GEOL-201
Shoreline Processes
Variations in tidal range
Depositional features on tidal flats

Lenticular bedding
Wavy bedding
Flaser bedding
Figure 9.12 Typical paleotidal range sequence based on the middle member of the upper Proterozoic–Lower Cambrian Wood Canyon Formation, Nevada. (After Klein, 1972b: 540; by permission of the Geological Society of America.)
Bedding related to daily tidal flows
Hummocky cross-stratification: effects of storm waves below the fair-weather wave base
Storm-swept coasts
The basal unconformity of the Nanaimo Group, southwestern British Columbia: a Late Cretaceous storm-swept rocky shoreline

P.D. Johnstone, P.S. Mustard, and J.A. MacEachern

Abstract: The Turonian to Santonian Comox Formation forms the basal unit of the Nanaimo Group. In the southern Gulf Islands of British Columbia, the Comox Formation nonconformably overlies Devonian metavolcanic and Jurassic intrusive rocks and is interpreted to reflect a rocky foreshore reworked by waves and ultimately drowned during transgression. The nonconformity displays a relief of metres to tens of metres. Basal deposits vary in thickness, as does the facies character along the several kilometres of paleoshoreline studied. In the study area, three distinct but related environments are expressed, typical of a complex rocky shoreline with headlands and protected coves. Crudely stratified conglomerates represent gravel-dominated fans characterized by debris-flow processes, building out from local coastal cliffs and gullies directly onto the rocky shoreline. Fine-grained basal units represent shoreline environments protected from higher energy shoreline processes, presumably in small embayments. Sandstone facies associations reflect storm-dominated shoreface environments. The unusual thickness and coarseness of these shoreface intervals suggest a combination of increasing accommodation space, proximal and high sediment supply, and high frequency and energy of storm activity. This, in turn, suggests that the majority of the shoreline was exposed to the full effects of large, open-ocean storms. This interpretation differs from most previous models for the lower Nanaimo Group, which suggest that deposition occurred in more sheltered strait or bay environments.
“diachronous”
Generalized Stratigraphy of the four members of the Comox Formation.

Fig. 11. Block model of Nanaimo Basin during early Comox Formation deposition. Within the study area, the Comox Formation was deposited upon a partially emergent Wrangellia Terrane, with the majority of the terrane submerged, exposing the shoreline to the full force of proto-Pacific Ocean storms. A rocky shoreline with high local relief result in varied energy conditions and three distinct facies associations: FA1, storm-dominated rocky shoreline; FA2, low-energy rocky shoreline; and FA3, drowned fan delta.