Georges Bank - Gulf of Maine

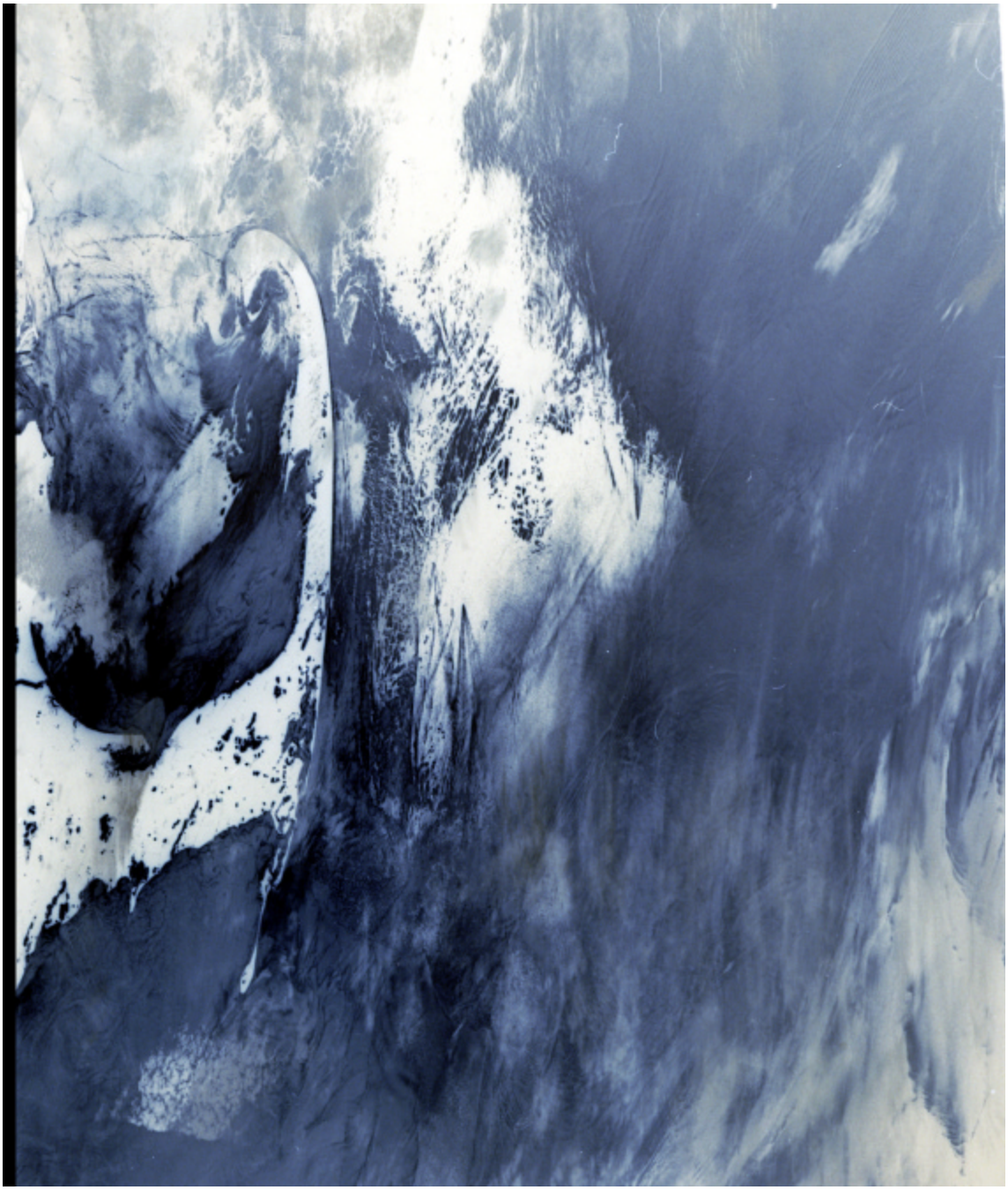


Figure 1. Space Shuttle Photograph (STS085-743-D) acquired in August 1997. Internal wave signatures can be seen in Cap Cod Bay, below the tip of Cape Cod, as well as in the Atlantic, east of Cape Code (top right, middle, and lower center). The sunglint image is color inverted to help highlight the internal wave signatures. Several ship wakes are also visible. Image Courtesy of Earth Sciences and Image Analysis Laboratory, NASA Johnson Space Center (http://eol.jsc.nasa.gov)

Figure 2. Radarsat C-Band HH SAR image collected Aug 13, 1998, GMT 22:24. Continental shelf generated solitons can be seen east and southeast of Cape Code. Internal wave signatures can be seen extending up into the Gulf of Maine. [Figure Courtesy of Don Thompson JHU/APL]

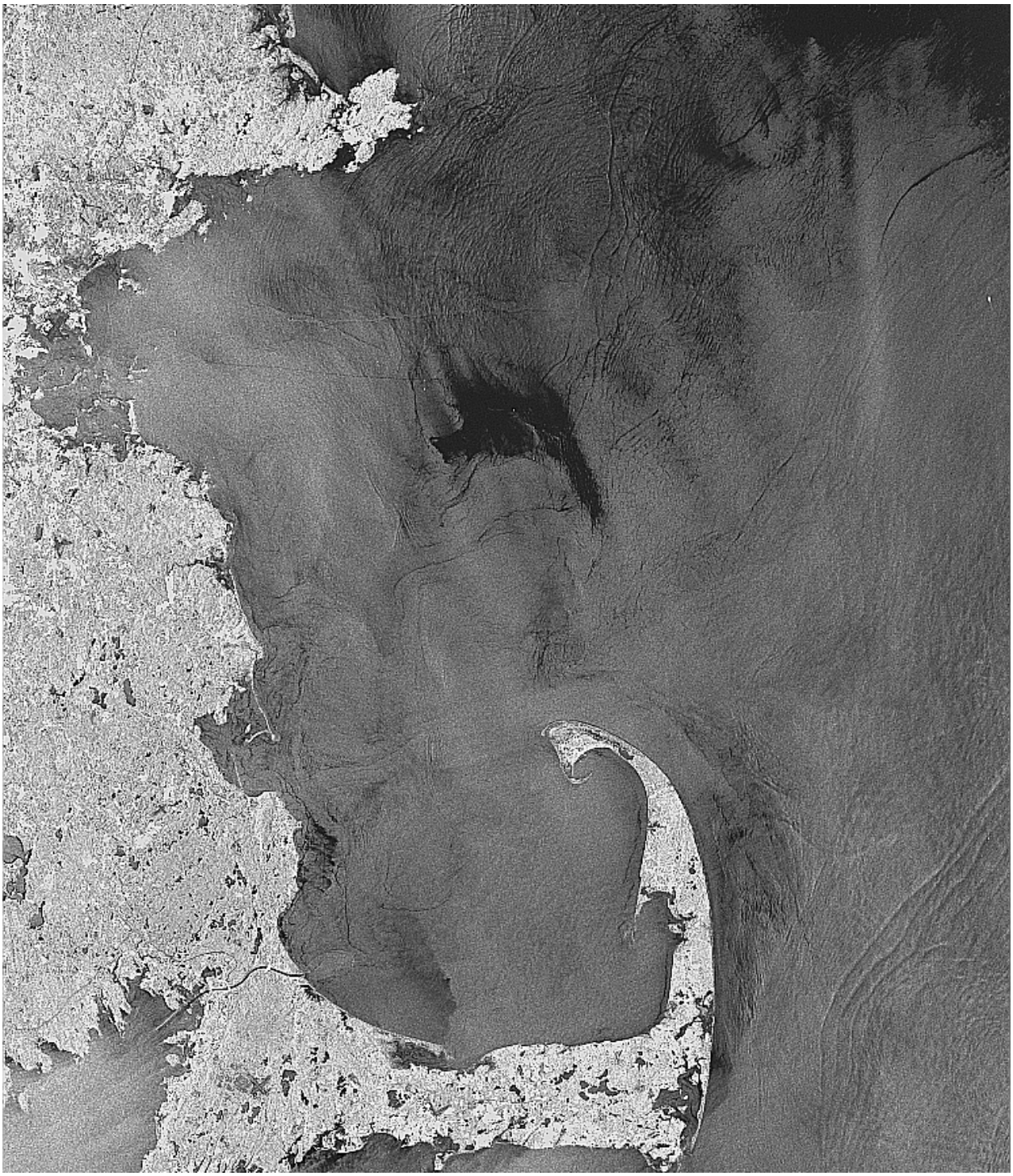


Figure 3. Radarsat C-Band HH SAR image collected September 13, 1998, GMT 22:24. Continental shelf generated solitons can be seen east of Cape Code. Smaller internal wave signatures can be seen in Massachusetts Bay and the Gulf of Maine generated by localized bathymetric variations. [Figure Courtesy of Don Thompson JHU/APL]

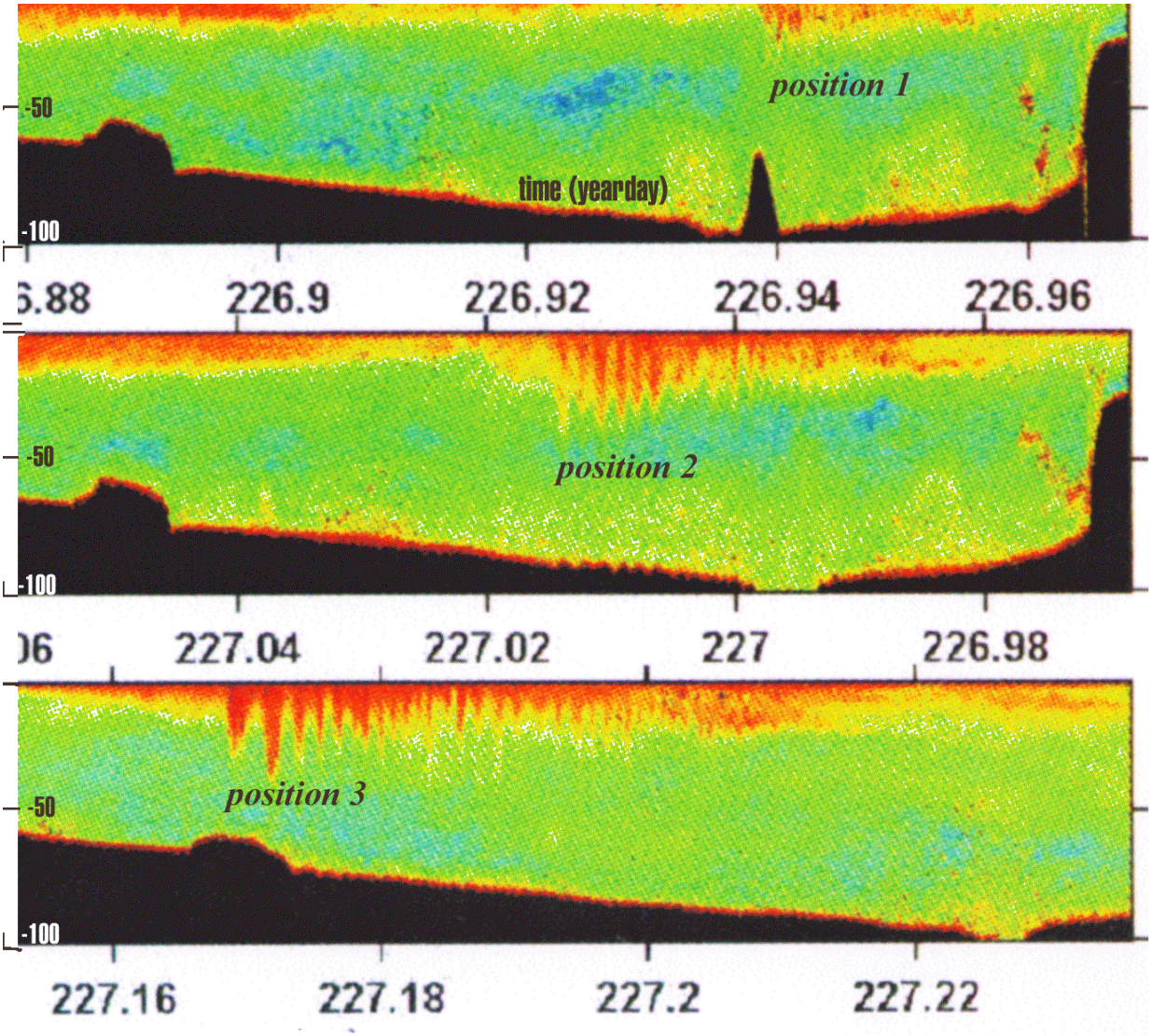
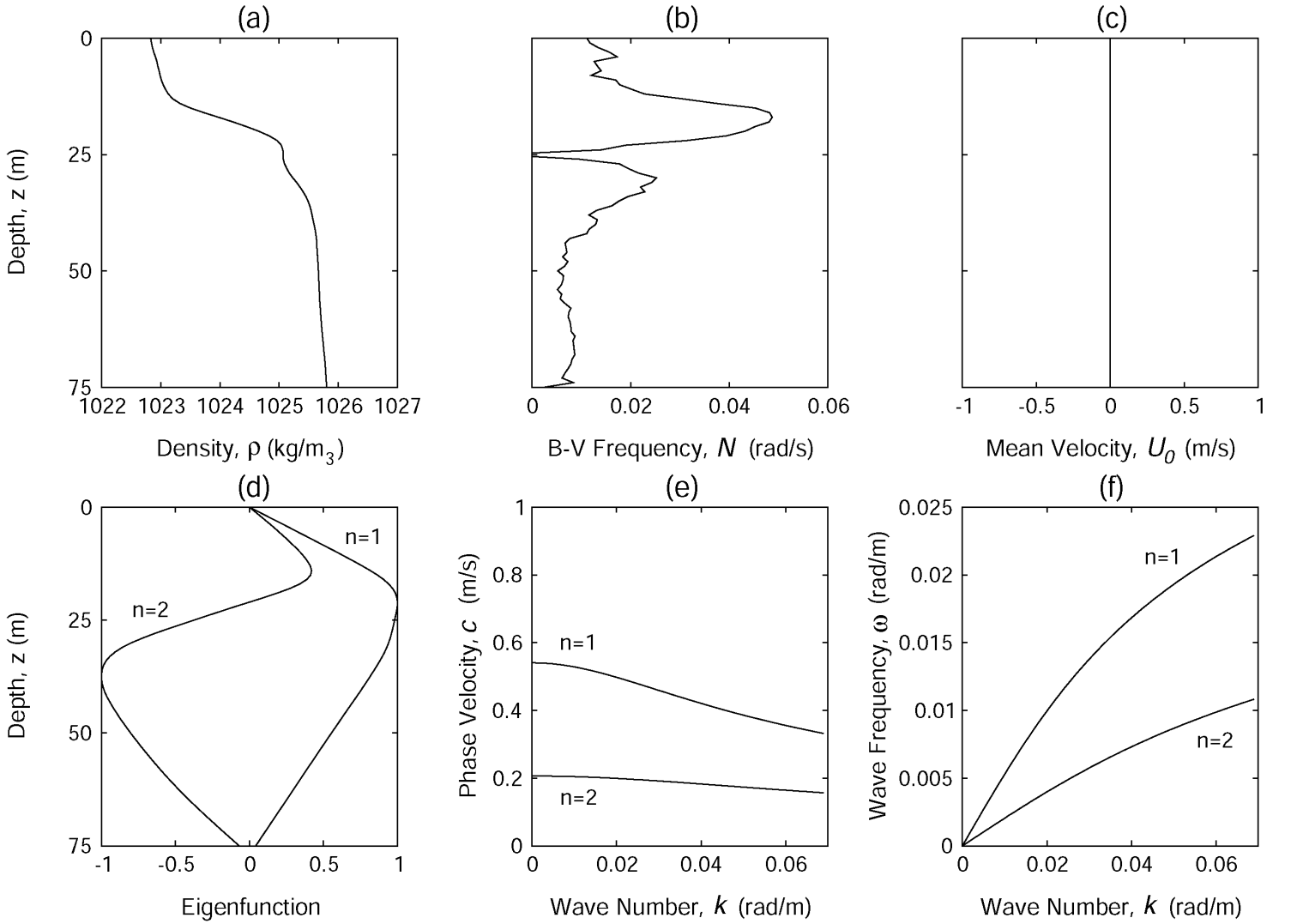


Figure 4. 420 kHz acoustic survey transect between Scituate, Massachusetts and Stellwagen Bank beginning August 14, 1999 (Yearday 226). The survey began slightly to the west of Stellwagen Bank in the top panel and the ship moved from east to west (right to left). The evolution of the internal wave packet is clealy visible. [From WHOI Cruise Report F/V Isabel S and R/V Connecticut Cruise NAGL-98-01B August 11-18, 1999. Courtesy of Tim Stanton, Mark Benfield and Peter Weibe]



KDV Parameters
Mode 1

Wave Speed (k = 0) c_0 (m/s)
0.54
Nonlinear coefficient $1/\alpha$ (m)
-18.5
Dispersion Factor $\gamma^{1/2}$ (m)
14.9
Amplitude (KDV theory) h_0 (m)
-1.5
Non-Linear Phase Velocity V (m/s) for (s^2=1)
0.57

Figure 5. a) Smoothed density profile derived from CTD cast collected on August 17, 1999 12:35 (local) at 42.31^0 N. latitude, 70.42^0 W. longitude, depth = 100 m near the acoustic survey transect shown in figure 4 (data courtesy of Mark Benfield) b) derived Brunt-Väisälä frequency *N*(z) c) zero flow current profile d) Normalized vertical eigenfunctions (mode 1 & 2) for $2\pi/k_0$ = 400m, H = 77 m for density and velocity profiles shown e) Phase Velocity f) Dispersion relations.

Related Publications

Brickman, D. and J.W. Loder, 1993: Energetics of the internal tide on northern Georges Bank. *J. Phys. Oceanog*r., **23 (3**), 409-424.

Chereskin, T.K., 1983: Generation of internal waves in Massachusetts Bay. *J. Geophys. Re*s., **88 (C4**), 2649-2661.

Halpern, D., 1970: Semidiurnal tides in Massachusetts Bay. *J. Geophys. Re*s., **7**6, 6573-6584.

Halpern, D., 1971: Observations of short period internal waves in Massachusetts Bay. *J. Mar. Re*s., **2**9, 116-132.

Haury, L.R., M.G. Briscoe and M.H. Orr, 1979: Tidally generated internal wave packets in Massachusetts Bay. *Nature*, **278 (5702**), 312-317.

Haury, L.R., P.H. Wiebe, M.H. Orr, and M.G. Briscoe, 1983: Tidally generated high frequency internal wave packets and their effects on plankton in Massachusetts Bay. *J. Mar. Re*s., **4**1, 65-112.

Scotti, A., and R. Beardsley, 2001: Large internal waves in Massachusetts Bay. Part 1: Modeling generation, propagation and shoaling. *J. Geophys. Re*s., submitted.

Trask, R.P., and M.G. Briscoe, 1983: Detection of Massachusetts Bay internal waves by Synthetic Aperture Radar (SAR) on SEASAT. *J. Geophys. Re*s., **88 (C3**), 1789-1797.