Figure 3: Comparison of ECMWF wave height results with ERS2 SAR wave height data for November 2000 (n.hem.)

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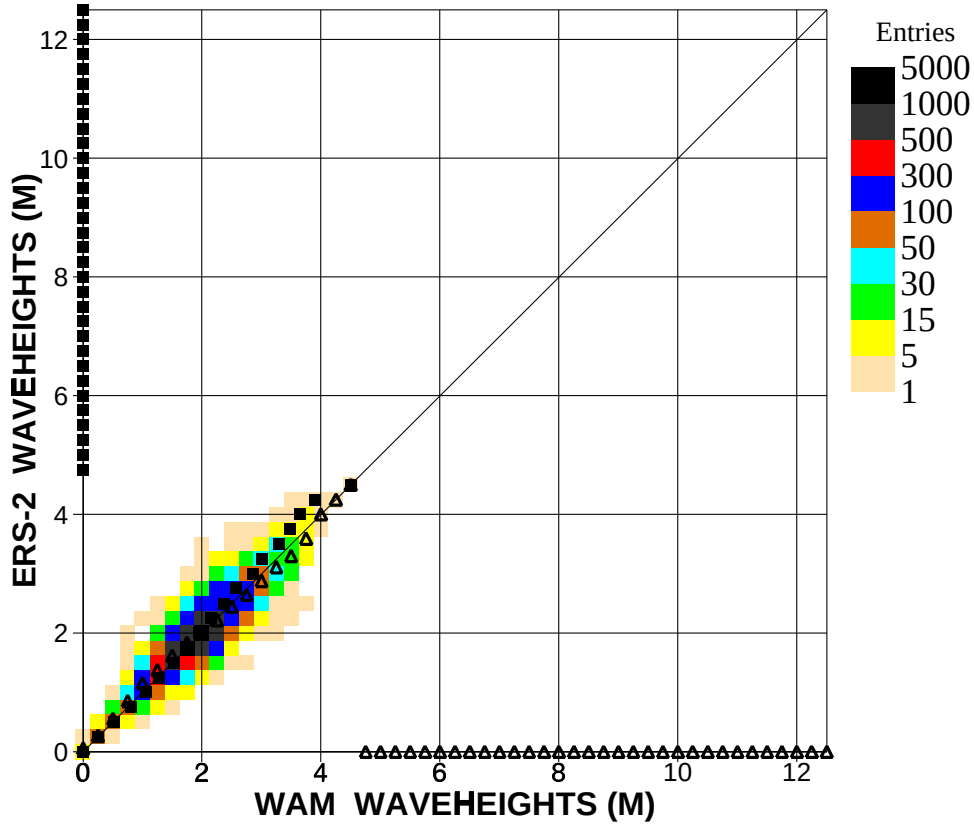

STATISTICS

ENTRIES	12111
MEAN WAM	1.8824
MEAN ERS-2	1.9242
BIAS (ERS-2 - WAM)	0.0418
STANDARD DEVIATION	0.2440
SCATTER INDEX	0.1296
CORRELATION	0.8893
SYMMETRIC SLOPE	1.0204(0.0043)
REGR. COEFFICIENT	0.8865(0.0041)
REGR. CONSTANT	0.2553(0.0081)

Figure 4: Comparison of ECMWF wave height results with ERS2 SAR wave height data for November 2000 (tropics)

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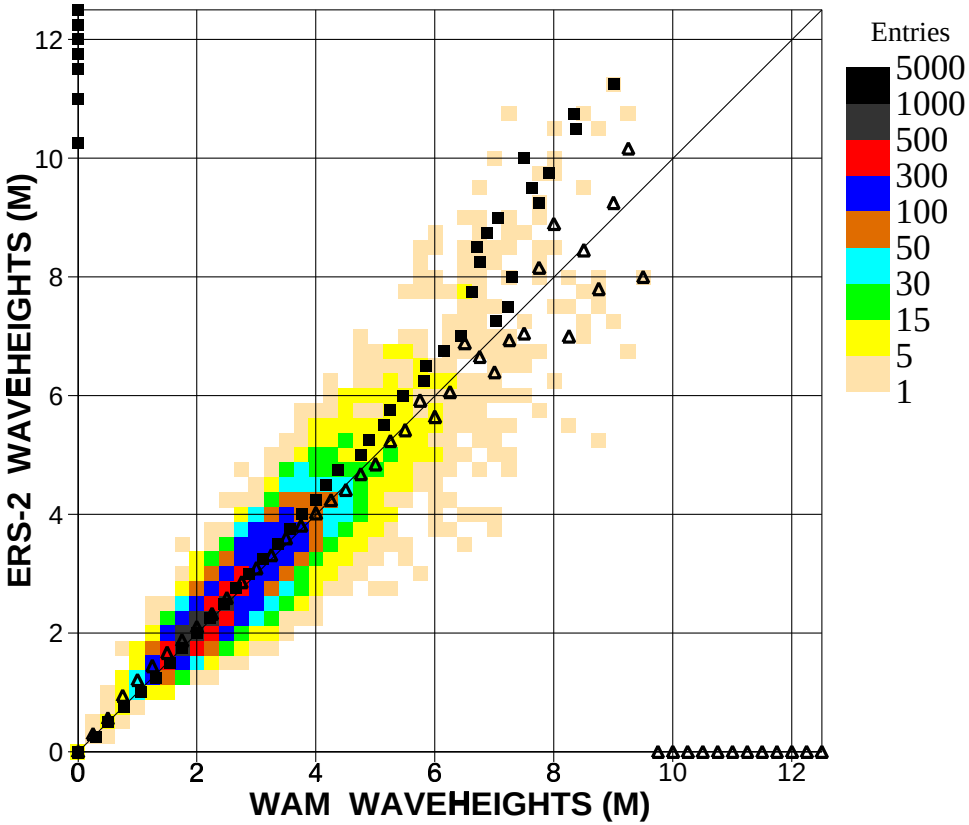

STATISTICS

ENTRIES	15977
MEAN WAM	2.6384
MEAN ERS-2	2.7273
BIAS (ERS-2 - WAM)	0.0889
STANDARD DEVIATION	0.4229
SCATTER INDEX	0.1603
CORRELATION	0.9169
SYMMETRIC SLOPE	1.0347(0.0033)
REGR. COEFFICIENT	0.9554(0.0033)
REGR. CONSTANT	0.2067(0.0093)

Figure 5: Comparison of ECMWF wave height results with ERS2 SAR wave height data for November 2000 (s.hem.)

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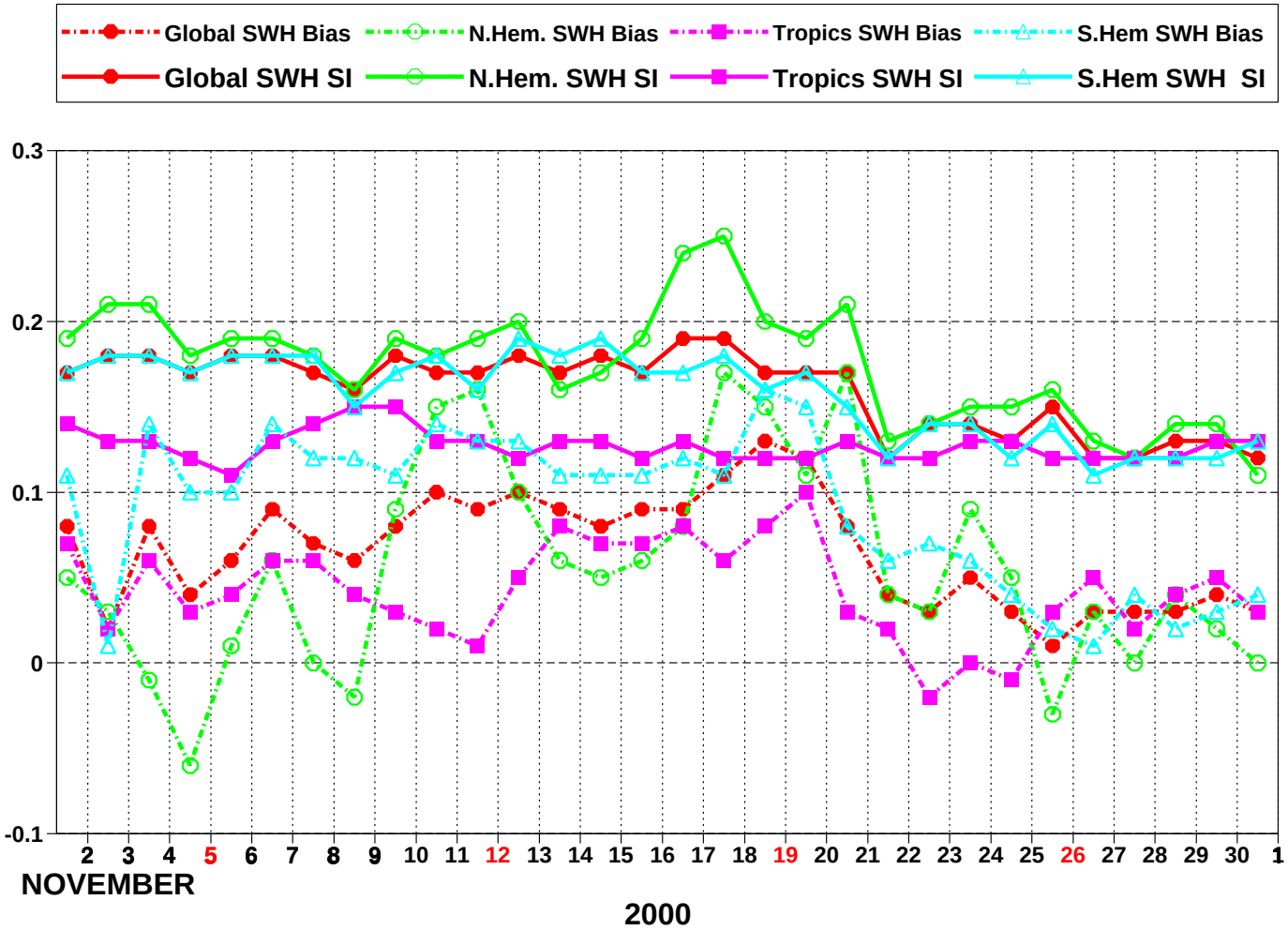

Figure 6: ERS-2 SAR wave heights: Timeseries of bias (ERS-2 - model) and scatter index (SI)

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