Study on the Oceanic Phenomena using PALSAR on board ALOS

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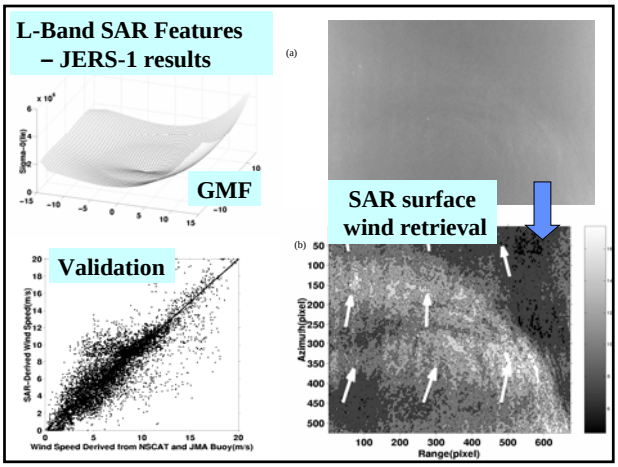
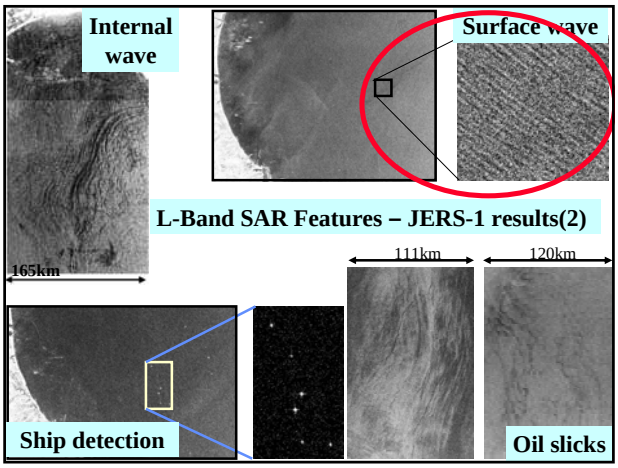
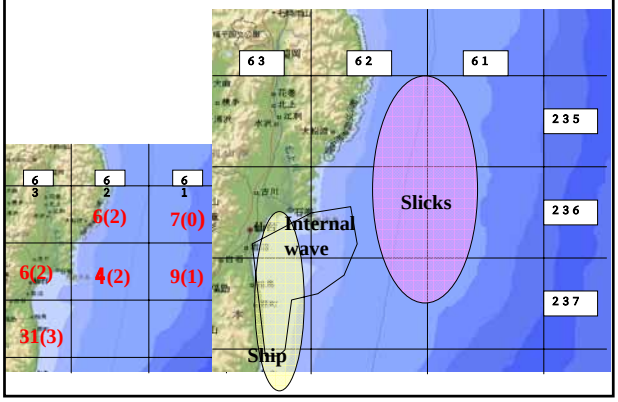
L-Band SAR Features – JERS-1 results





SAR monitoring of the Sendai Bay



C-band Surface wave retrieval

Coastal wave gauges for validation

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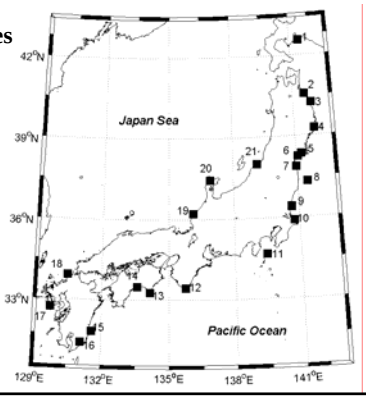
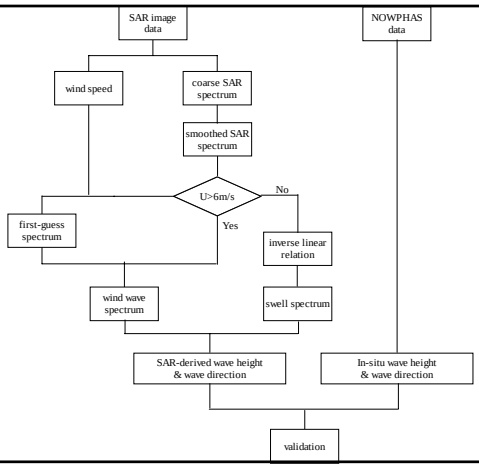
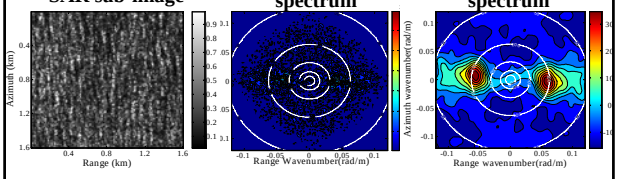




SAR sub-image

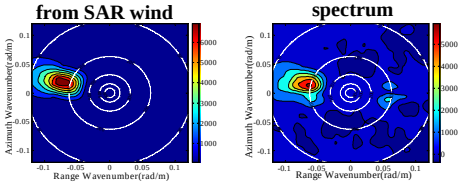
Original SAR spectrum

Filtered SAR spectrum

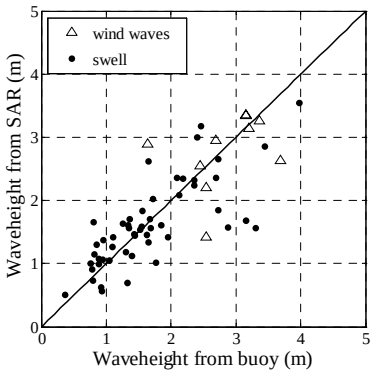


First guess spectrum constructed from SAR wind

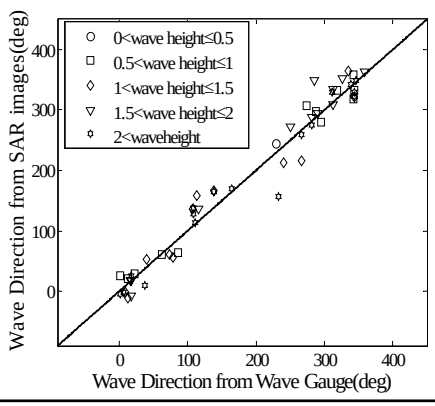
Retrieved wave spectrum



Validation – Significant wave height



RMSE=0.92m



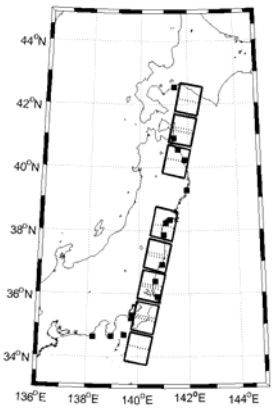


Figure 1 Locations of PALSAR images along an ALOS pass on ** August 2006. Wave-gauge positions near the Japanese Pacific coast are also indicated.

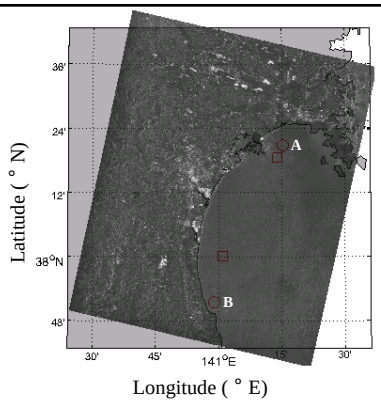


Figure 2 A SAR scene imaging the Sendai bay.(No.6 in Table 1). The circles and squares indicate the position of wave gauge and the center of sub-images coupled with the gauge records. A: Ishinomaki station, and B: Soma station.

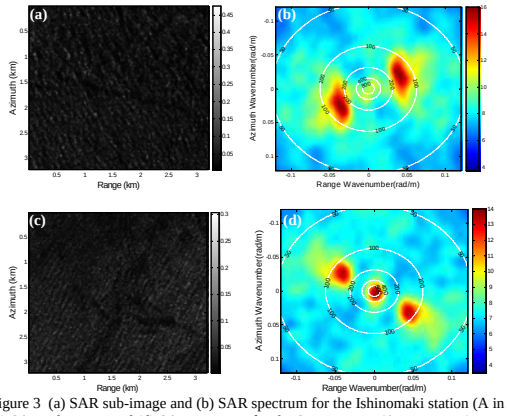


Figure 3 (a) SAR sub-image and (b) SAR spectrum for the Ishinomaki station (A in Figure 2). (c) SAR sub-image and (d) SAR spectrum for the Soma station (A in Figure 2).

Wave direction

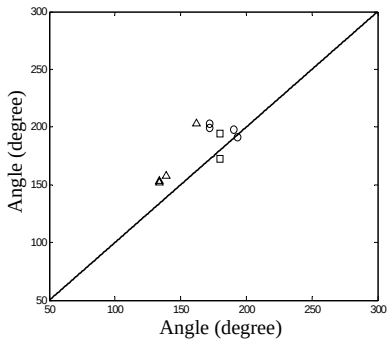


Figure 4 Comparison of the SAR-derived and in situ wave directions. (The averaged angle error is 20.7 degree)

Significant wave height

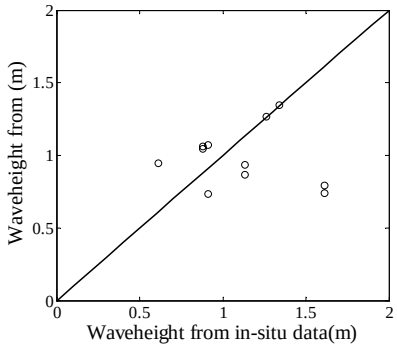


Figure 5 Comparison between the SAR-derived and in situ wave heights.

Conclusions

A preliminary study has been conducted for retrieval of the coastal surface waves near the Japanese coasts.

1) A scheme of the ALOS/PALSAR (L-Band SAR) surface wave retrieval was developed on the basis of C-Band SAR wave retrieval scheme.

2) Using the SAR images of a pass along the Japanese Pacific coast, the SAR-retrieved wave height are retrieved in the coastal seas near the coastal wave gauges. The comparison shows that the L-Band SAR has high potential in the retrieval of surface wave height.

3) We need further R&D for high-accuracy surface wave retrieval.