**Olympic 1**

1. Although now brewed in California, for almost a century Olympia beer was brewed in Tumwater, Washington – right next to Olympic National Park. For the sake of novelty (and the love of beer), I’ve decided to use the slogan and trademark of this once popular northwest lager, as unifying themes in the discussion of the geology of Olympic National Park. First note the slogan – “It’s the water that makes the difference”.
2. Located in the Pacific Northwest, it should come as no surprise that Olympic National Park is a rainy place, but would you have guessed that much of the park receives over 180 inches per year!?
3. That deluge feeds a network of perennial streams that have deeply dissected the mountains …
4. … and washed a tremendous amount of sediment down to the coast.
5. The monstrous quantities of runoff are apparent from the large size and vast amount of driftwood that litters Olympic’s shorelines.
6. Driftwood is so large and abundant, that Olympic National Park is one of the few places in the world where it becomes a hazard. Apparently it is not uncommon for hikers to get caught between the waves and wood, which when buoyed by rising tides, can roll onto unfortunate beachcombers with crushing results.
7. Undeterred by the threat of rolling logs, geologists find the best exposed rocks in the sea cliffs. The thinly-layered strata here is common in Olympic National Park and is called turbidite.
8. Turbidite is deposited via density-driven, submarine sediment avalanches called turbidity currents. For millions of years they have been an especially common phenomenon offshore of Olympic National Park, because the extremely high rainfall brings an exceptional amount of sediment to the coast. Remember the beer slogan again: “It’s the Water that Makes the Difference!”
9. Each turbidity current deposits a layer of sand, which in this photo is represented by the light colored, upstanding sandstone layers. Turbidity currents are sporadic events, occurring perhaps once every century or so. During the calm periods between turbidity currents, fine-grained, deep-ocean sediment will deposit, which is represented here by the dark, eroded mudstones. The thinness and extreme lateral continuity of the beds is typical of turbidites that deposited from turbidity currents that traveled a great distance.
10. Coarser particles in the turbidity current settle out before finer particles, so turbidites typically display graded bedding.
11. Although turbidites are the dominant rock type throughout the park, outcrops are rare because soil rapidly develops on turbidite in humid environments. Indeed, Olympic National Park qualifies as one of the wettest rain forests in the world, …
12. … so the park is covered with fantastically green vegetation. Seen through the eye of a truly die hard geologist, …
13. … such landscapes amount to hellish obstructions to rock appreciation.
14. Nonetheless, there are a few places in the park where a geologist can find the solace of exposed rocks.
15. Road cuts are good, …
16. … stream beds, albeit less accessible, are better, …
17. … but the best exposures are above the tree line where that annoying rainforest succumbs to the wonderfully harsh conditions brought on by semi-permanent snow and ice.
18. Here there are vast exposures of beautifully bare rock!
19. Much of the rock exposed in the higher elevations is basalt.
20. And much of that basalt is pillow basalt, which implies that it poured out underwater. Again - “It’s the water that makes the difference”. Even in road cuts the rock is quickly weathered so it may be hard to pick out the pillows.
21. This should help.