

Stop 11 White Lake Formation

[00:04] Fluvial processes as an agent of geomorphic change are not a new thing here in the Okanagan Valley. In fact, the White Lake Formation located behind me gives us a window back into the Eocene, a time when the climate was warmer and wetter and large paleo river systems flowed over the landscape.

[00:26] The history of this paleo river system is recorded for us today in the bedrock of the White Lake Formation. So, this coarse material here this coarse sandstone, it was deposited when the river had a lot of energy, so high energy braided fluvial system. Some of the sediments that it was depositing it had eroded from those recently formed volcanoes that were active in the area during this Eocene period. Next up we have these finer sandstones to siltstones that were deposited when the river was flowing with much less energy, so more slowly. Some of them in fact um are considered to be over bank deposits.

[01:06] Thirdly, we have this carbonaceous siltstone that was deposited in floodplain marshes or wetlands where the flow was very slow to still, and so a lot of the plant material was able to decompose and form the low-grade coal that we have today. Now you can see looking across the formation that these fluvial processes, these changes, occurred repeatedly during the history um that led to the formation of this rock.

[01:38] So how do we know that it was a warmer wetter period in time? Well, one of the cool things about the White Lake Formation is that it contains a large number of plant fossils and it's from these fossils that scientists have been able to infer historical climate conditions.

[01:56] Analysis of Eocene plant fossil communities from nearby sites in southern BC, so around Princeton and also over the border in Washington state near Republic have been used to infer that the mean annual temperature during the Eocene when these paleo rivers were flowing was about six to seven degrees warmer than present, with the coldest monthly temperatures about seven to eight degrees warmer than the present. Really interestingly from a river point of view, the mean annual precipitation has been estimated to be about 11 000 millimeters a year. Compare that to the current amount of precipitation we get on average in Penticton these days at about 350 millimeters a year. So, the results indicate a microthermal mesothermal climate with low seasonal variation in temperatures. The plants that have led us to this understanding are plants that include ginkgo, metasequoia, alder, conifer needles and also palms.

[03:19] The White Lake Formation provides us with a great reminder that the major agents of geomorphic change in our landscape themselves change over time. So back in the Eocene it was volcanic activity and giant paleo rivers. Then in the Pleistocene through came the glaciers reworking the landscape. Today, what do you think the major agents for geomorphic change are?