Supplementary Material:

Late Pleistocene to Holocene paleoseismicity and seismic hazard of the southern Feldbiss Fault (Lower Rhine Graben, Germany)

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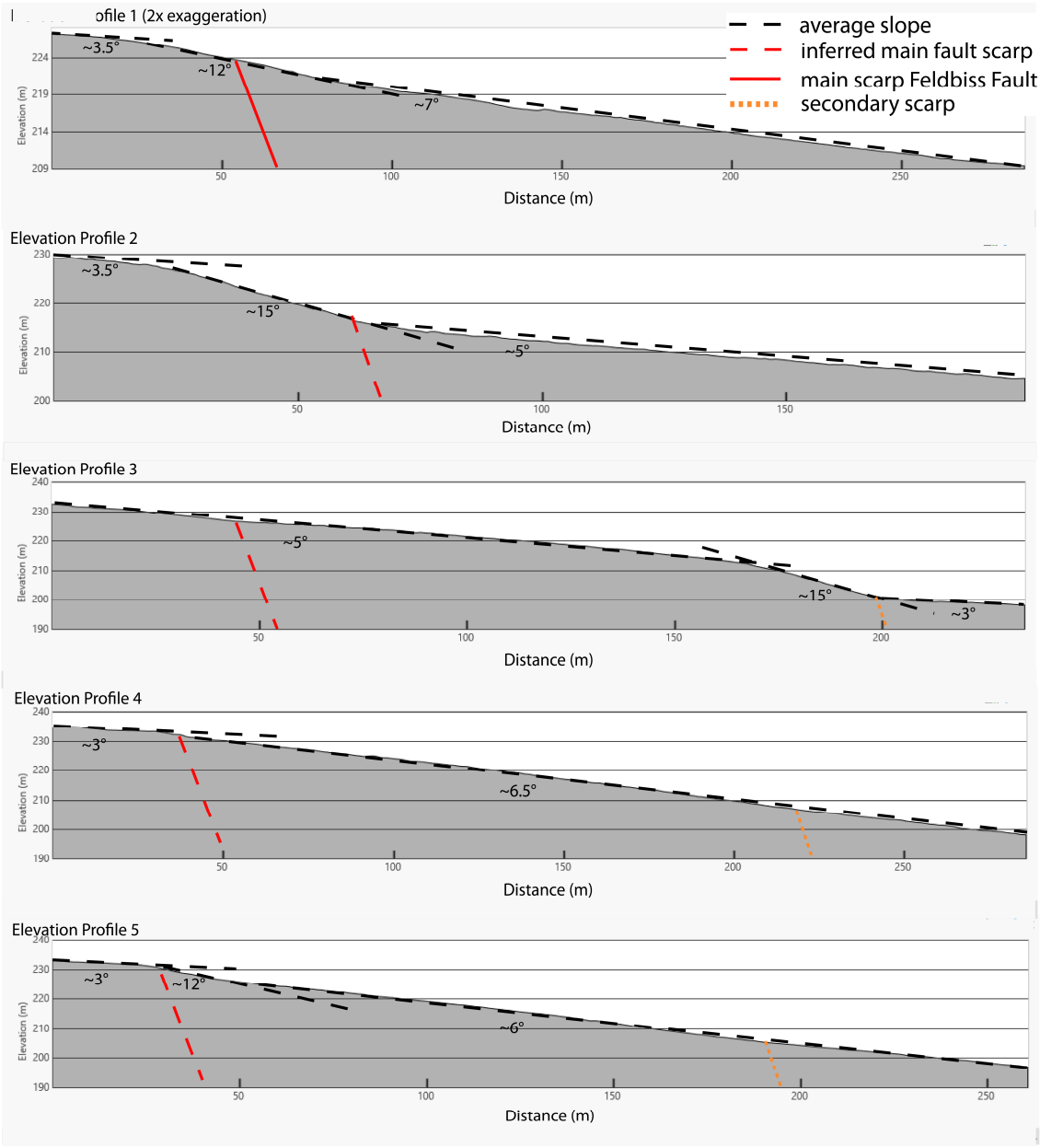
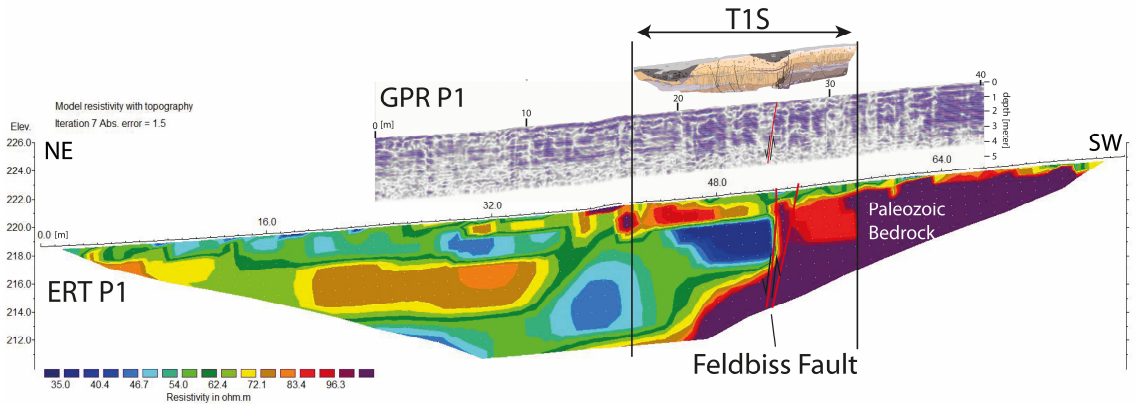


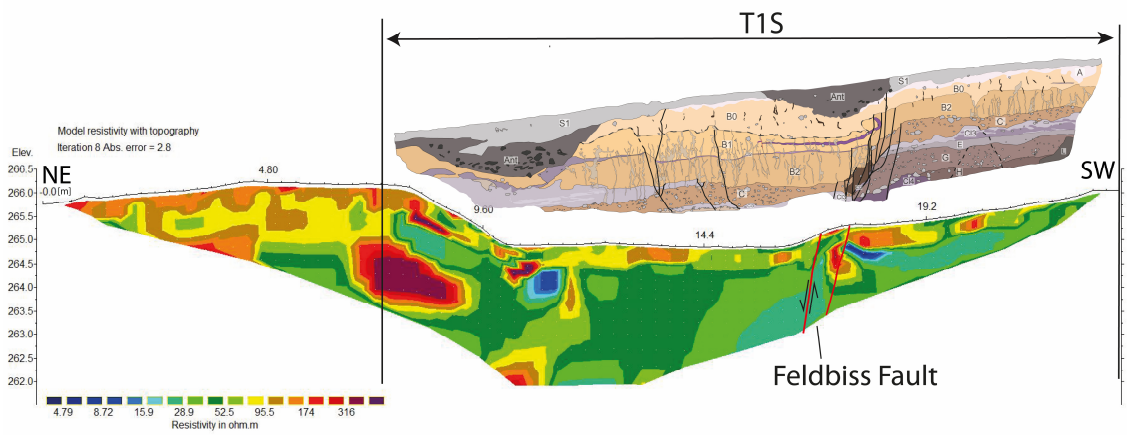
Fig. S1 *Elevation profiles P1 - P5 (location see Fig. 4) across the southern Feldbiss Fault scarp. Each profile plots elevation (y-axis) against horizontal distance (x-axis). The black dashed line indicates the average slope, while the red dashed line marks the inferred fault location. Profile 1 is shown with 2× vertical exaggeration to emphasize subtle topographic breaks. Slope angles (e.g., 3.5°, 12°, 7°).*



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20 ***Fig. S2*** *Combined representation of Electrical Resistivity Tomography (ERT) profile P1, Ground-Penetrating Radar*
21 *(GPR) profile P2, and the location of trench T1S. The ERT survey was conducted using a dipole–dipole configuration*
22 *with 1 m electrode spacing, revealing pronounced vertical resistivity variations in the fault zone and a clear correlation*
23 *with the trench stratigraphy of T1S. The GPR profile, acquired with a 400 MHz antenna, shows disrupted reflection*
24 *patterns within the fault zone. The black lines indicate the location of trench T1S.*

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27 ***Fig. S3*** *Combined representation of the Electrical Resistivity Tomography (ERT) profile P3 and trench stratigraphy of*
28 *T1S. The survey was performed using a Dipol-Dipol configuration with 1 m electrode spacing at the bottom of T1,*
29 *revealing pronounced vertical resistivity variations at the fault zone.*

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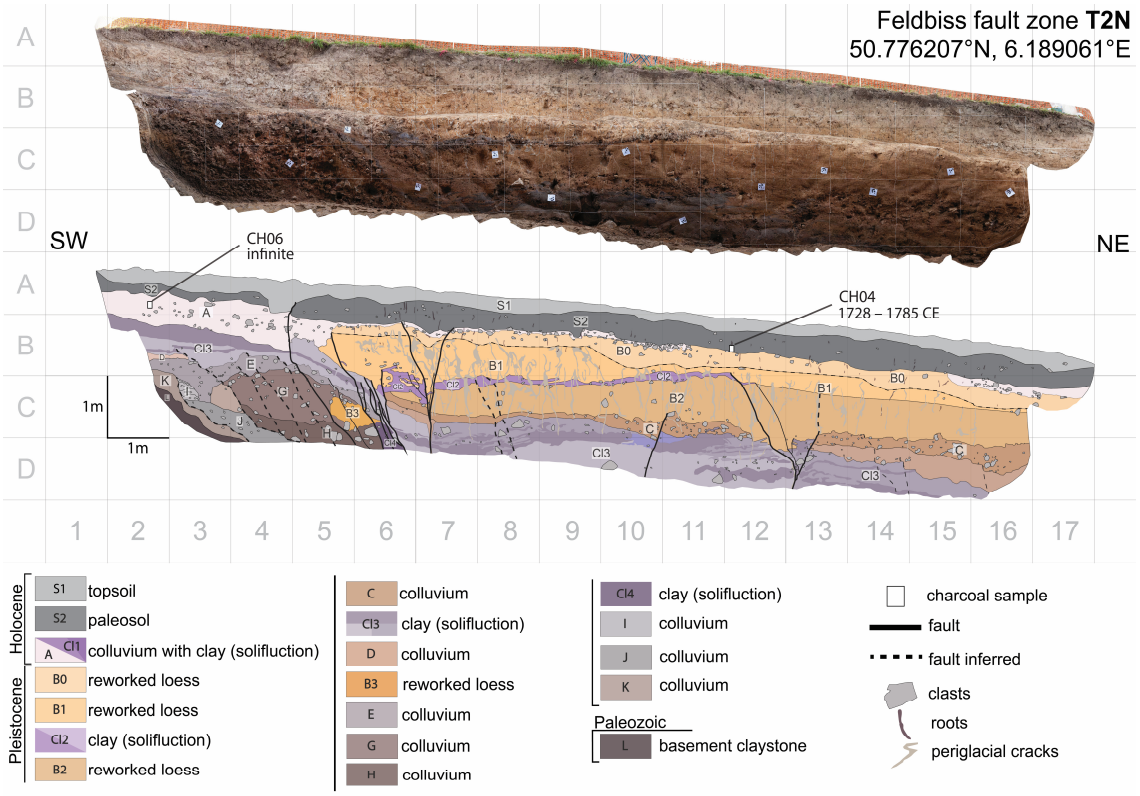


Fig. S4 *Trench log with geological interpretation of the northern wall of Trench 2 (T2N), indicating key stratigraphic boundaries, sedimentary units, and the main fault structures. The locations of charcoal samples are indicated. Dated ages are presented in Table 2.*

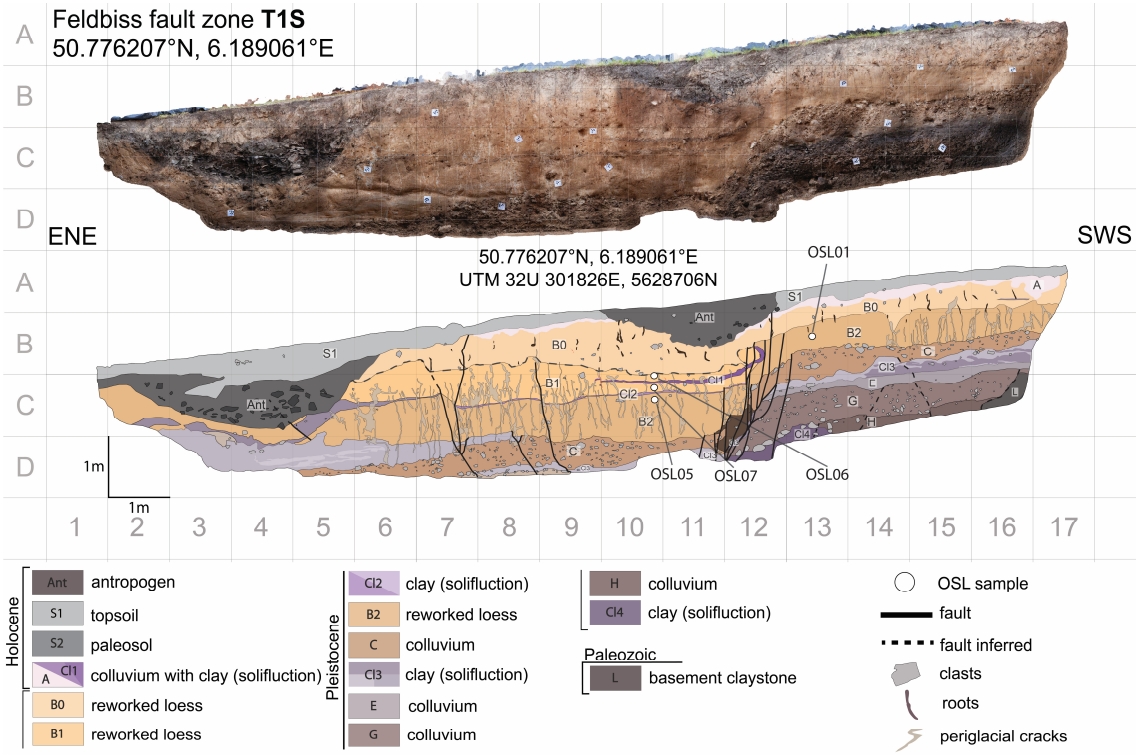
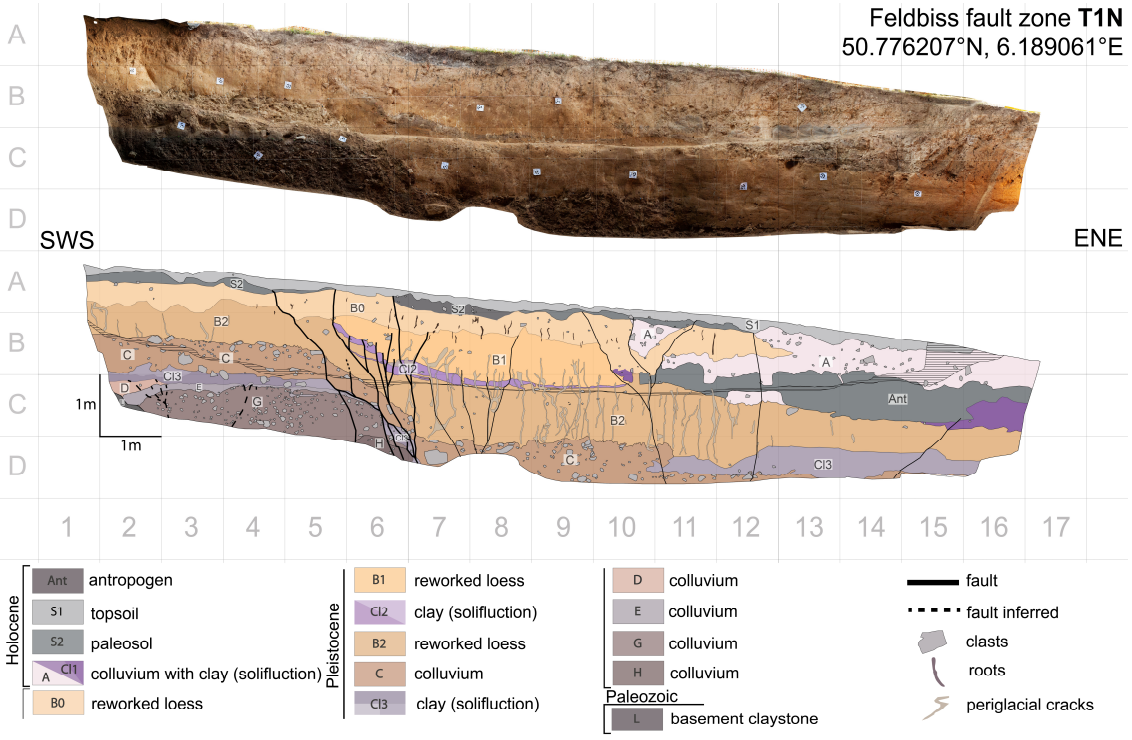


Fig. S5 *Trench log with geological interpretation of the southern wall of Trench 1 (T1S), indicating key stratigraphic boundaries, sedimentary units, and the main fault structures. The locations of OSL samples are indicated. Dated ages are presented in Table 1 and 2.*



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42 ***Fig. S6*** *Trench log with geological interpretation of the northern wall of Trench 1 (T1N), indicating key stratigraphic*

43 *boundaries, sedimentary units, and the main fault structures.*

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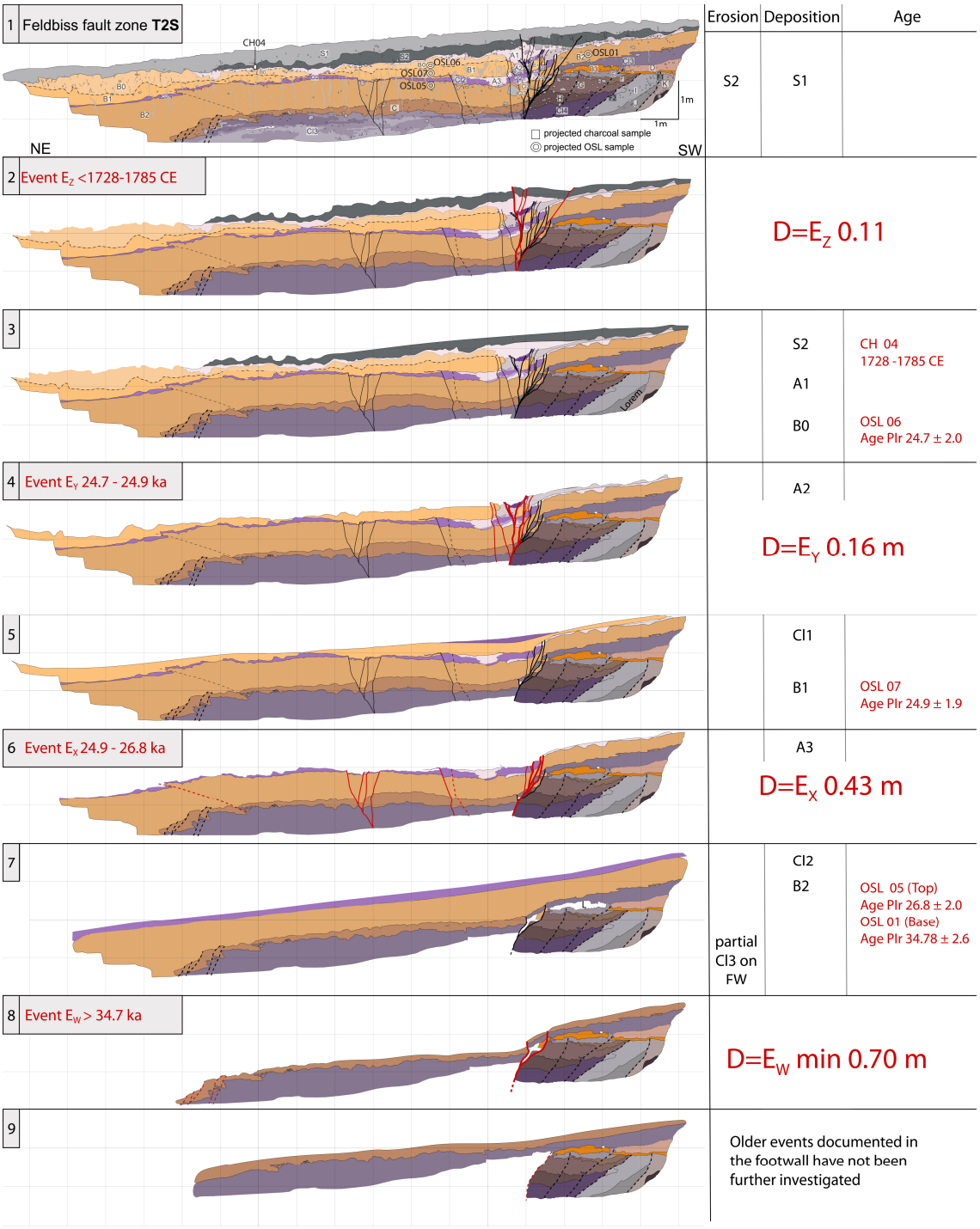


Fig. S7 *Schematic retrodeformation. Fault branches active during each event are shown in red (primary and secondary faults), whereas faults originating from earlier events are depicted in black. D= total displacement.*

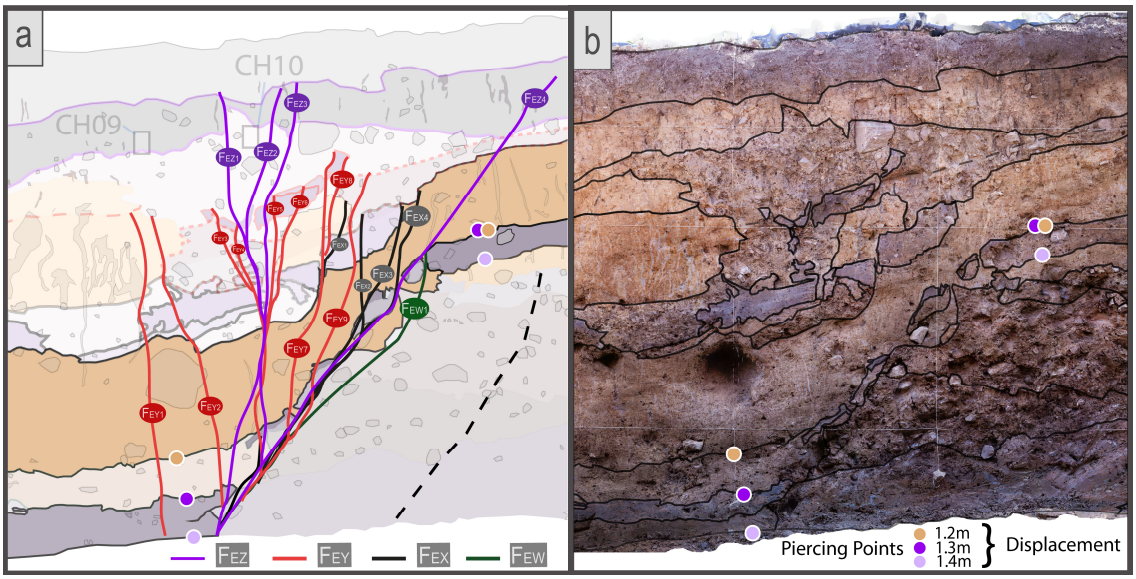


Fig. S8: (a) Labeled fault strands within the Feldbiss Fault. Colors correspond to the interpreted events: EZ (purple; faults FEZ 1–4), EY (red; faults FEY 1–9), EX (black; faults FEX 1–4), and EW (green; fault FEW 1). Additional piercing points used to calculate total displacement are also indicated. (b) Photograph of the fault zone with schematic stratigraphic interpretation and marked piercing points.

```
Plot()
{
Sequence(“Feldbiss south”)
{
Boundary(“start sequence”);
Date(“EW”);
Phase(“Unit B2”)
{
C_Date(“OSL 01”, (2022-34780), 2600);
C_Date(“OSL 05”, (2022-26800), 2000){z=155};
};
Date(“EX”);
Phase(“Unit B1”)
{
C_Date(“OSL 07”, (2022-24900), 1900){z=130};
};
Date(“EY”);
Phase(“Unit B0”)
{
C_Date(“OSL 06”, (2022-24700), 2000) {z=105};
};
Boundary(“historic”);
Phase(“Unit S2 ”)
{
R_Date("Ch04",175,15) {z=52};;
};
Date(“EZ”);
Boundary(“endsequence”, 2025 CE)
};
};
```

Fig. S9: OxCal 4.4 (Ramsey, 2021) code of the southern Feldbiss Fault earthquake age model. OSL imput ages are shown in Table 1. The ages of the paleoearthquakes are calculated using the OxCal Date function.

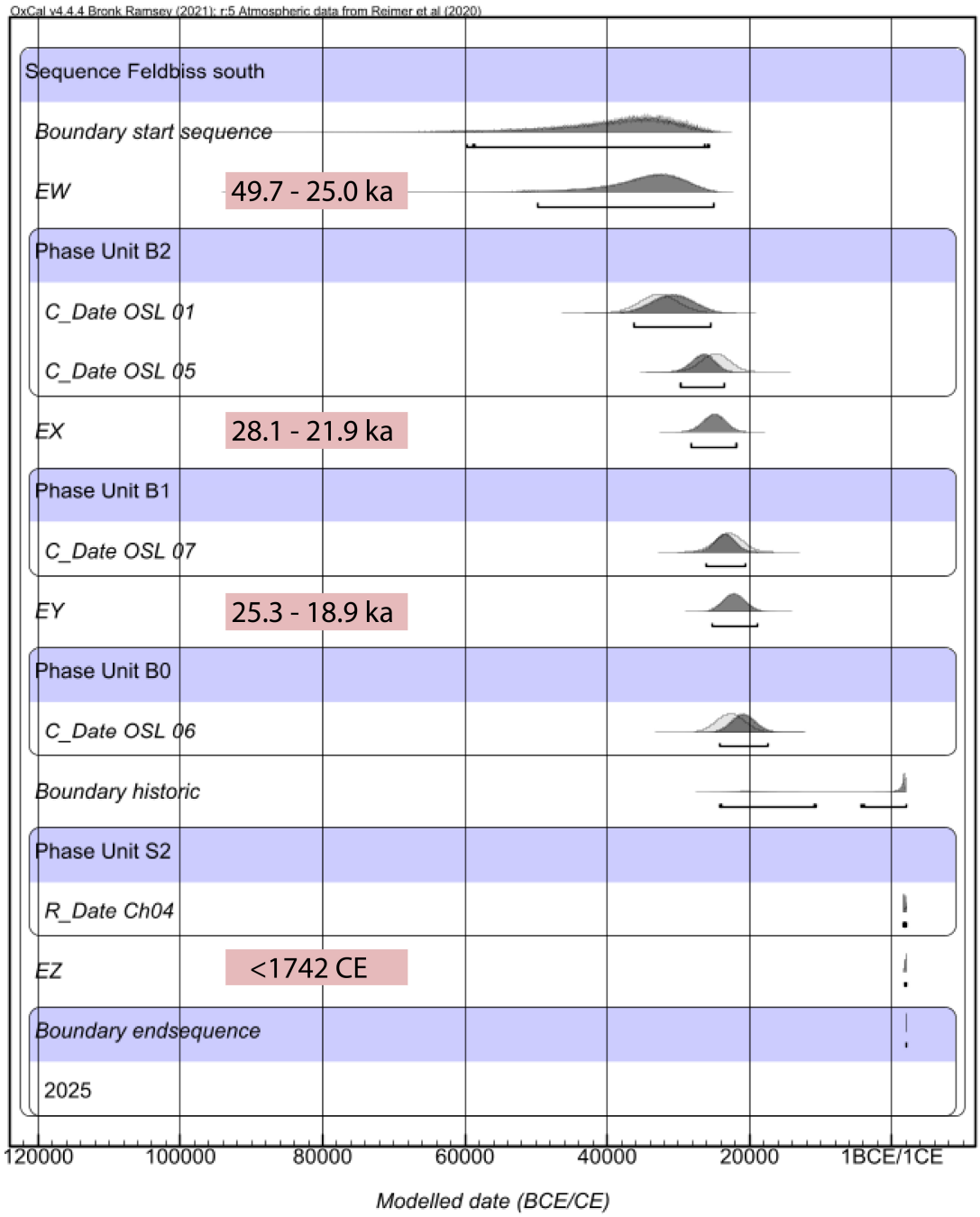


Fig. S10: OxCal 4.4 Earthquake age model (Bronk-Ramsey, 2017) showing chronological order of the modeled ages of stratigraphy and the surface rupturing paleoearthquakes EW,EX, EY, EZ (shown as PDFs, uncertainty ranges refer to 2σ).

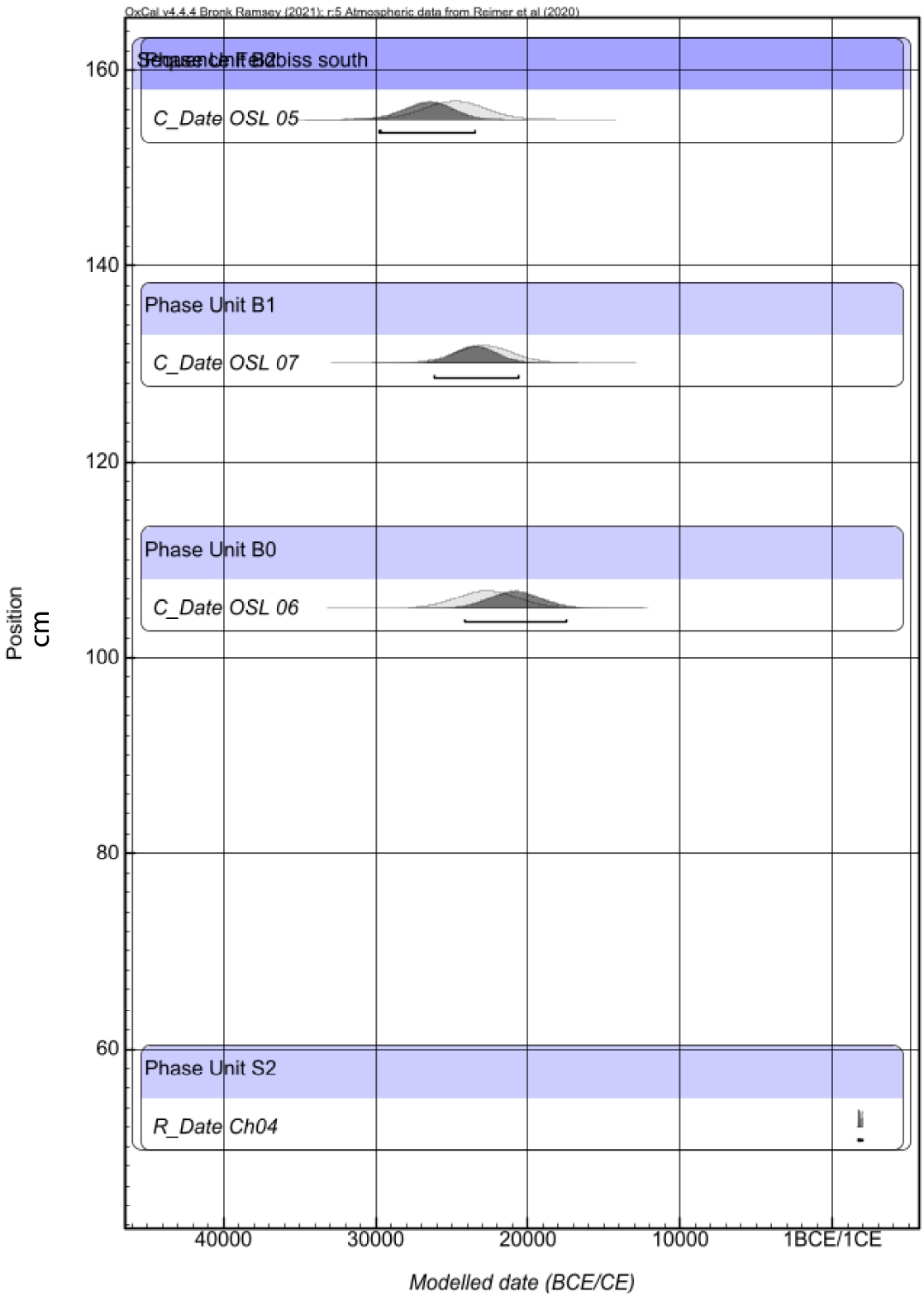


Fig. S11: OxCal 4.4 (Bronk-Ramsey, 2017) age – depth model (uncertainty ranges refer to 2σ).Input parameter are OSL and Charcoal ages as well as their respected sampling depth (Table 1 and 2).