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Ocean Science Discussions

Interactive comment on "Acoustic Doppler Current Profiler observations in the southern Caspian Sea: shelf currents and flow field off Freidoonkenar Bay, Iran" *by* P. Ghaffari and V. Chegini

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Depth-averaged long-term mean flow tends to orient along-isobath on a continental shelf, and the vertical profiles of the mean across-shore currents usually show a two-layer structure (e.g., offshore flow in the near-surface layer and onshore flow in the near-bottom layer, and vice versa) on the inner shelf (e.g., Lentz 2008; Weisberg et al. 2009). However, as shown in Figure 7, the mean across-shore current component has positive values (northward) throughout the water column, which indicates that the depth-averaged mean across-shore current does not vanish. Actually, the depth-

averaged mean across-shore current is about 1 cm/s, not that smaller than the depth-averaged mean along-shore current (3∼4 cm/s) in Figure 7. This is counter-intuitive, given the fact that the time series is not short (57 days) and the water depth is only 14 m at this site.

The along-shore direction is defined as "the coast direction", 12 degrees from the east. Note that the across-shore component of the current on a continental shelf is sensitive to the choice of the coordinate system. It would be indicative to see the difference between this choice (12 deg) and those determined from conventional methods: (1) principal axis of subtidal depth-averaged currents (e.g., Liu and Weisberg 2005) and (2) direction of mean depth-averaged currents (e.g., Lentz 2008; Weisberg et al. 2009).

Also in Figure 7, the mean across-shore current shows a much smaller value at the top-most level (2 m). For a bottom-mounted ADCP with 1-m bin, the data at this 2-m level (below the surface) may not be reliable at all, because it may be affected by the surface reflections of the acoustic echoes. The data at the top 2-m levels are usually discarded for scientific analysis (e.g., Liu and Weisberg 2005, 2007; Weisberg et al. 2009).

In Figure 8, the units of the power spectra should be (m/s)ˆ2/cph and (cm/s)ˆ2/cph for the winds and currents, respectively.

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6, C1137–C1139, 2010

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