Feasibility of Simultaneous Ocean Wind and Current Measurements.


Feasability of combining ocean wind and current:
- Scatterometry provides wind vectors relative to a moving ocean surface. Ocean motion knowledge is needed to retrieve absolute wind vectors
- SAR ocean surface motion vector processing needs prior wind knowledge
- combining both measurement will have significant advantages
  - It gives the relation between absolute and relative winds
  - It may be easier to solve the scatterometer ambiguity problem
  - more accurate SAR current retrieval may be possible

1. Objectives
DOPSCAT aims at assessing the potential of scatterometer instruments for sea surface current retrieval. The objectives are twofold:
- To obtain some preliminary new results from existing scatterometer data capitalizing on new signal processing techniques;
- To propose an optimized scatterometer concept maintaining the good directional NRCS detection performances and coverage for wind vector retrieval but, at the same time, allowing Doppler shift estimation with sufficient accuracy for surface current measurement.

3. DC estimation
The Doppler Centroid (DC) has been estimated over 3 full EWIC cycles. and at a temporal resolution of 12-24 hours.

4. First ERS-2 Doppler results
the ERS-2 Doppler signal has been extracted from the side beam I/Q data for 3 EWIC cycles (a total of 26 days of data). Detrending using the reference DC functions has been applied.

5. Plans
Next steps will be:
- The cdop GMF will be used to remove the effect of wind on the DC signal.
- New algorithms will be explored to allow using the Doppler information in the scatterometer wind inversion procedure, based on simulations, rather than using the ERS-2 results.

Conclusions
First Doppler estimates from ERS-2 data have been obtained at a coarse resolution. Simulation studies are underway to test scatterometer Doppler capability on future systems.

Bibliography