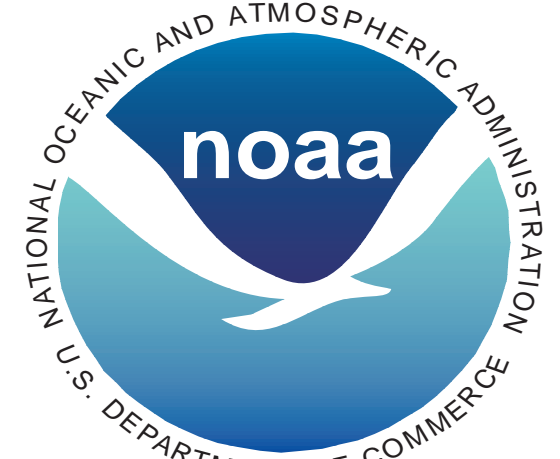


Along-Shelf and Cross-Shelf Flow on the GOA Shelf

P.J. Stabeno¹, N.A. Bond², N. B. Kachel², D.G. Kachel¹, N.B. Kachel²

³Pacific Marine Environmental Laboratory, NOAA, Seattle, WA

¹Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, Seattle, WA

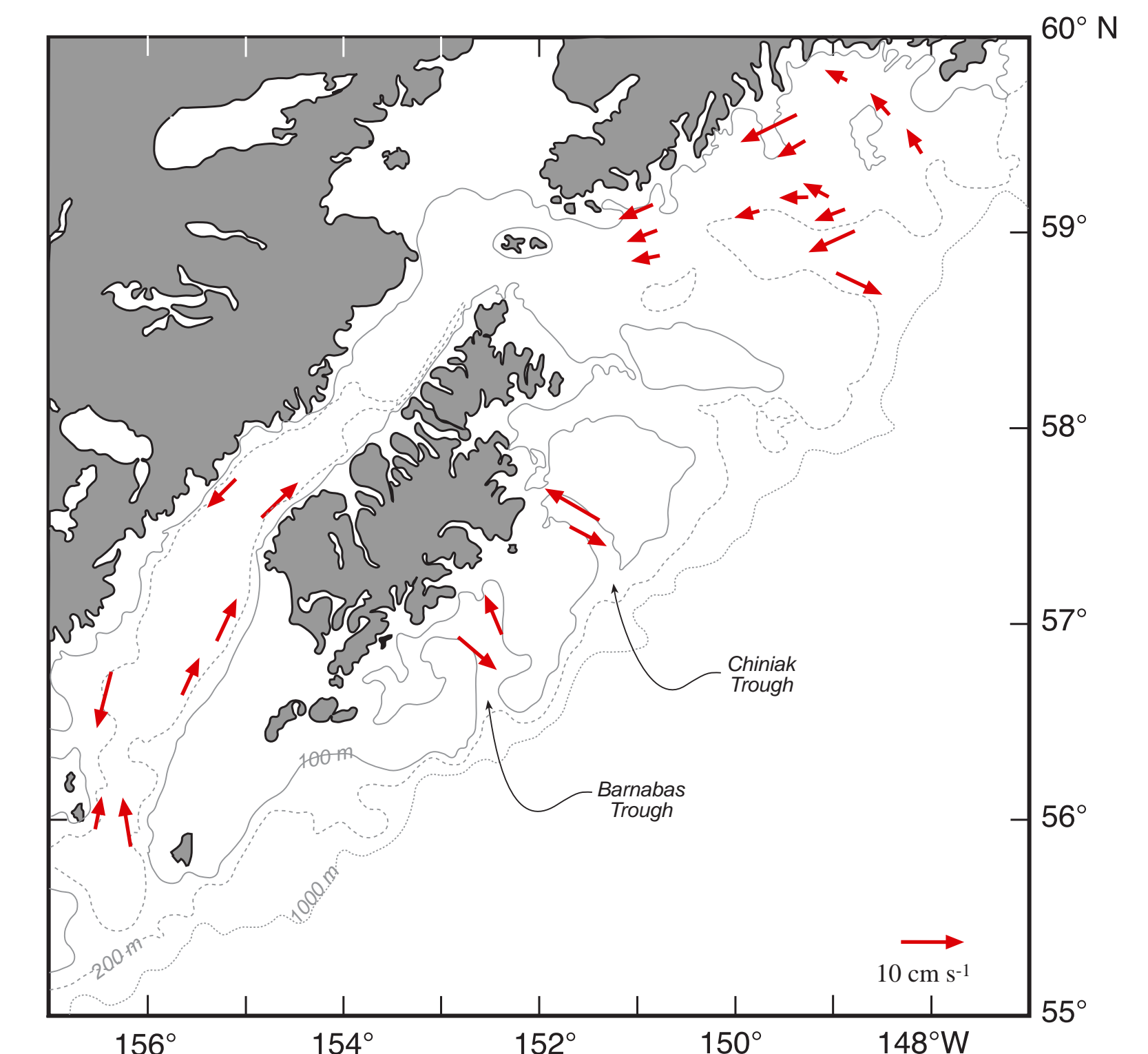


Since May 2001, flow on the Gulf of Alaska shelf between Prince William Sound and the east end of Kodiak Island has been measured using moorings and satellite tracked drifters. Trajectories from approximately 50 satellite-tracked drifters have been examined, along with the data from moorings that were deployed at 25 sites. A small selection of that data is shown here. Currents and transport during summer are relatively weak and disorganized. During winter, with the spin-up of the winds, transport and currents increase. In general, the transport in the Alaska Coastal Current is significantly correlated with local winds.

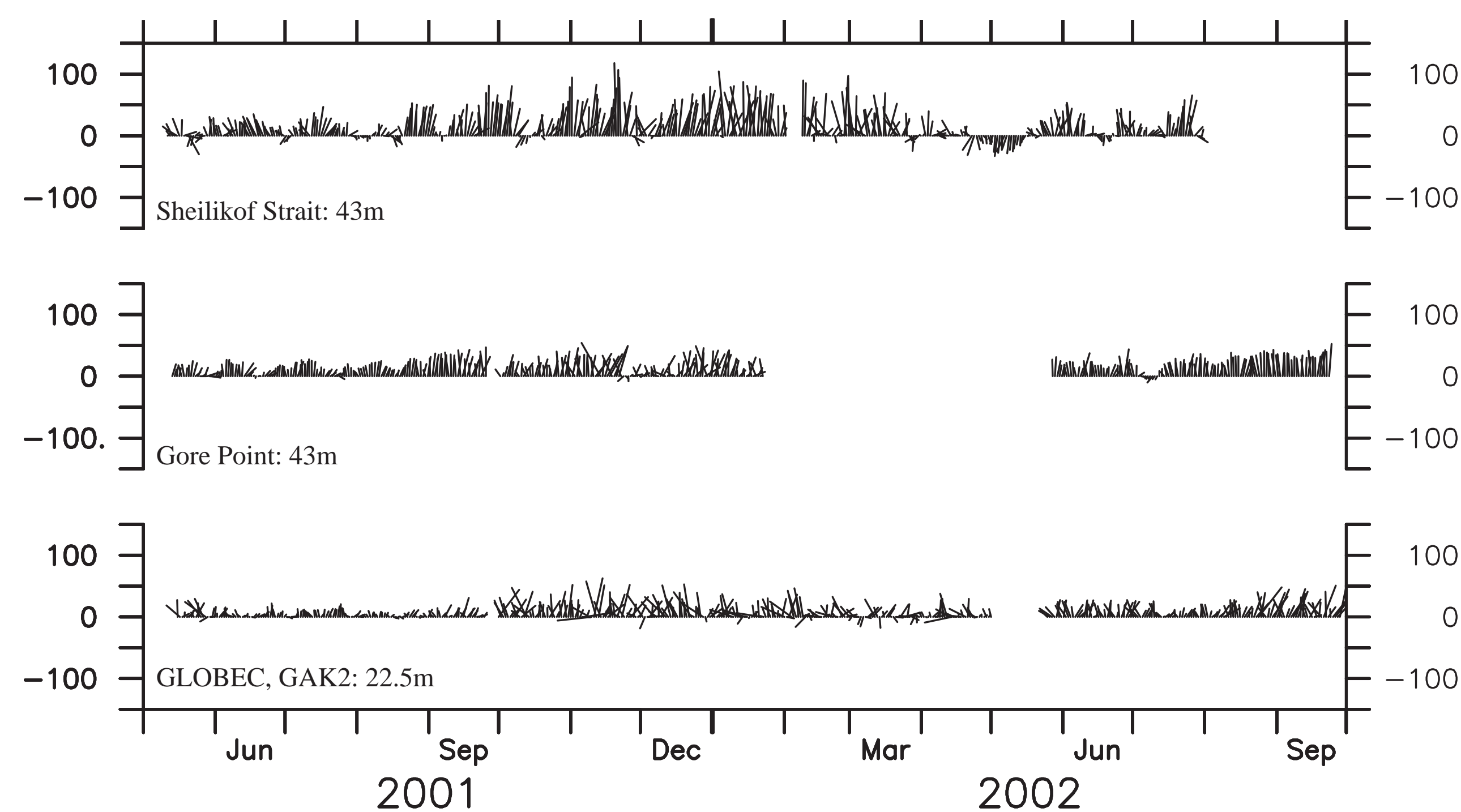
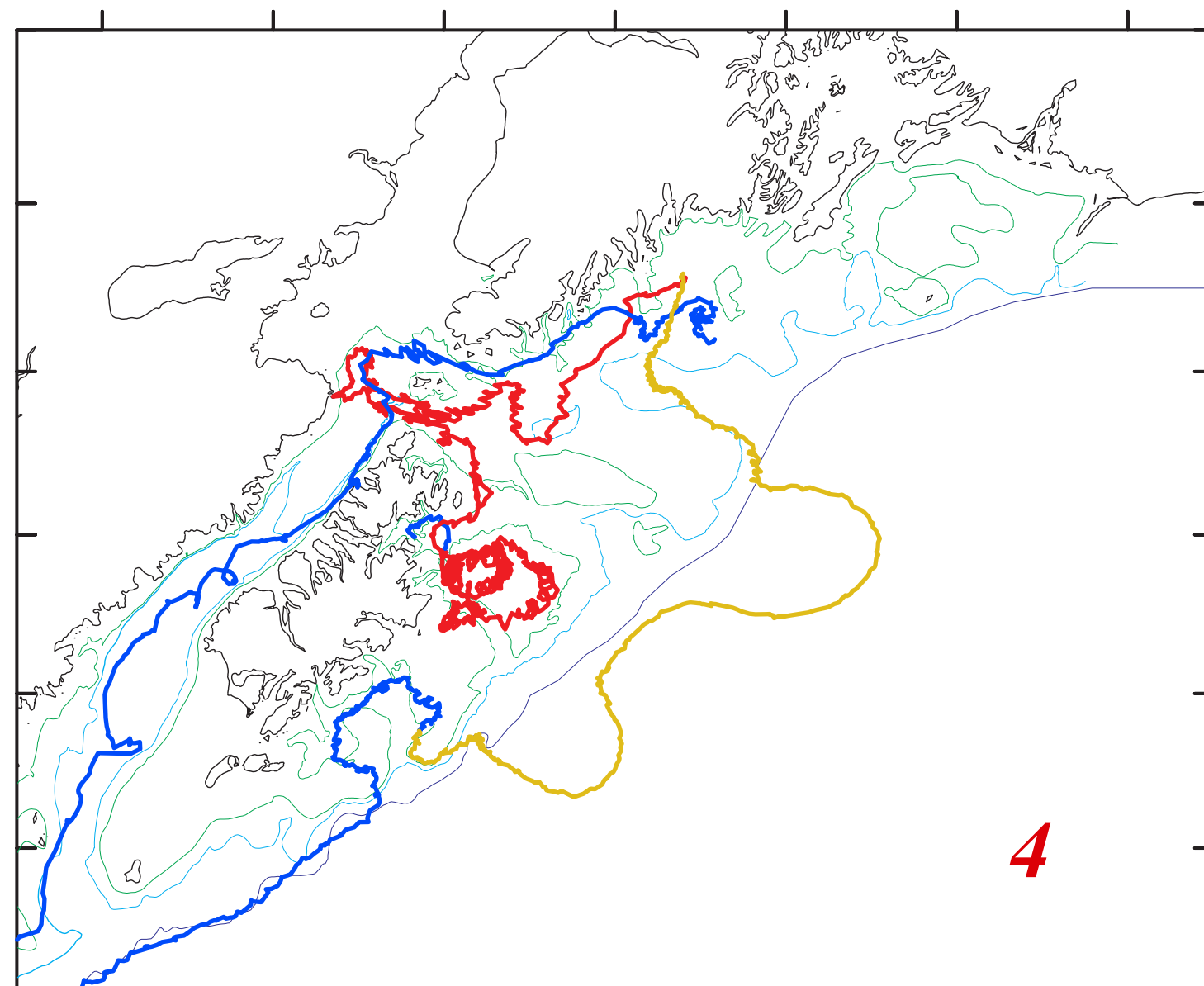
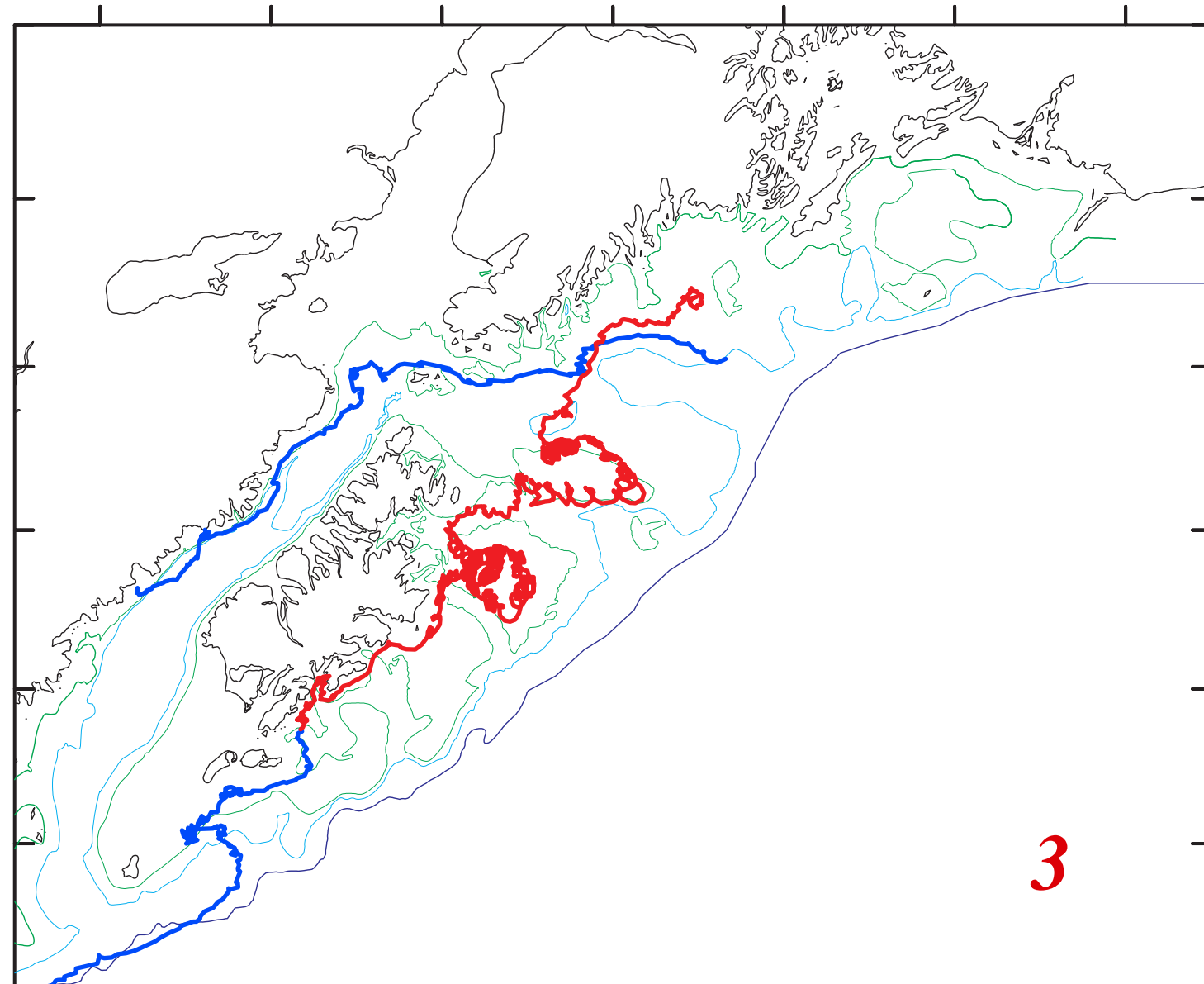
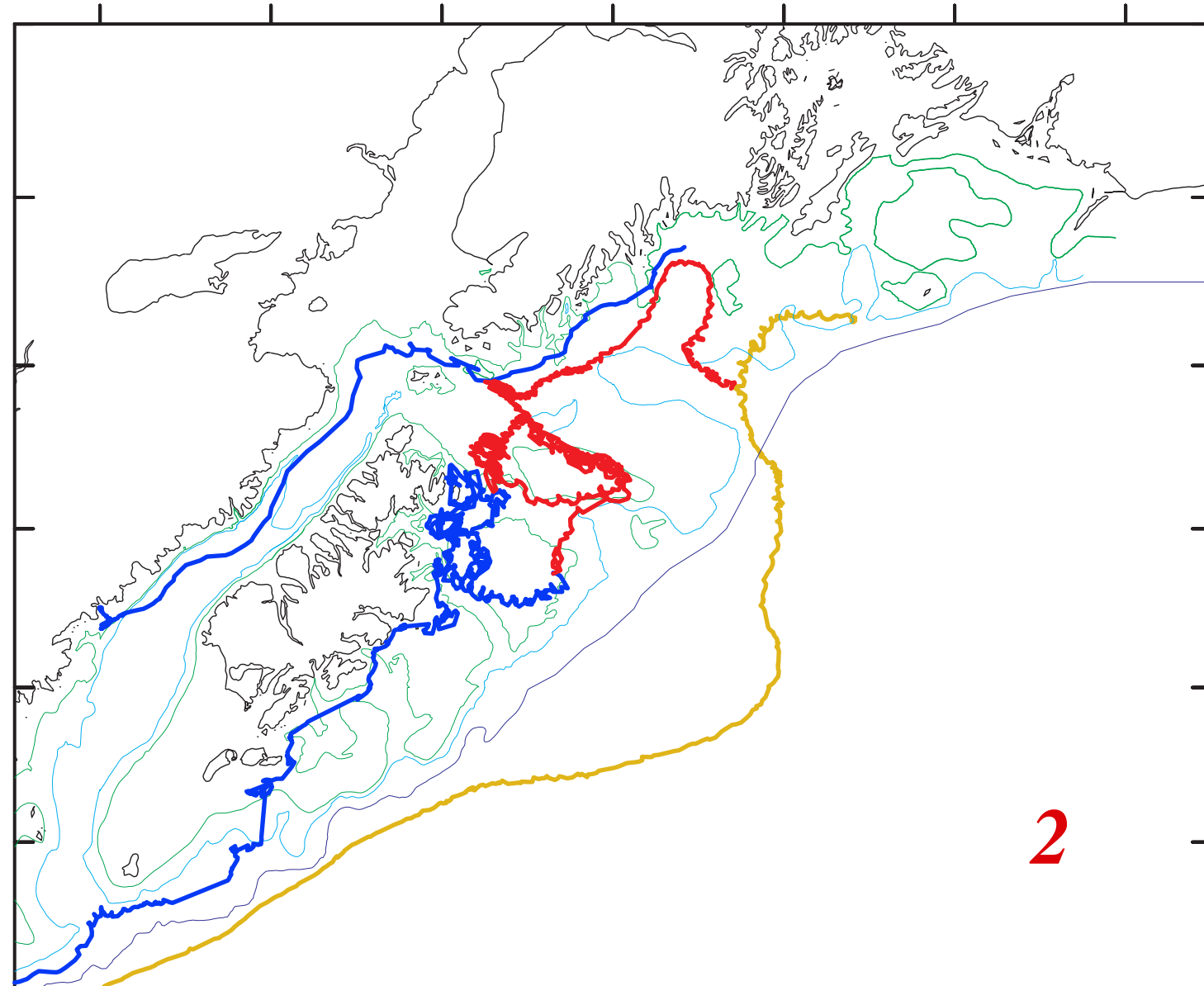
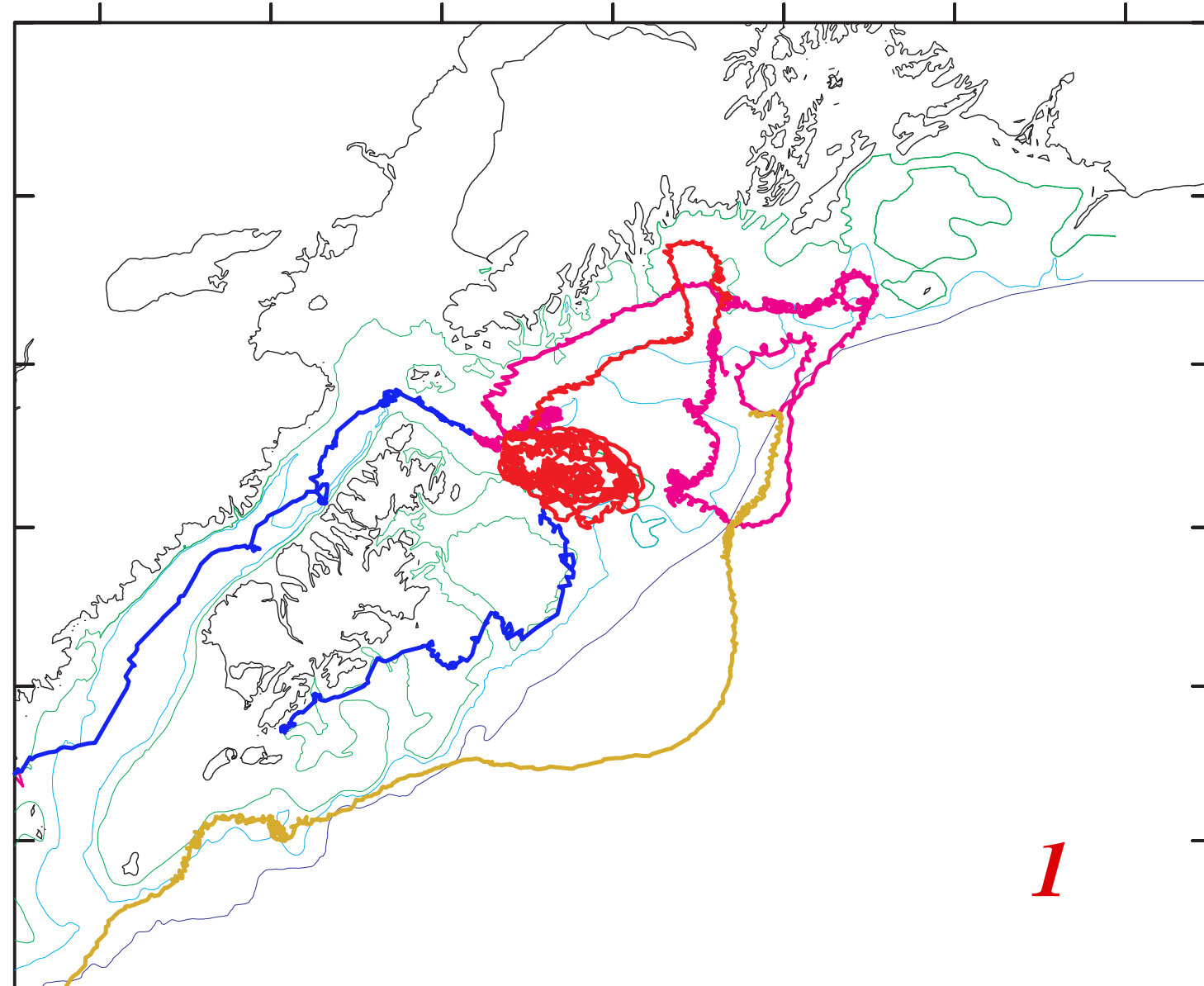
During summer, trajectories from drifters deployed on shelf near the Kenai Peninsula, show lack of organized flow (red, pink and yellow trajectories in drifter figures 1-6). Drifters are often advected onto banks, and can remain there for weeks to months. With the onset of fall winds, they are forced off the banks by wind driven currents. During winter, the ACC spins up and the drifters tend to be advected down Shelikof Strait (blue trajectories).

Interestingly, of the dozen drifters deployed east of Prince William Sound, only one drifter entered the sound. The most typical pattern of flow was similar to the pink in Map 6.

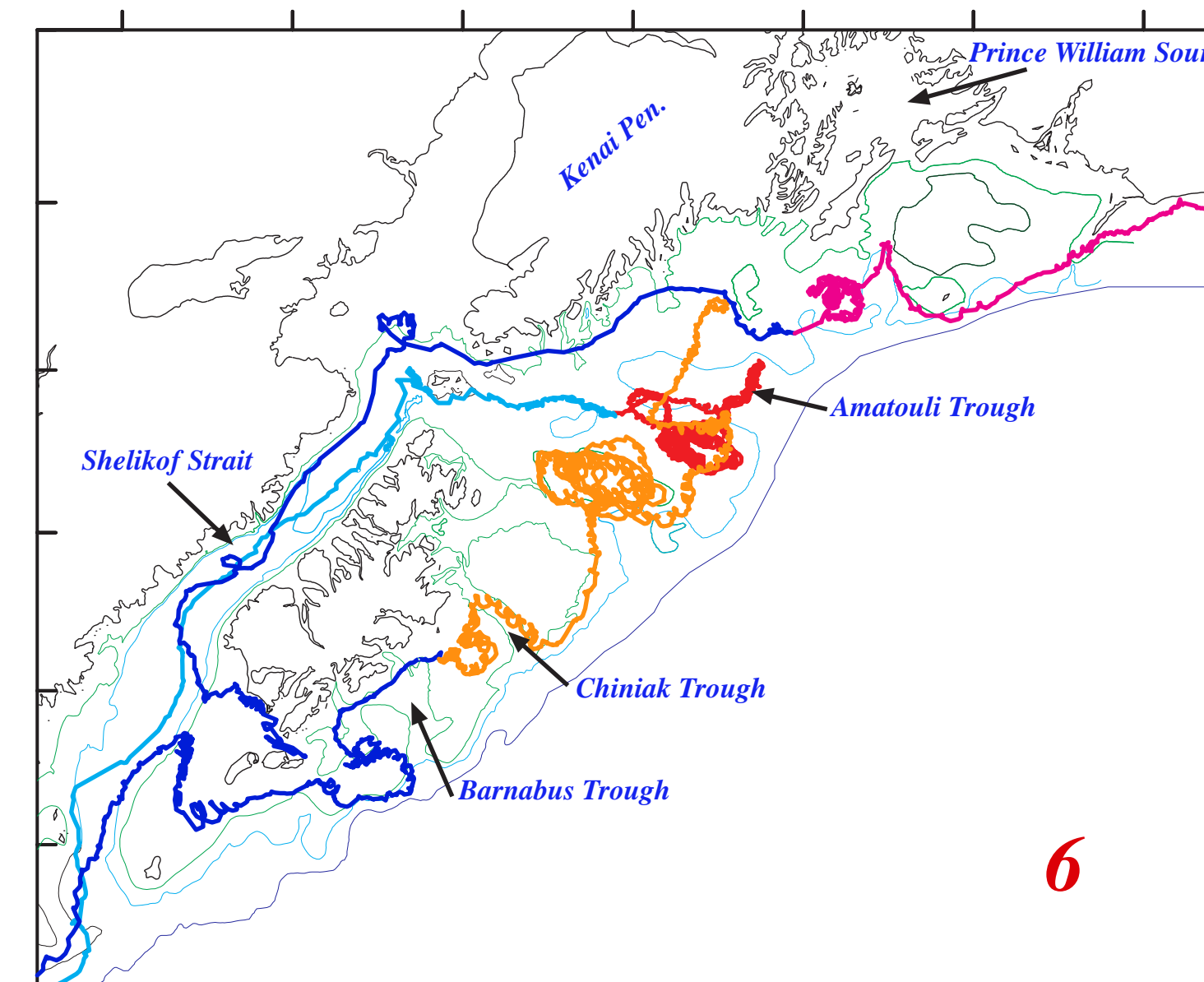
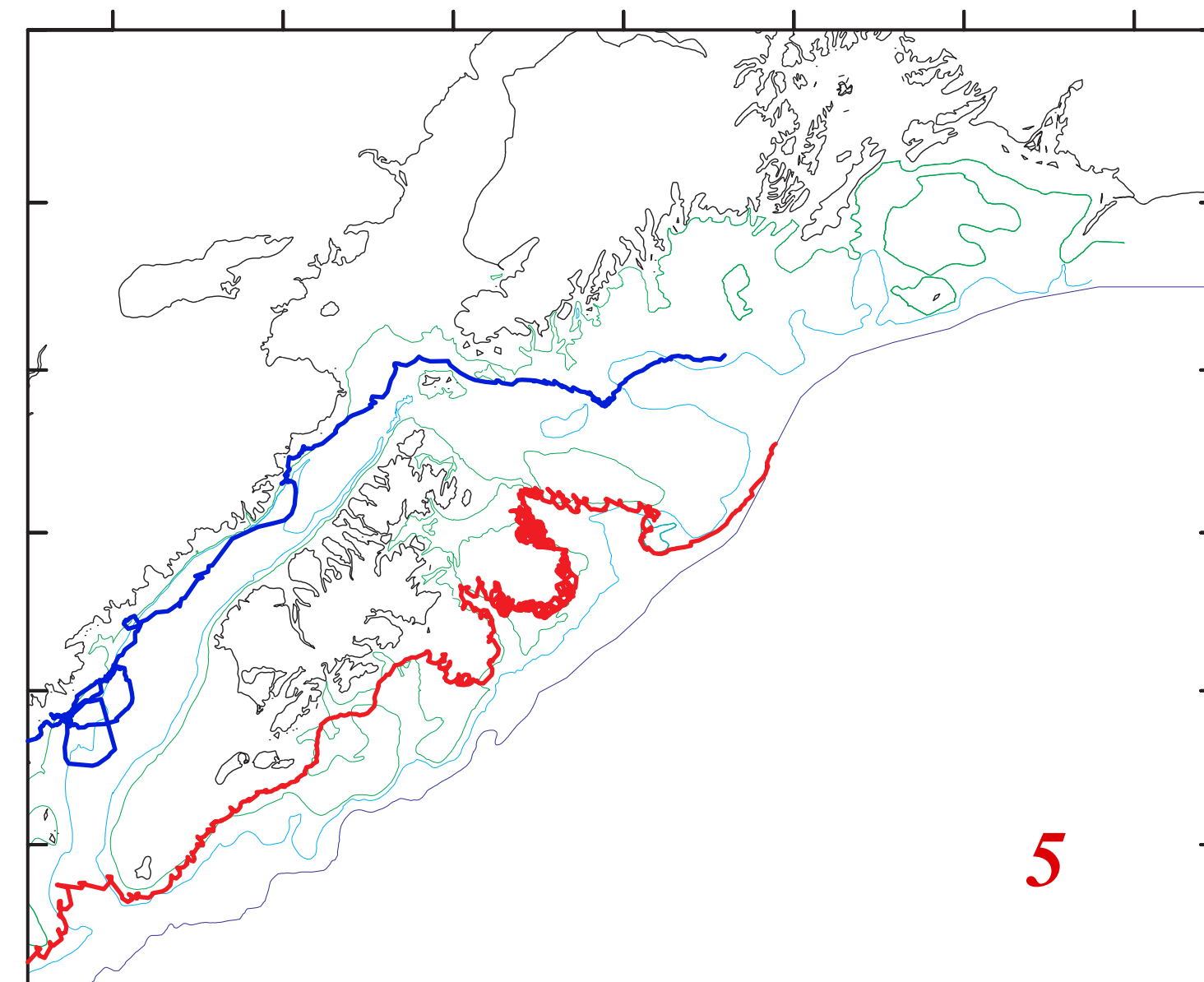
Cross-shelf flow is common in the vicinity of the Seward Line, while farther westward at Gore Point the transport is more along shelf. The bottom currents have less seasonality. Flow in Amatouli, Chiniak and Barnabas Troughs is typically onshore on the eastern side and offshore on the western side. The onshelf flow in these troughs is a source of nutrients to the shelf. For a more detailed discussion of these processes see the posters by Mordy et al., Kachel et al., and Reed et al.



Near bottom currents measured from current meter moorings show the strongest currents in the ACC near the Peninsula. There is inflow on the east side of the various troughs and outflow on the west side. To the east of the Seward line there is weak, but consistent onshore flow in a shallow trough. Unlike the surface currents, the bottom currents have less of a seasonal signal.



The ACC in the upper hundred meters shows a strong seasonal signal with strongest flow in the winter. This is especially evident at the exit of Shelikof Strait. The flow in Shelikof Strait and Gore Point are significantly correlated, but the correlations are not significant between the flow at these two sites and that at Seward.



Satellite-Tracked Drifters

Selected drifter trajectories (heavy colored lines) are shown in the six panels to the left. Each trajectory is color coded. The warm colors (red, yellow, and pink) are for the period May through September. The blues are for the period October through April. The thin green line is 100m isobath, the thin light blue line is the 200m isobath and the dark blue line is the 1000m isobath. Drifters generally move from northeast to southwest.