

The dynamical processes governing lateral dispersion in the ocean on horizontal scales of 0.1-10 km (the submesoscale) remain poorly understood. Field measurements made in relatively quiescent regions dominated by internal waves such as the Sargasso Sea show surprisingly high rates of lateral dispersion on these scales. We present the results of a numerical study initialized with broadband internal wave fields and demonstrate that Stokes drift can explain much of the $O(1) \text{ m}^2\text{s}^{-1}$ lateral dispersion observed in dye-tracer releases during the ONR-sponsored Lateral Mixing (LatMix) June 2011 campaign in the Sargasso Sea. We contrast the Stokes drift contribution to that resulting from internal-wave shear dispersion and from vortical-mode stirring. The scale dependence of lateral dispersion at these scales is also addressed.