Ekman Spiral

At each level the circulation is driven by frictional and Coriolis forces. Friction results from drag exerted by fluid in adjacent levels. In northern oceans, because of the rightward Coriolis deflection and the decreasing current speed with depth, each layer experiences equilibrium (zero net force) because of the forward-leftward frictional tug from the relative motion of the layer above, the rightward Coriolis force, and the canceling backward-rightward frictional tug of the layer beneath. Therefore the current velocity varies with depth both in direction and speed as indicated in the accompanying figure. At a depth of about 100 meters, the current direction is opposite the current direction at the surface. The average current direction, represented by the “net transport” arrow in the figure, is about 90° to the right of the prevailing wind direction. Thus a prevailing wind direction southward and parallel to the west coast of a northern continent will produce an offshore net transport direction which will cause upwelling as subsurface waters flow upward to prevent a void created by departing surface waters.

For the same reason, a large iceberg will move in a direction about 90° to the right (in the northern hemisphere) of the wind direction, since its motion is much more strongly affected by water friction than by air friction. **Question:** Will the motions of large icebergs and small icebergs be in the same direction? If not, how will they differ?