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Reply on RC3

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Author comment on "Assessing local impacts of the 1700 CE Cascadia earthquake and tsunami using tree-ring growth histories: a case study in South Beach, Oregon, USA" by Robert P. Dziak et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2020-427-AC4, 2021

We appreciate Reviewer 3 suggesting addtional references to include. We have revised the text in several location to include tehse references.

Introduction:

Recent studies have demonstrated the utility of using tree-ring growth chronologies for assessment of tsunami and earthquake impacts on coastal environments [Buchwal and Szczucinski, 2015; Kubota et al., 2017; Wang et al., 2019]. Catastrophic tsunami inundation events along the Sumatra and Japan coasts have shown tsunamis can have a devastating effect on coastal forests and overall coastal geomorphology [Kathiresan and Rajendran, 2005; Udo et al., 2012; Lopez Caceres et al., 2018]. In addition to the physical impacts from tsunamis, Kubota et al. 2017 showed that coastal trees that survived direct physical damage from the great 2011 Japan began to die the following summer, likely due to the physiological stress of salt water immersion. Wang et al (2019) performed a regional assessment of coastal western Washington forests and demonstrated that seawater exposure drives reductions in growth, increased mortality and greater climate sensitivity, regardless of whether the seawater exposure is recent or long term.

Section 4.1:

, but the trees eventually responded with wide reaction wood rings in the following years to regain upright positions. Van Arsdale et al (1998) showed the New Madrid earthquakes of 1811-1812 caused inundation of bald cypress trees near Reelfoot Lake (Tennessee) which great increased radial growth from 1812 to 1819. In contrast, the growth of bald cypress trees in northeastern Arkansas was severely suppressed for almost 50 yr following the earthquakes. Wells and Yeton (2004) studied the 1929 Buller and 1968 Inangahua earthquakes in New Zealand, finding clear impacts on tree growth, where swamps on elevated terrances are generally best for preserving earthquake record because they are not affected by drought or wind. As for tree growth disturbances due to earthquake shaking, Fu et al. (2020) showed how the 1950 Zayu-Medog magnitude 8.6 earthquake in the southeastern Tibetan Plateau, influenced tree growth during the period 1950–1955. However, alpine trees were less disturbed than those located at mid and low elevations. Severe growth suppressions occurred during the first three years after the earthquake, and were stronger at low elevations.

Section 4.2

. There are several studies demonstrating the impact of the inundation of large amounts of seawater and salts on coastal trees after the tsunami (e.g. Kubota et al., 2017; Wang et al., 2019). These studies showed trees that survived direct physical damage from the tsunami began to die the following summer, likely due to the physiological stress of salt water immersion. Tree rings that were immersed in seawater from the tsunami had higher $\delta^{13}C$ values in the earlywood that formed in the spring following the tsunami than those formed prior to the disaster. In a field survey following the 2010 Chile and 2011 Japan tsunamis, Yoshii et al 2012 that the soil deposits collected in the tsunami-inundated areas are rich in water-soluble ions compared with the samples collected in the non-inundated areas.