British Colombia

- Knight Inlet
- Strait of Georgia
- Strait of Juan de Fuca

Overview

Knight Inlet, the Strait of Georgia and the Strait of Juan de Fuca are all shallow inshore waterways along the Pacific Coast of British Columbia. The latter two helping to separate Vancouver Island from the North American mainland. Each exhibit strong density gradients conducive to the generation of internal waves.

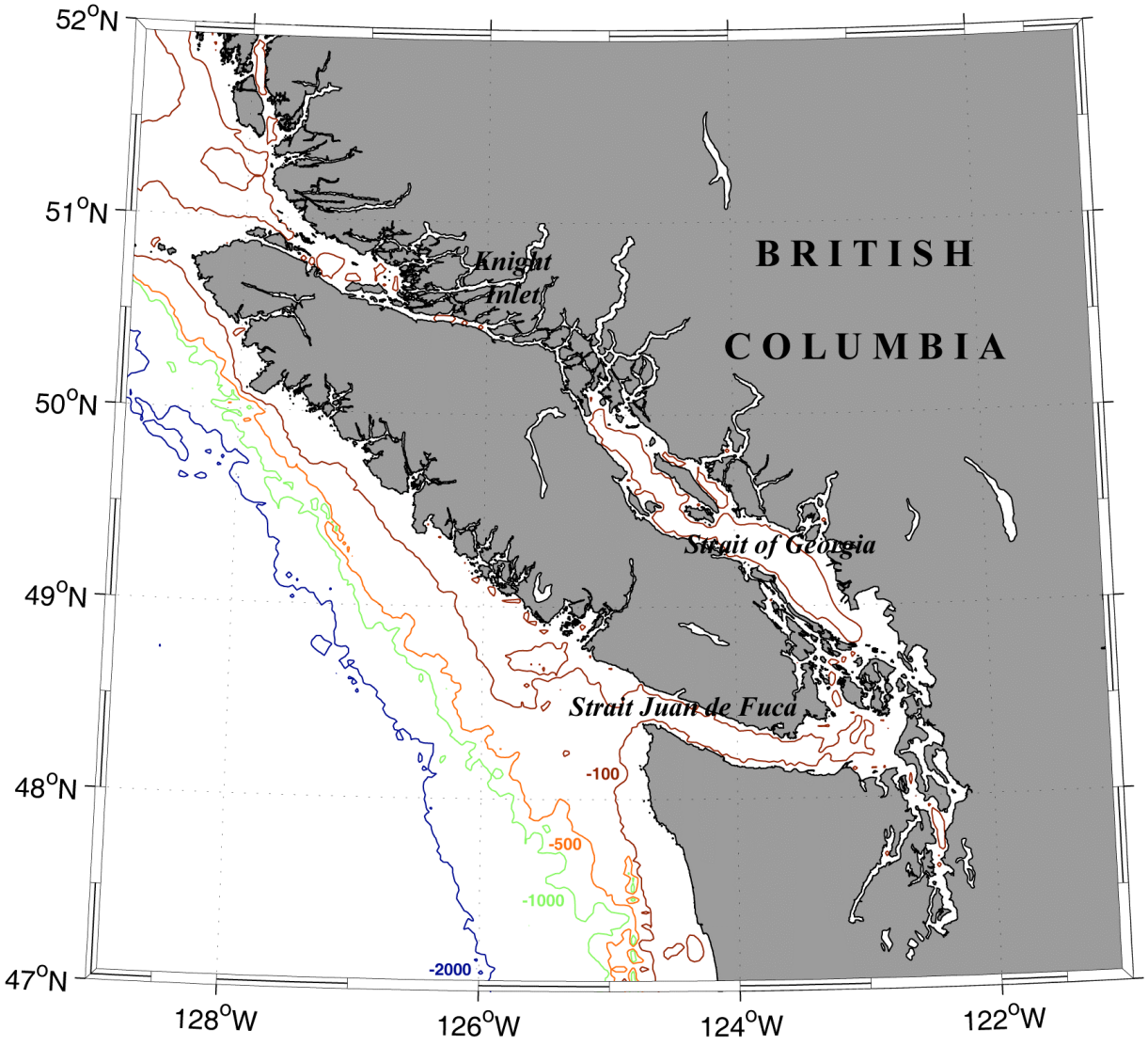


Figure 1. Bathymetry of around British Colombia [Smith and Sandwell, 1997]

Observations

There has been some research done on the internal waves occurring in Knight Inlet, the Strait of Georgia and the Strait of Juan de Fuca. Farmer and Armi [1999] took measurements in Knight Inlet to examine solitary wave generation mechanisms. The observed solitons had peak-to-trough amplitudes of 5 to 10 meters, with lead soliton separation wavelength of 100 meters and speeds of approximately 0.5 m/s.

Several combined in situ and imagery experiments have been carried out in the Strait of Georgia [Hughes and Gower, 1983; Hughes and Dawson, 1988] although the focus of these were the mechanism of internal imaging by SAR and not the internal wave properties themselves. Gargett [1976] reports that internal waves are common in the Strait of Georgia and are the result of strong lee-wave patterns produced by tidal flow though the bordering passes.

Table 1 - Months when internal waves have been observed around British Colombia
(Numbers indicate unique dates in that month when waves have been noted)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
					1	3	6				

References

Farmer, D., and L. Armi, 1999: The generation and trapping of solitary waves over topography. *Scienc*e, **283**, 188-190

Hughes, B.A., and J.F.R. Gower, 1983: SAR imagery and surface truth comparisons of internal waves in Georgia Strait, British Columbia. *J. Geophys. Re*s., **88 (C3)**, 1809-1824.

Hughes, B.A., and T.W. Dawson, 1988: Joint Canada-U.S. Investigation Project: An Overview of the Georgia Strait Experiment *J. Geophys. Re*s., **93 (C10)**, 12219-12234.

Gargett, A. E. 1976: Generation of internal waves in the Strait of Georgia, *Deep Sea Res.*, **23**, 17-32

Smith, W. H. F., and D. T. Sandwell, 1997; Global seafloor topography from satellite altimetry and ship depth soundings, *Science*, v. **277**, 1957-1962
http://topex.ucsd.edu/marine_topo/mar_topo.html

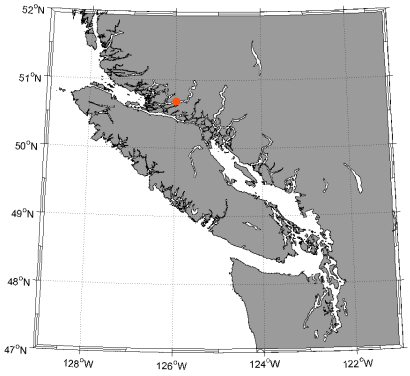
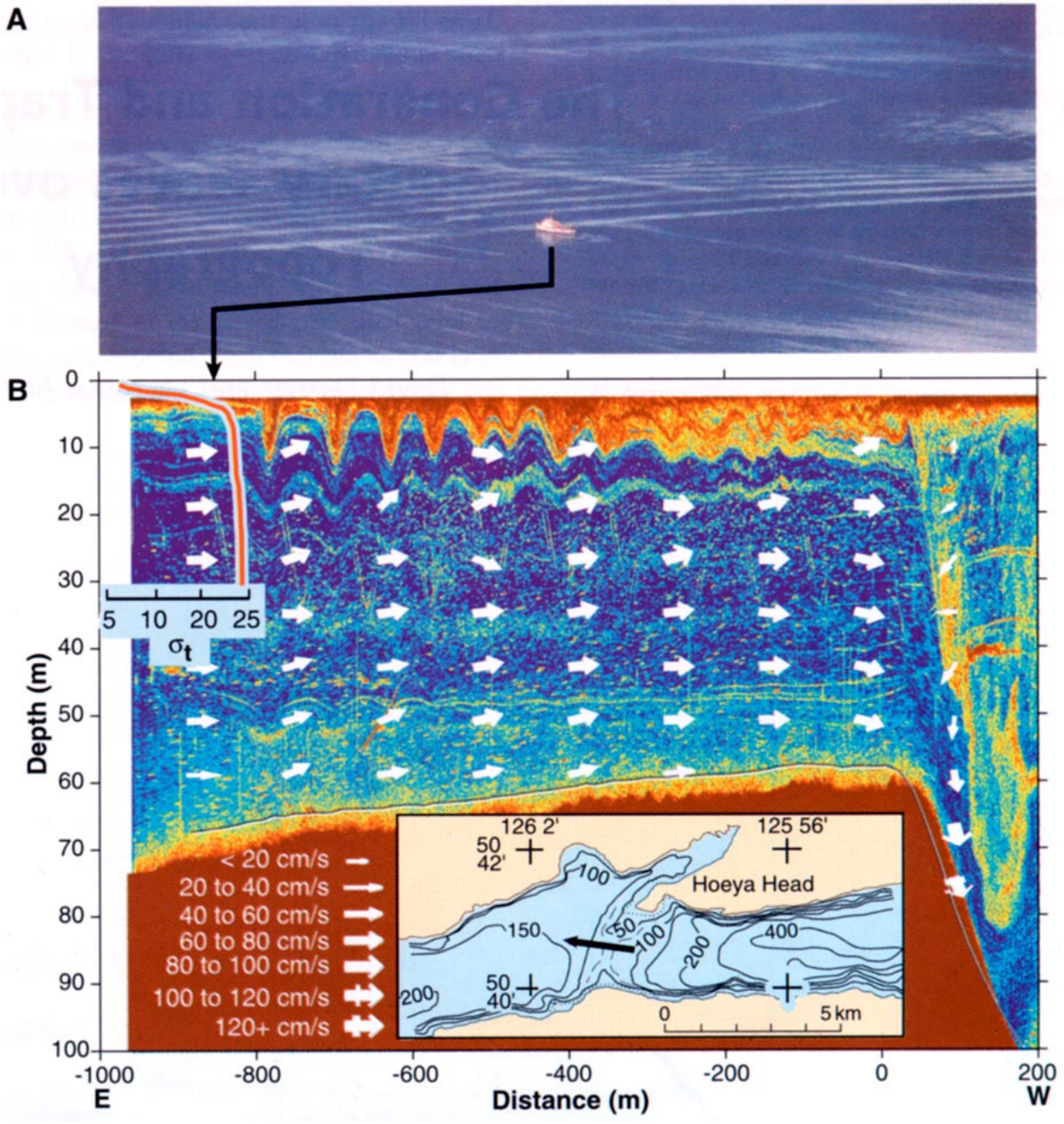
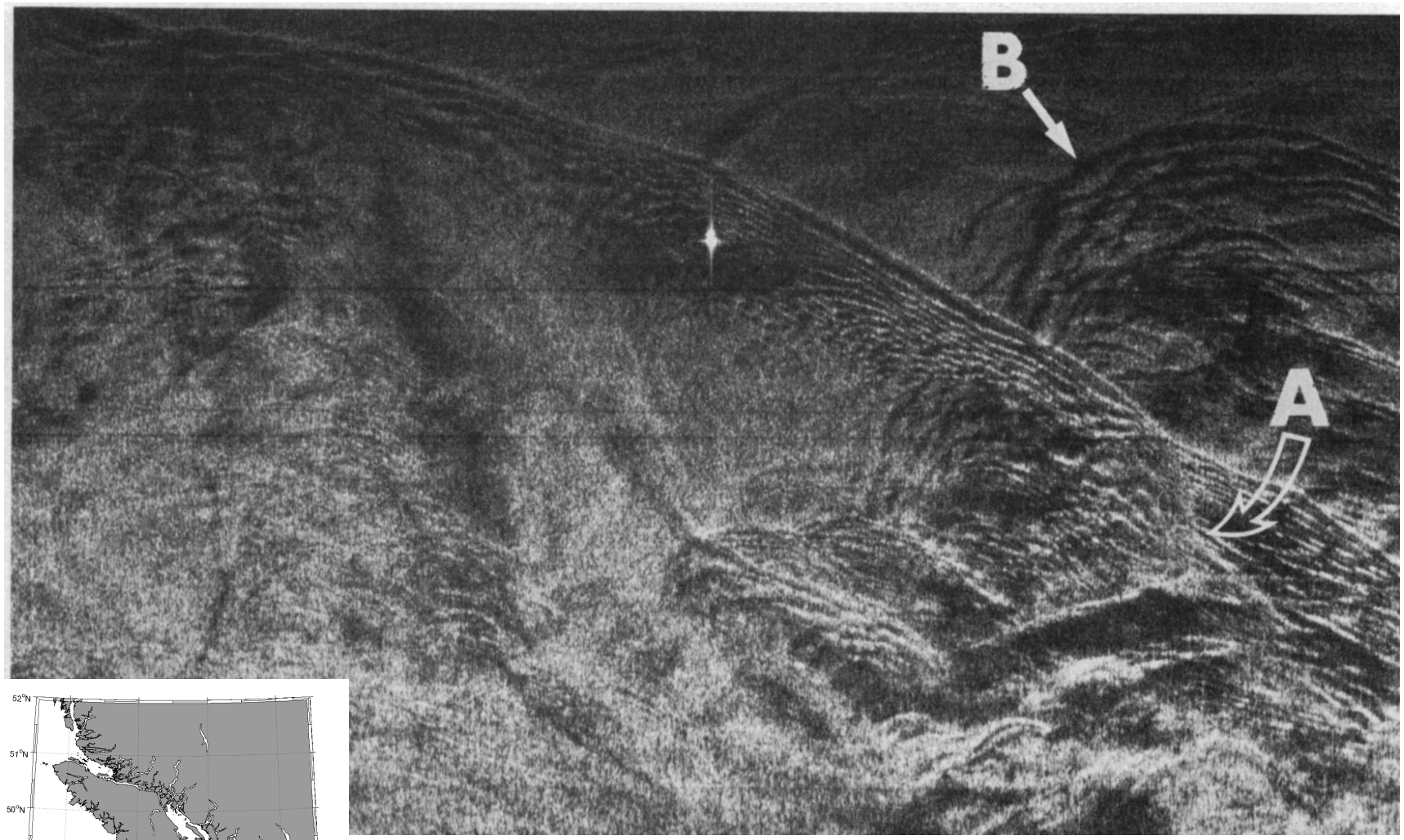


Figure 2. (A) Photograph of Canadian ship *Vector* traversing packet of solitons in Knight Inlet, B.C. on 28 August 1995 at 0121 UTC. (B) Corresponding current vectors and acoustic profile during height of tidal flow. Ship direction is with current. Solitons appear to have been generated before release of downstream pycnocline depression. [From Farmer, D., and L. Armi, 1999]





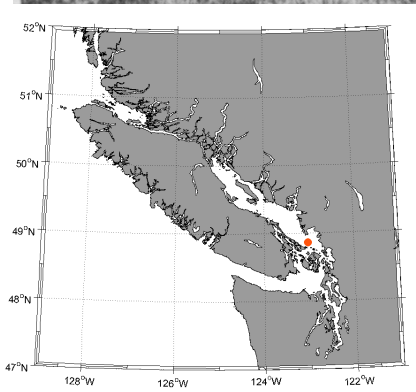


Figure 3. SAR-580 aircraft (L-band, HH) SAR image of the Strait of Georgia acquired on 30 July 1978 at 0346 UTC. The image shows the CFAV Endeavour (white dot, top center) amidst internal waves (see photograph Figure 4). [After Hughes and Gower 1983]

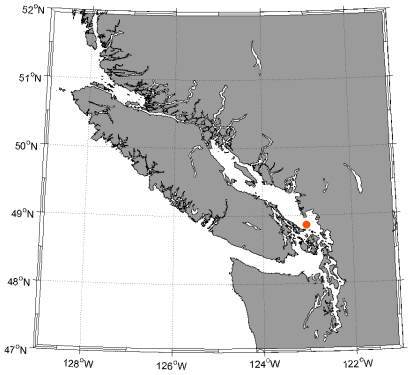
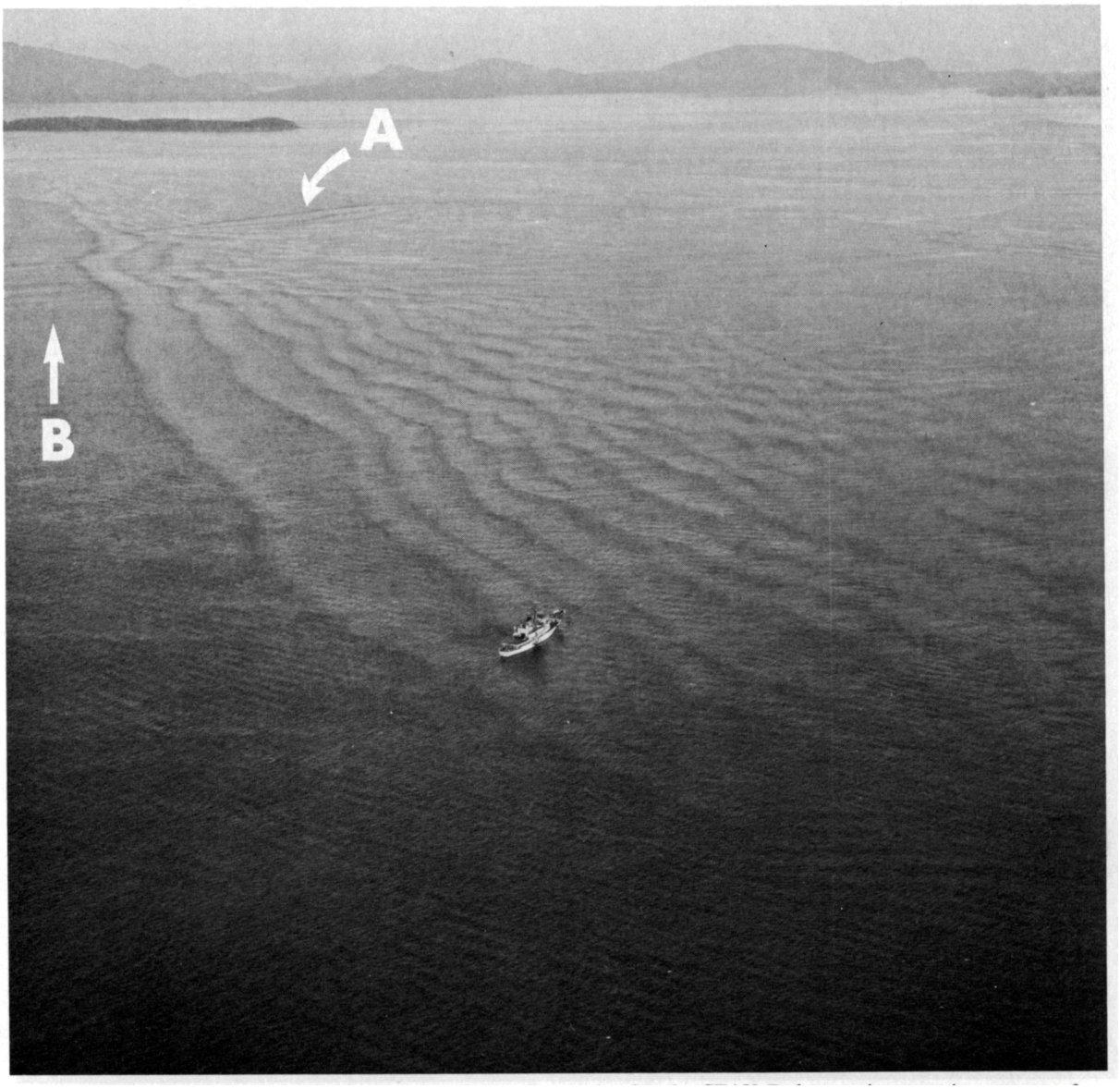


Figure 4. Helicopter photograph showing the CFAV Endeavour entering a group in internal waves in the Strait of Georgia. The image was acquired on 30 July 1978 at 0338 UTC from an altitude of 305 meters. The view is approximately to the southeast. [After Hughes and Gower, 1983]



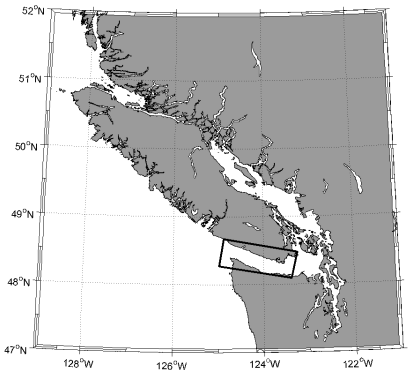
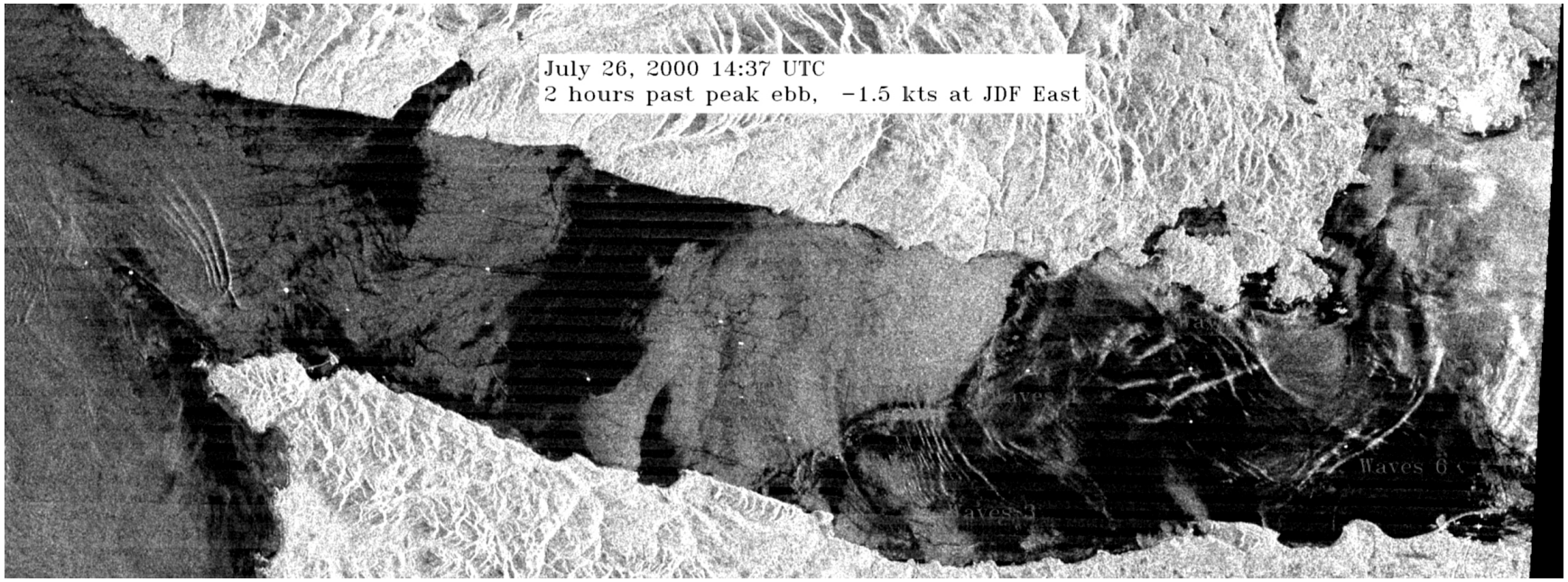
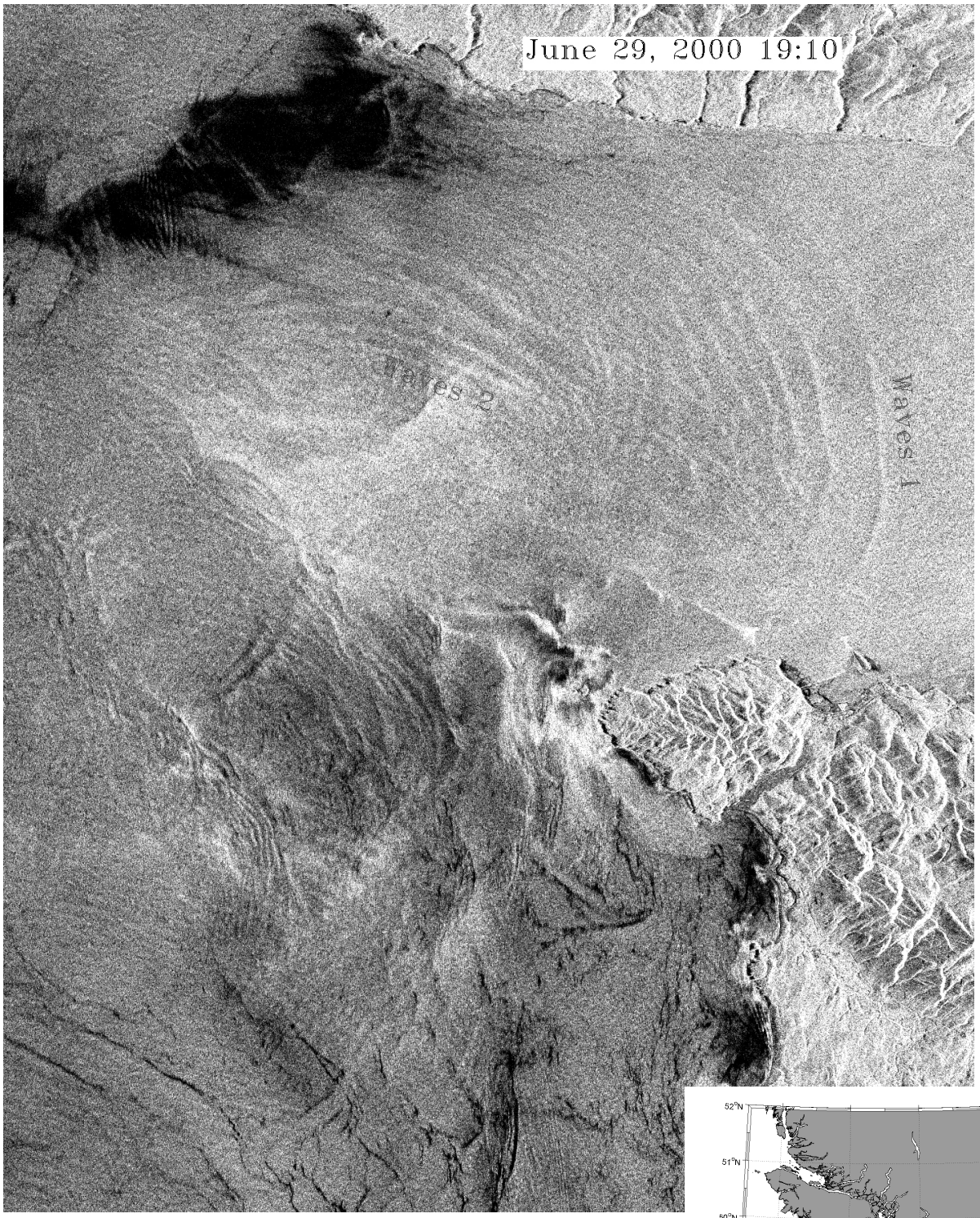


Figure 5. RADARSAT-1 (C-band, HH) ScanSAR Wide B image of the Juan de Fuca Strait acquired 26 July 2000 at 1437 UTC. The image shows internal wave packets at both the mouth and the east end of the Strait. Imaged area is approximately 125 km x 45 km. ©CSA 2000 [Image courtesy of Dr. Kathleen A. Edwards, The Applied Physics Laboratory at the University of Washington, Seattle Washington. Data processed at the Alaska Satellite Facility]





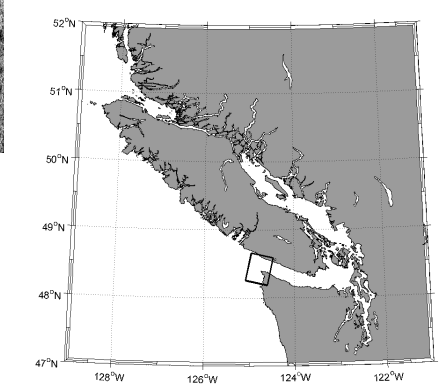


Figure 5. ERS-2 (C-band, VV) SAR image of the western end of the Juan de Fuca Strait acquired on 29 June 2000 at 1910 UTC (orbit 27150, frame 2637). The image shows internal wave packets entering the Strait as well as waves generated at the continental shelf break. Imaged area is approximately 100 km x 100 km. ©ESA 2000 [Image courtesy of Dr. Kathleen A. Edwards, The Applied Physics Laboratory at the University of Washington, Seattle Washington. Data processed at the Alaska Satellite Facility]

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