

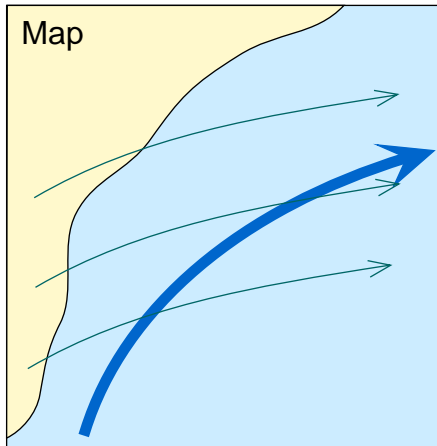
The contrasting scales of currents, tides, and waves

The currents, tides, and waves can present a seeming conundrum. For example, if currents are driven by winds and waves are generated by winds, how can waves move in different directions than currents? Also, if currents move clockwise in the northern hemisphere, how can the tides move counterclockwise through the same water?

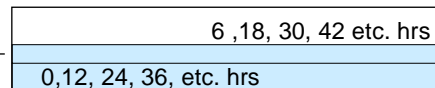
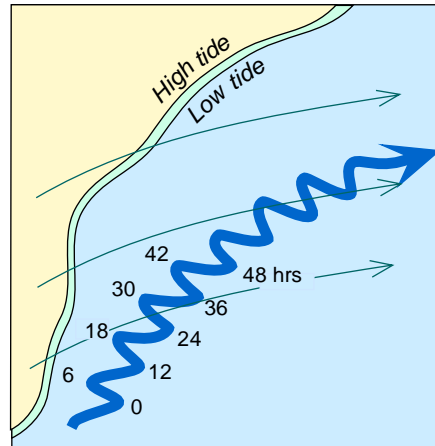
The answers are largely matters of scale. Currents are long-term motions of vast amounts of water across which the tides are regular but much smaller oscillations or ripples running backwards across the currents. Waves are much shorter-term and smaller-scale disruptions of the sea surface (but not motions of water at any significant scale) generated by winds that may deviate from the prevailing patterns.

		Spatial scale (area affected)		
		Larger (entire ocean basins)	Smaller (10s - 100s of km)	
Temporal scale: period of wave, or of motion of water	Short (Seconds to minutes)		Waves generated by winds of storms	Short (days)
	Inter- mediate (12 hours)	Tides generated by moon and sun		
	Effectively infinite	Currents generated by prevailing winds		Effectively infinite
				Temporal scale: duration of modification of ocean

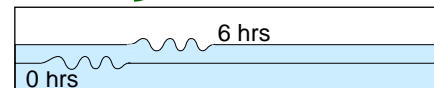
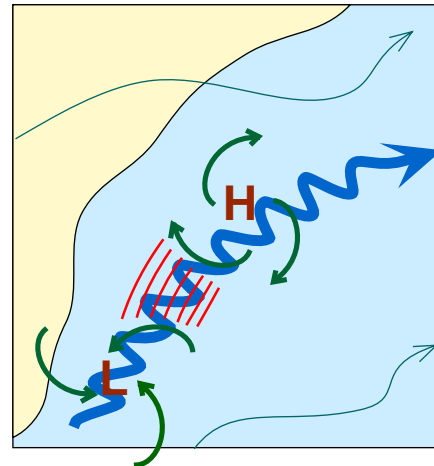
Long-term low-resolution view: **current** driven to NE by prevailing southwesterly winds



Long-term high-resolution view: **water in current** driven to NE moves with tides



Short-term view #1: storm winds generate **waves** on surface of **current** that wiggles with tides



Short-term view #2: storm moves on to generate more **waves** elsewhere; previous waves move out as **swell**.

