

## An Alternative Strategy for Correlation Surface Pattern Matching in the Meteosat Atmospheric Motion Vector (WV) Algorithm

On 1st Aug 2000 an alternative strategy for correlation surface pattern matching in the Meteosat Atmospheric Motion Vector (WV) algorithm was introduced operationally. It was applied to the WV part of the CMW (SATOB) and ELW (BUFR) products. It was also applied on the Clear Sky WV product. It is foreseen to assess its potential impact on the High Resolution WV product later this year.

### The Sum-of-Squares Distance Method

The method is a variation of a standard method (Euclidian distance, SSADM, Rank correlation...) tested during the so called "WV Wind Campaign" (Holmlund, 1995) and extensively during the 1st half of 2000. It is described by:

$$C = (1 - ( \text{Sum}_{ij}((t_{ij} - s_{ij})^2) ) / 255*255 )$$

where  $s_{ij}$  and  $t_{ij}$  are the counts for the search and target areas respectively in a 32 \* 32 pixel box  $i * j$ . Since this method is less cpu intensive than the cross correlation method, it is possible to calculate a value for every pixel position within the overlap of the search & target areas. The function returns a value between 0 and 1, where 0 is no correlation and 1 is full correlation.

### Validation

A validation of the Sum-of-Squares Distance Method showed an increased number of vectors, a more uniform field and a increased quality in terms of normalized vector RMS error (NRMS) compared with radiosonde observations, in particular for the clear sky winds.

An increase of 5-10% in number of winds for the WV part of the ELW product was experienced. For the clear sky vector field (WVW) the corresponding figures are 10-20% during night and 30-40% during daytime. The impact on the NRMS was generally more positive for winds with AQC score between 0.3 and 0.8, than for the best winds with AQC score > 0.8. A somewhat negative impact could be seen only for clear sky vectors below 400 hPa. A slight increase in (negative) speed bias, is subject of ongoing analysis.

### References

Holmlund, K., 1995: Half hourly wind data from satellite derived water vapour measurements. *Adv. Space Res.*, **16**, 1059-1068.