Supplement of Nat. Hazards Earth Syst. Sci., 24, 4523–4561, 2024
https://doi.org/10.5194/nhess-24-4523-2024-supplement

Natural Hazards and Earth System Sciences
Open Access
EGU

Supplement of

Sedimentary record of historical seismicity in a small, southern Oregon lake

Ann E. Morey et al.

Correspondence to: Ann E. Morey (ann@cascadiapaleo.org)

Supplementary Data

Figure S1. Comparison between upper Acorn Woman Lake (previously called Upper Squaw Lake) and lower Acorn Woman Lake (previously called Lower Squaw Lake) for the identification of a horizon representing 1964. CT number = radiodensity data in Hounsfield units; Loop Mag. is whole round magnetic susceptibility in SI units.

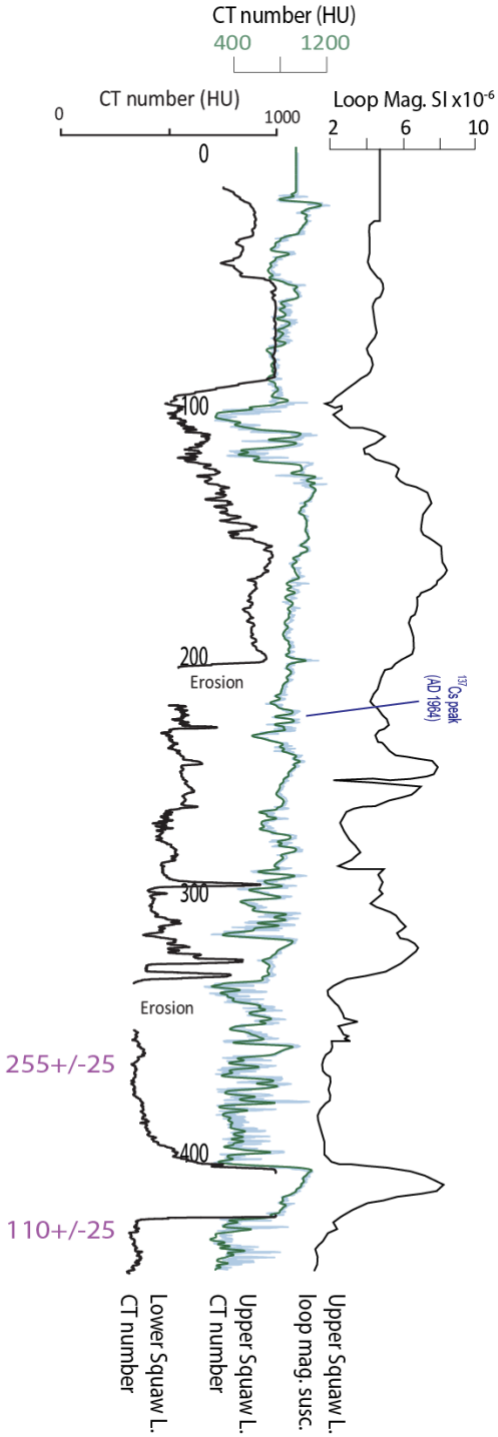
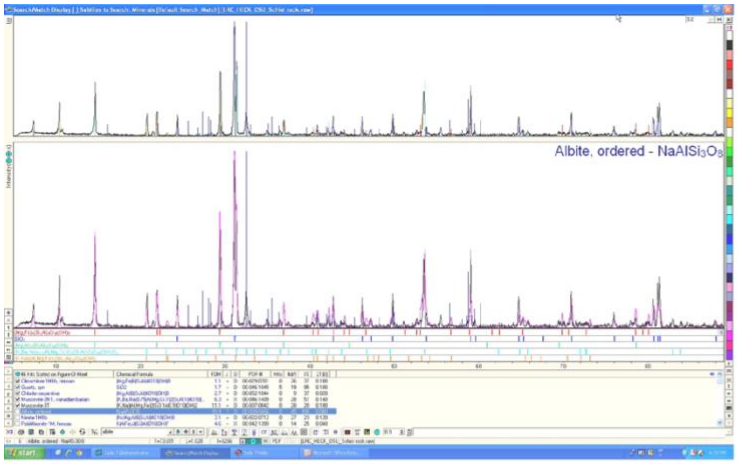
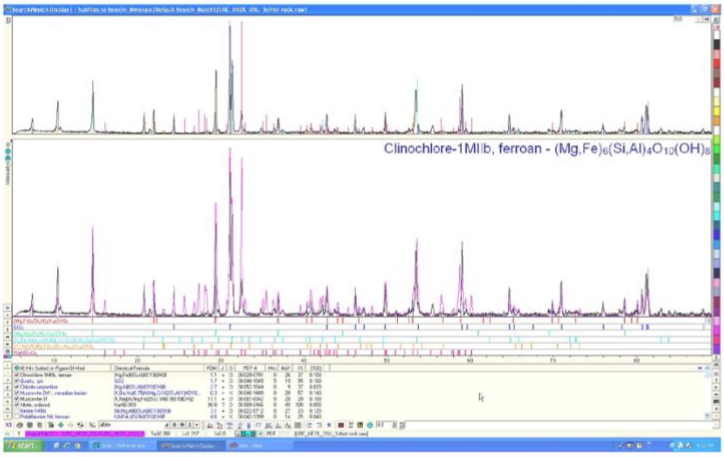


Figure S2. XRD Data

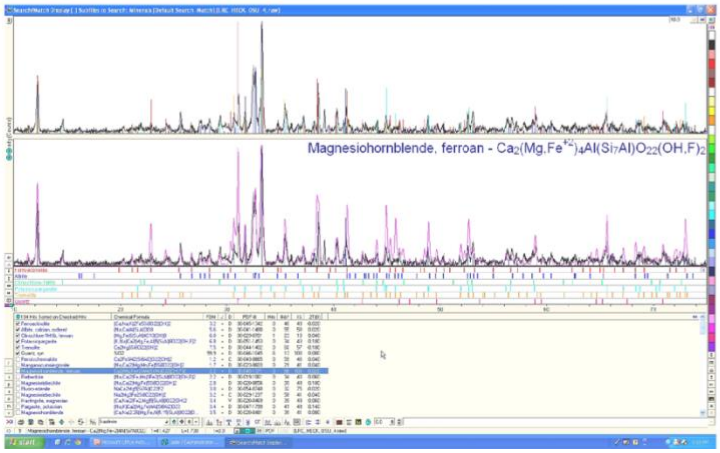
a. JADE software output; screenshots were all that was available as the option to export results was not working. We used the automated pattern-matching routine in JADE 9 Software (previously found at http://ksanalytical.com/jade-9/, now a revised version – JADE Pro - can be found at https://www.materialsdata.com/prodjd.html; last accessed 10/18/2024), which compares the relative peak heights and areas from unknowns to those from samples of known mineralogy contained in the software database.



Schist grab2

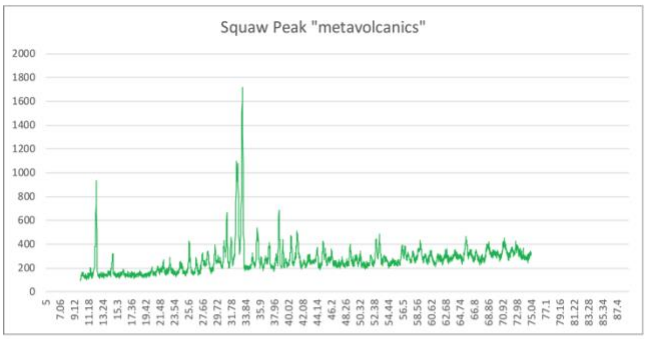


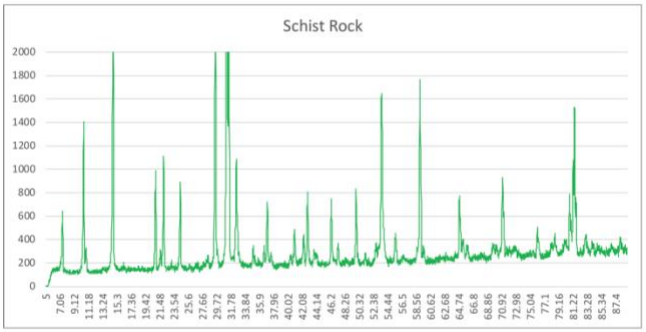
Schist grab1

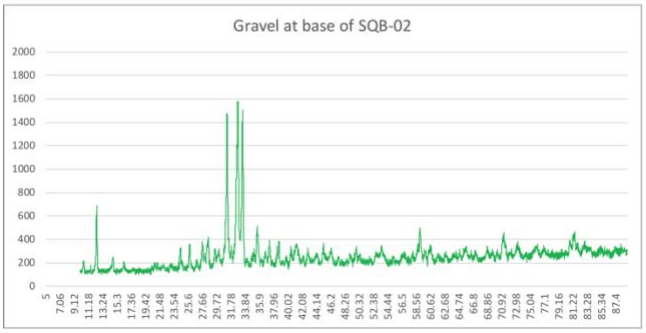


Squaw Peak rock

b. Graphs of XRD data from sediment core samples (see data at the end of this supplement). X-axis 2Theta, Y-axis is counts per second.







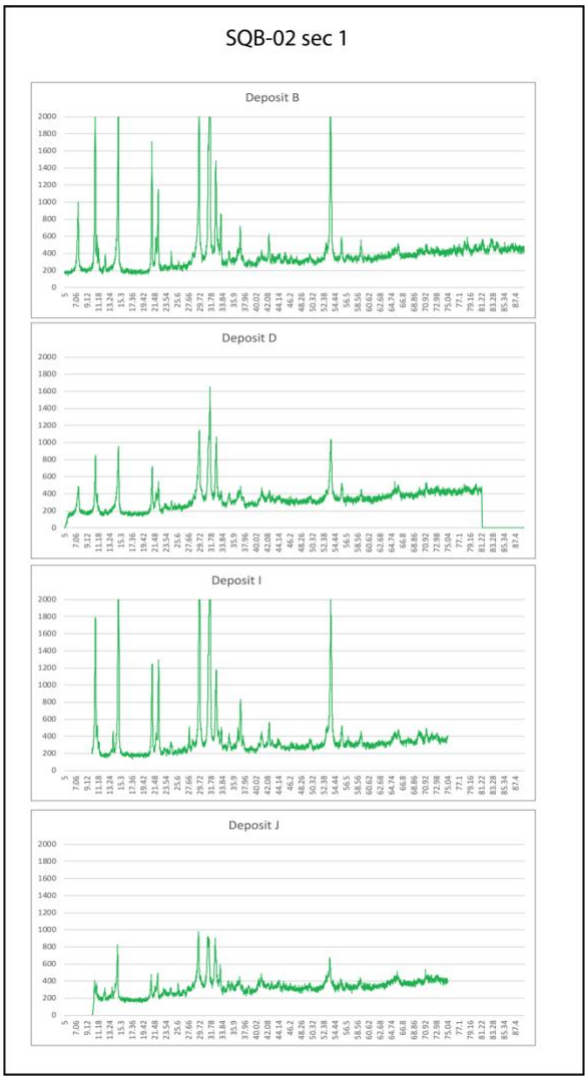
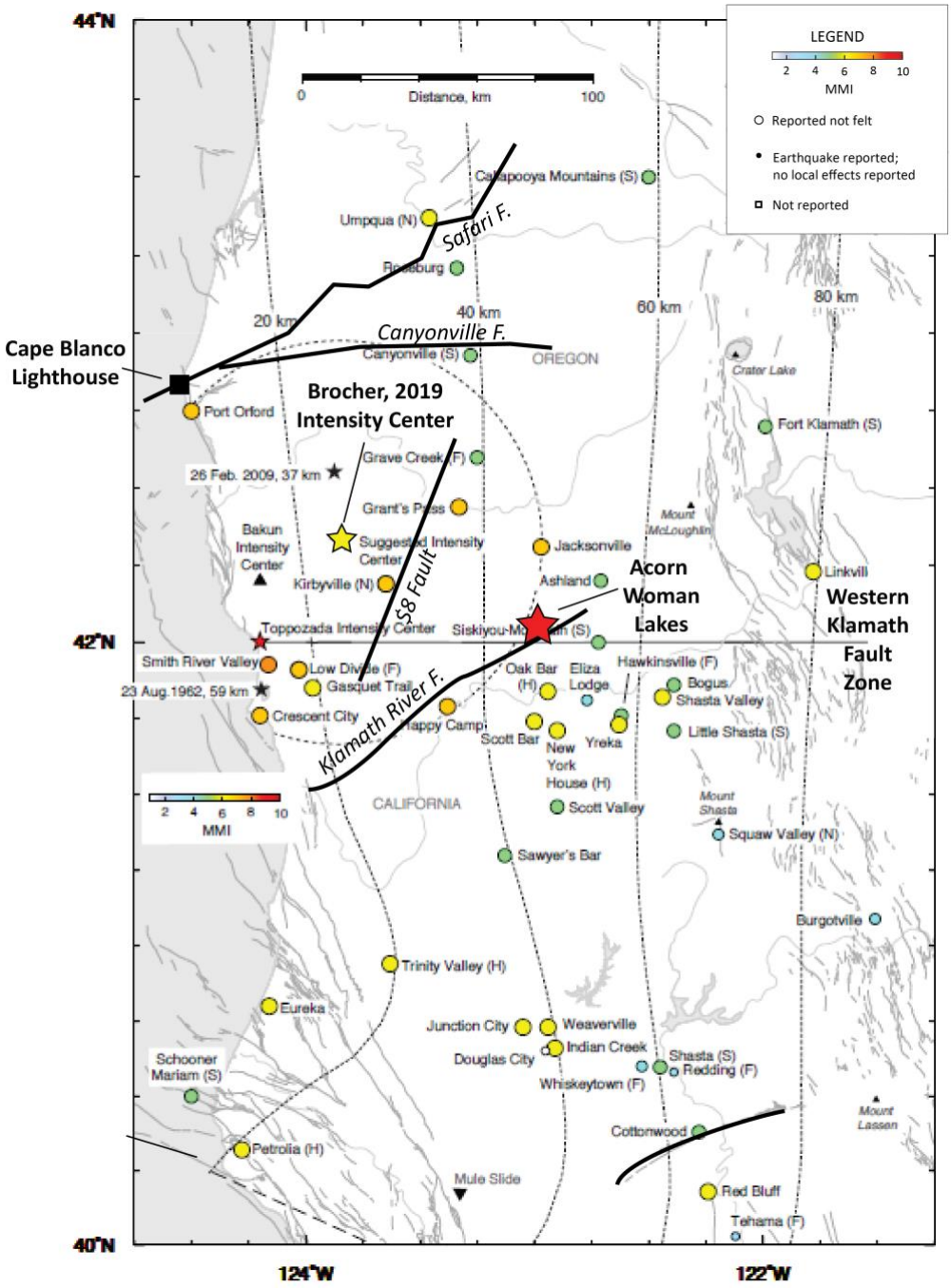


Figure S3. The 1873 earthquake and regional faults.

Felt reports do not simply dissipate in intensity with distance from the Intensity Center.



The figure above was adapted from a map of felt reports created by Thomas Brocher (provided as personal communication, 2019) with crustal faults (Klamath River, Canyonville, and Safari Faults) from Wells et al., 2017, and the $8 fault (Cave Junction Fault) from von Dassow (2018) placed on it. The large red star shows the location of Acorn Woman Lakes. MMI values in the Brocher map are coded by color based on newspaper reports and Felt (F), Light (L), Heavy (H),

and Severe (S) are intensities assigned by Toppozada et al. (1981). Reinterpretations of the Felt reports led to minor reassignments of MMI values and the Brocher intensity center (identified by the yellow star). Also shown are the intensity centers of Toppozada et al. (1981) and Bakun (2000).

T. Brocher estimated his intensity center as follows:

"To estimate an intensity center based on the new intensities, I fit a circle of 70 km radius to enclose all of the MMI VII and VIII intensities, including the new intensity VII assigned to Kirbyville, Oregon. This center is located to the east of both previously proposed intensity centers (Figure 2). Subject to the caveat that we lack intensity observations offshore in this region, the center of this circle lies at 42.3°N and 123.9°W, about 40 km northeast of, but within the 60-km confidence region of the intensity center determined by Toppozada and others (1981). This intensity center lies about 35 km to the north east but is within the 67% confidence limit of Bakun's (2000) intensity center."

Table S1. Table of all the ages used in the downcore age depth model from the companion paper (Morey and Goldfinger, 2024; “A 2700-yr record of Cascadia megathrust and crustal/slab earthquakes from Upper and Lower Acorn Woman Lakes, Oregon”). The entire dataset (Table 2 in the companion paper) was used in the age depth model to provide stability to the model results for the historic portion of the record. See the companion manuscript for model details and the code link at this end of this paper for the OxCal model code. See next page for table and caption.

Caption from Morey and Goldfinger, 2024: *"***Table 2.** *Radiocarbon ages in radiocarbon years, and the ^{137}Cs peak (for Upper Acorn Woman Lake core only; Colombaroli et al., 2010; 2018).* The samples in italicized text (Samples 0, and 11-13) were not included in the age model because they are inferred to be reworked. Samples in bold text were used to create the age-depth model for the historic portion of the sequence. Upper Acorn Woman Lake depths are composite depths from splicing together two cores (Upper Acorn Woman Lake I and Upper Acorn Woman Lake II; collected in 2009) with overlapping 1-m drives to produce a continuous sequence; Colombaroli and Gavin, 2010. NOSAMS = National Ocean Sciences Accelerator Mass Spectrometry, SQB = Lower Acorn Woman Lake, USL = Upper Acorn Woman Lake. Sample ID's include the original sections and depths (archival and event-free composite) for the SQB cores, and composite depth for the USL cores."

Sample #	ID	Description	Laboratory and sample no.	^{14}C yrs BP
0	SQB1A; 14.0-14.5 cm	Fir needle	S-ANU 42418	865+/-35
1	**SQB1A; 15.5-16.0 cm event-free: 65 cm**	**Fir cone frag**	**S-ANU 42419**	**255+/-25**
2	**SQB1A; 25.5-26.0 cm Event-free: 71 cm**	**Fir needle**	**S-ANU 42618**	**110+/-25**
3	**SQB1A; 35.5-36.0 cm Event-free: 81 cm**	**Fir needle**	**S-ANU 42617**	**190+/-25**
4	**SQB1A; 84.0-85.0 cm Event-free: 108 cm**	**Fir needle**	**S-ANU 42616**	**260+/-40**
5	**SQB1A; 95.0-96.0 cm Event-free: 115 cm**	**decid. Plant frags**	**S-ANU 42417**	**630+/-25**
6	**SQB1B; 67.0-68.0 cm Event-free: 185 cm**	**plant frags**	**UCIAMS 140214**	**1155+/-20**
7	**SQB2H; 39.0 cm Event-free: 566 cm**	**plant frags**	**OS-109825**	**2480+/-20**
8	SQB5C; 27-28 cm	Cone bract	NOSAMS	1270+/-20
9	**SQB5D; 99-100 cm Event-free: 336 cm**	**Cone bract**	**NOSAMS**	**1580+/-20**
10	SQB14 sec 2, 81cm	Fir needle	NOSAMS	1220+/-20
11	SQB14 sec 3; 122.5cm	Twig	NOSAMS	2310+/-20
12	SQB14 sec 6; 30.5-31cm	Deciduous leaf	NOSAMS	4470+/-25
13	SQB10 sec 3, 54-55cm	Plant fragment	NOSAMS	1810+/-20
14	**USL; ^{137}Cs**	**Bulk samples**	**Flett Research, Inc.**	**~1964 CE**
15	USL; 539.5 cm	Charred wood	NOSAMS 64498	615+/-40
16	**USL; 630.5 cm Event-free: 145 cm**	**Terrestrial plant macros**	**NOSAMS 64497**	**980+/-55**
17	USL; 729 cm	Wood	Beta-23617	1110+/-40
18	USL; 856.5 cm	Bud scale	NOSAMS 64496	1610+/-140
19	USL; 952.5 cm	Douglas-fir needle	NOSAMS 64495	1870+/-100