Late Pleistocene Glacial and Environmental History of Skagit Valley, Washington and British Columbia

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Drainage patterns established in the Tertiary in the North Cascades were reorganized to accommodate southern drainage of the Cordilleran Ice Sheet. Repeated continental glaciation rendered the Skagit an interconnected valley, with meltwater routes opening it to the Fraser and Okanogan watersheds, and linking it to a drainage system around the east margin of the Puget Lobe of the ice sheet. Alpine glaciers from two major tributaries blocked Skagit valley during the Evans Creek stade, creating glacial lakes Concrete and Skymo. Organic material from lake sediments provides the first radiometric constraint on the beginning of the Evans Creek stade in the Cascades at 25,040 \(^{14}\)C yr BP. Sediments and macrofossils at the Cedar Grove section define two advances of the Baker alpine glacier during this stade, separated by a period of warmer and wetter climate at 20,770 \(^{14}\)C yr BP. During colder parts of the Evans Creek stade treeline was about 1200 m lower than present, which corresponds to a mean July temperature depression of 7 C. Glacier equilibrium line altitudes (ELA) during the cold periods were depressed 730-970 m below the modern glaciation threshold. Skagit valley alpine glaciers advanced several times to positions 5-10 km below valley heads between 12,200 and 9,975 \(^{14}\)C yr BP. ELA depression during these advances ranges from 340 ± 100 m to 590 ±75 m, with greater depression in maritime western tributaries. Skagit ELA depression values are about 200 m less than reported for the southern North Cascades during the Sumas stade. The effect of the Cordilleran Ice Sheet on precipitation likely caused ELAs to be higher in the Skagit valley than in the southern North