ECMWF - Report on the ERS-2 Scatterometer

Title: MONITORING STATISTICS OF ERS-2 SCATTEROMETER FOR ESA (Project Ref. 11699/95/NL/CN)

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•Date: 9 February 2000

1 - INTRODUCTION

During the 49th cycle the ERS instruments were switched of from 18 UTC 31 December 1999 until 12 UTC 2 January 2000 as a precaution against year 2000 problems. For the whole of the monitoring period the data quality was high. Lower than usual data volumes were received at ECMWF a few cycles: 6 UTC 28 December 1999, 6 UTC 31 December 1999, 0 UTC 16 January 2000 and 0 UTC 17 January 2000. For these cycles the data volume was below 50% of the usual volume. Inspection of the data shows that there were no quality problems with the data received during those four reduced volume cycles.

The ECMWF data assimilation system did not change during cycle 49.

2 - ERS-2 STATISTICS FROM 21 DECEMBER 1999 TO 24 JANUARY 2000

The level of the sigma0 biases with respect to the ECMWF model first guess winds are similar to the results from the previous cycle for descending tracks. For ascending tracks all three beam biases are slightly smaller over the whole incidence angle range, compared to the results from cycle 48. All curves have a fairly flat distribution over the whole incidence range.

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The distance to the cone history shows the data void period around the 1999/2000 shift. Two peaks above normal levels are seen on 0 UTC 16 January 2000 and 0 UTC 17 January 2000. This is due to low data volume for these two cycles and is not linked to instrument problems. For the remaining part of the period the monitoring results are very stable without any sign of instrument problems. The sigma0 level is generally at the same level as is the previous cycle. The speed monitoring time series are very stable, except for the positive peak on 0 UTC 17 January 2000. The directional statistics shows a very uniform result, similar to the previous cycle's.The spike on 6 UTC 31 December 1999 is due to low data volume.

The UWI winds have an average bias of -0.79 m/s, (-1.13 m/s for nodes 1-2 down to -0.60 m/s for nodes 11-19). This is slightly smaller than in the previous cycle, and is quite likely due to seasonal variations. The standard deviations is slightly larger than the values seen in the previous cycle: the standard deviation is on the average 1.56 m/s, and very similar for all nodes.

The standard deviation for ECMWF (4D-Var) processed data is similar to the results from the last monitoring cycle, the average value is 1.65 m/s. The bias is better than in cycle 48: the average value is now -0.54 m/s. The (scatterometer - model) direction standard deviations were ranging between 30 and 65 degrees for the UWI data (the average value 49 degrees) and between 15 and 30 degrees (average value 20.4 degrees) for their 4D-Var counterparts. The direction standard deviations are slightly higher than in the previous report period. As usual, the directional bias is close to zero for both UWI and 4D-Var products.

The scatter plot of model 10 m wind speeds versus UWI wind speeds shows the slight decrease in bias and a standard deviation similar to the results from the previous cycle. The direction scatter plot is in close agreement with the results from the previous cycle, perhaps with a slight degradation.

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3 - FIGURE CAPTION

Fig. 1: Ratio of < σ0**0.625 > over < CMOD4(First Guess)**0.625 > converted in dB for fore beam (solid line), mid beam (dashed line) and aft beam (dotted line) as a function of incidence angle for descending and ascending tracks. The thin lines indicate the error bars on the estimated mean. (fig 1a: as fig1 but proper first guess values used.)

Fig. 2: Mean normalised distance to the cone computed every 6 hours for nodes 1-2, 3-4, 5 to 7, 8 to 10, 11 to 14 and 15 to 19 (solid curve close to 1 when no instrumental problems are present). The dotted curve shows the number of incoming triplets in logarithmic scale (1 corresponds to 60000 triplets) and the dashed one indicates the proportion of triplets rejected by the ESA flag, the SST or the land/sea mask, i.e. affected by technical problems (0: all data kept, 1: no data kept).

Fig. 3: Mean (solid line) and standard deviation (dashed line) of the wind speed difference UWI - First Guess for the data retained by the 4D-Var quality control. (fig 3a: as fig3 but proper first guess values used)

Fig. 4: Same as Fig. 3, but for the wind direction difference. Statistics are computed only for wind speeds higher than 4 m/s.

Fig. 5-6: Same as Fig. 3 and 4 respectively, but for the 4D-Var processed data.

Fig. 7: Two-dimensional histogram of First Guess and UWI wind speeds, for the data kept by the 4D-Var quality control. Circles denote the mean values in the y-direction, and squares those in the x-direction.

Fig. 8: Same as Fig. 7, but for wind direction. Only wind speeds higher than 4m/s are taken into account.

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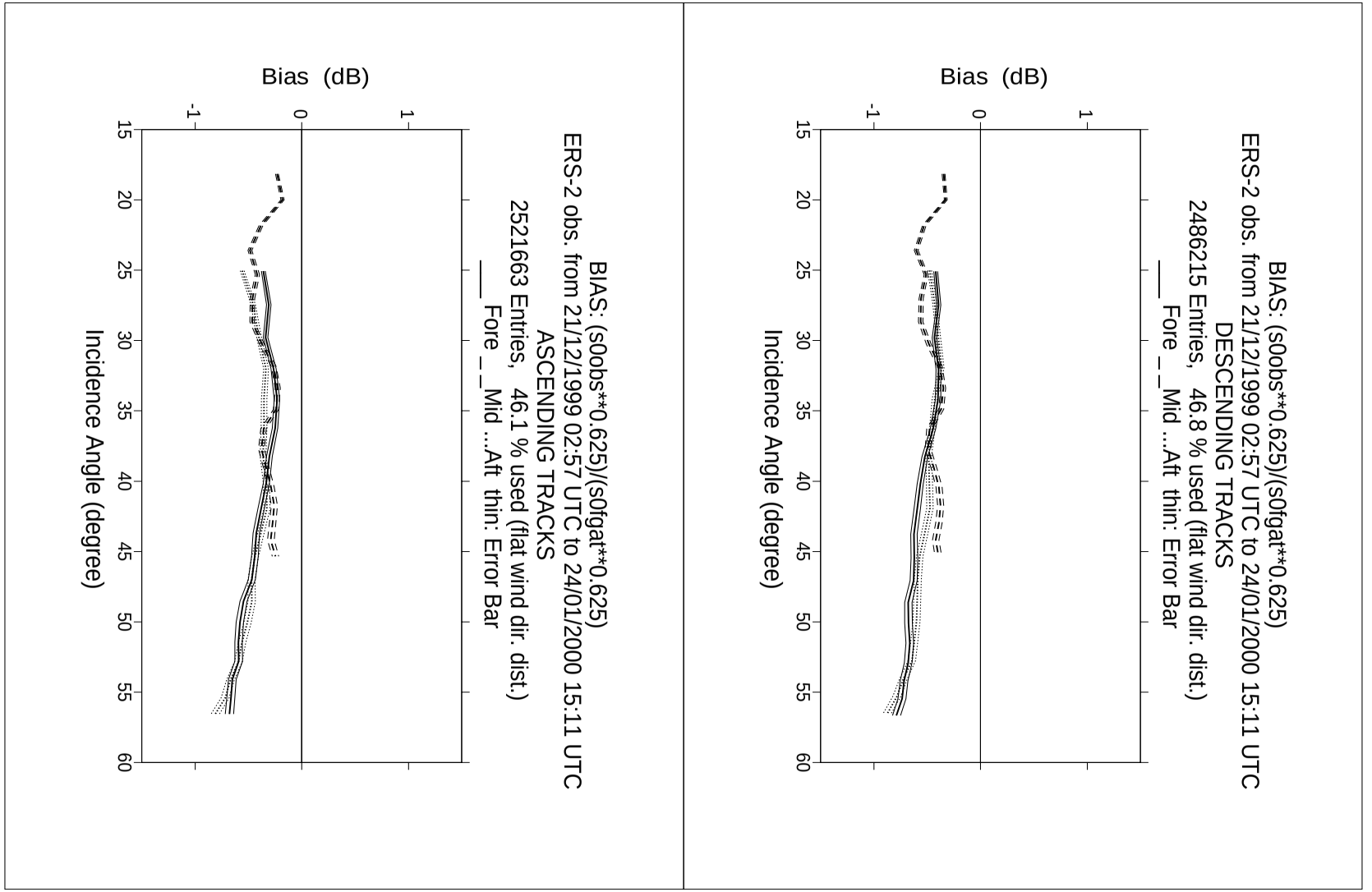

FIGURE 1

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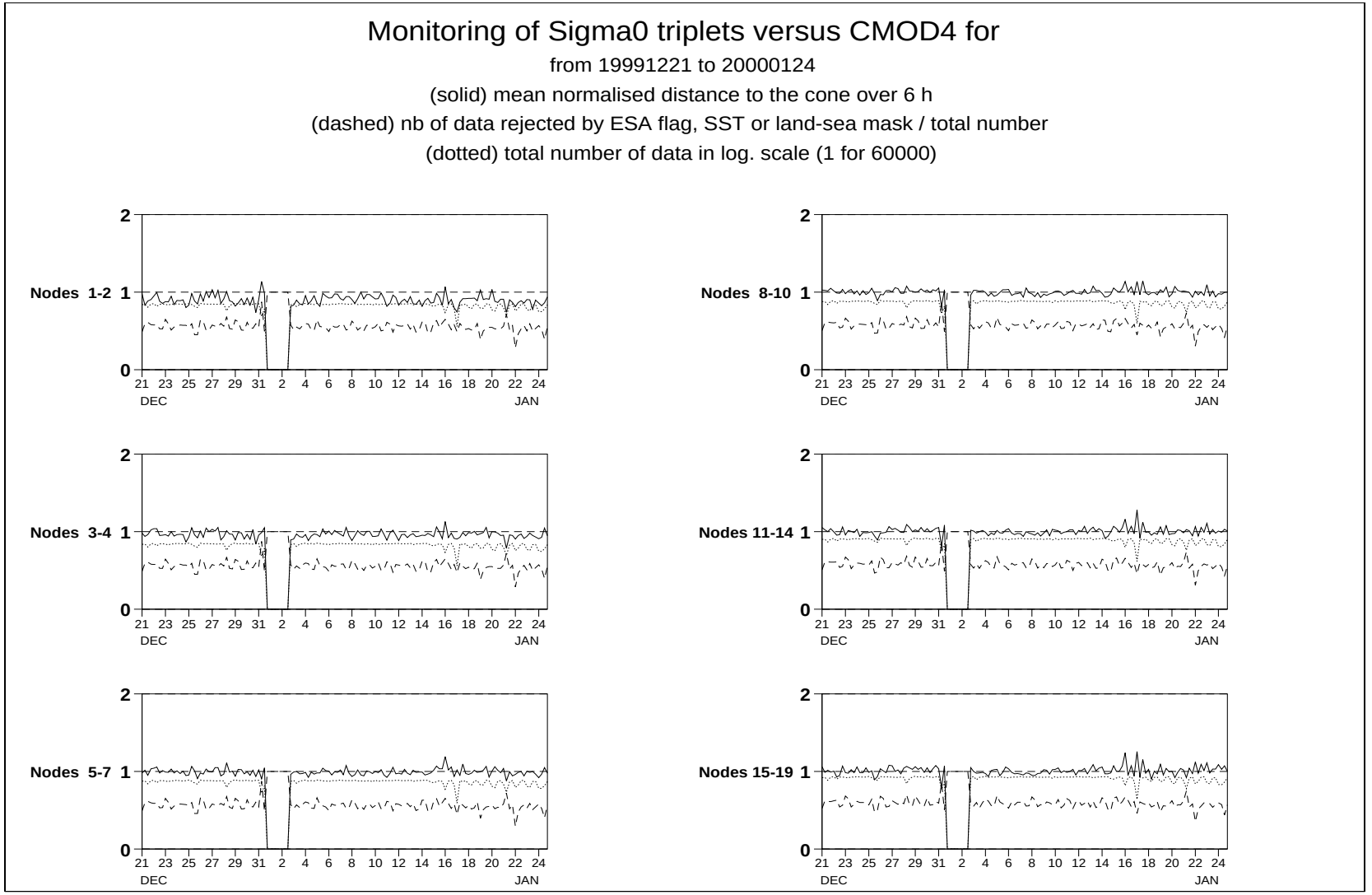

FIGURE 2

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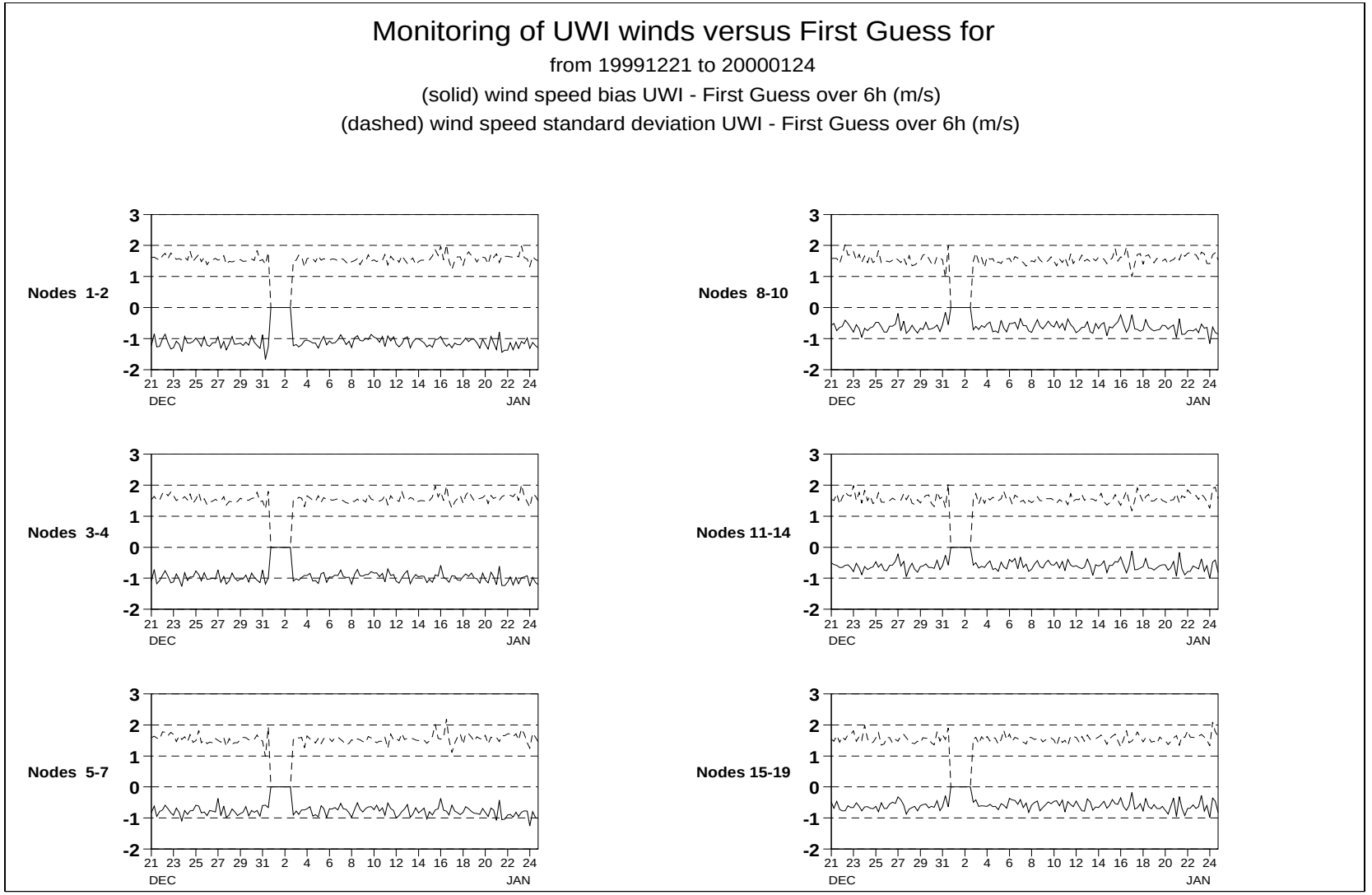

FIGURE 3

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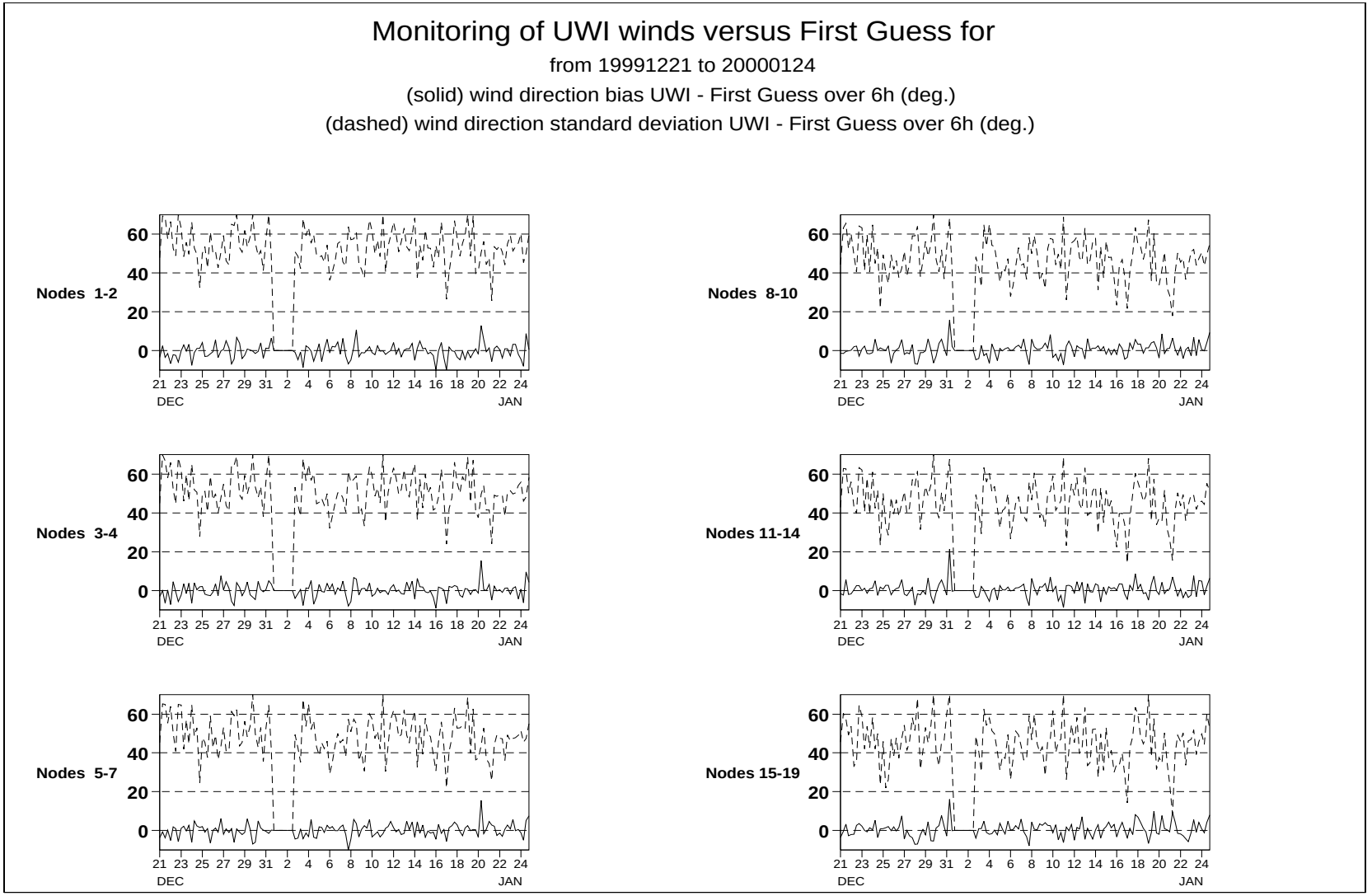

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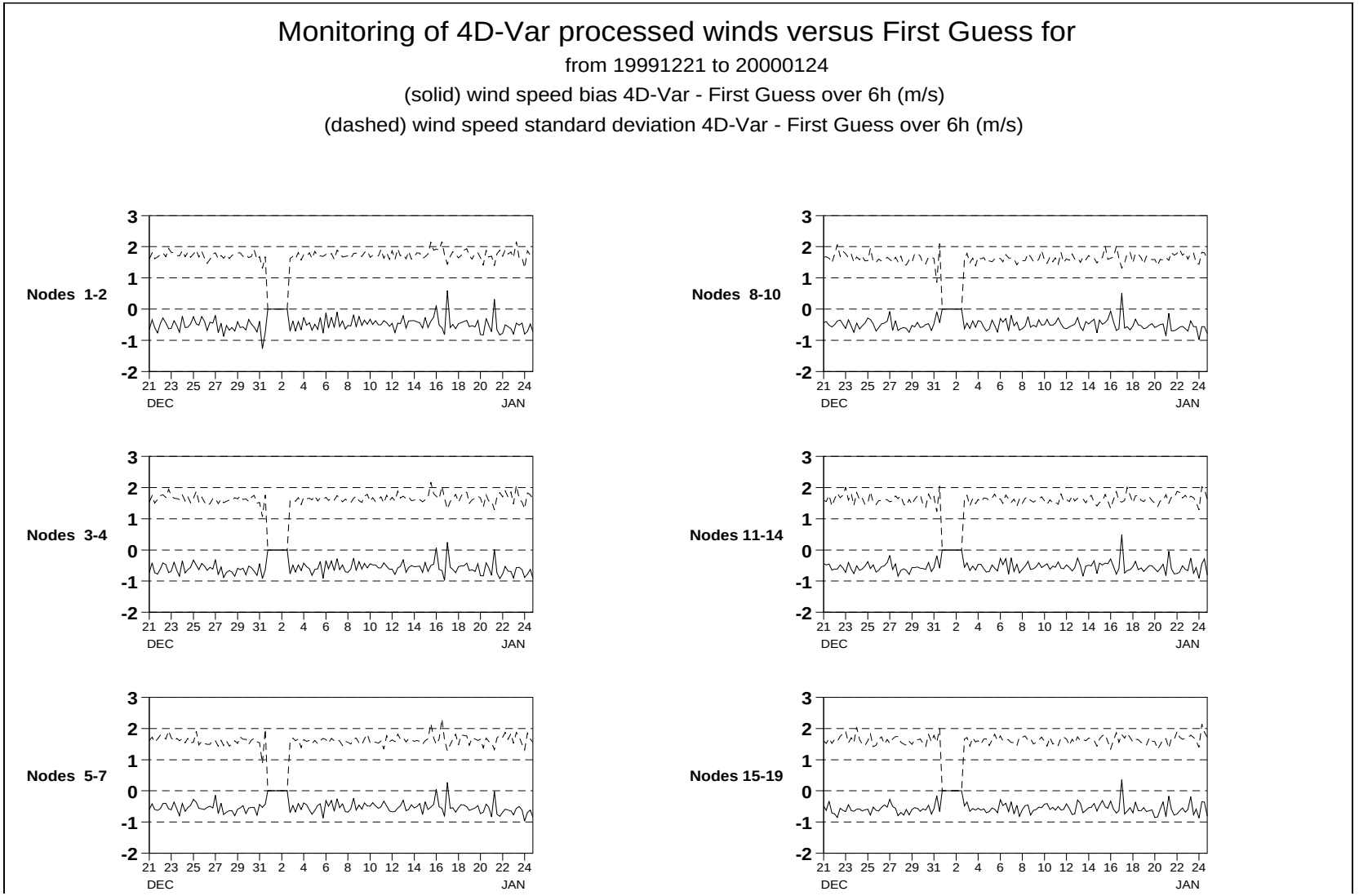

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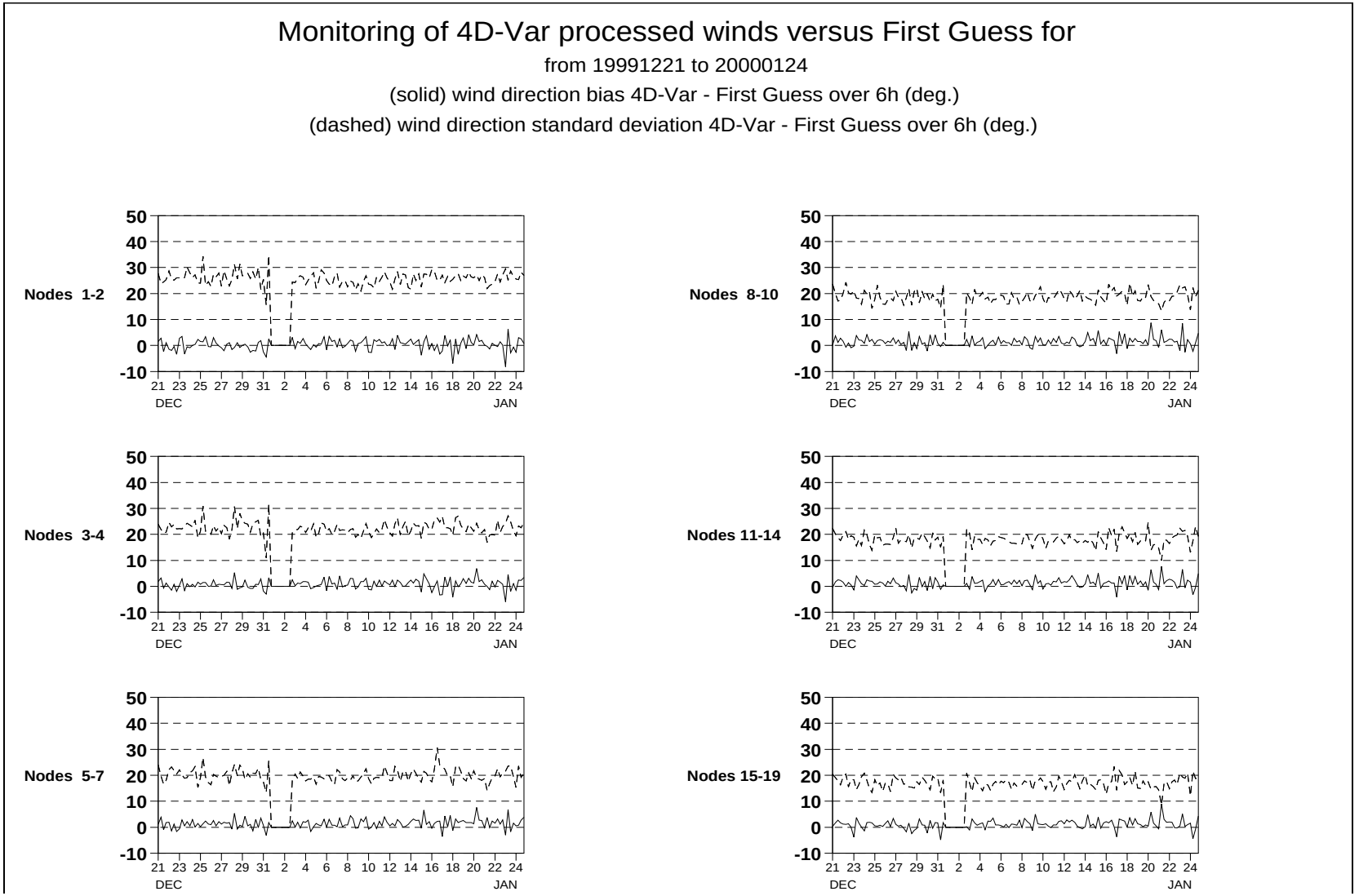

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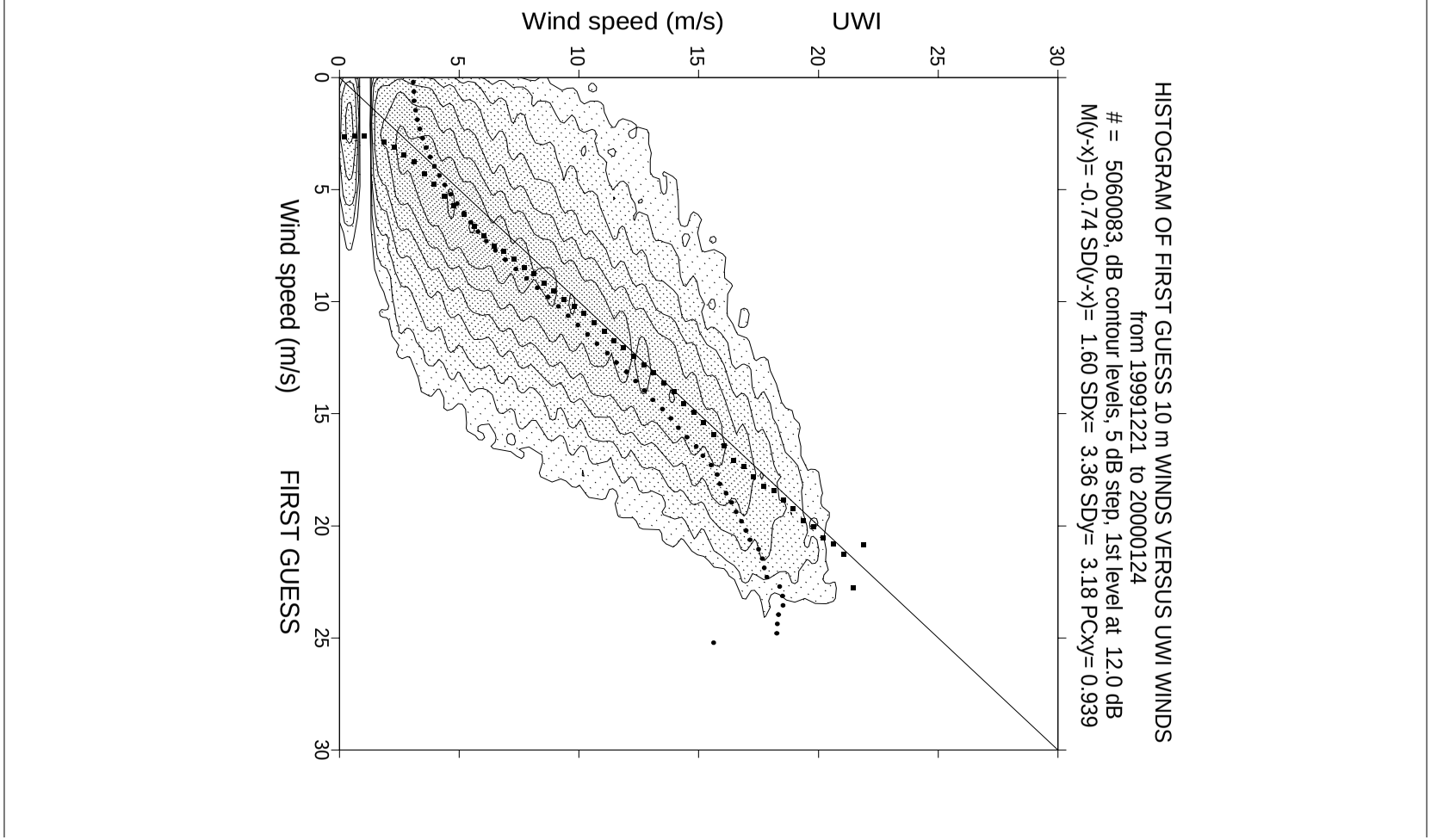

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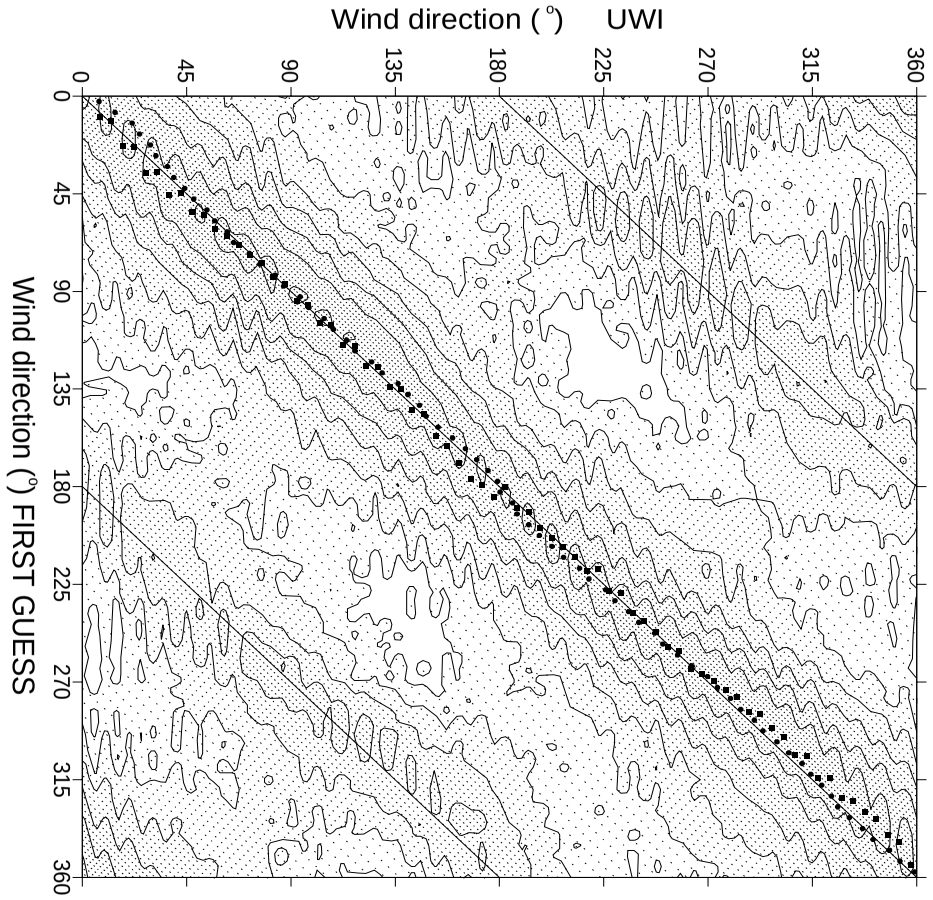

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