Supplementary text to Stanton et al., The signature of accumulated permanent uplift, northern Cascadia subduction zone

Discussion of ages for luminescence dating for non-estuarine deposits

In addition to dates on estuarine sediments, in the main manuscript (Tables 2-6) we also report feldspar luminescence ages from sediments collected in fluvial sands and gravels (sample 19GW827.1 in unit Qgs; Stanton, 2021), for sands related to the Nemah River (sample 19GW826.2 in unit Qrt; Stanton, 2021) and for sands and gravels near Elma, WA mapped as undifferentiated, pre-Fraser-glaciation continental glacial drift (Qgp) from the 1:250,000 regional geologic map (sample 21GW0819.4; Walsh et al., 1987). The ages are not discussed in the main manuscript because these samples are not from estuarine or marine sediments and are not relevant to the uplift history of the region. However, the ages of these samples contributed to the Quaternary mapping (Stanton, 2021) and may be of interest to regional studies. The sample ages are discussed in turn. Reference can be made to the radial graphs of Fig. 5 which show the distribution of single-grain ages from the uncorrected pIRIR measurements.

Sample 19GW826.2 is from sands in a terrace related to the Nemah River on the southeastern side of Willapa Bay at Lynn Point. An age from pIT-IRSL could not be obtained because the natural signal did not intersect the growth curve, an indication of a very old, probably over-estimated age, which could indicate partial bleaching. The FMM (uncorrected; Table 4) shows a small percentage of young grains which are likely contamination. The minimum age is best represented by the second component, which gives an age of 76.7 ± 6.11 ka. The third component, representing 68% of the grains, gives a much older age of 180 ± 9.13 ka. Because sample 19GW826.2 is from deposits mapped as Nemah River terraces, it is equally possible that the terraces are very old or are younger with partially bleached, reworked sediments.

Sample 19GW827.1 is from fluvial gravels and sands at high elevation within unit Qgs. It contains some young grains, but more than 60% of the grains are more than about 200 ka. This is consistent with the high degree of weathering and oxidation of the sediments. We interpret these as outwash related to the Double Bluff glaciation (MIS6).

Sample 21GW0819.4 is from sands and gravels in a high terrace above the Chehalis River between Montesano and Elma. It has been mapped as pre-Fraser-glaciation, undifferentiated glacial drift (Qgp; Walsh et al., 1987). It has a few young grains, but almost 90% of the grains are older than about 160 ka, consistent with pre-Fraser-glaciation deposits.

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