Targeting Near-Coastal Regions for Scatterometer Wind Retrieval Processing

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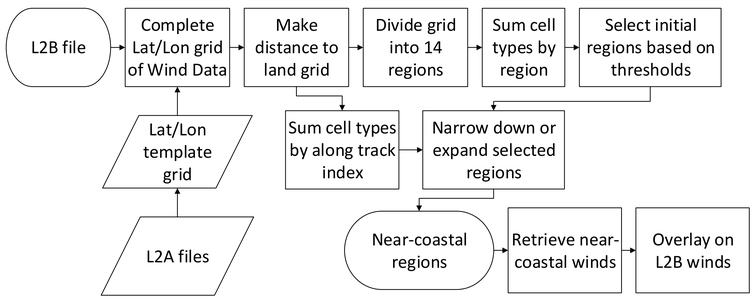
Introduction

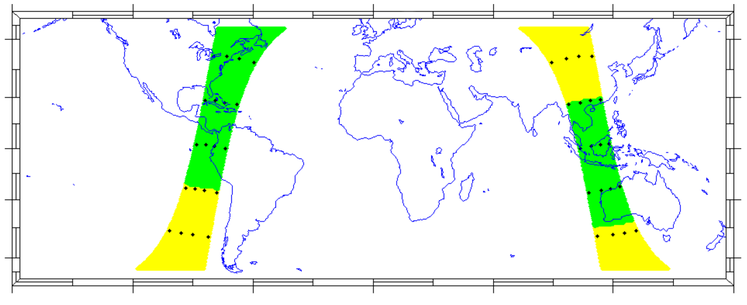
Microwave scatterometers, which use radar backscatter measurements from satellites to infer wind vectors near the ocean's surface, have the ability to monitor global wind speeds at high resolutions. Such data is used for weather forecasting and climate research. However, scatterometer observations over the ocean can be contaminated by land proximity.

Current wind retrieval methods do not use measurements within 30 km of the coast (about 10.6 million square kilometers worldwide) in the data set. This data loss can be ameliorated by a recently developed algorithm that can measure winds within 5 km of the coast[1]. Areas near land can be systematically targeted for special processing using information from L1B and L2B data, providing valuable near-coastal wind data. The effectiveness of the targeting method on a global scale is demonstrated with QuikSCAT winds.

Methodology

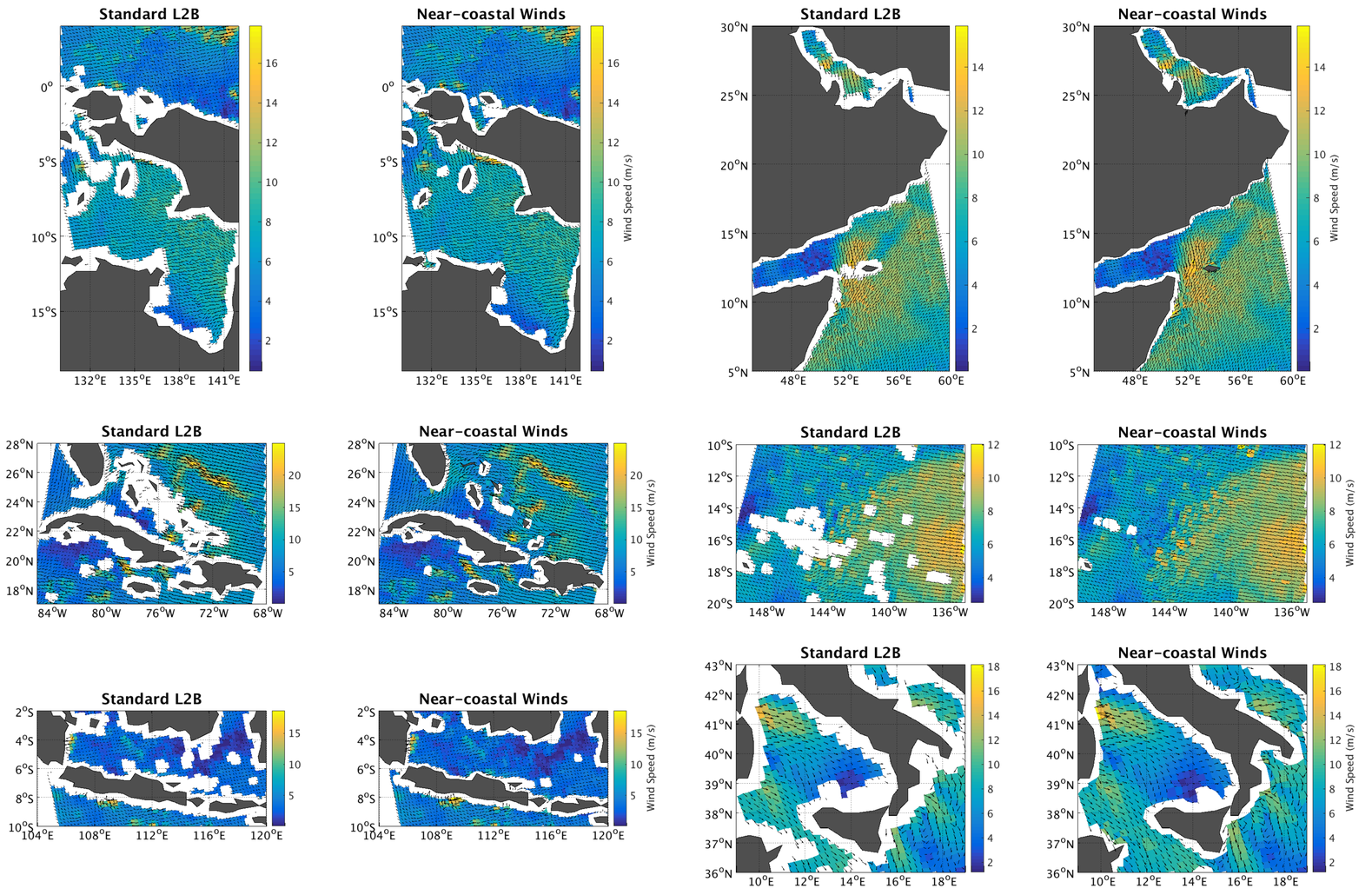


Near-Coastal Regions



Graphical representation of the two stage near-coastal region identification, showing the swath (yellow and green), the 14 regions (divided by black dotted lines) and the near-coastal regions (green). Samples from this example (Caribbean, Java Sea) have had winds retrieved and are shown on this poster.

Near-Coastal Winds Compared to Standard L2B



Standard L2B winds compared to L2B winds overlayed with near-coastal winds for 6 different regions, clockwise from top left: Arafura sea, Arabian Sea, French Polynesia, Italy, Java Sea, Caribbean. Wind vectors for QuickSCAT L2B winds follow oceangraphic convention and are on a 25 km grid. For overlayed winds, wind vector cells are irregularly spaced as a consequence of averaging the latitude and longitude of all the samples in each cell.

Near-Coastal Wind Processing

Near-coastal wind processing is achieved by leaving only data actually contaminated by land unused, making it possible to produce more 25 km wind vector cells more accurate and closer to the coast than before[1]. This research works to make large-scale coastal wind studies using scatterometer winds more feasible.

Work has been done to expand the utility of near-coastal wind retrieval to other scatterometers, such as OSCAT and ASCAT.

References

[1] M. Owen and D. Long, "Land-Contamination Compensation for QuikSCAT Near-Coastal Wind Retrieval," *Geoscience and Remote Sensing, IEEE Transactions on*, vol. 47, no. 3, pp. 839–850, 2009.

Check out our on-going work on coastal winds including calibration and validation at www.spc.byu.edu and www.mers.byu.edu