

# Cape Cod Field Trip

Sunday, February 24, 2008

*Why do we go to the beach in February?* Because the coast is a good place to look at modern **processes of erosion, transport, and deposition of sediment**.

Visualizing these processes will help us understand how unconsolidated sediments become part of the **rock record** as stratified sedimentary rocks. To accomplish this objective, we will examine modern erosional and depositional environments along **Cape Cod National Seashore** at Coast Guard Beach of Eastham, MA. We will also see an overview of this depositional system, including **Nauset Marsh**, from the Fort Hill area. Specifically, we will consider the following:

1. The **seasonal cycle of the beach** is striking. The ‘winter beach’ is very different than the ‘summer beach’! We’ll see how and learn why.
2. The beach, dunes, overwash fans, and salt marsh collectively form a **depositional system**. We will examine how these individual environments each produce a characteristic suite of lithologies, sedimentary structures, and bedding features. These associations can be readily observed in the rock record and are called “**facies**”.
3. This shoreline is presently retreating due to **rising global sea level** and **subsidence** of the land. We will learn how this depositional system could potentially preserve the record of a **transgression** of the sea, and how we can use this knowledge to unlock ancient records of sea level change. *For example, what might these sediments look like in the future as a **stratigraphic section** of sedimentary rock resulting from rising sea level?* **Walther’s Law** describes how laterally adjacent facies become stacked one atop another as each facies migrates laterally over time. As facies become stacked atop one another, a vertical stratigraphic sequence of facies is created. We will consider how coastal facies migrate landward in response to rising sea level.
4. **Cape Cod** is a product of the glacial processes of the **Last Glacial Maximum** (LGM) ~23-20 kyr, rapid retreat of the ice sheet ~18-15 kyr, and continued retreat and rising sea level and erosion. Sea level was 125-130 meters (~400 ft.) lower during the LGM. Cape Cod is a complex **depositional feature** consisting of glacial moraines, outwash plains with large erratics, and kettle ponds. This glacial material is the source of the sediment along the coast.