Experiment (WOCE; http://www.soc.soton.ac.uk/others/woceipo/index.html). Regional ocean observing systems, such as the Gulf of Maine Ocean Observing System (GoMOOS; www.gomoos.org) are now in operation, or are being planned in the near future with the long-term goal of forming a network of integrated, sustained operational observing systems for the U.S. coastal waters (see Ocean.US web site). Government agencies now recognize the importance of moorings and drifters and plan to implement an integrated ocean observing system incorporating both technologies (www.ocean.us.net).

Moorings carry significant payloads, allowing many many different variables to be measured from each platform. As a result of the large number of instruments and the necessary hardware needed to support a mooring (float, line, glass balls, anchor, acoustic release, etc.), these platforms are relatively expensive to build, deploy, operate and maintain. Drifters, on the other hand, are usually smaller, carry fewer instruments, need much less hardware, and each copy is far less expensive than a typical moored array. In addition, since drifters are designed to track water masses they can quantify the time-dependent evolution of physical and bio-optical properties within particular water mass features. However, large numbers of drifters are needed, and as they are generally not recoverable, they must be considered expendable. Moored instruments, on the other hand, are recovered and reused. Moreover the methods of interpreting mooring data are much better developed. Nevertheless, equivalent ship-based observations are even more expensive than mooring, or drifter, observations. A relatively large number of drifting data buoys can be used to augment high-resolution time-series measured with moored arrays at a few fixed locations, seeking an optimal balance between spatial and temporal coverage (Dickey, 2003).

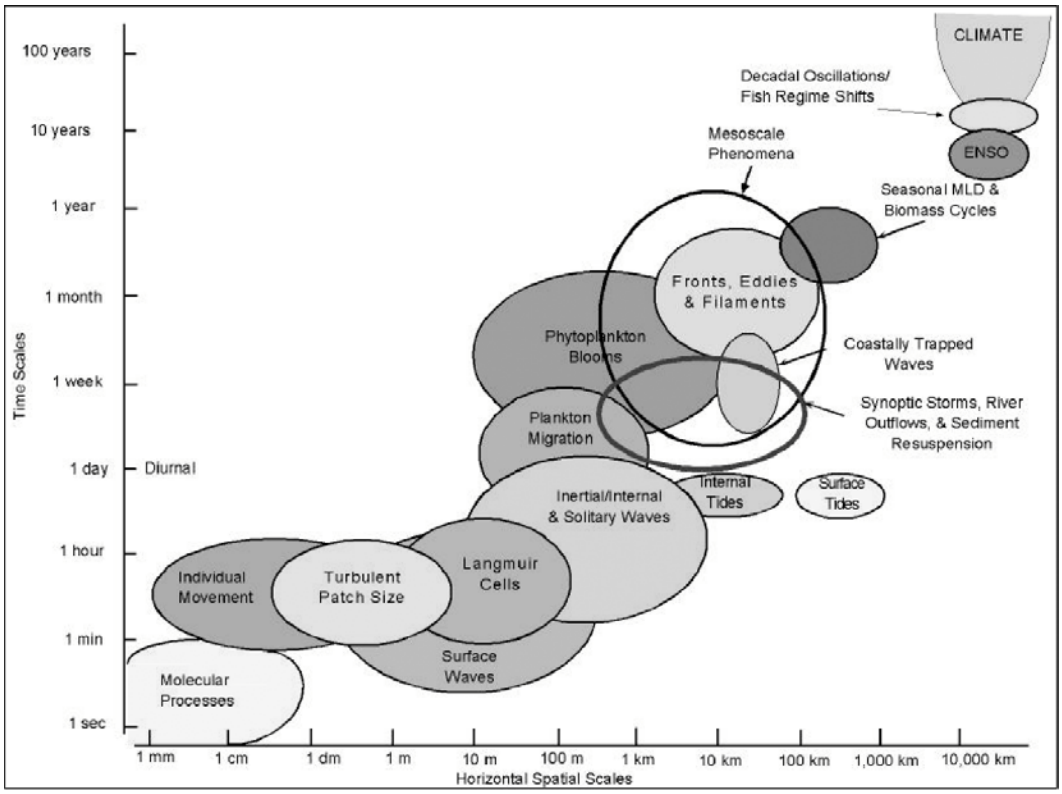

Fig. 3.1: Time-horizontal space scale diagram illustrating several physical and biological processes in ovals. (after Dickey, 2003).

Bio-optical measurements from moored and drifter platforms

The deployment of radiometers, and other bio-optical sensors, on moorings and drifters facilitates bio-optical measurements that transcend the spatial and temporal boundaries of classical shipboard methods (*e.g.* shipboard radiometric profiles) to enhance our understanding of oceanographic processes, particularly biological-physical coupling. Moored arrays observe bio-optical variables and ocean current velocities from an Eulerian perspective, yielding vector transport of bio-optical properties at a fixed point. It was recognized in the initial version of the