MONITORING STATISTICS OF ERS-2 SCATTEROMETER FOR ESA (Project Ref. 12893/98/NL/PR)

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1 - INTRODUCTION

During cycle 59 ERS-2 scatterometer data was stable for most of the period. Due to a manoeuvre in Fine Pointing Mode, poor quality data was received within two 6-hourly periods centred around 18 UTC 5 December 2000 and 00 UTC 6 December 2000. For these periods the distance to the cone was larger than normal, especially for the higher nodes (see figure 2). The erroneous data in these periods were rejected by the 4D-Var data assimilation system at ECMWF. For the remaining part of the monitoring period the data quality was high. On 13 December 2000 no data was received for observation times between 01:13 UTC and 08:35 UTC.

The ECMWF assimilation system was not modified during cycle 59.

ERS-2 STATISTICS FROM 05 DECEMBER 2000 TO 08 JANUARY 2001

Compared to the results from the previous cycle (58), the sigma0 bias level (compared to simulated sigma0's based on ECMWF model first guess winds) of the descending tracks of the Mid beam has been slightly improved for incidence angles between 40 and 45 degrees. For this range the bias level of the descending Mid beam is back to its bias level of cycle 57. For the Fore and Aft descending tracks and all

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ascending tracks bias levels have remained the same (i.e. compared to cycle 58). Therefore, the bias levels of the Fore and Aft descending beams are still slightly worse than those of cycle 57. As usual all curves have a fairly flat distribution over the whole incidence angle range.

The distance to the cone history shows a peak, being more profound towards the higher nodes, for the period from 15 UTC 5 December 2000 to 03 UTC 6 December 2000. This behaviour is a signature for orbital manoeuvres, which indeed was the case as mentioned above. The UWI and 4D-Var processed wind speed and direction monitoring plots also show a peak for this period. The mean normalised distance to the cone is similar to the previous report cycle for all node ranges.

The UWI winds have an average bias of -0.79 m/s, (-1.15 m/s for nodes 1-2 down to -0.62 m/s for nodes 11-19). It is almost identical to the results from the previous cycle. The standard deviation has increased somewhat: on average 1.57 m/s (was 1.53 m/s) and similar for all nodes. The same trend applies to the ECMWF (4D-Var) processed data: the bias remained the same (-0.53 m/s) and the standard deviation has increased from 1.61 m/s to 1.65 m/s. The (scatterometer - model) direction standard deviations were ranging between 30 and 60 degrees for the UWI data (average value 52.4 degrees; was 51.3) and between 15 and 30 degrees (average value 19.0; was 18.8) for their 4D-Var counterparts. 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 same bias compared to the plot from the previous cycle (-0.73 m/s). The standard deviation has increased from 1.57 m/s to 1.62 m/s. The direction scatter plot looks similar to the results from the previous cycle, although both the bias (from 1.5 to 2.2 degrees) and the standard deviation (from 49.6 to 50.4 degrees) has increased.

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2 - 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. 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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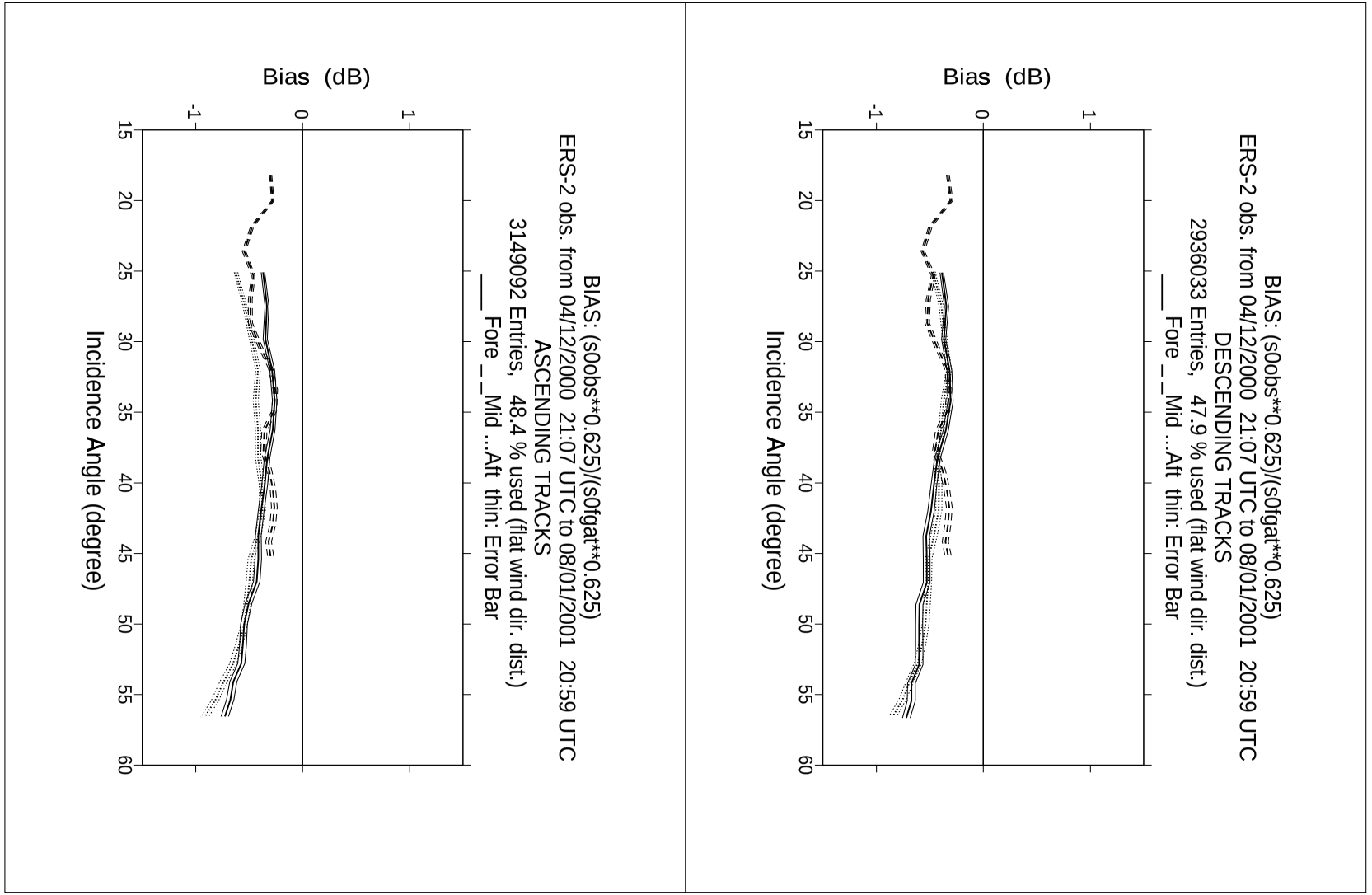

FIGURE 1

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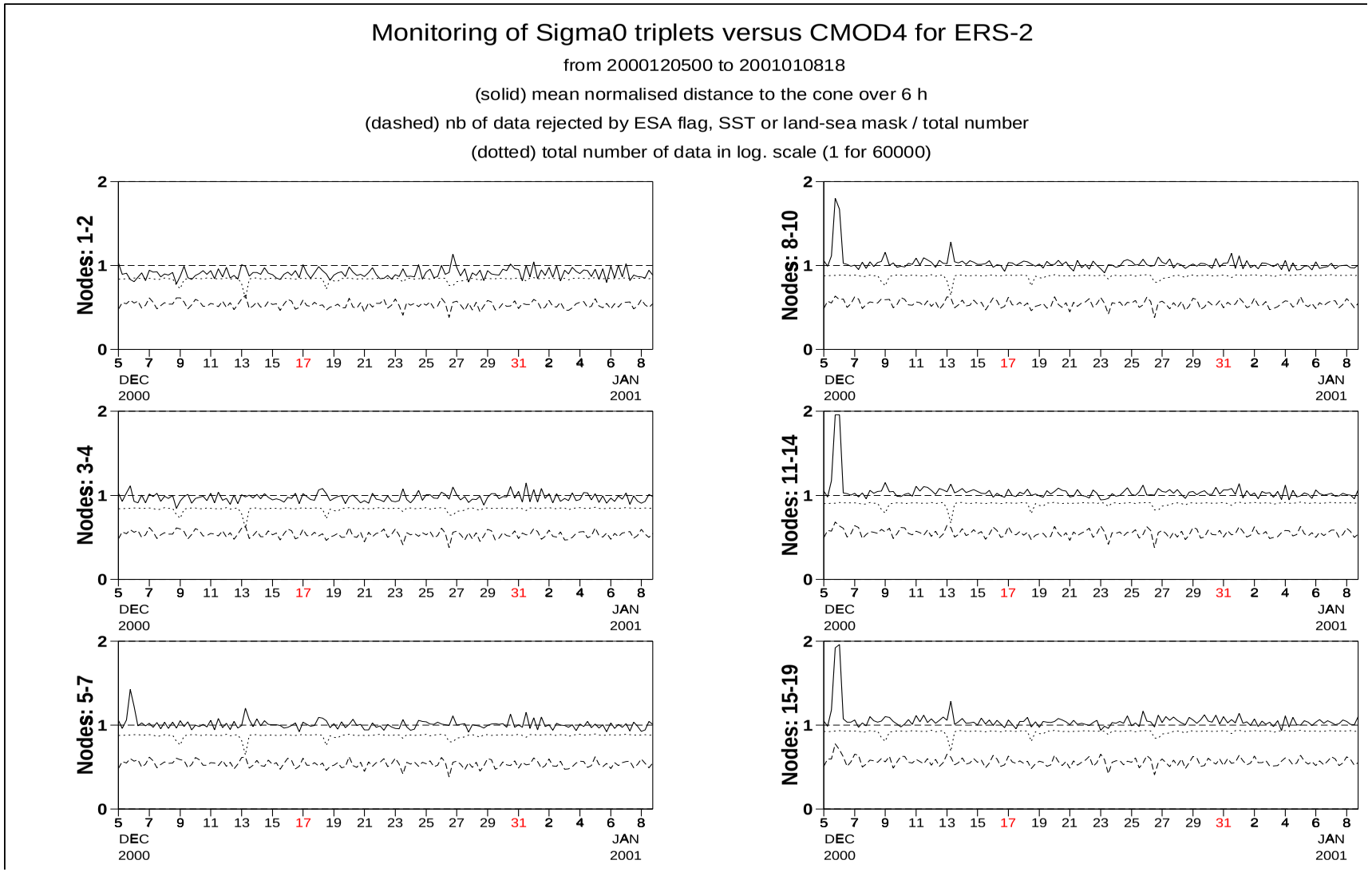

FIGURE 2

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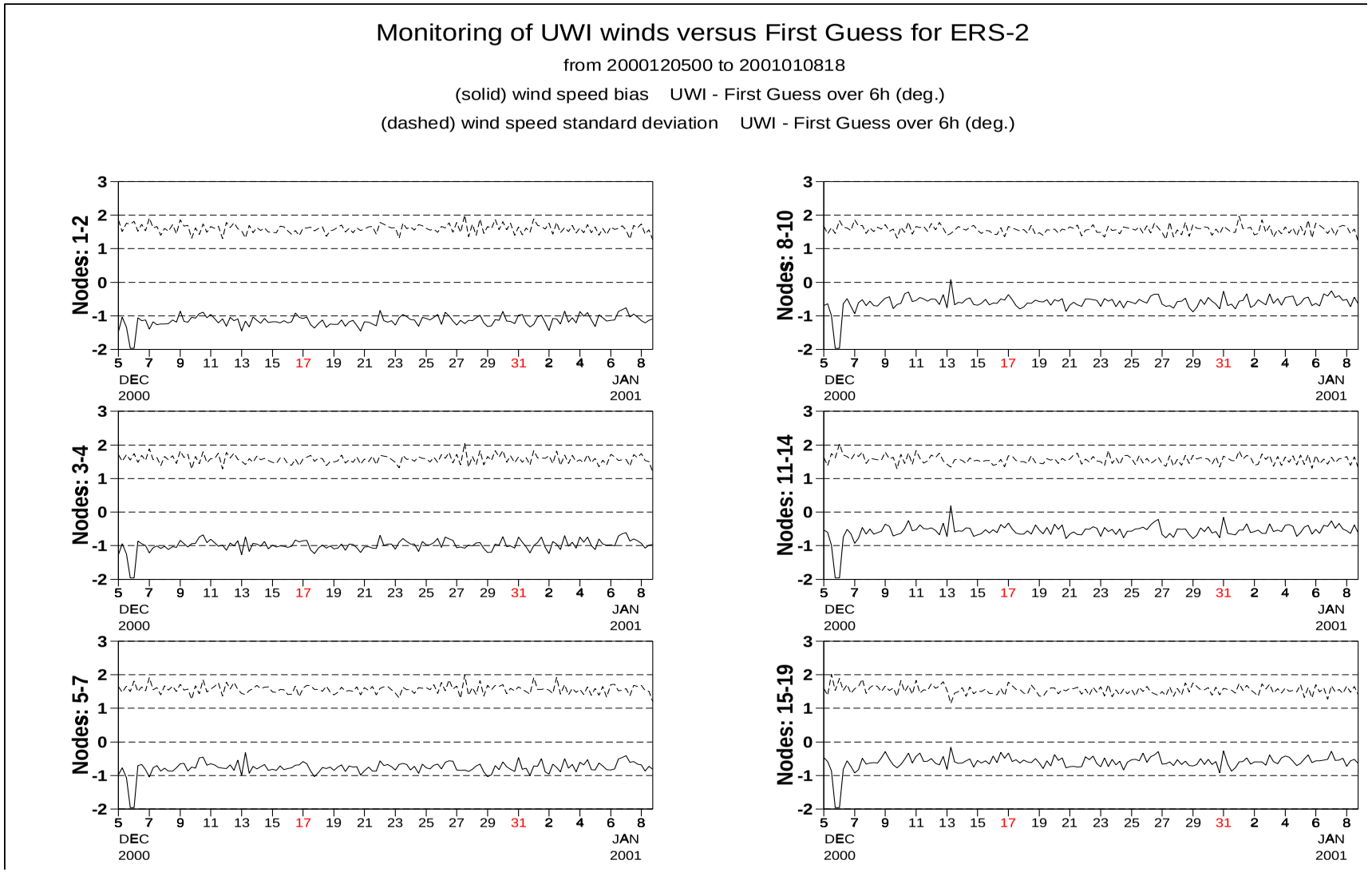

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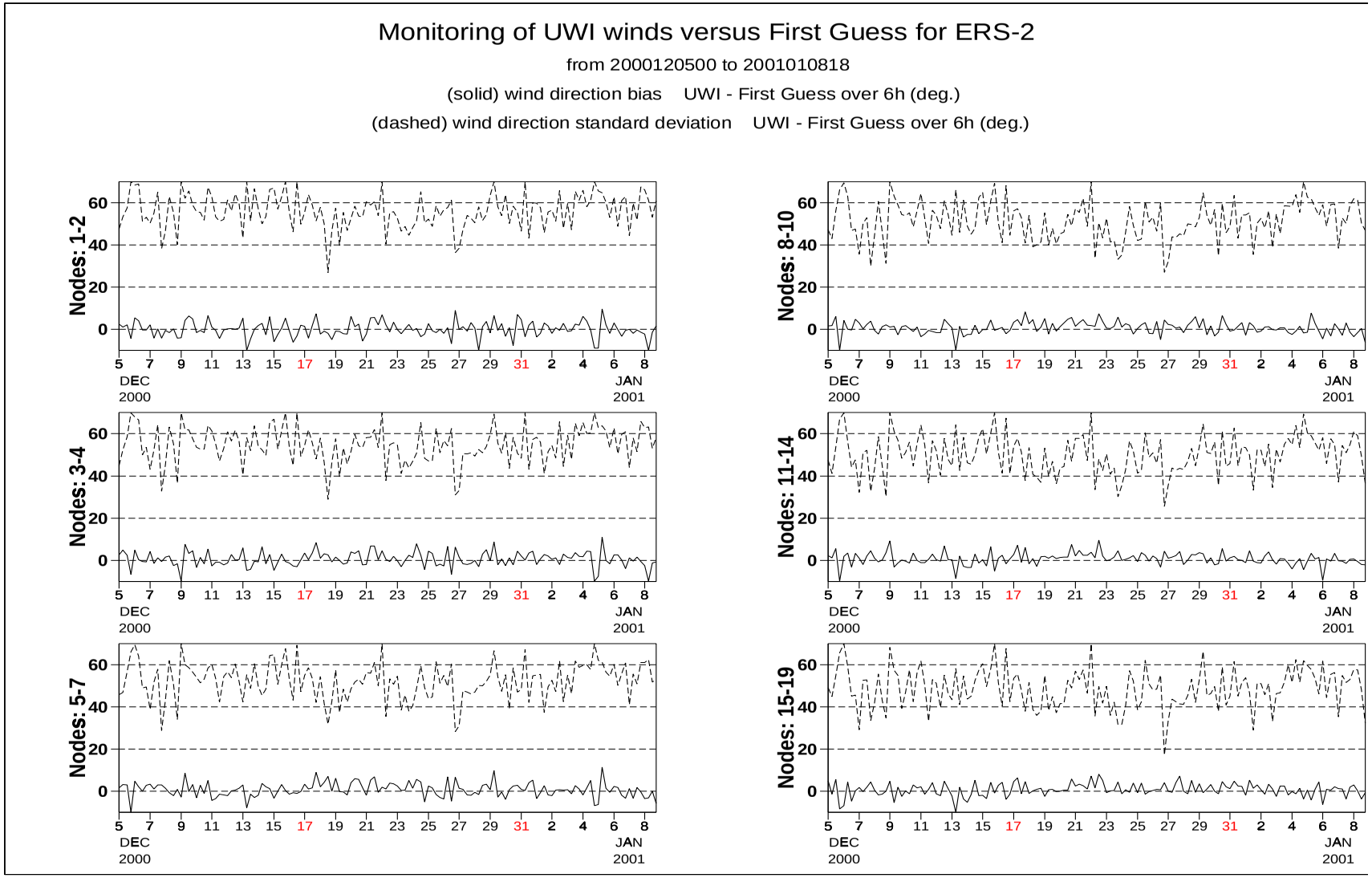

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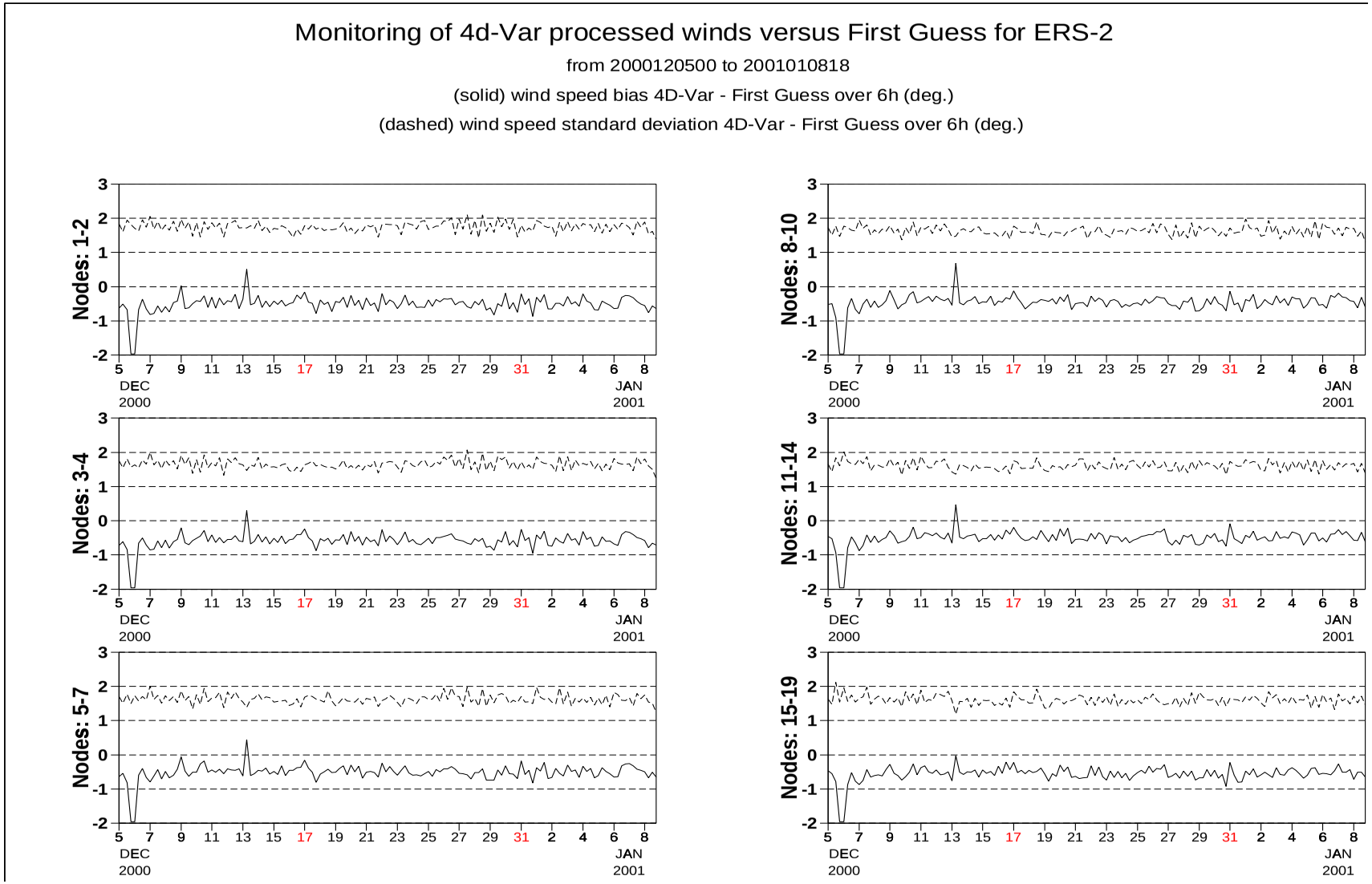

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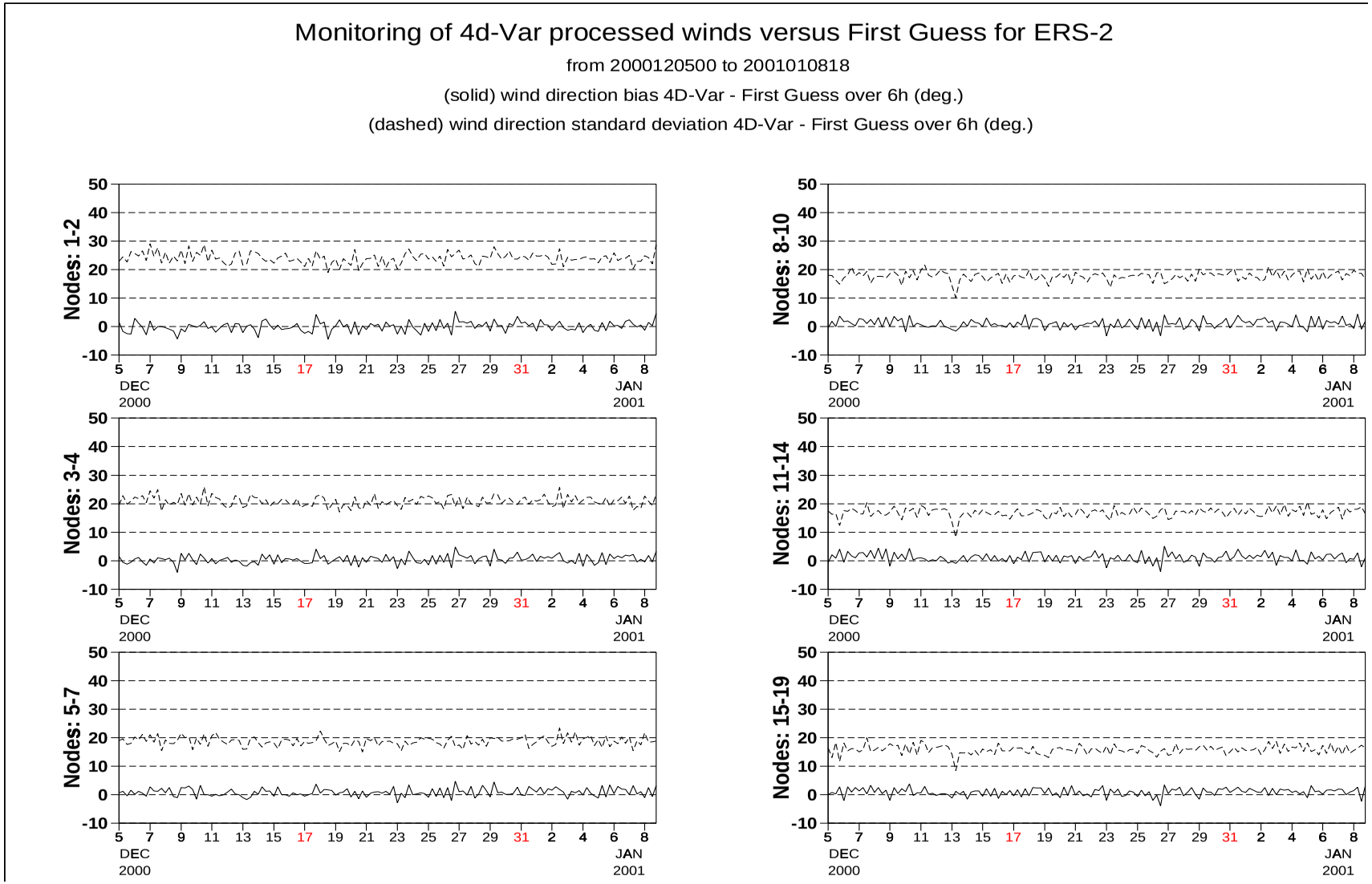

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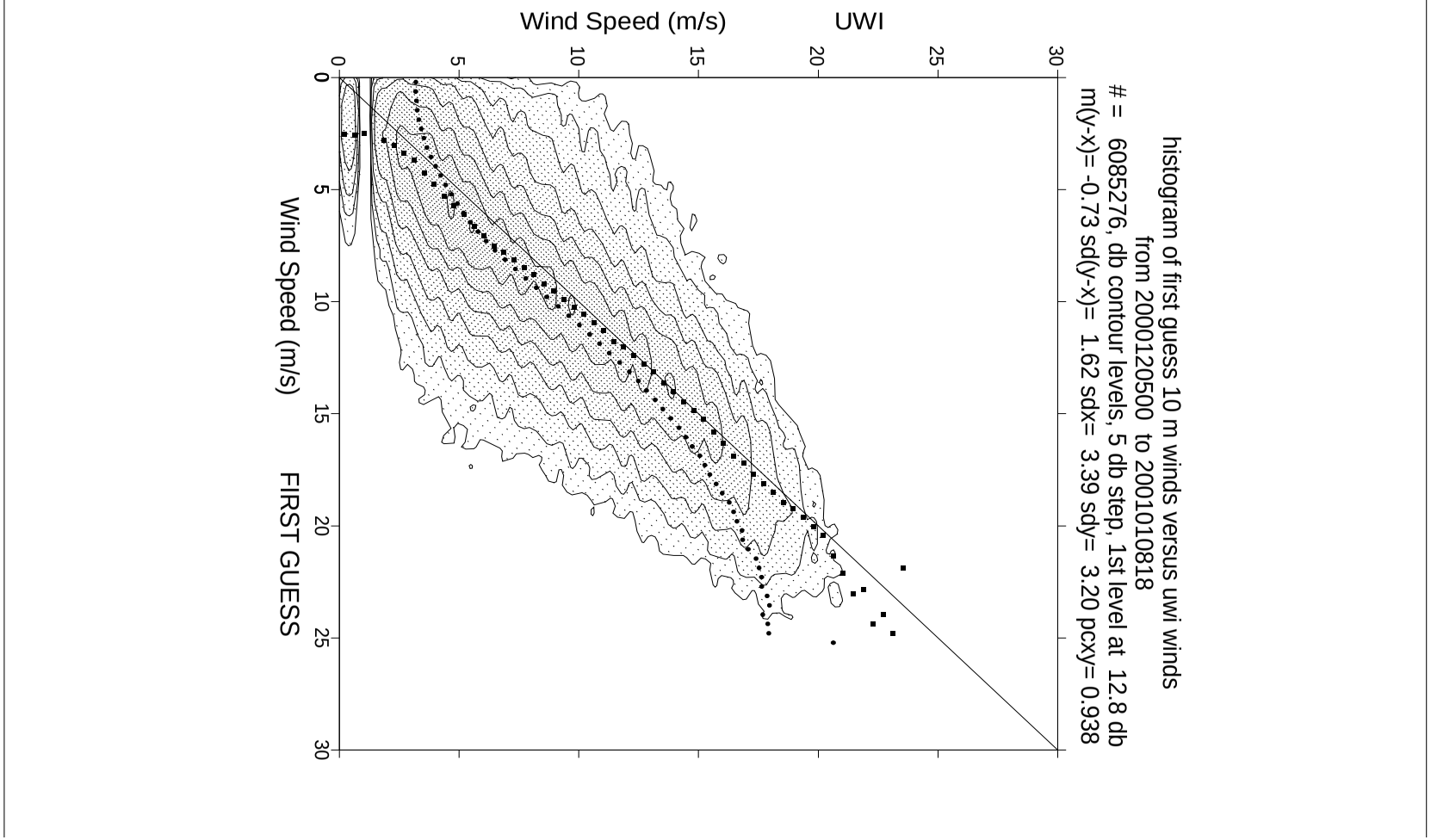

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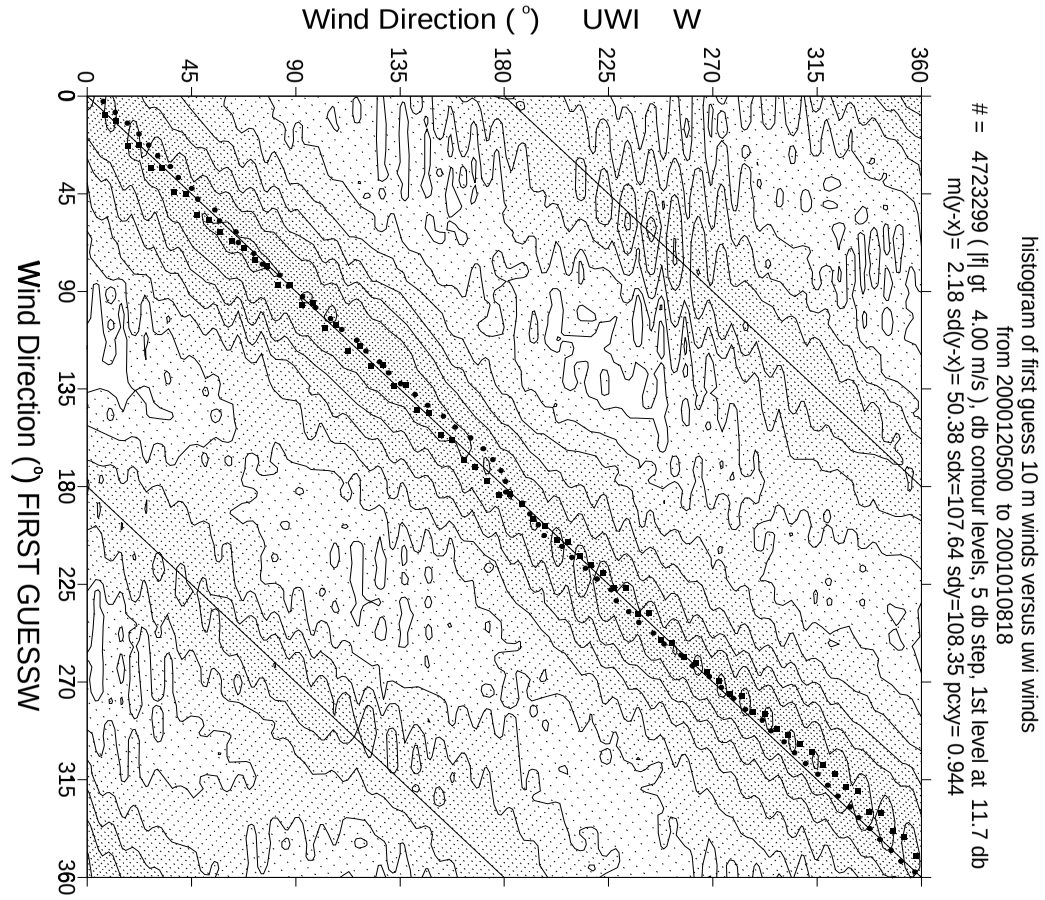

FIGURE 8

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