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First direct evidence of a great earthquake in 1717, central Alpine Fault, New Zealand

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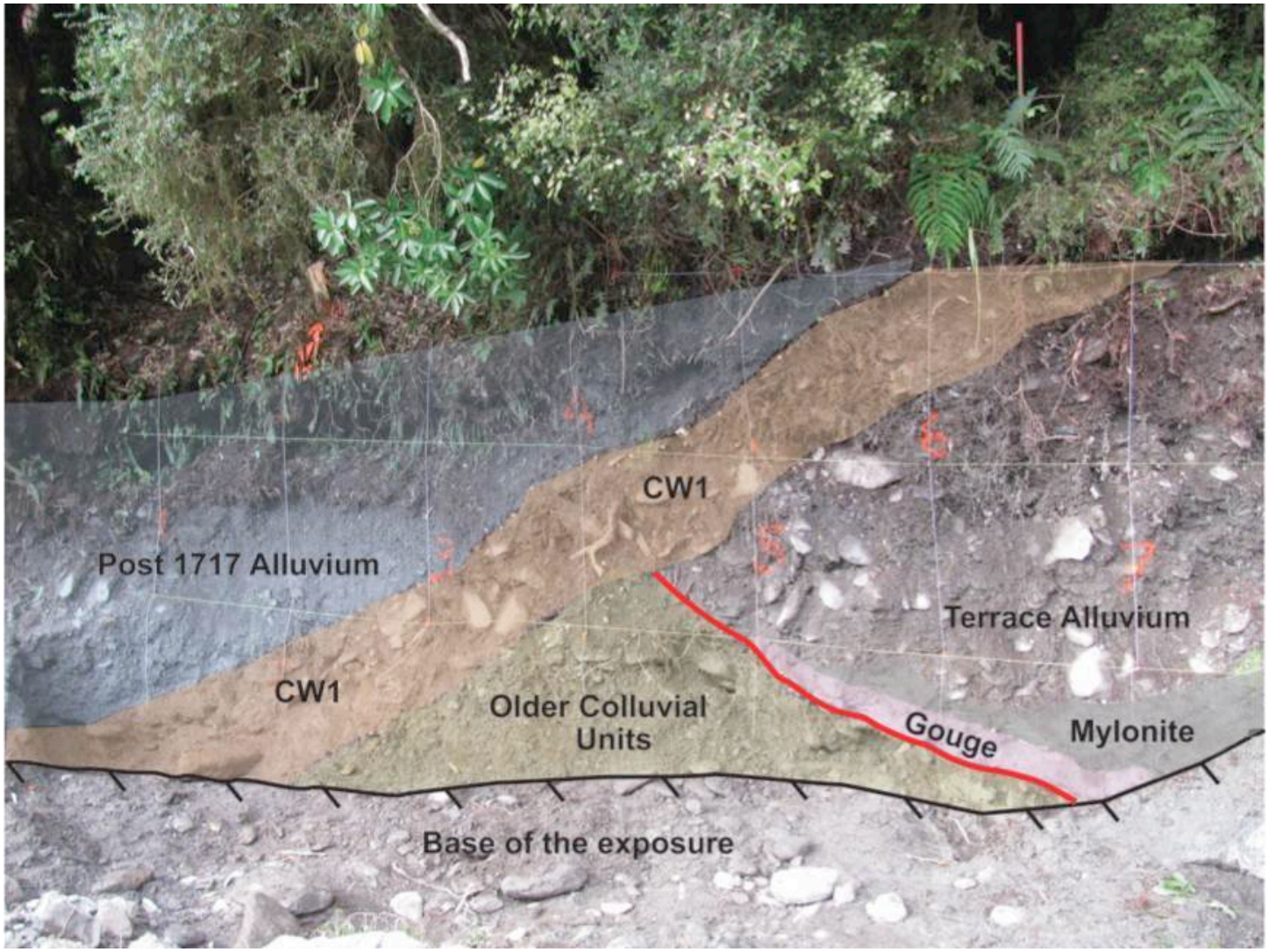
This supplemental data is comprised of two photographs from the scarp (Figures DR1 & DR2) and fault exposure site, and an.annotated version of the photograph in Figure 2 with interpretations (Figure DR3). Additionally we have included the full fault exposure log (Figure DR4). Table.DR1.gives.results.from.radiocarbon.dating.from.Gaunt.Creek.fault.exposure.

Supplemental Figure DR1: Photograph of the fault scarp ~150 m north of the fault exposure site. The flat surface the geologist is standing on is the onlapping alluvium found in the fault exposure.

Supplemental Figure DR2: Photograph from the fault exposure. Logging lines form 1 m blocks and numbers are station distance (m) from the left side of the trench in meters. Note the bluish alluvium on the left side of the photo that onlaps the fault scarp near the number 3. Also not the very light grey gouge zone ~1.3 m below station 6.

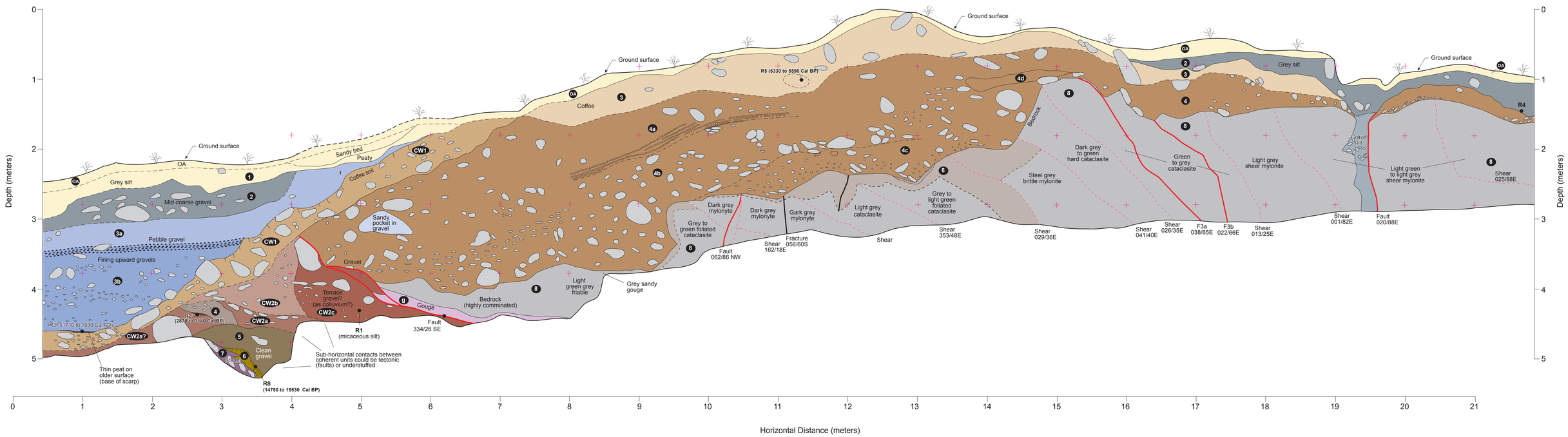


Supplemental Figure DR3: Annotated photograph of the fault exposure.

GAUNT CREEK TRENCH

Scale 1:20 Orientation 125°

Northwest **Southeast**



LEGEND

Geologic Units

- OA — Sandy SILT (ML), very dark brown (10YR 2/2), [MODERN SOIL]
- 1 — Silty SAND with gravel (SM), dark olive gray (5Y 3/2) (damp), [ALLUVIUM].
- 2 — Sandy GRAVEL (GP), dark olive gray (5Y 3/2) (damp),clast-supported, clasts are medium gravel to boulders, [ALLUVIUM].
- 3 — Sandy silty GRAVEL (GP-GM), dark olive gray (5Y 3/2), [ALLUVIUM]
- 3a — Sandy silty GRAVEL (GP-GM), dark olive gray (5Y 3/2), [ALLUVIUM]
- 3b — Sandy silty GRAVEL (GP-GM), very dark gray (5Y 3/1), [ALLUVIUM]
- 4 — Sandy silty GRAVEL (GP-GM), very dark gray (5Y 3/1), [ALLUVIUM]
- 4a — Sandy silty GRAVEL (GP-GM), very dark gray (5Y 3/1), [ALLUVIUM]
- 4b — Sandy silty GRAVEL (GP-GM), very dark gray (5Y 3/1), [ALLUVIUM]
- 4c — GRAVEL with sand (GW), light olive gray (5Y 6/2), [ALLUVIUM]
- 4d — Sandy SILT (ML), light olive gray (5Y 6/2), [ALLUVIUM]
- 5 — Sandy GRAVEL (GP) with cobbles, dark olive grey (5Y 3/2), [OLDER COLLUVIAL UNITS].
- 6 — Sandy GRAVEL (GP), dark olive grey (5Y 3/2), peat growing on top of unit, [OLDER COLLUVIAL UNITS].
- 7 — Sandy GRAVEL (GP), dark olive grey (5Y 3/2), [OLDER COLLUVIAL UNITS].
- CW1 — Sandy GRAVEL with silt (GW-GM), olive brown (2.5Y 4/3), [SCARP-COVERING COLLUVIAL UNIT].
- CW2a — Silty GRAVEL with sand (GW-GM), olive brown to dark grayish brown (2.5Y 4/4 to 2.5Y 4/2), [OLDER COLLUVIAL UNITS].
- CW2b — Silty GRAVEL with sand (GW-GM), olive brown (2.5Y 4/4), [OLDER COLLUVIAL UNITS].
- CW2c — Sandy GRAVEL with silt (GW-GM), dark grayish brown (2.5Y 4/2), [OLDER COLLUVIAL UNITS].
- 9 — CLAY with gravel (CH), greenish gray to bluish grey (Gley 1 6/1 to Gley 2 5/1), [FAULT GOUGE].
- 8 — weathered hanging-wall BEDROCK, cataclasite and mylonite, from olive grey to olive (5Y 4/2 to 5Y 5/3), [HAAST SCHIST DERIVED MYLONITE AND CATACLASITE].
- 8 — Hanging wall BEDROCK, cataclasite varies from dark greenish gray to olive gray (Gley 1 4/1 to 5Y 4/2), mylonite varies from greenish gray (Gley 1 6/1) to dark greenish gray (Gley 1 4/1). [HAAST SCHIST DERIVED MYLONITE AND CATACLASITE].

Symbols

- Geologic contact, soild where certain, dashed where approximate
- Weathering contact
- Shears with attitudes
- Faults with attitudes
- R6 ● AMS radiocarbon sample location

TABLE DR1. RESULTS FROM RADIOCARBON DATING FROM GAUNT CREEK FAULT EXPOSURE

Sample number	Exposure unit	NZA Lab #	Del 13C	Radiocarbon Age (yr. BP)	Calibrated age 2 sigma (cal BP or Calendar years AD)	Probability for each 2 sigma range	Material and Significance
GCT-R2*	Older Colluvial Unit	36168	-26.5	2917 ± 30	2870-3100 3130-3140	94.3% 0.6%	Peat found in older colluvial wedge. Dates age of paleoearthquake on the fault?
GCT-R5	Alluvial terrace	36169	-27.8	4823 ± 30	5330-5370 5460-5590	10.3% 84.8%	Peat found in alluvium of alluvial terrace. Dates the age of the terrace.
GCT-R8	Older Colluvial Unit	36205	-30.4	12731 ±45	14750-15530	95.0%	Peat at base of trench below fault. Dates age of a paleoearthquake on the fault?
GCT-R3F	Top of CW1	36252	-24.3	115 ± 15	1710-1720 AD 1810-1840 AD 1850-1870 AD 1880-1930 AD	7.6% 28.3% 5.4% 53.5%	Peat growing at the base of the fault scarp post-dates the MRE. Surface rupture at this location post 1709.