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: 16 July 1999

1 - INTRODUCTION

The 43th cycle for ERS-2 showed the normal good data standard from ERS-2. A few periods saw lower than usual data volumes quantified in the 6 hour ECMWF assimilation interval. No data was received on 6 UTC 7 June 1999 and 18 UTC 15 June 1999. On 0 UTC and 6 UTC 15 June 1999 very little useful data was received, the same was true for 6 UTC 25 May 1999. Monitoring the data received for these lower volume cycles showed it had the normal high quality.

The ECMWF data assimilation system was not changed during cycle 43.

2 - ERS-2 STATISTICS FROM 25 MAY 1999 TO 28 JUNE 1999

The sigma0 biases with respect to the ECMWF model first guess winds were very similar to the results from the previous monitoring cycle. The descending tracks fore antenna measurements had a slightly lower bias in the 50-57 degree incidence angle range. Other descending tracks antenna measurements were very similar to previous results. The fore antenna measurements for ascending tracks for incidence angles greater than 45 degrees are slightly lower. The scatterometer measurements are still generally overestimated by 0.2 dB to 0.3 dB for incidence angles above 32 degrees, most pronounced for the ascending tracks.

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The distance to the cone history shows indications of a problem at 6 UTC 25 May 1999. This was due to low data volume, the received data look OK. The cycles without data are visible on the plot. For the other events with low data volume cycles, mentioned above, the distance to the cone stayed at its normal level. The monitoring gives results very similar to last report period's. The wind speed plots has a peak at 6 UTC 29 May 1999. This is due to a relative low data volume combined with high winds speed for an area where the model has lower winds. The scatterometer data is OK.

The UWI winds have an average bias of -0.43 m/s, (-0.80 m/s for nodes 1-2 down to -0.25 m/s for nodes 11-19). This is similar to the results from last cycle. The standard deviations is also similar to the previous cycle: all nodes standard deviations are close to 1.56 m/s.

The standard deviation for ECMWF (4D-Var) processed data is slightly worse than last monitoring cycle, the average value is 1.67 m/s. The bias is slightly better than the results seen in cycle 42, the average value is now -0.17 m/s.

The (scatterometer - model) direction standard deviations were ranging between 30 and 65 degrees for the UWI data (average value 48 degrees) and between 15 and 30 degrees (average value 20.0 degrees) for their 4D-Var counterparts. The direction standard deviations are similar to the ones in the previous report period. As usual, the directional bias is still close to zero for both UWI and 4D-Var products.

The scatter plot of model 10 m wind speeds versus UWI wind speeds are very similar to the results from the previous cycle. The direction scatter plot is in close agreement with the results from the previous cycle.

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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. 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. 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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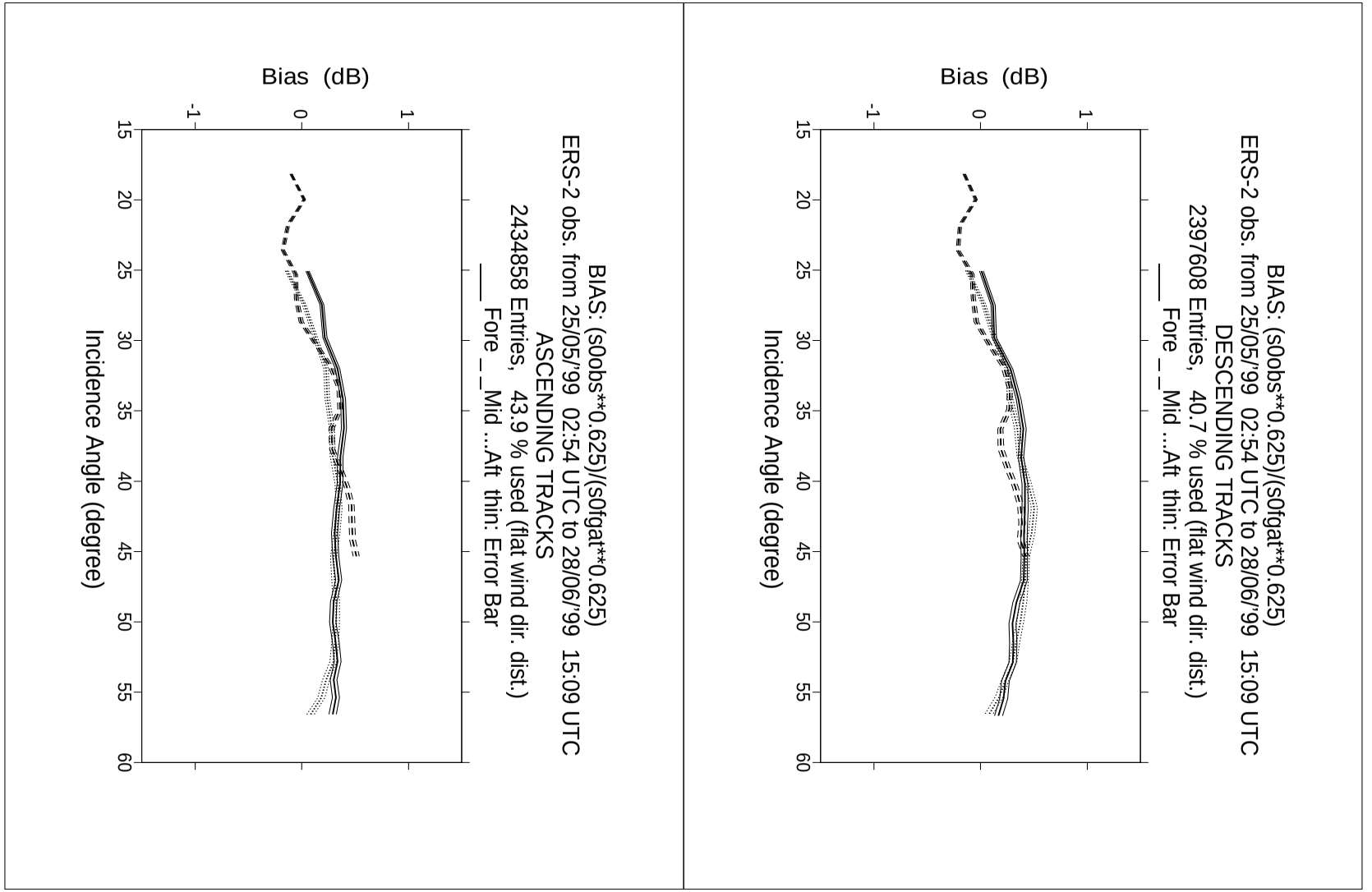

FIGURE 1

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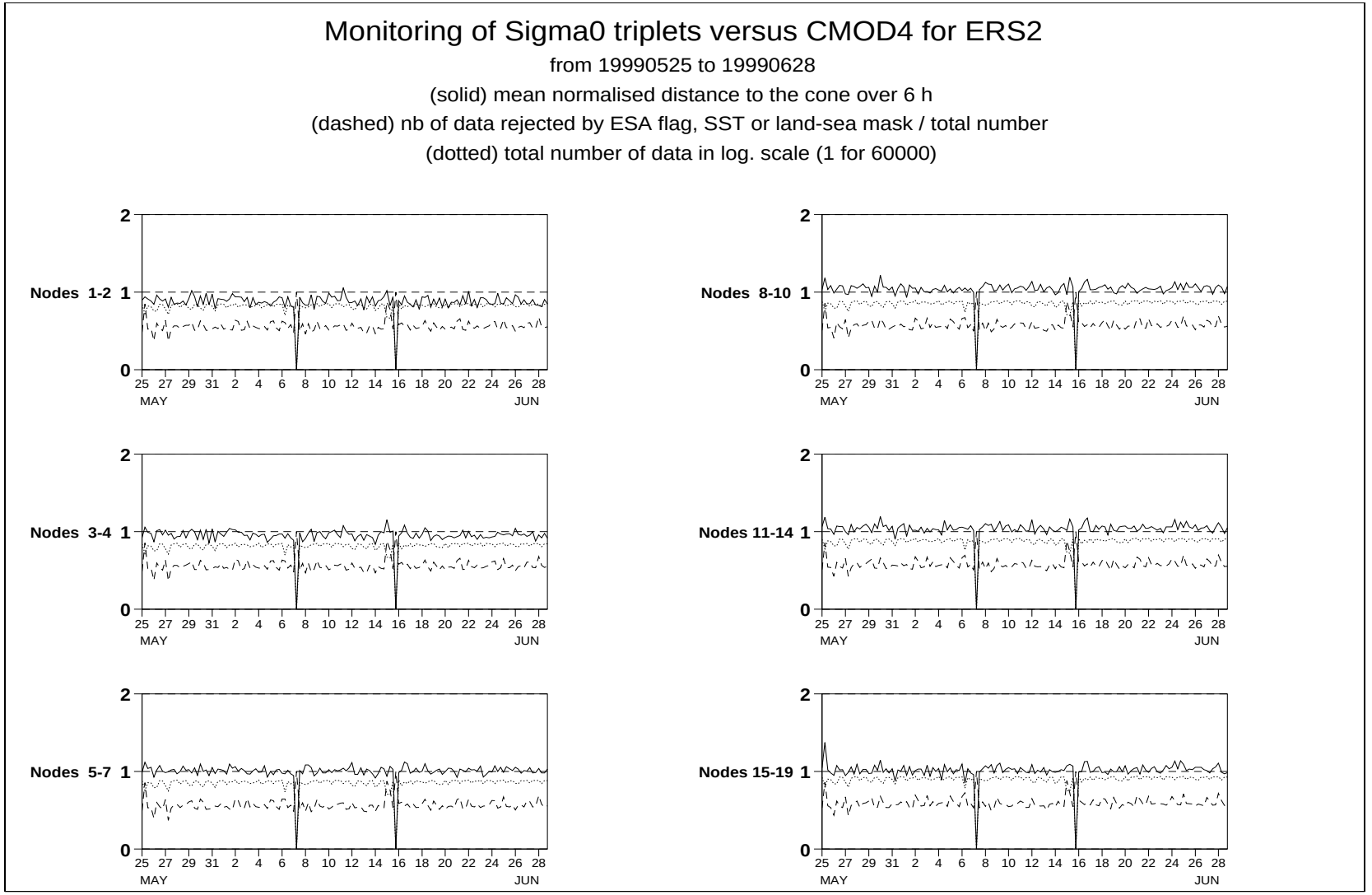

FIGURE 2

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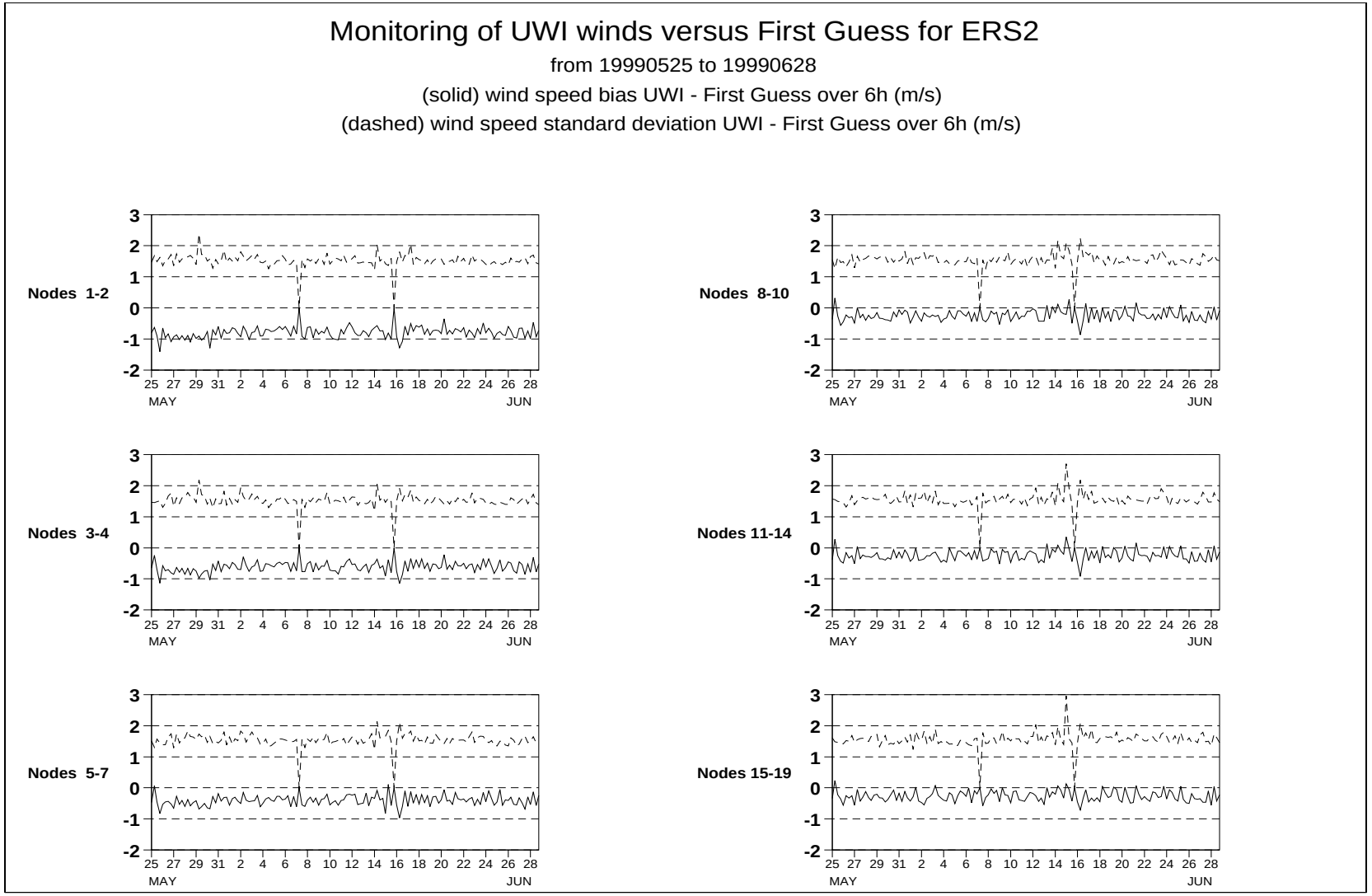

FIGURE 3

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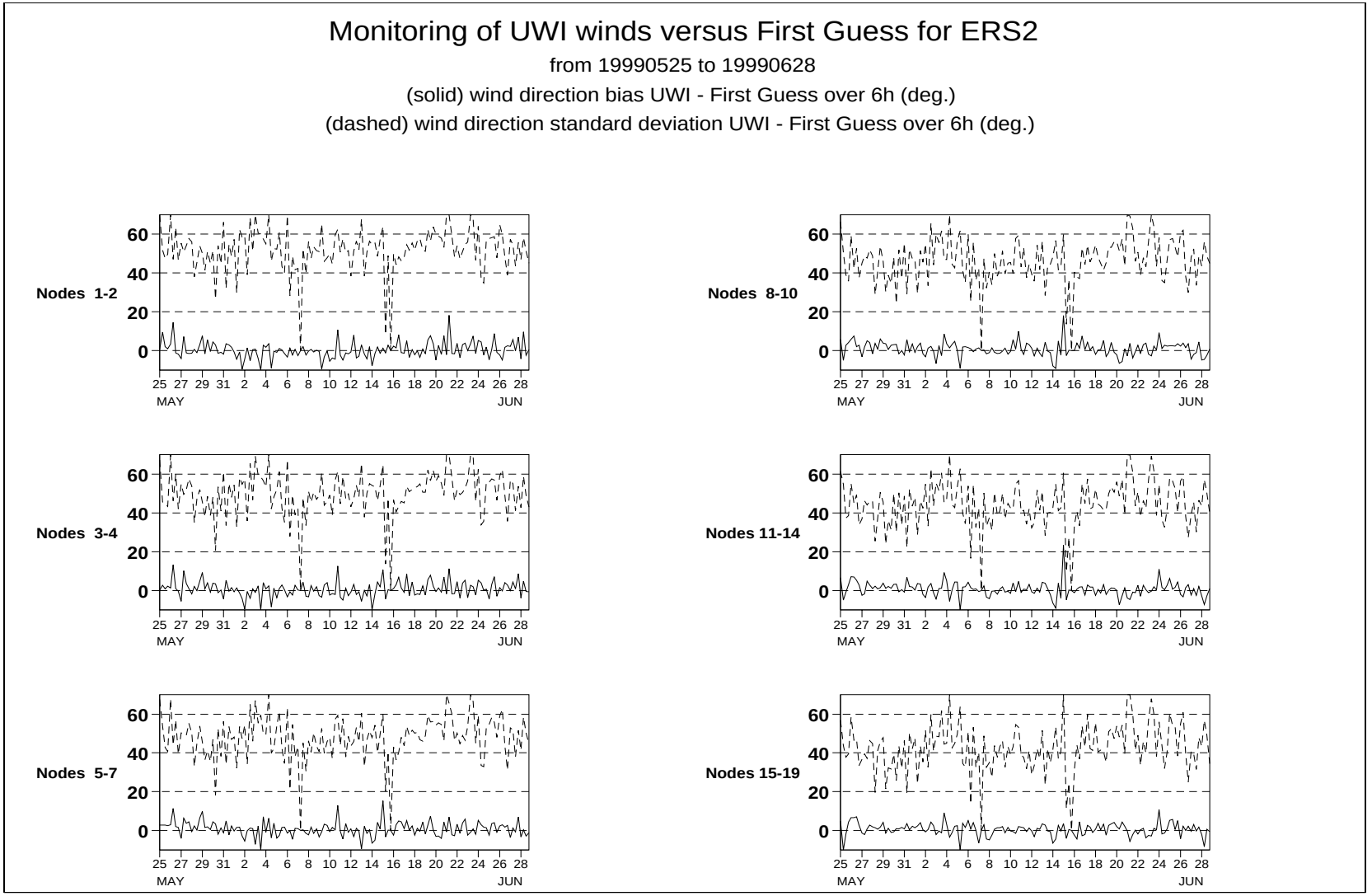

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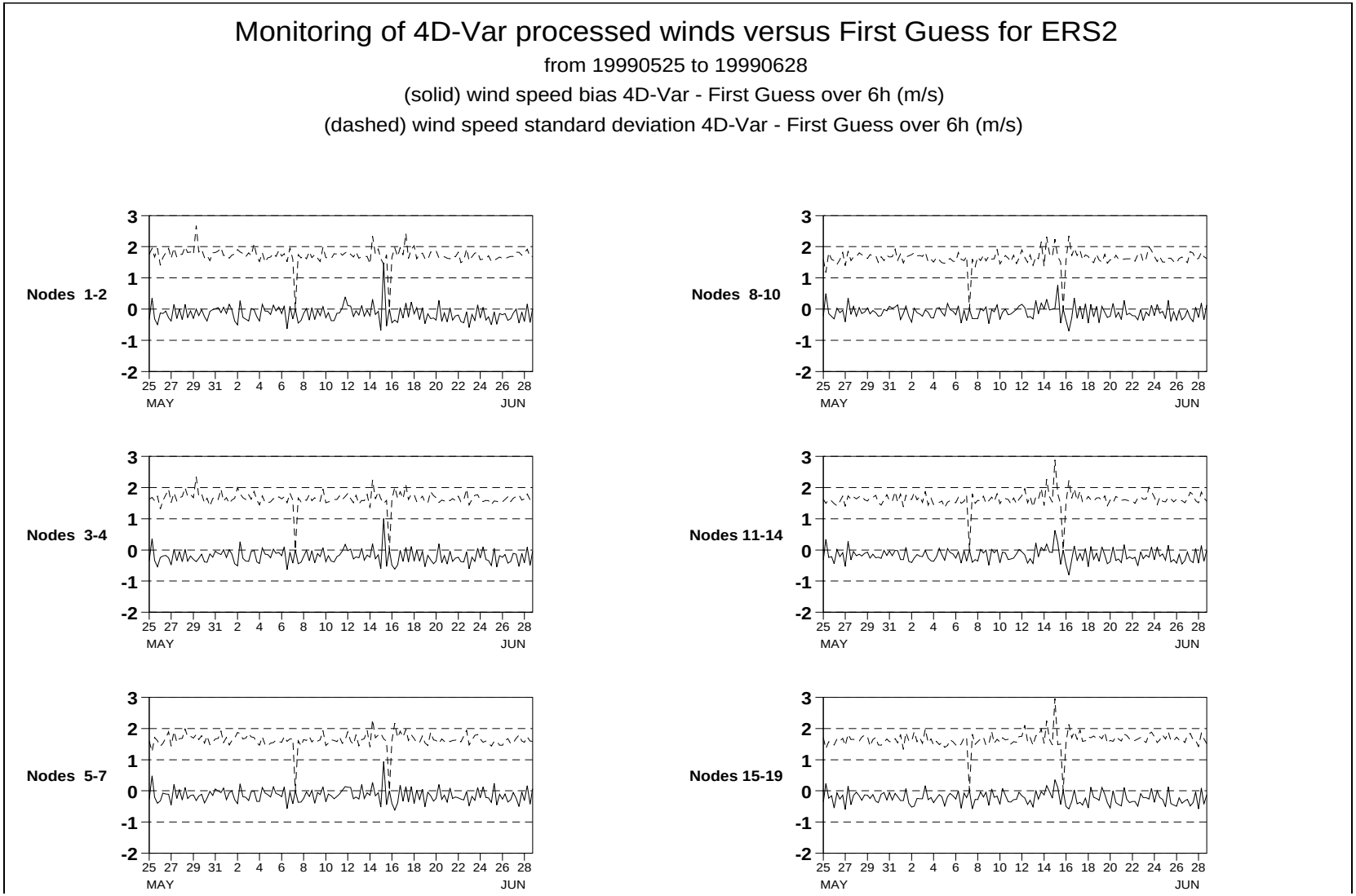

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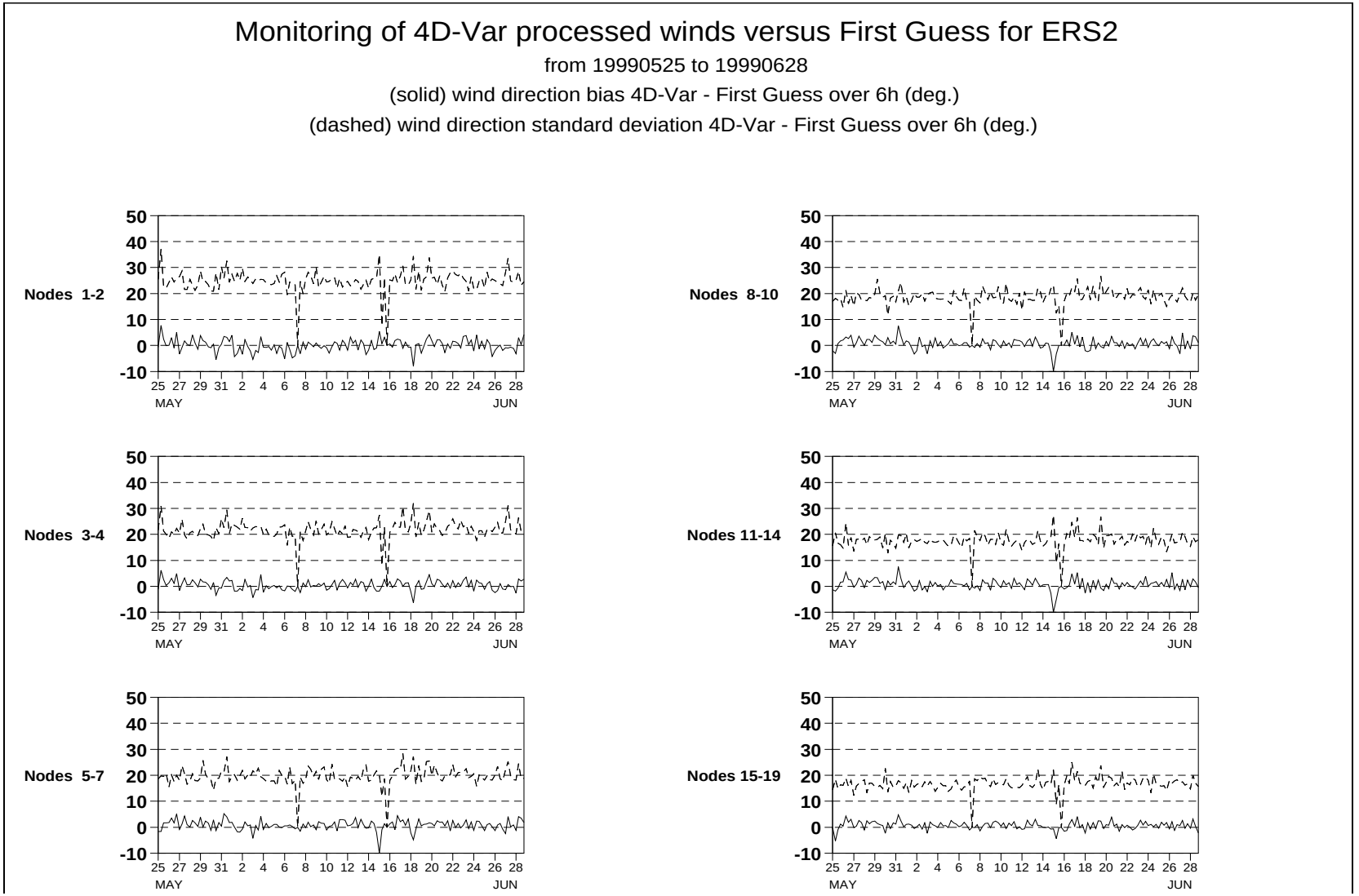

FIGURE 6

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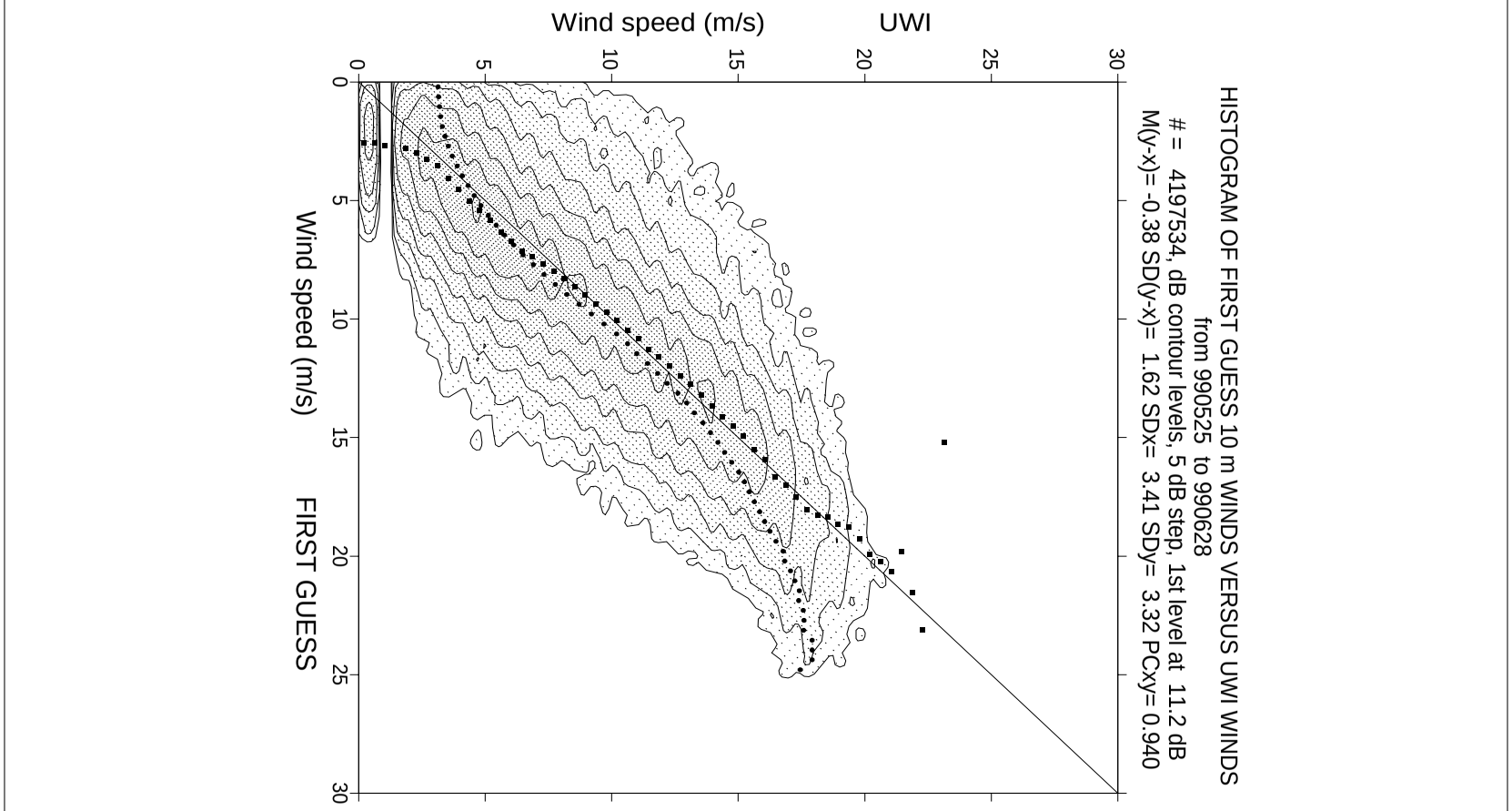

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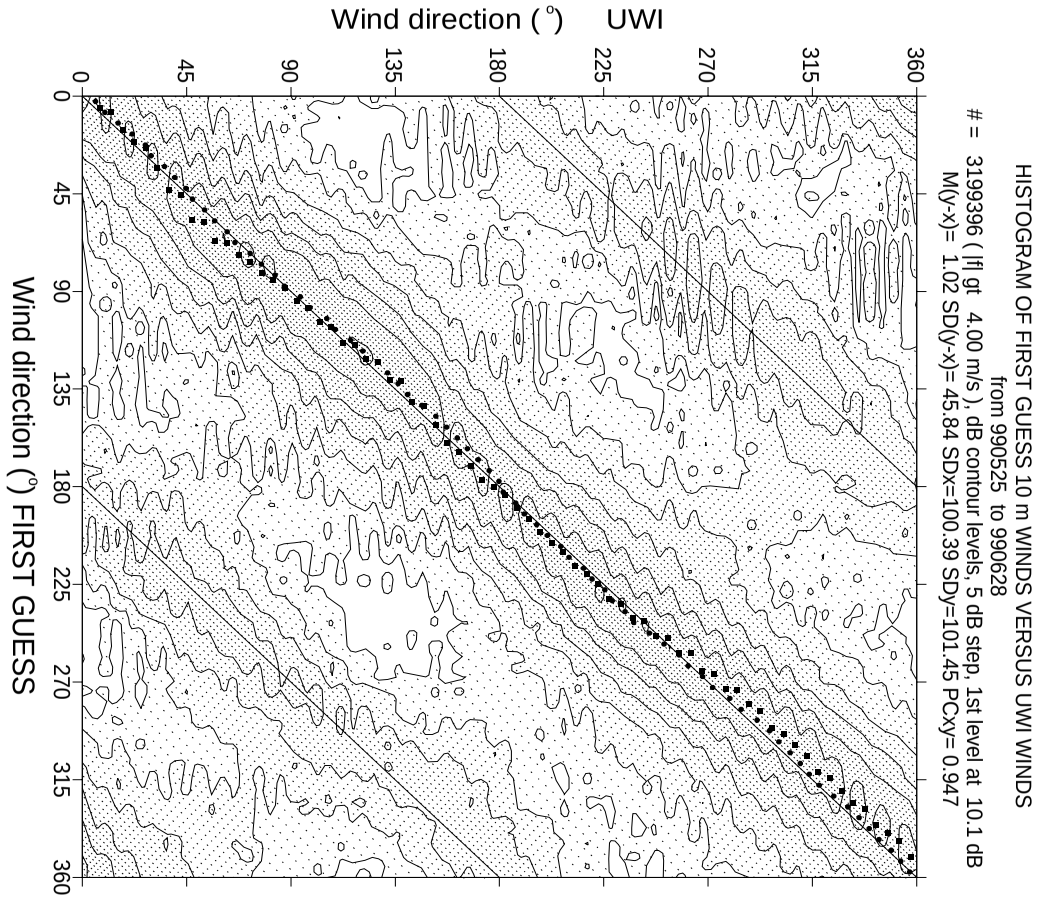

FIGURE 8

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