FIGURES

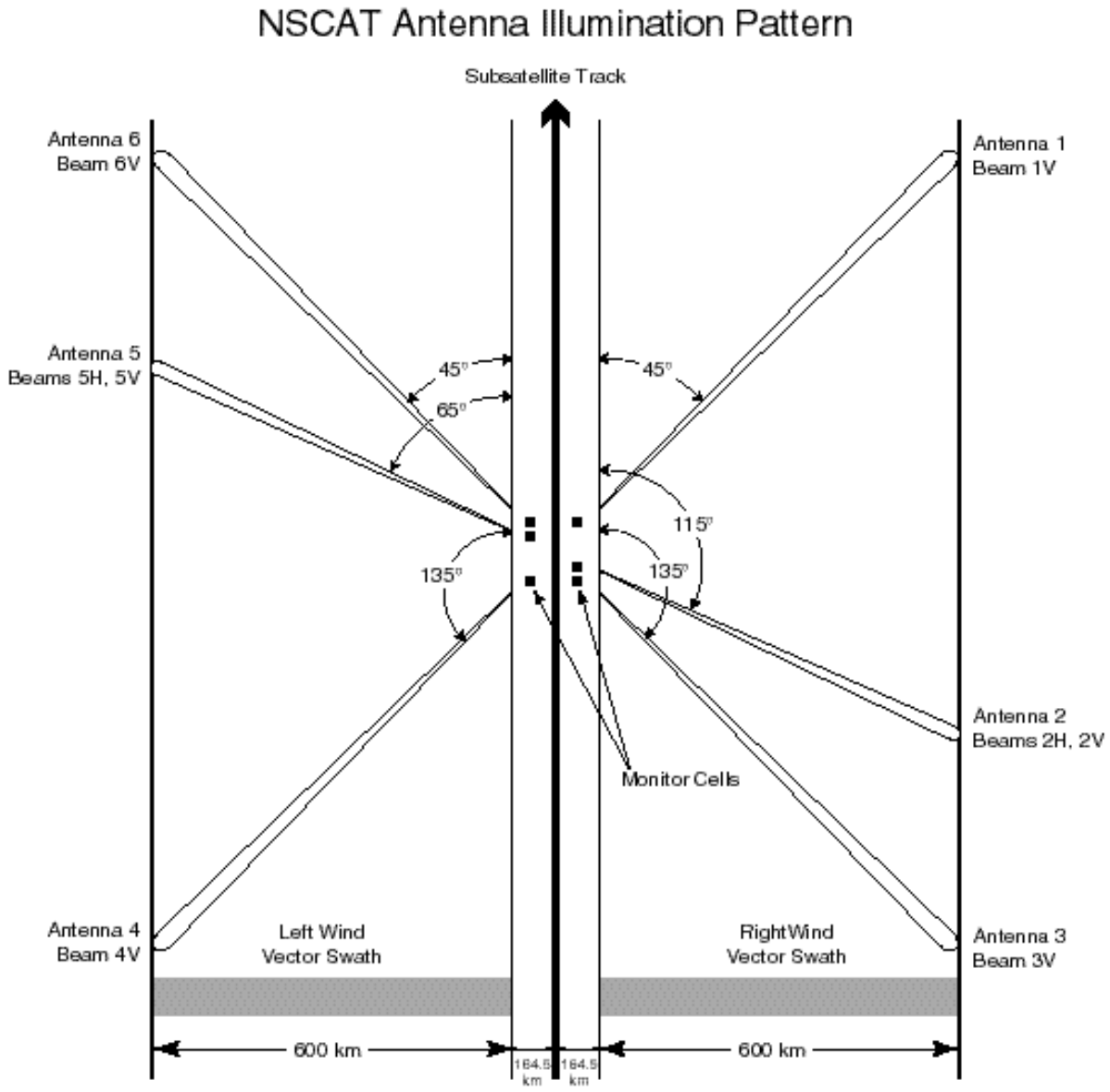

Fig. 1 : NSCAT antenna illumination pattern and the two swaths.

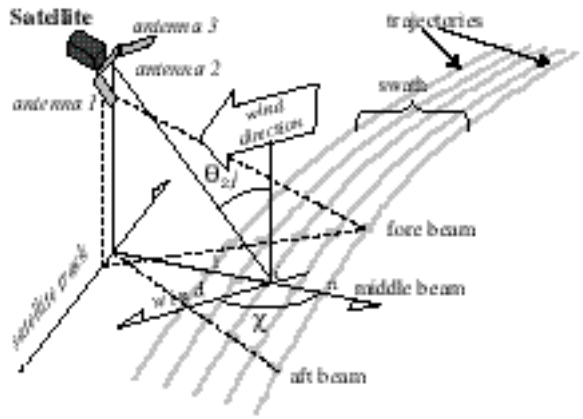

Fig. 2 : Definition of geophysical parameters: θ the incidence, χ the azimuth angle.

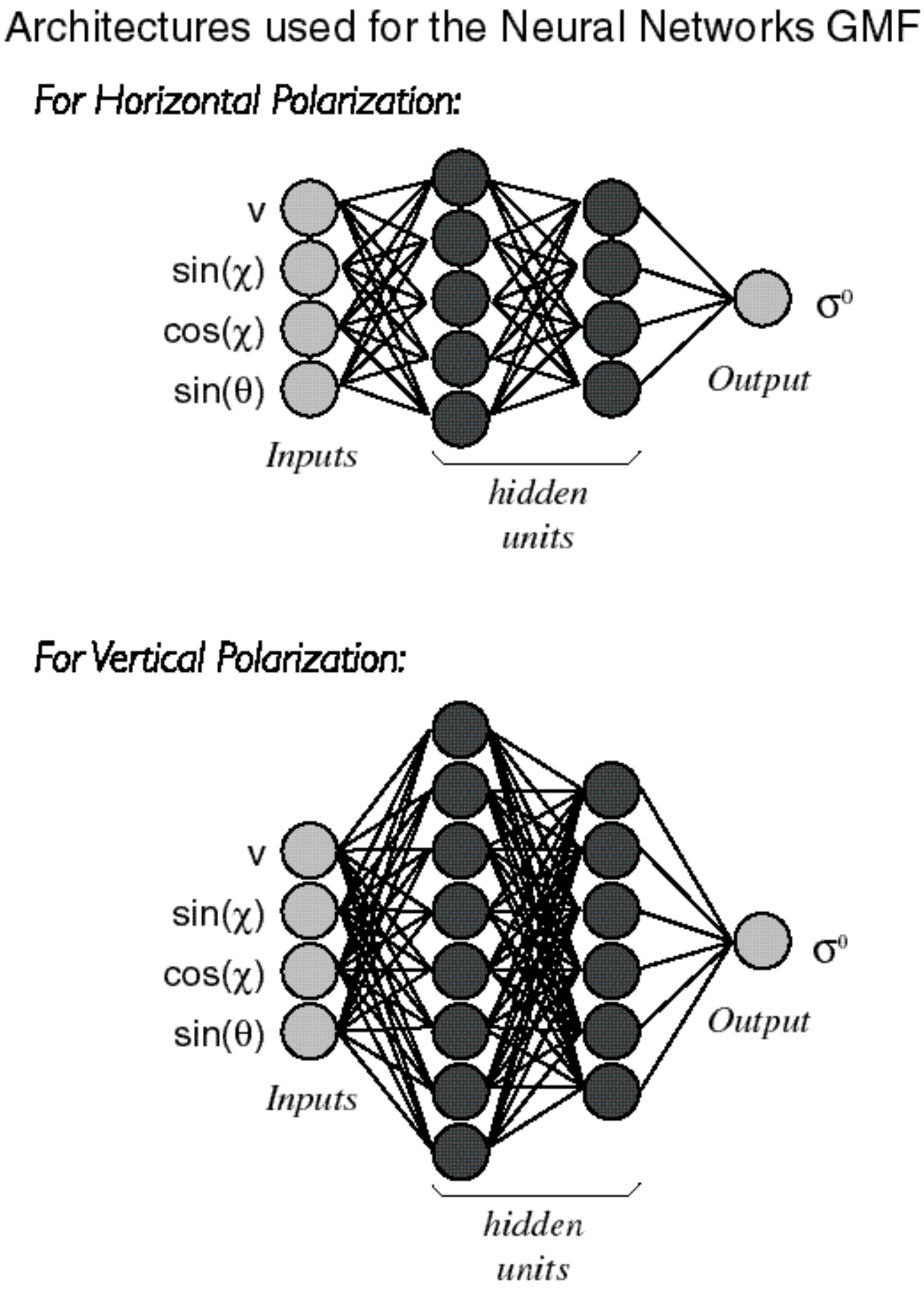

Fig. 3 : Architecture of the neural networks : (a) NN-GMF-H, (b) NN-GMF-V.

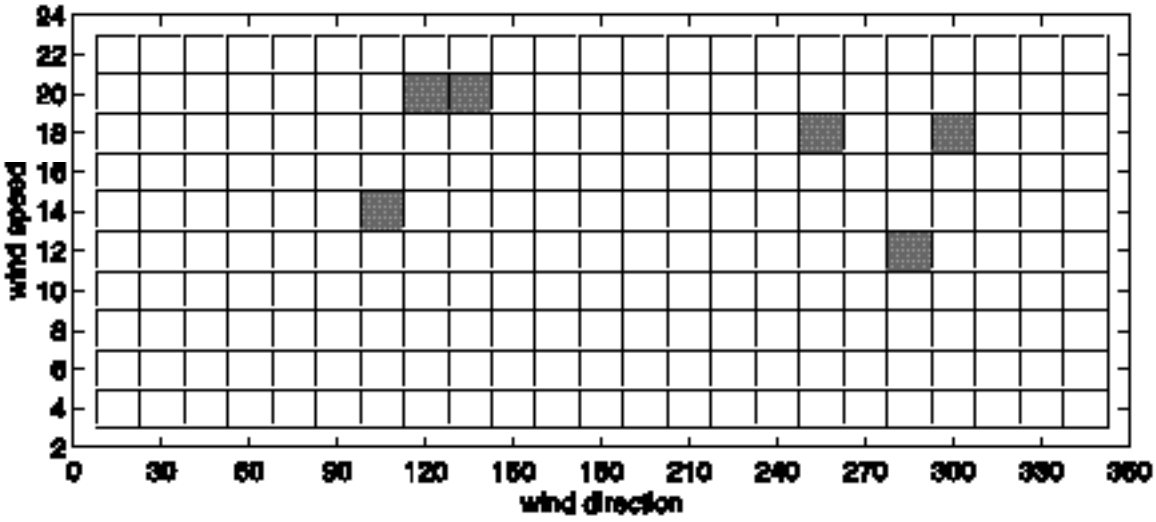

Fig. 4 : Student Test for the NN-GMF-V at an incidence angle of 36° with respect to the wind azimuth and for different wind speeds. When the pixels are white, the test is satisfied with a confidence level of 95% (at a significance level of 5%).

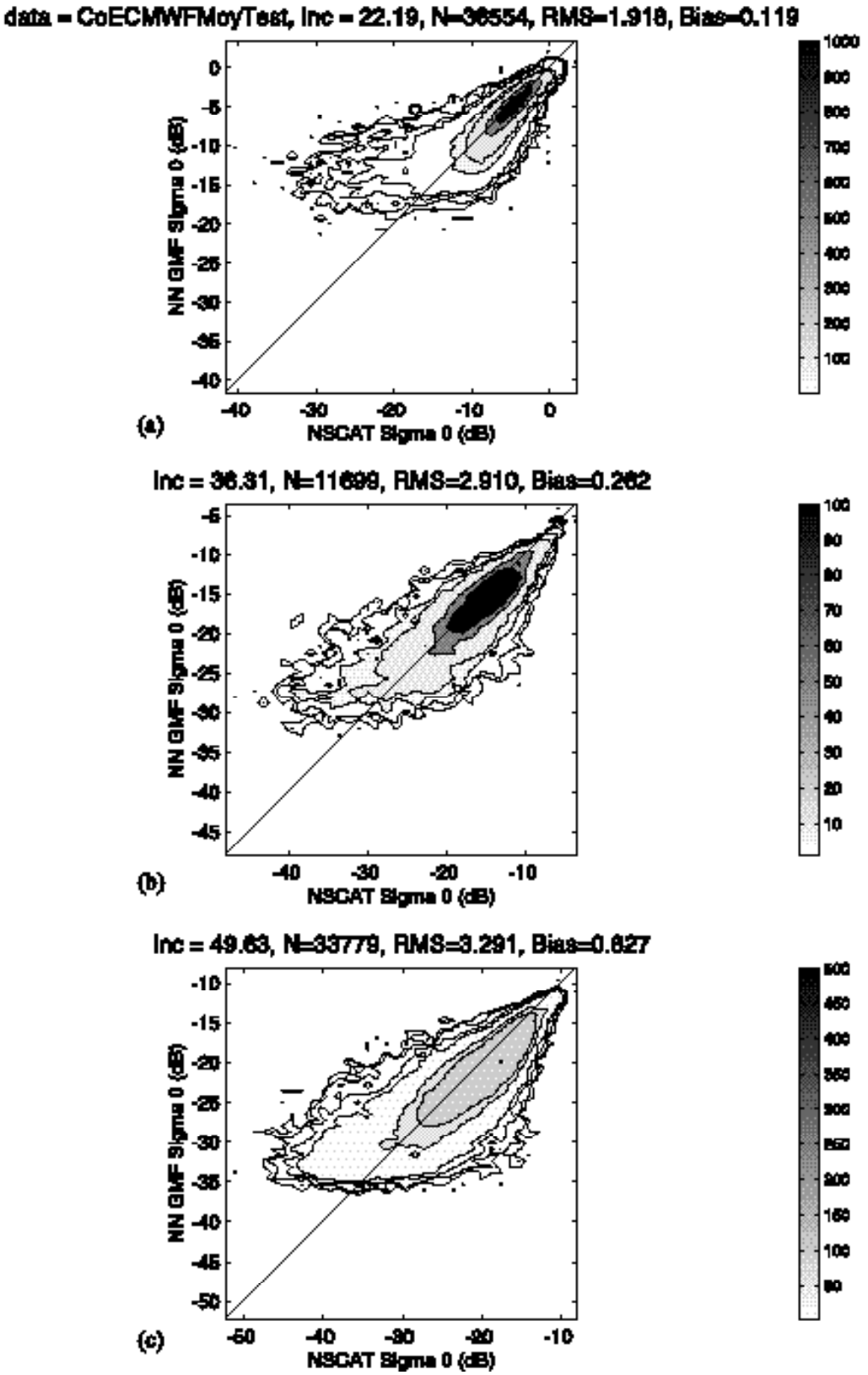

Fig. 5 : Scatter plots of NN-GMF-V versus the NSCAT sigma-0 at three incidence angles : (a) θ=22°; (b) θ=36°; (c) θ=49°5. The darker the area, the denser the data number. The scale is given in thousands of points.

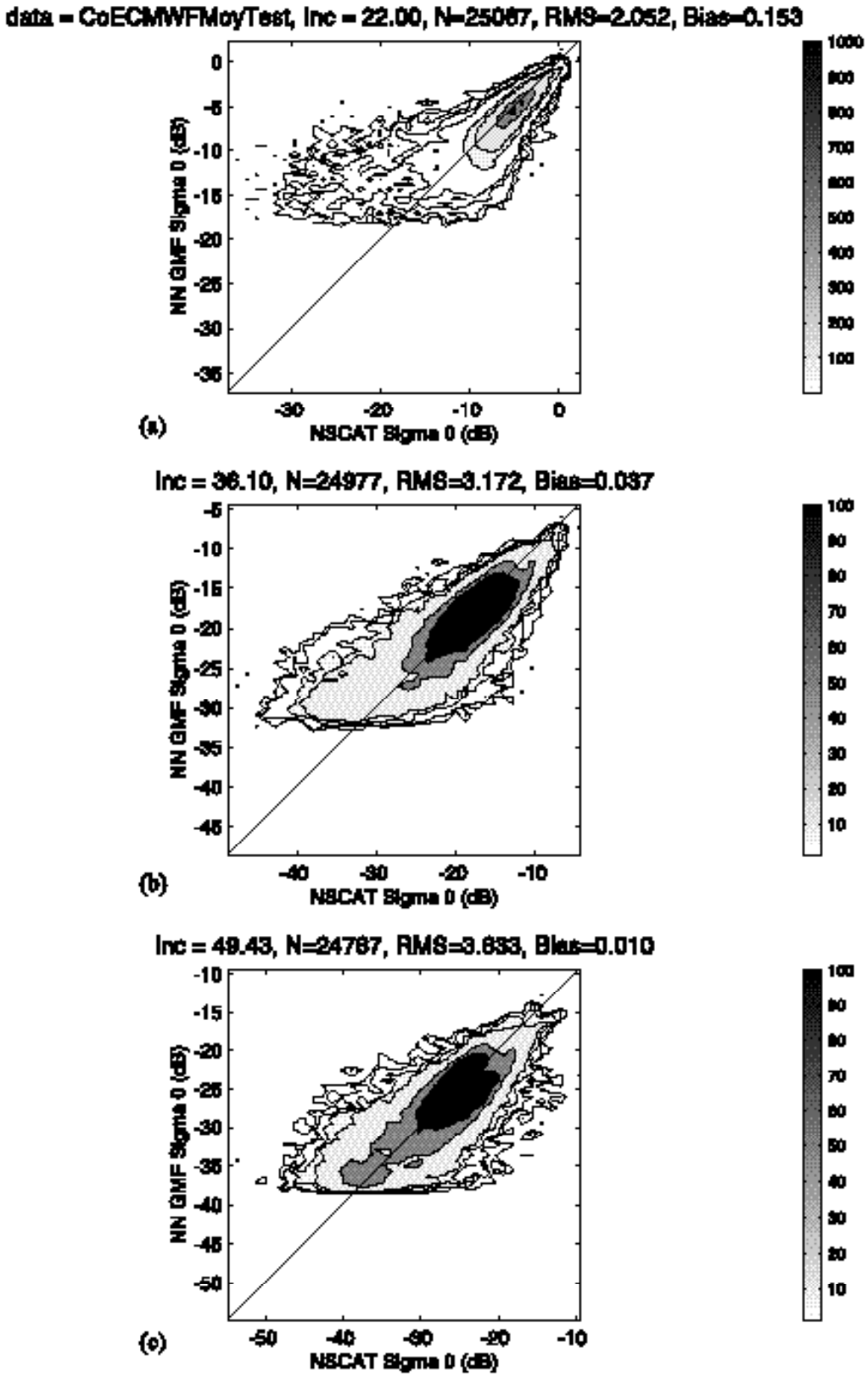

Fig. 6 : Scatter plots of NN-GMF-H versus the NSCAT sigma-0 at three incidence angles. (a) θ=22°; (b) θ=36°; (c) θ=49°5. The darker the area, the denser the data number. The scale is given in thousands of points.

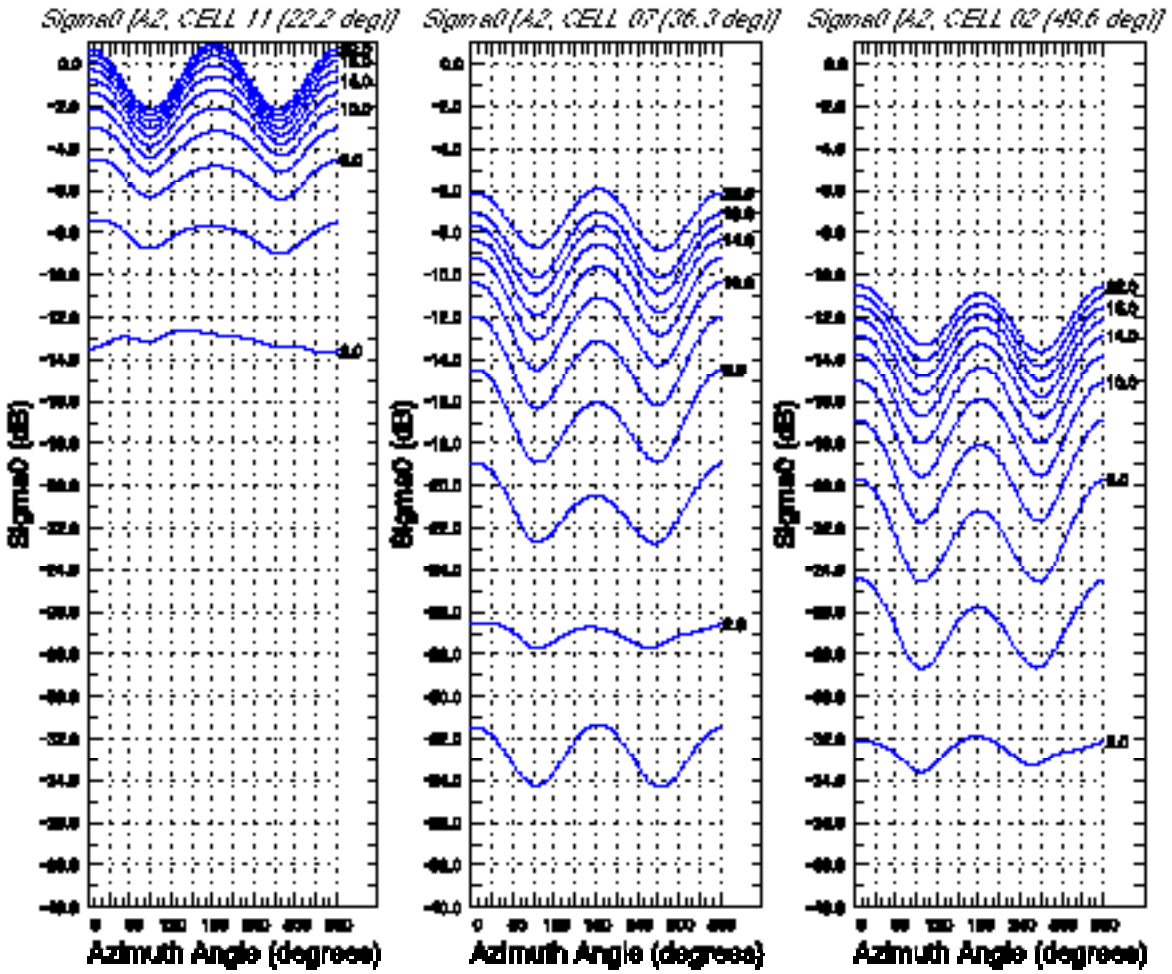

Fig. 7 : Sigma-0 (in dB.) of the NN-GMF-H function with respect to the azimuth angle at different wind speeds at three incidence angles. (a) θ=22°; (b) θ=36°; (c) θ=49°5.

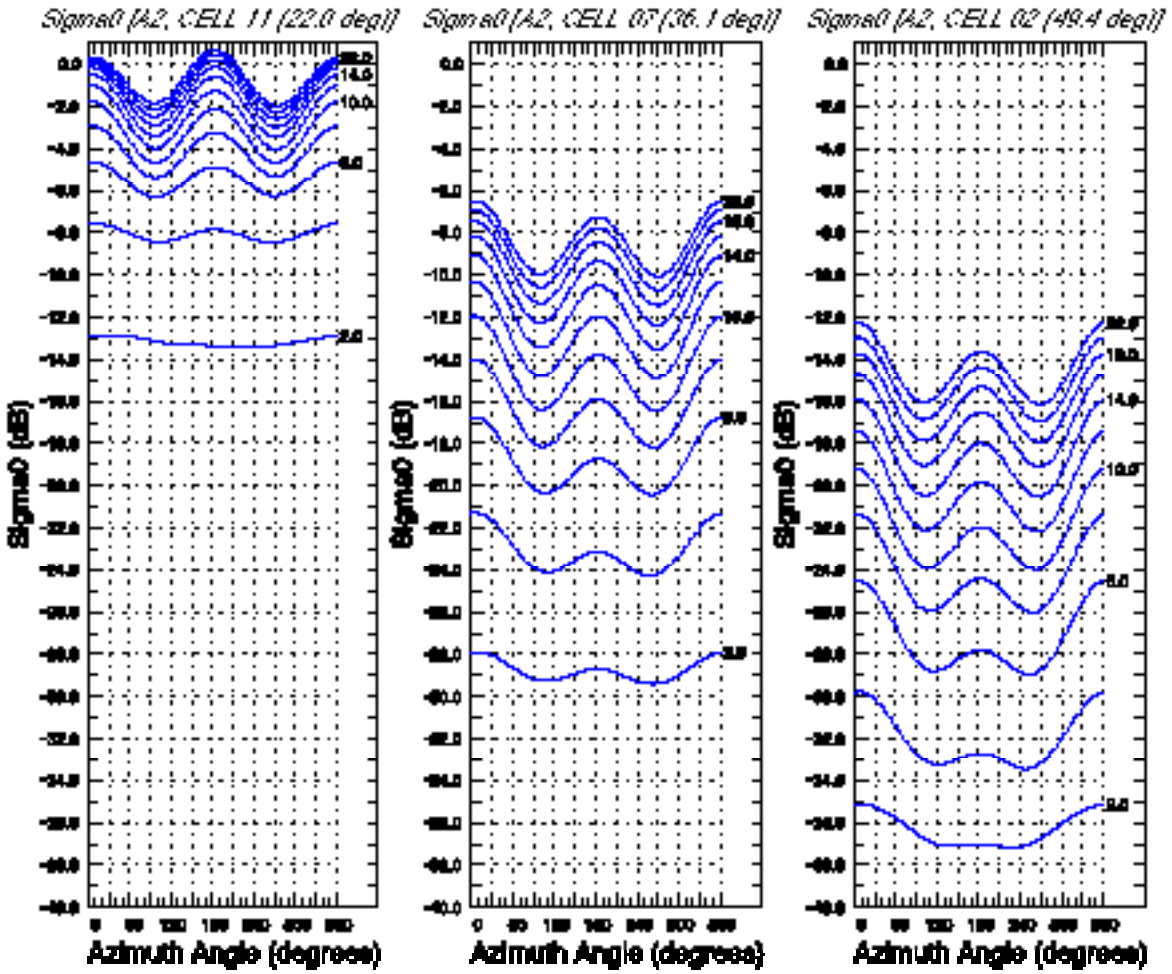

Fig. 8 : Sigma-0 (in dB.) of the NN-GMF-V function with respect to the azimuth angle at different wind speeds at three incidence angles. (a) θ=22°; (b) θ=36°; (c) θ=49°5..

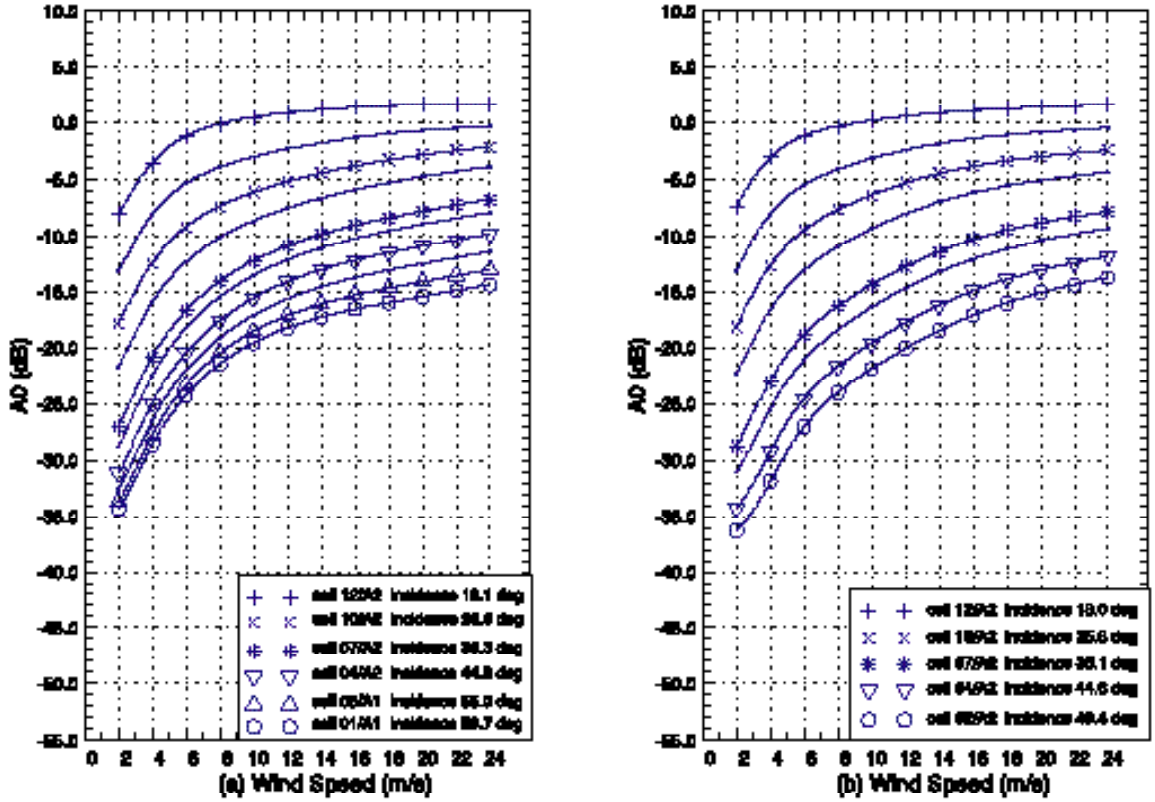

Fig. 9 : Mean values (A_0 Fourier coefficient) of (a) NN-GMF-V and (b) NN-GMF-H versus the wind velocity at different incidence angles. These values are given in dB.

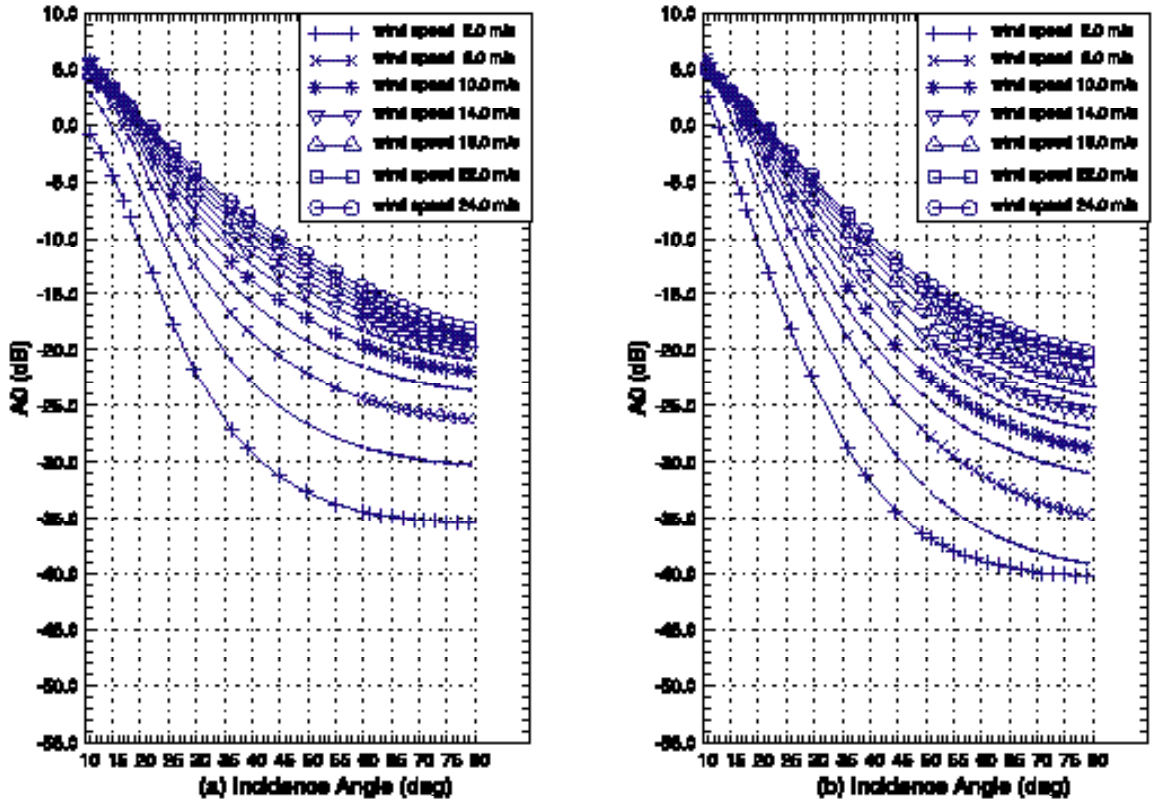

Fig. 10 : Mean values (A_0 Fourier coefficient) of (a) NN-GMF-V and (b) NN-GMF-H versus the incidence angle at different wind velocity. These values are given in dB.

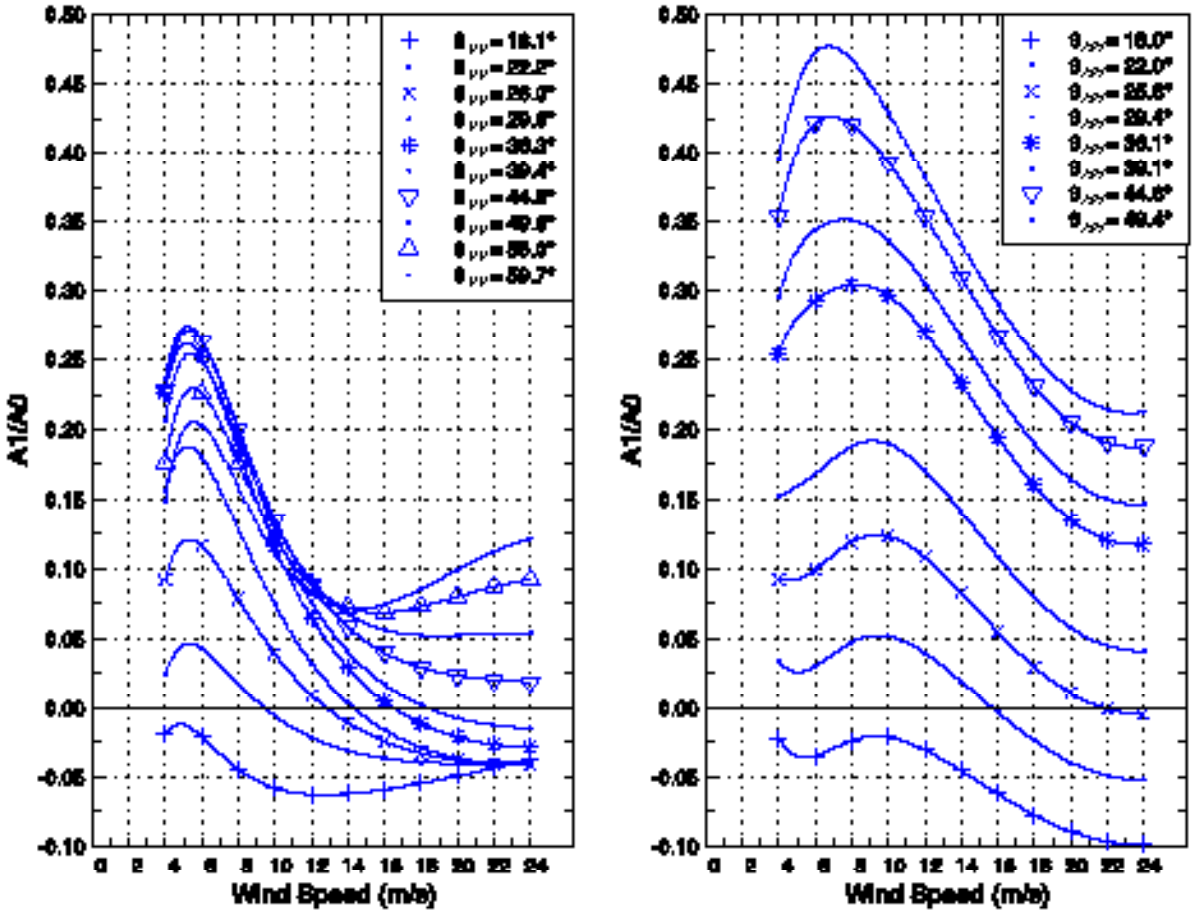

Fig. 11 : Up-wind minus down-wind values (A_1 Fourier coefficient) of (a) NN-GMF-V and (b) NN-GMF-H versus wind velocity at different incidence angles. All these values are given in linear scale.

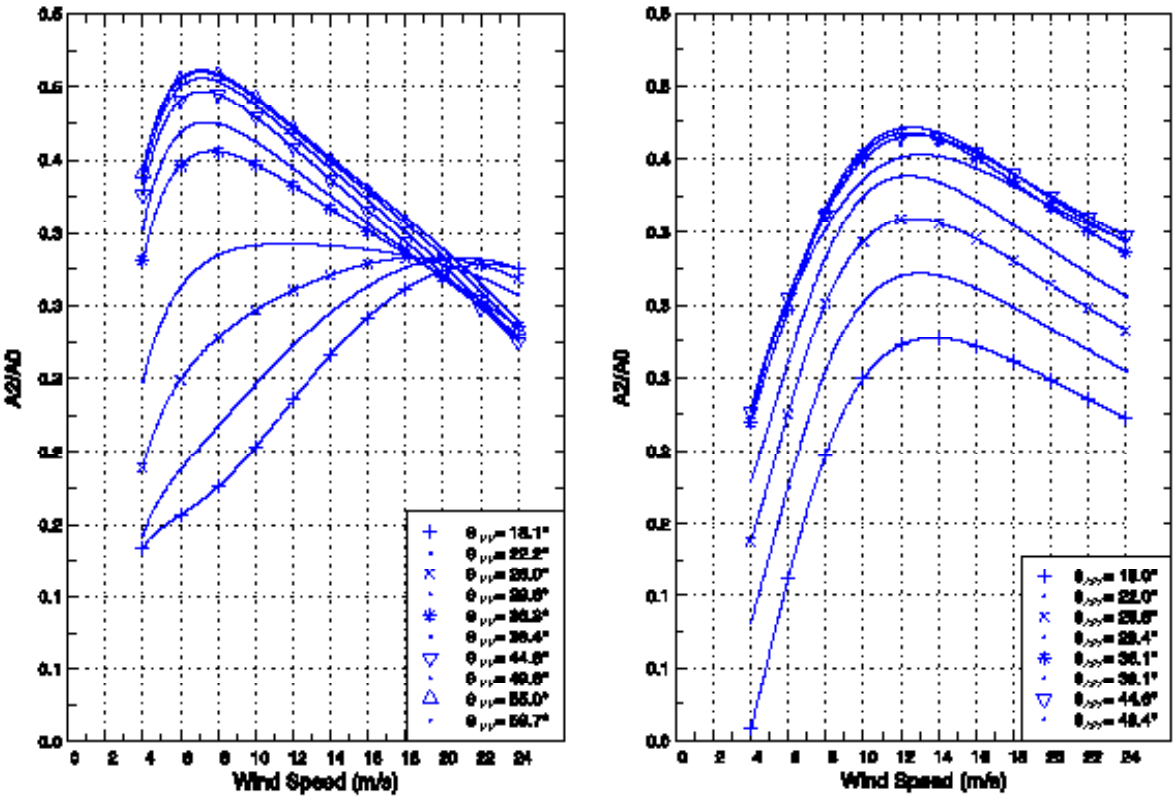

Fig. 12 : Up-wind minus cross wind values (A_2 Fourier coefficient) of (a) NN-GMF-V and (b) NN-GMF-H versus wind velocity at different incidence angles. All these values are given in linear scale.

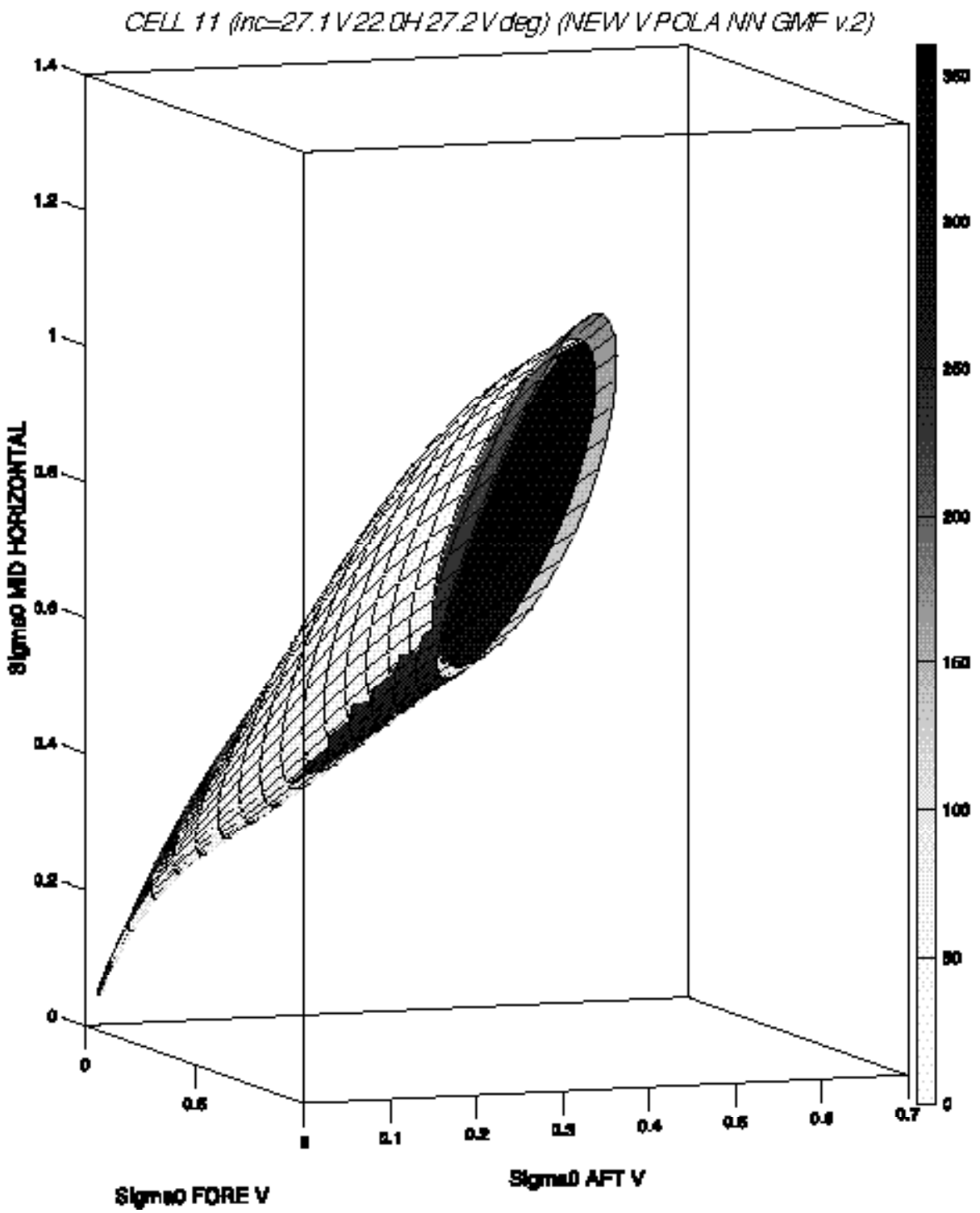

Fig. 13 **:** Three-dimensional view of a NN-GMF surface corresponding to wind vector solution in the sigma-0 space (σ^1, σ^2, σ^3), where σ^1 and σ^3 correspond to the vertical polarization at an incidence angle of 27° (fore and aft beams respectively) and σ^2 to the horizontal polarization at an incidence angle of 22° (mid beam).

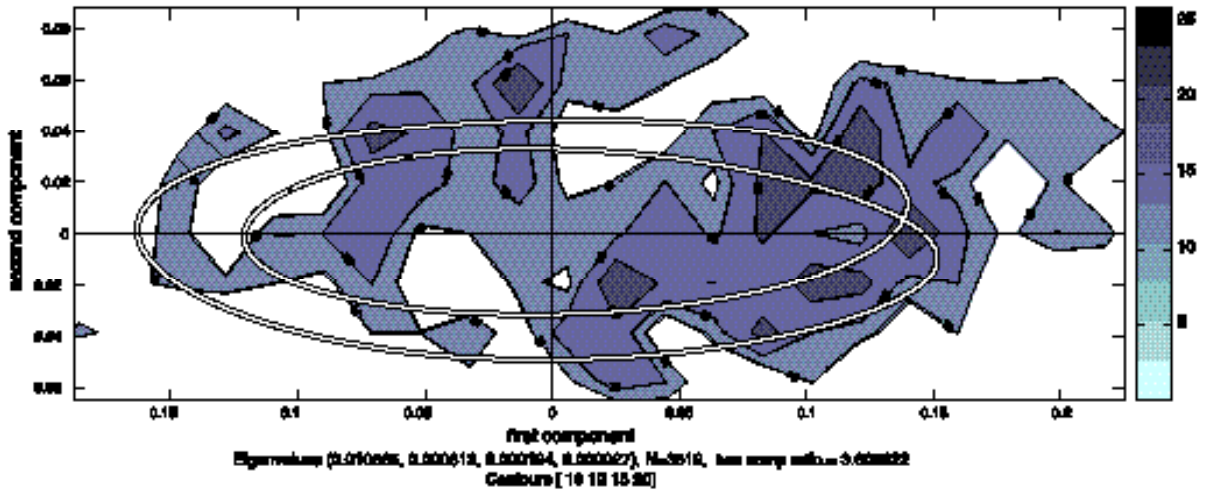

Fig 14 : Simplified projection of the NSCAT cone in the V.V.H. V space against the data corresponding to a wind speed of 8 ms^{-1} and incidence angles of 27°, 22°, 22° and 27°. The darker the shade, the denser the measurements. The scale is given in thousands of points.

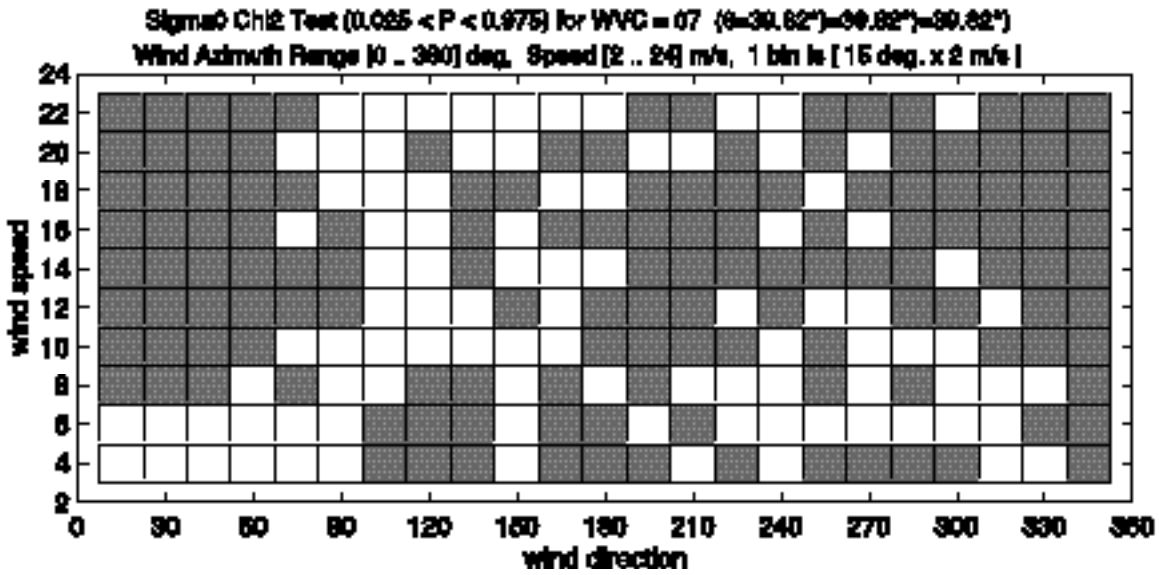

Fig. 15: Chi-2 Test for the NN-GMF-V at an incidence angle of 36° with respect to the wind azimuth and for different wind speeds. When the pixels are white, the test is satisfied with a confidence level of 95% (at a significance level of 5%).

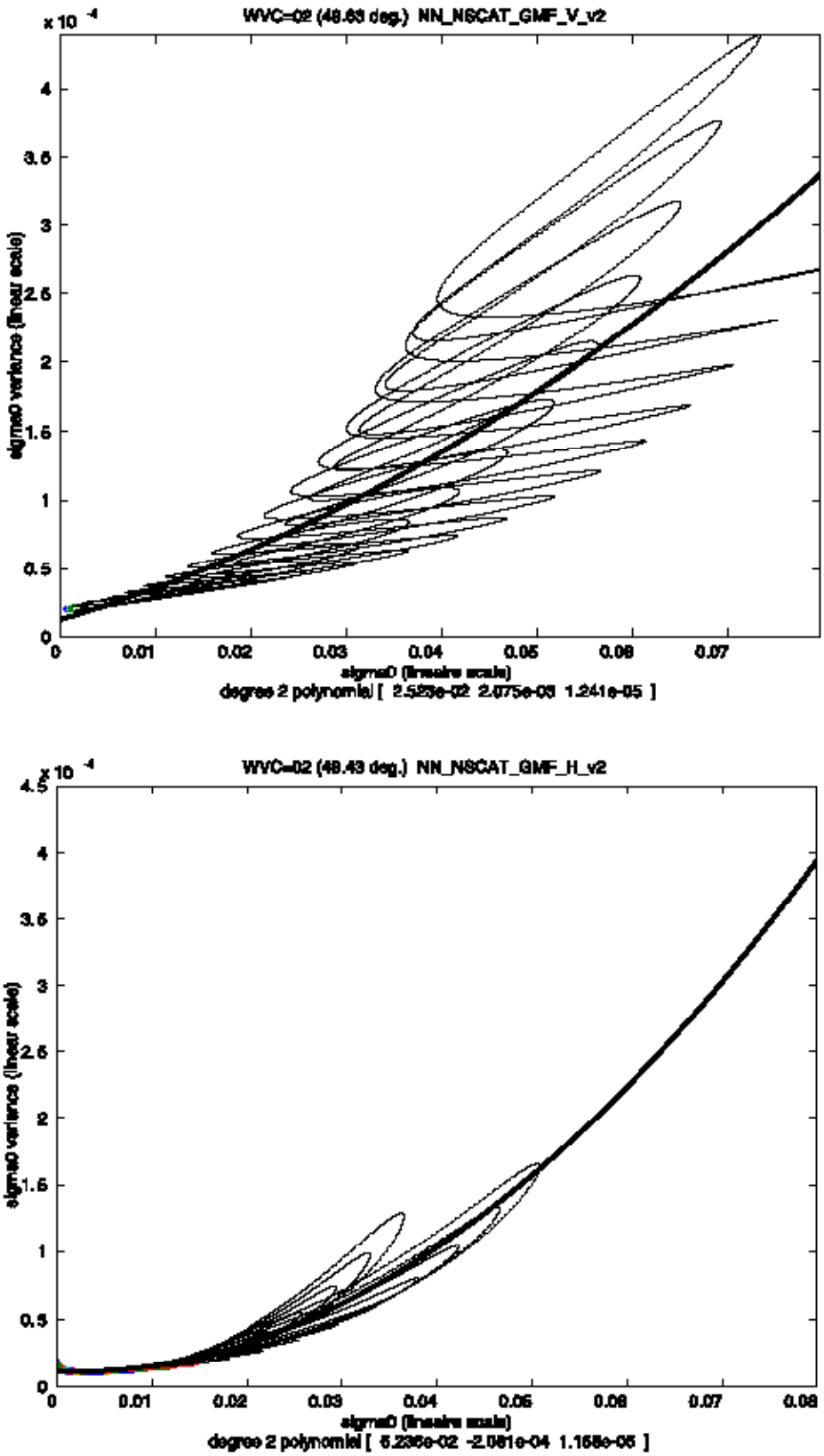

Fig. 16: (a) NN-VAR-V against NN-GMF-V, (b) NN-VAR-H against NN-GMF-H with respect to the wind speed at an incidence of 49°. The trend of the graph (heavy black line) of the NN-VAR relationship is quadratic and of the form of equation (3). The curly pattern of the curve (light line) is a function of the wind azimuth for different speed.

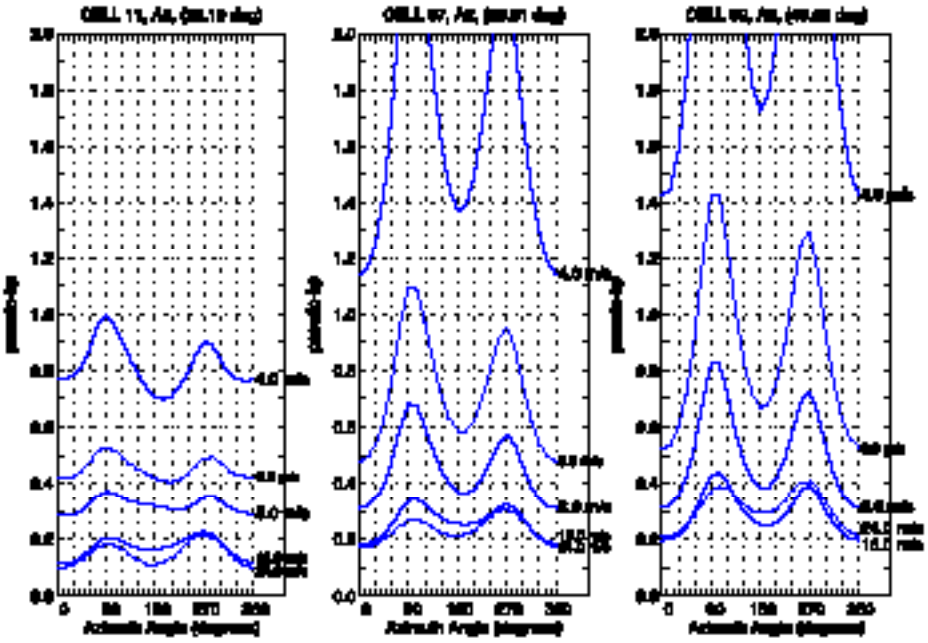

Fig 17 : Signal to noise ratio (so called Kp) corresponding to NN-GMF-V at three different incidence angles (22°, 36°, 49°) with respect to the azimuth angle and at different wind speeds.

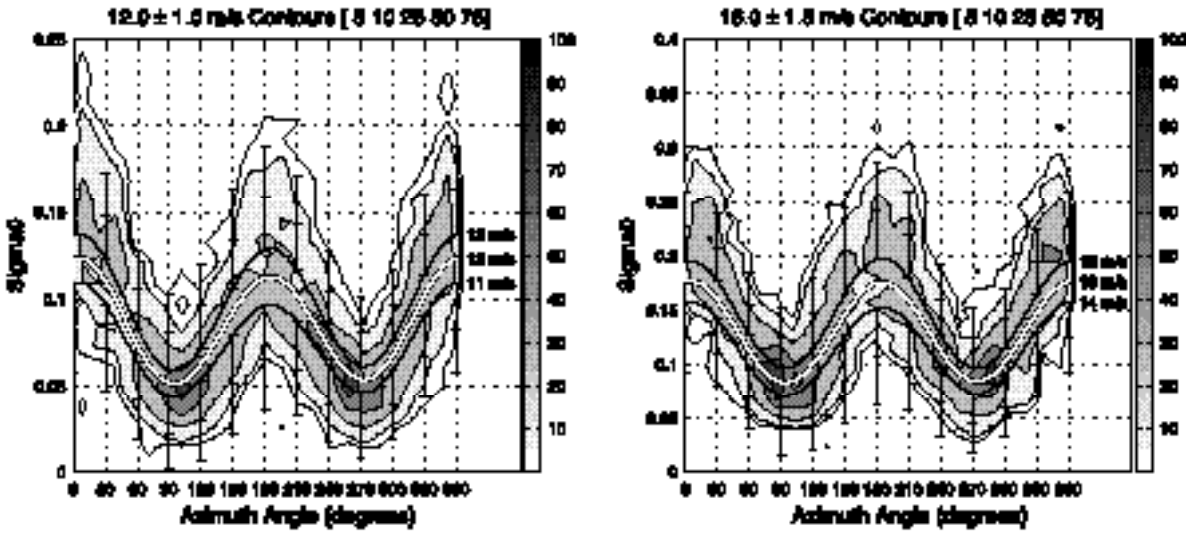

Fig 18 :NN-GMF-V values for different wind speeds (white and black curve) with respect to the azimuth angle for wind speed ranges of $12ms^{-1} \pm 1ms^{-1}$ and $14ms^{-1} \pm 2ms^{-1}$ at an incidence angle of 36.1° against the NSCAT data. In the same figure we plot bars corresponding to one and two standard deviation for some azimuth angles, the standard deviation being derived from NN-VAR results. The darker the shade, the denser the measurements. The scale is given in thousands of points.