

Observed vs Simulated — Goodness of Fit

intensitylab.com · ground motion validation report

WITHIN BAND · mean |bias| 0.544 · factor 1.72x

RESULT — BBP ROTD50 RESIDUALS (AUTHORITATIVE)

mean bias	0.544	(a factor of 1.72x)
mean sigma	0.88765	(station-to-station scatter)
stations compared	40	
spectral periods	63	
pass band	mean bias <= 0.69 (a factor of 1.99x), declared before the run	
bias at 0.1s	-1.245	simulation over-predicts by 247%
bias at 0.3s	-0.876	simulation over-predicts by 140%
bias at 1s	-0.901	simulation over-predicts by 146%
bias at 3s	-0.240	simulation over-predicts by 27%

CROSS-CHECK — THIS REPORT'S OWN SPECTRA

mean bias	0.835	(a factor of 2.31x)
mean sigma	0.836	
basis	geometric-mean horizontal, computed from the downloaded waveforms rather than BBP's residual tables. It will not match exactly; a large divergence indicates a pipeline fault, not physics.	

EVENT

USGS id	nc72282711
magnitude	M6.02 (mw)
origin time	2014-08-24 10:20:44 UTC
epicentre	38.2152, -122.3123
depth	11.1 km
region	The 2014 South Napa, California Earthquake

Provenance

nc72282711 · generated 2026-08-04 20:33 UTC

SIMULATION

produced by	BBP simulated
BBP job id	job_7b20ecd07ce6408394a3
BBP version	22.4.0
method	GP
realizations	1 of 1 succeeded – a single stochastic rupture, not an ensemble; the bias below is one draw
realization used	r0001
sites in job spec	–
job submitted	2026-08-04T20:16:14Z
per-site Vs30 from	submit-time record (/app/plots/gof_work/nc72282711/compare/station_specs.json)

SOURCE PARAMETERS

magnitude used	–
hypocentre	–
depth	–
strike / dip / rake	–
mechanism source	USGS moment tensor, nodal plane 1 – the conjugate plane is equally consistent with the tensor and gives different amplitudes

VELOCITY MODEL

region used	NoCal500
native for this location	Mojave500 – not installed, so the run is approximate. LABasin500 carries a deep sedimentary basin that Ridgecrest does not have, which would amplify 0.3-1 s motion.
calibration	M6.02 against GP's ~M5.5 floor
platform	arm64 under emulation – amplitudes are not SCEC-reference-accurate; this number measures BBP plus Rosetta and cannot separate them

Observed data and processing

fetches 2026-08-04T20:14:43Z

STATION SELECTION

search radius	100.0 km
policy	all usable within radius
stations on event	966
without FDSN code	0 – cannot be queried at all
candidates	532
usable records	349 (183 returned no usable 3-component set)
in this report	40 with both observed and simulated
distance range	4.0 – 30.1 km

INSTRUMENTATION

channel priority	HN?, EN?, HH?, BH?, EH?
channels used	EN, HN
data centres	EARTHSCOPE, NCEDC, SCEDC
mixed instrument types	yes – strong-motion and broadband are both present, which puts a second variable into the residual
Vs30 source	ShakeMap stationlist (per-station)

SIGNAL PROCESSING

window	origin -60.0 s to +300.0 s (requested)
records not starting as requested	30 of 40 – triggered instruments whose data begins later. Each trace's true start is measured and used; assuming the requested lead would misplace them.
response removal	to acceleration and velocity separately, pre-filter (0.05, 0.1, 20.0, 25.0) Hz
resampled to	100.0 Hz
time origin	t = 0 is the rupture origin for both observed and simulated traces on every overlay

How to read this report

the metric, the sign convention, and the limits

THE METRIC

definition	$\ln(\text{observed} / \text{simulated})$ RotD50 spectral acceleration, averaged across stations at each period.
sign	POSITIVE means the simulation under-predicts – real shaking was larger. NEGATIVE means it over-predicts.
scale	It is a log ratio: ± 0.10 is about $\pm 10\%$, ± 0.69 is a factor of 2, ± 1.10 is a factor of 3.
sigma	The station-to-station spread around that average. A large sigma with a small bias means the model is right on average and wrong site by site.

READING THE PATTERN

short-period poor, long-period good	Points at high-frequency attenuation or near-surface site response rather than the source.
long-period poor, short-period good	Points at the source – corner frequency, stress drop – or at basin response in the velocity model.
one station far off	Usually 3D site or directivity effects that a 1D layered velocity model cannot reproduce by construction. Check whether it is driving the sigma before treating it as model error.

WHAT THIS DOES NOT TELL YOU

A pass means the simulation is consistent with recordings at these stations, for this event, under this velocity model, on this hardware. It is not a general statement about BBP, and it is not a prediction of accuracy at an unrecorded site.

Station summary — three independent sources (1/2)

ShakeMap = amplitudes the seismic network reported in stationlist.json. obspy = the same recordings fetched from FDSN and processed here. BBP = simulated. The first two should agree closely; where they do not, the ShakeMap quality flags usually explain why.

Station	Dist (km)	Vs30 BBP	Vs30 ShakeMap	Chan	PGA (g) ShakeMap	PGA (g) obspy	PGA (g) BBP	PGV (cm/s) ShakeMap	PGV (cm/s) obspy	PGV (cm/s) BBP	PGD (cm) obspy	PGD (cm) BBP	PGD (cm) obs/sim	ln(obs/sim)	Flags
NC.NHC	4.0	205	205	HNE	0.4029	0.3920	0.4443	59.8	57.4	31.0	22.03	8.08	2.73x	-0.125	—
CE.68150	6.9	272	272	HNE	0.3580	0.3700	0.3915	54.8	55.6	27.7	16.36	6.56	2.50x	-0.056	—
NC.N016	9.6	291	291	HNE	0.6468	0.6101	0.3858	34.4	46.9	23.8	14.77	9.24	1.60x	+0.458	—
YK.KRE	10.1	674	674	ENE	0.3408	0.3491	0.3521	25.9	25.5	17.4	6.79	2.31	2.94x	-0.009	—
NC.NGVB	11.1	680	680	HNE	0.1105	0.1071	0.4020	12.9	12.0	17.3	5.48	4.12	1.33x	-1.323	—
CE.68294	11.5	375	375	HNE	0.4660	0.3903	0.3675	17.4	17.4	25.7	2.71	6.88	0.39x	+0.060	—
NC.N019B	12.3	685	685	HNE	0.3429	0.3349	0.3383	62.1	62.7	13.0	22.52	3.33	6.76x	-0.010	Unkn
NP.1765	12.8	325	325	HNE	0.4507	0.4268	0.2941	86.9	92.4	23.8	32.30	7.12	4.54x	+0.372	—
NP.1759	12.9	450	450	HNE	0.3455	0.3225	0.3088	17.1	20.9	15.3	1.90	4.98	0.38x	+0.043	—
NC.NSP	13.4	674	674	HNE	0.0545	0.0506	0.3010	7.8	10.1	19.3	4.28	3.31	1.29x	-1.784	—
NC.NTO	14.4	279	279	HNE	0.0381	0.0374	0.3109	6.1	5.7	42.9	1.30	10.89	0.12x	-2.117	Outl
NC.N002	15.4	274	274	HNE	0.0930	0.0922	0.2864	6.7	6.8	25.5	2.15	6.68	0.32x	-1.133	—
NP.1829	15.4	357	357	HNE	0.1427	0.1438	0.3043	24.9	18.9	22.0	7.70	5.05	1.53x	-0.750	—
NC.NMI	16.2	377	377	HNE	0.3774	0.3594	0.3083	19.0	18.9	16.5	1.12	5.68	0.20x	+0.153	—
NC.NLH	17.6	452	452	HNE	0.0939	0.0926	0.2795	7.0	6.8	19.2	1.33	5.38	0.25x	-1.104	—
BK.CVS	19.3	692	692	HNE	0.1230	0.1208	0.1757	18.5	17.7	8.2	8.66	2.82	3.07x	-0.374	—
NC.C032	19.9	464	464	HNE	0.1401	0.1395	0.2087	7.9	7.5	13.4	0.99	5.02	0.20x	-0.403	—
NP.1813	20.4	422	422	HNE	0.1230	0.1265	0.2409	7.8	8.3	12.7	0.93	4.88	0.19x	-0.644	—
NC.NBRB	21.5	624	624	HNE	0.0438	0.0414	0.1724	10.6	9.6	9.7	5.74	2.53	2.27x	-1.427	—
NC.N013	22.8	693	693	HNE	0.0873	0.0850	0.1357	6.5	6.3	7.6	3.67	2.39	1.54x	-0.468	—
CE.68367	23.9	373	373	HNE	0.0740	0.0738	0.1708	5.1	4.9	10.2	0.89	4.63	0.19x	-0.839	—
NC.N003	24.2	667	667	HNE	0.0172	0.0162	0.1757	1.7	1.6	13.1	1.06	3.42	0.31x	-2.384	—
NC.C040	25.0	442	442	HNE	0.0628	0.0625	0.1482	5.3	4.1	11.8	1.23	5.00	0.25x	-0.864	—
NP.1848	25.1	414	414	HNE	0.0038	0.1489	0.1701	1.1	9.6	12.7	3.94	3.64	1.08x	-0.133	Outl

Station summary — three independent sources (2/2)

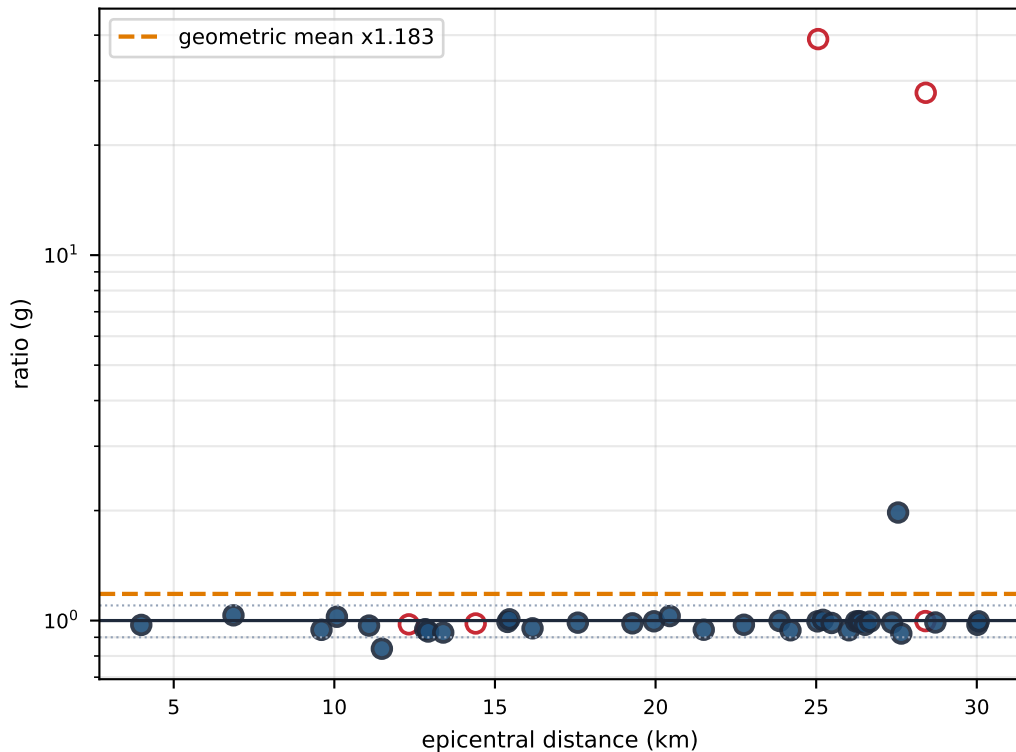
ShakeMap = amplitudes the seismic network reported in stationlist.json. obspy = the same recordings fetched from FDSN and processed here. BBP = simulated. The first two should agree closely; where they do not, the ShakeMap quality flags usually explain why.

PGD is the animation pipeline's own number on both sides, read from the displacement each side hands to Blender — a different processing chain from the PGA and PGV columns, and from each other. See the displacement pages at the end.

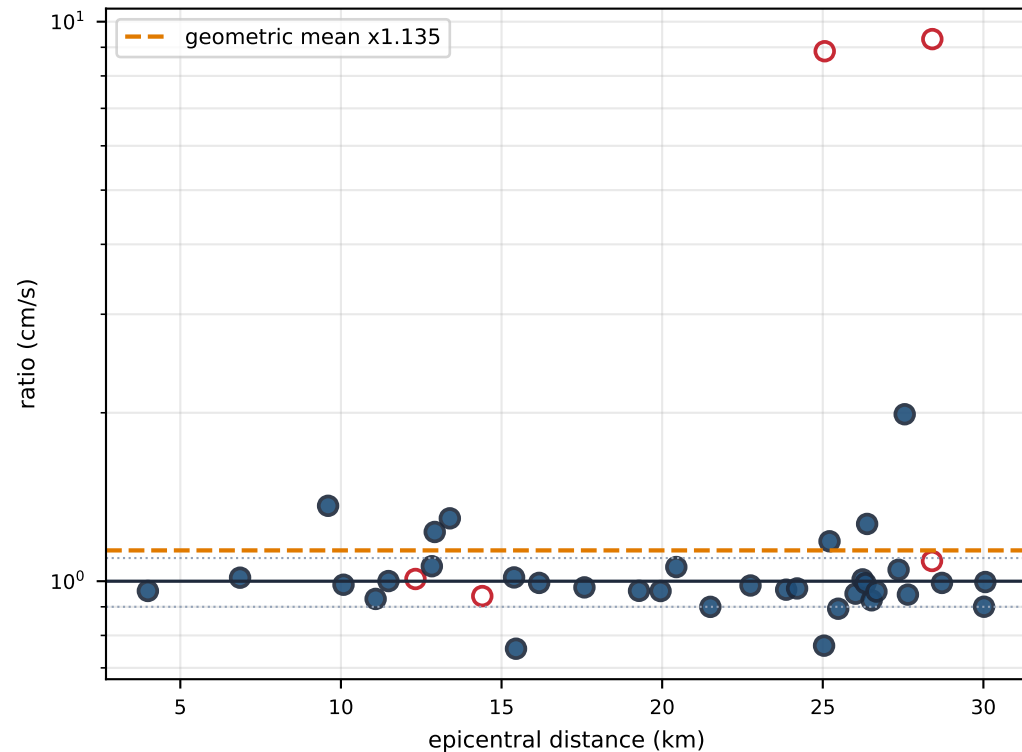
Station	Dist (km)	Vs30 BBP	Vs30 ShakeMap	Chan	PGA (g) ShakeMap	PGA (g) obspy	PGA (g) BBP	PGV (cm/s) ShakeMap	PGV (cm/s) obspy	PGV (cm/s) BBP	PGD (cm) obspy	PGD (cm) BBP	PGD obs/sim	ln(obs/sim)	Flags
CE.68433	25.2	312	312	HNE	0.0429	0.0431	0.1746	2.8	3.3	21.2	0.94	6.39	0.15x	-1.398	—
NC.NAPC	25.5	520	520	HNE	0.1159	0.1141	0.1298	21.6	19.3	7.2	10.07	2.79	3.61x	-0.129	—
NC.NHF	26.0	514	514	HNE	0.0395	0.0372	0.1428	1.9	1.8	12.8	0.51	3.32	0.15x	-1.345	—
NC.N014	26.2	324	324	HNE	0.0877	0.0872	0.1741	7.2	7.3	10.8	2.87	2.80	1.03x	-0.691	—
CE.58368	26.3	383	383	HNE	0.2029	0.2022	0.2077	12.1	12.0	15.5	0.97	4.47	0.22x	-0.027	—
CE.58558	26.4	443	443	HNE	0.0285	0.0283	0.1866	2.3	2.9	12.7	0.90	4.42	0.20x	-1.888	—
NC.CPI	26.5	436	436	HNE	0.0655	0.0637	0.1591	5.6	5.2	9.2	1.18	3.85	0.31x	-0.915	—
NC.C067	26.7	441	441	HNE	0.0598	0.0594	0.1529	3.8	3.6	10.9	0.82	4.11	0.20x	-0.946	—
NP.1847	27.4	303	303	HNE	0.1005	0.0992	0.1832	8.7	9.1	12.2	1.15	4.03	0.29x	-0.613	—
NC.NSM	27.6	698	698	HNE	0.0717	0.1415	0.1161	9.8	19.4	6.1	5.30	1.96	2.70x	+0.199	—
NC.NCC	27.6	706	706	HNE	0.0148	0.0136	0.1093	1.0	1.0	6.3	0.39	1.89	0.21x	-2.083	—
CE.58408	28.4	255	255	HNE	0.0169	0.0168	0.1608	1.8	1.9	19.4	0.55	6.54	0.08x	-2.258	Outl
NP.1768	28.4	325	325	HNE	0.0019	0.0532	0.1515	0.5	4.6	10.0	1.77	2.56	0.69x	-1.047	Outl
NC.CSPB	28.7	447	447	HNE	0.0288	0.0285	0.1654	3.8	3.8	9.5	1.07	4.10	0.26x	-1.759	—
NP.1823	30.0	479	479	HNE	0.0767	0.0747	0.1148	6.0	5.4	7.6	0.70	2.46	0.28x	-0.429	—
CE.58421	30.1	241	241	HNE	0.0234	0.0233	0.1630	2.3	2.3	15.9	0.49	5.65	0.09x	-1.947	—

Cross-check — two processings of the same recordings

PGA — obspy / ShakeMap-reported
36 of 40 within $\pm 10\%$

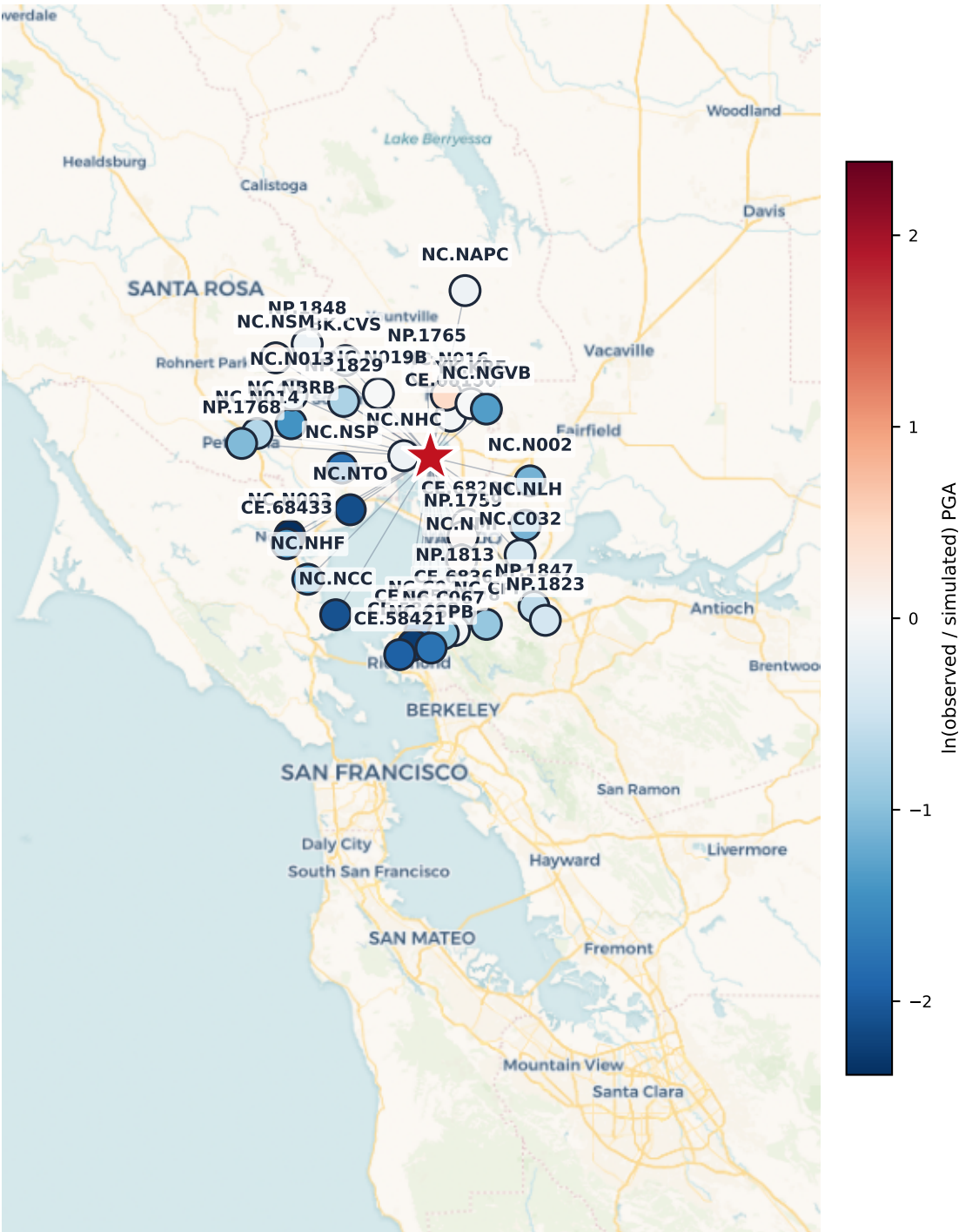


PGV — obspy / ShakeMap-reported
28 of 40 within $\pm 10\%$

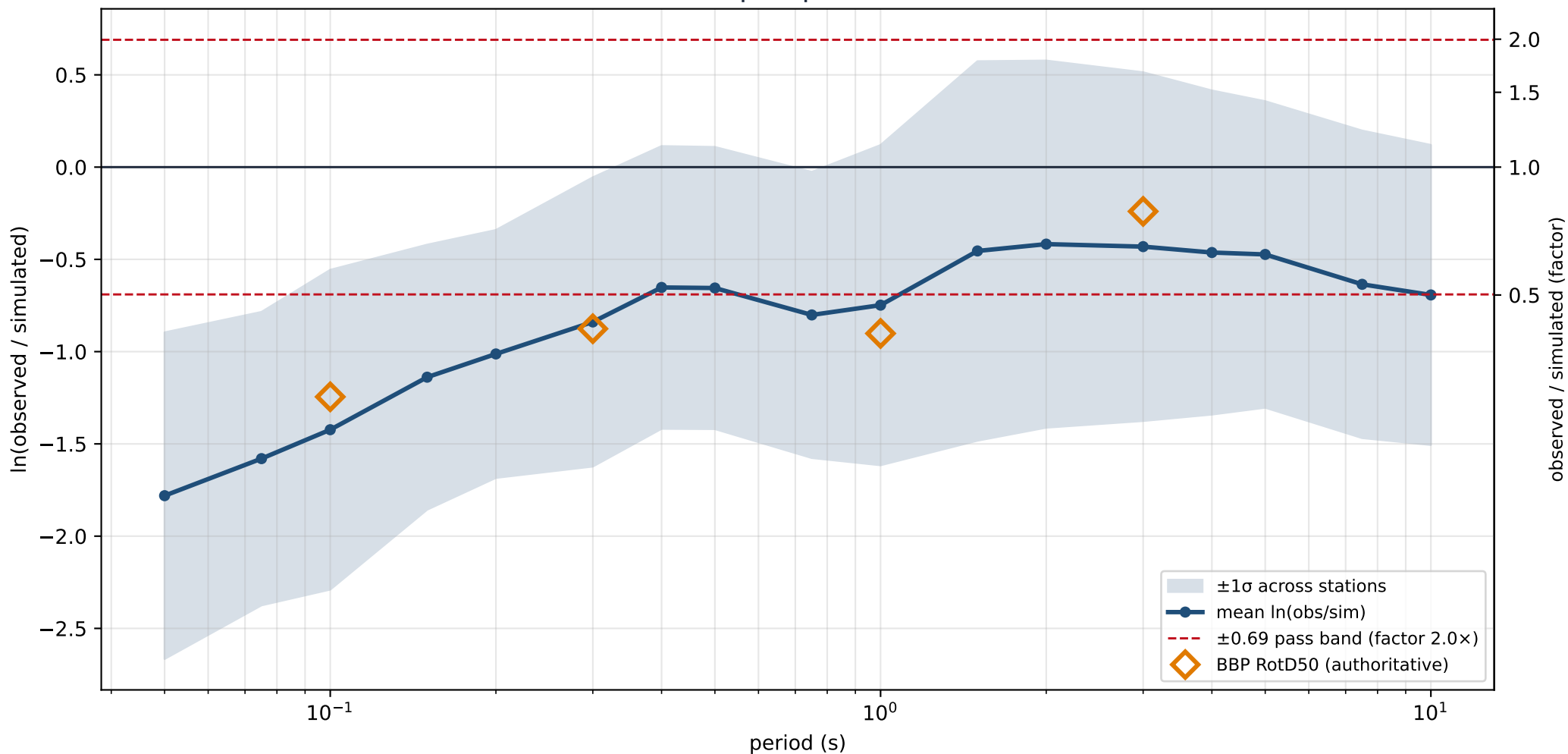


Low red markers are stations ShakeMap flagged (IncompleteRecord, Outlier, ...). Dotted lines are $\pm 10\%$. A consistent offset would mean our processing differs systematically from the network

Station geometry — nc72282711 M6.02
star = epicentre; marker colour = $\ln(\text{obs}/\text{sim})$ PGA residual (red = observed larger)



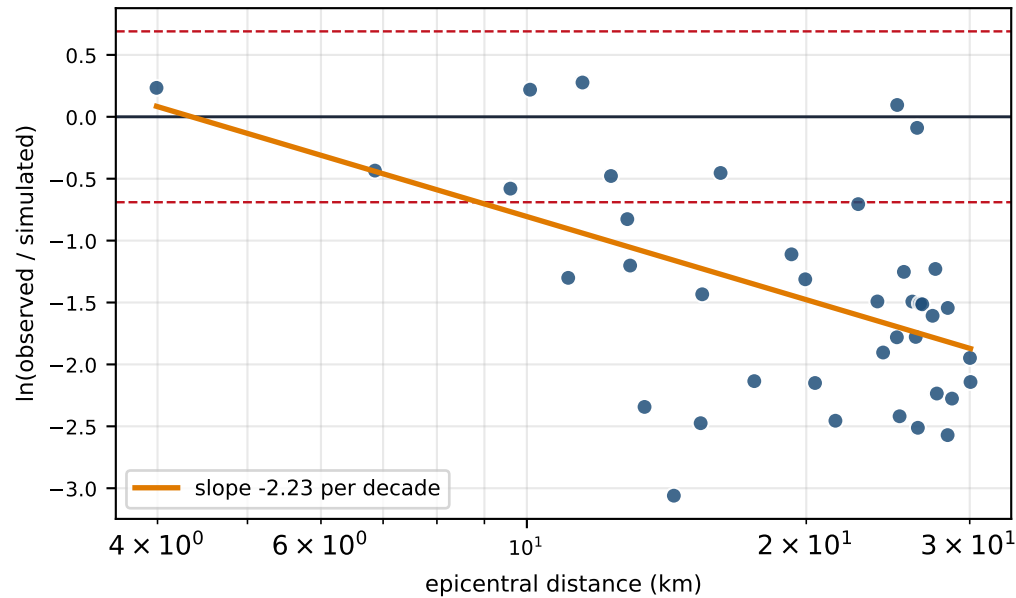
Goodness of fit — log residual by period
this report's spectra: mean |bias| = 0.835 (factor 2.31×)
BBP RotD50: mean |bias| = 0.544 (factor 1.72×)



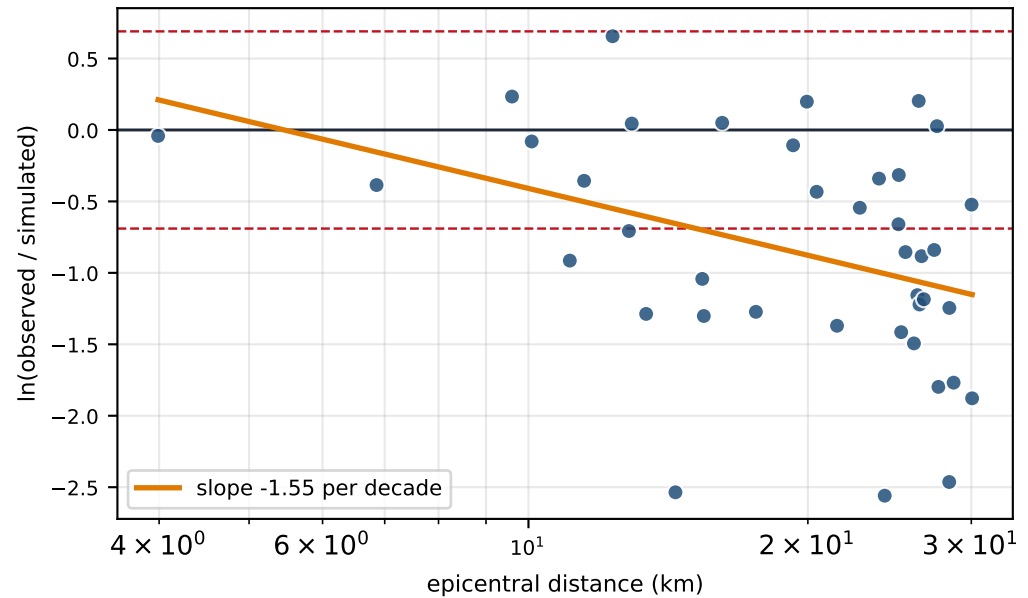
Positive = the simulation under-predicts (real shaking was larger). Negative = it over-predicts.

Residual versus distance — is the error constant, or does it grow?

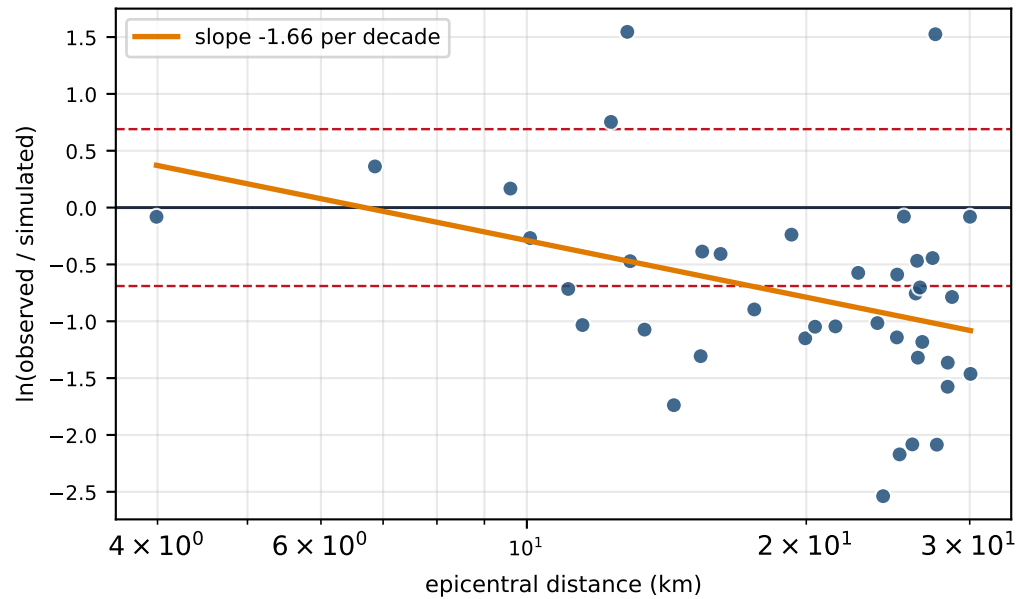
T = 0.1 s mean -1.423 (factor 4.15x over-predicted)



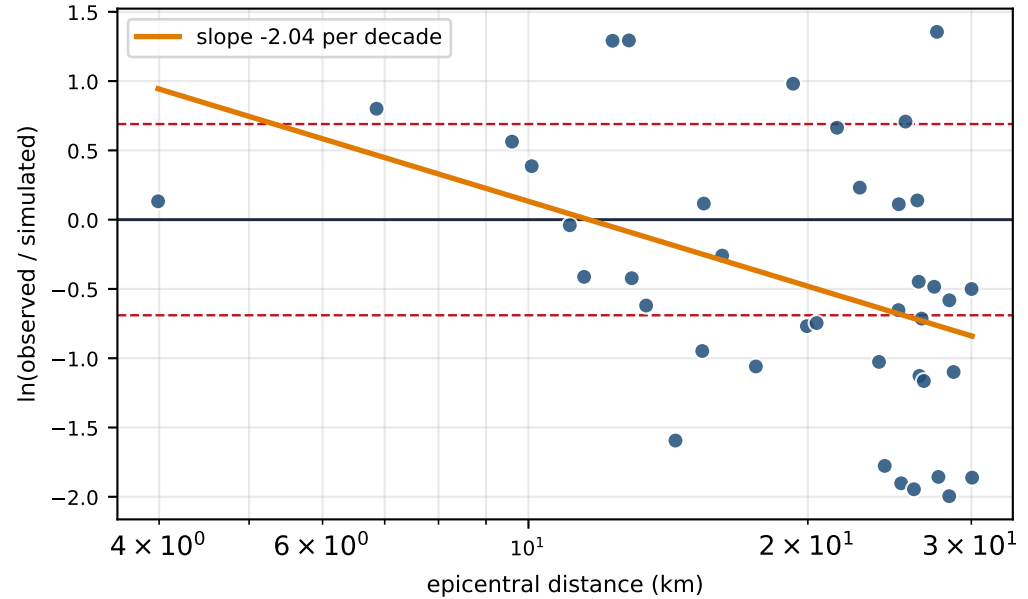
T = 0.3 s mean -0.839 (factor 2.31x over-predicted)



T = 1 s mean -0.748 (factor 2.11x over-predicted)

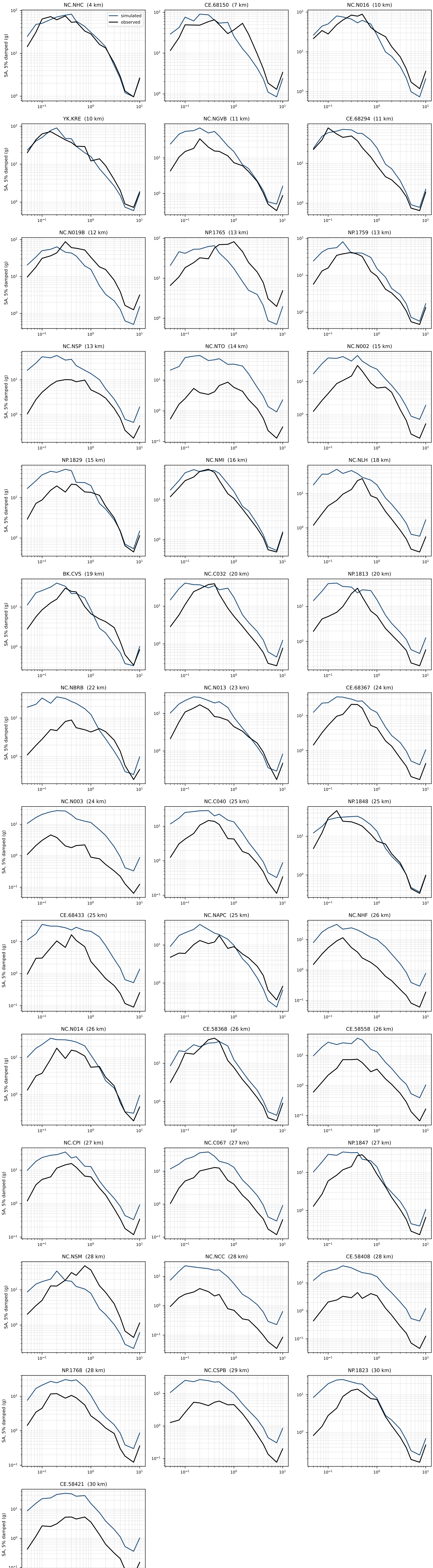


T = 3 s mean -0.431 (factor 1.54x over-predicted)

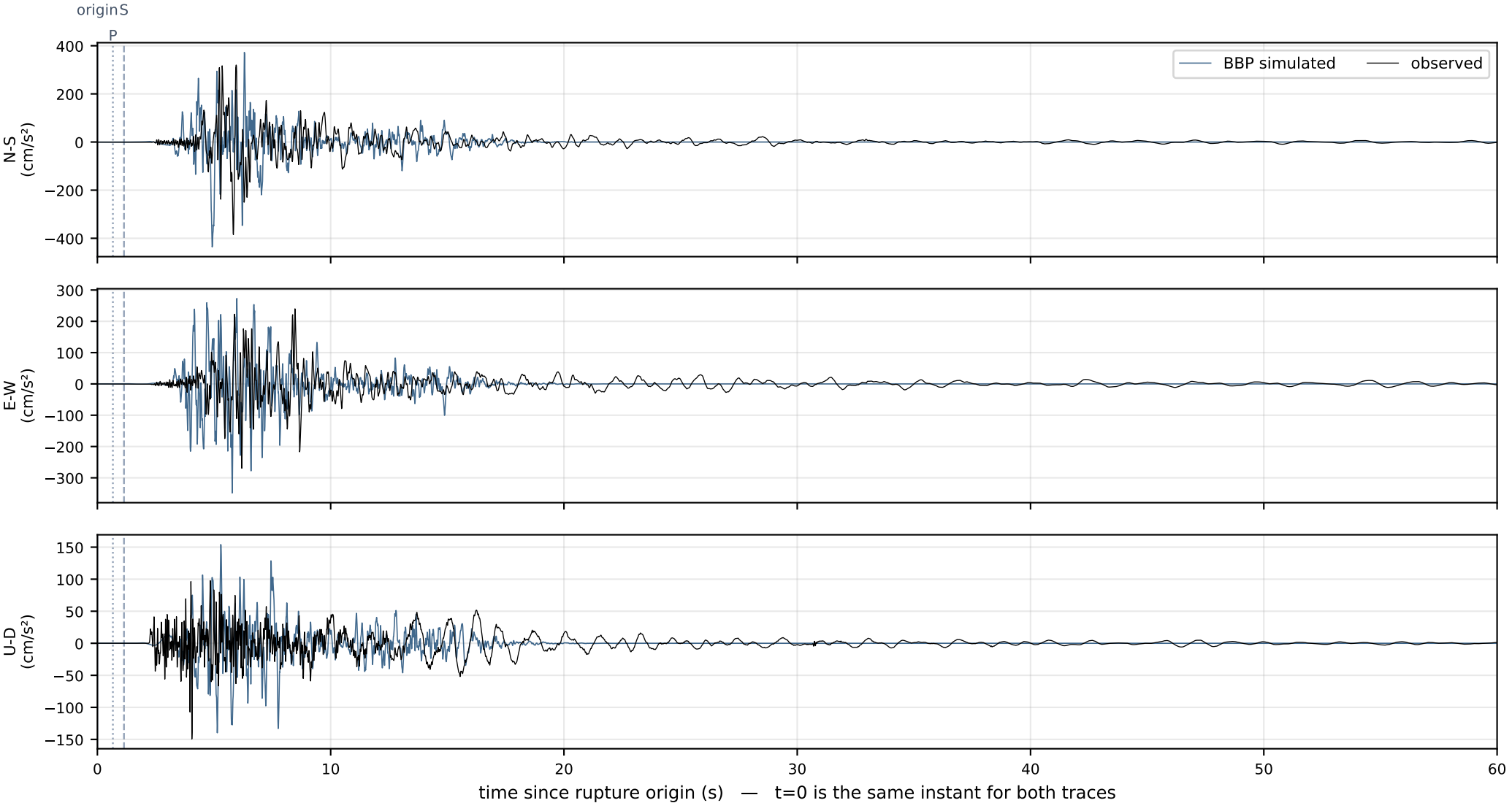


Flat offset = amplitude/site problem. Sloping = attenuation problem. Dashed lines are the ± 0.69 pass band.

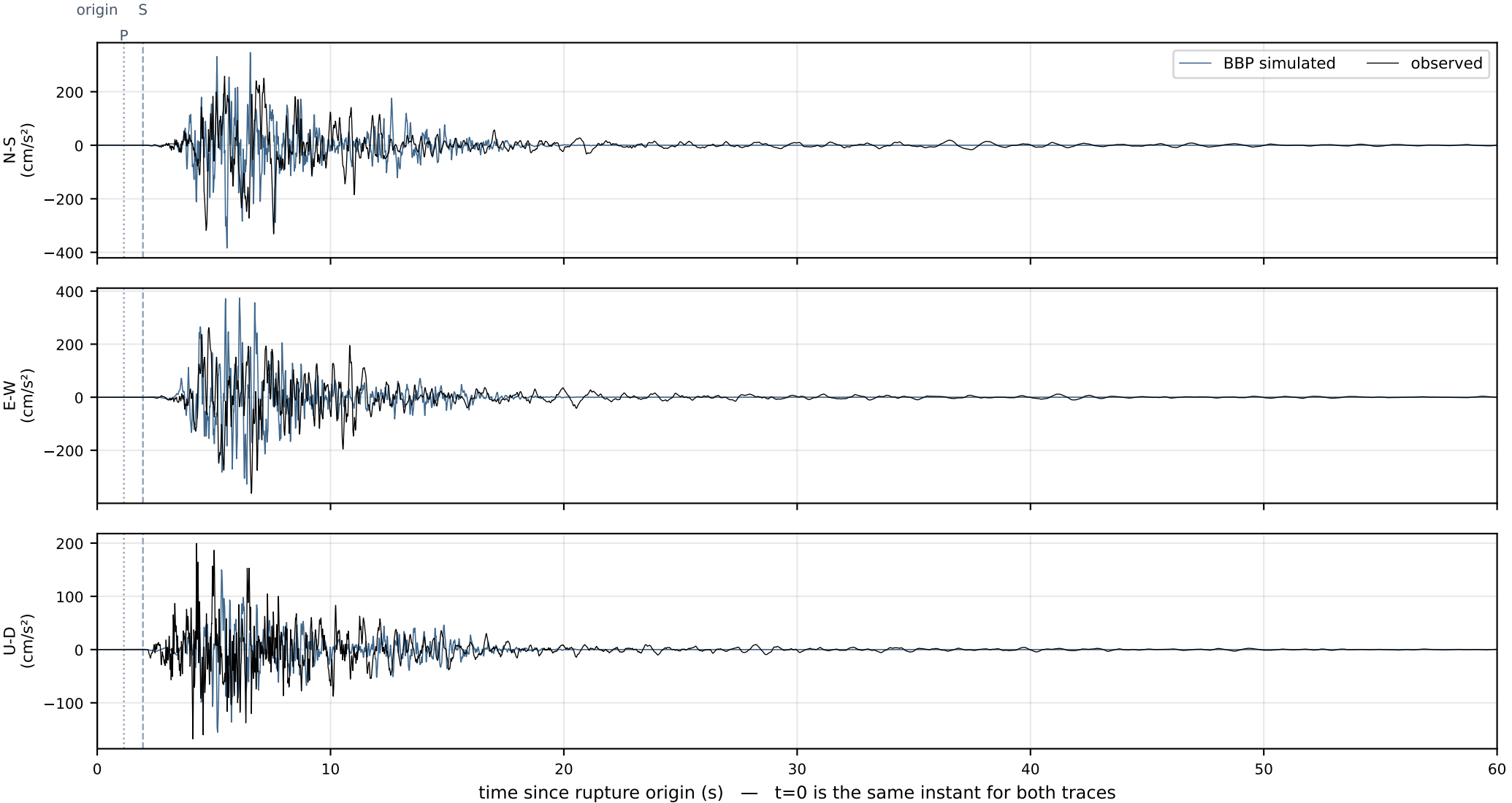
Response spectra — observed vs simulated (geometric-mean horizontal)



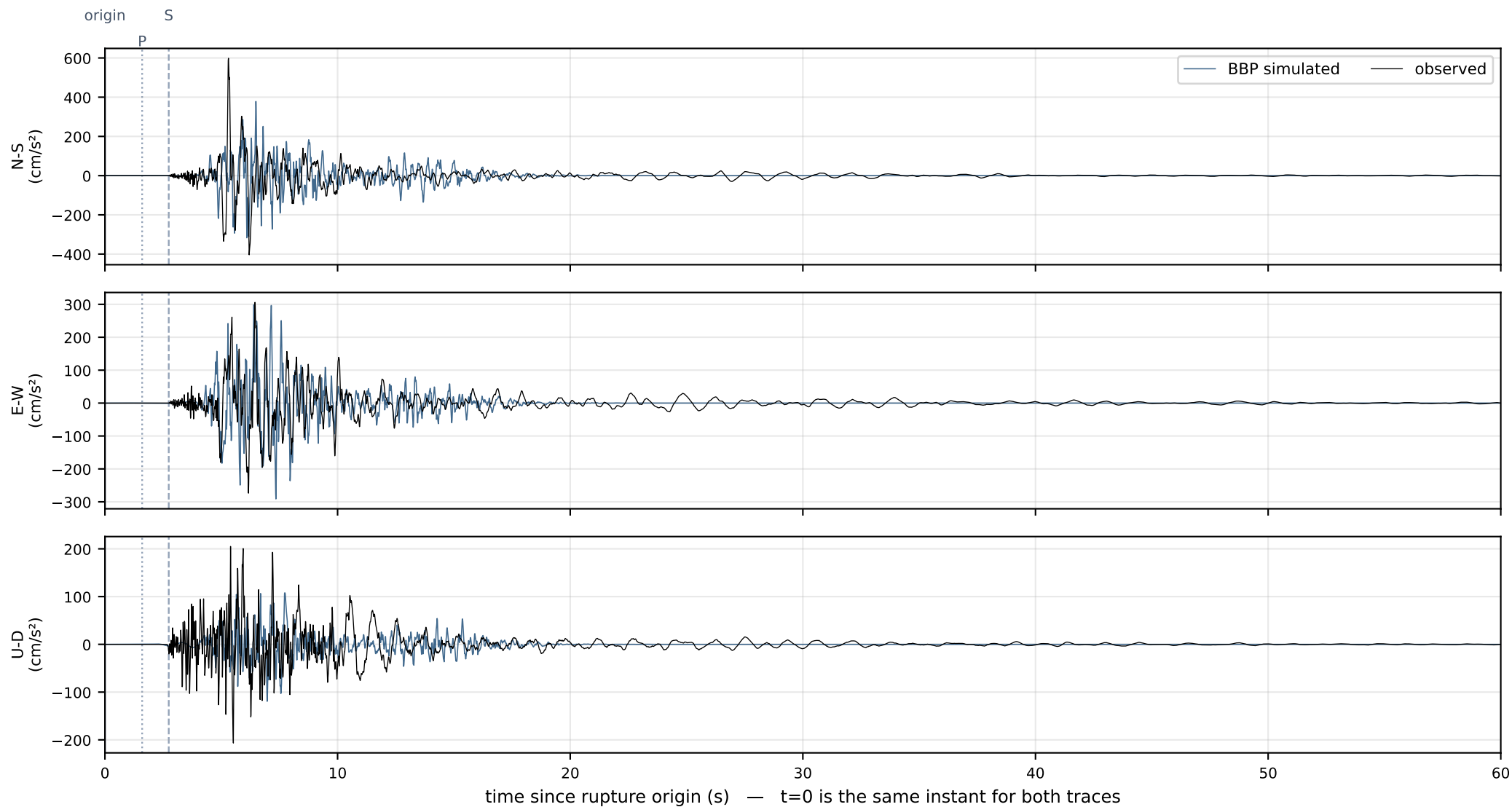
NC.NHC — 4.0 km, Vs30 205 m/s, HNE (NCEDC)
observed PGA 0.3920 g · simulated PGA 0.4443 g · $\ln(\text{obs}/\text{sim}) = -0.125$ · observed peak at +5.8 s
observed record starts 60.0 s before origin



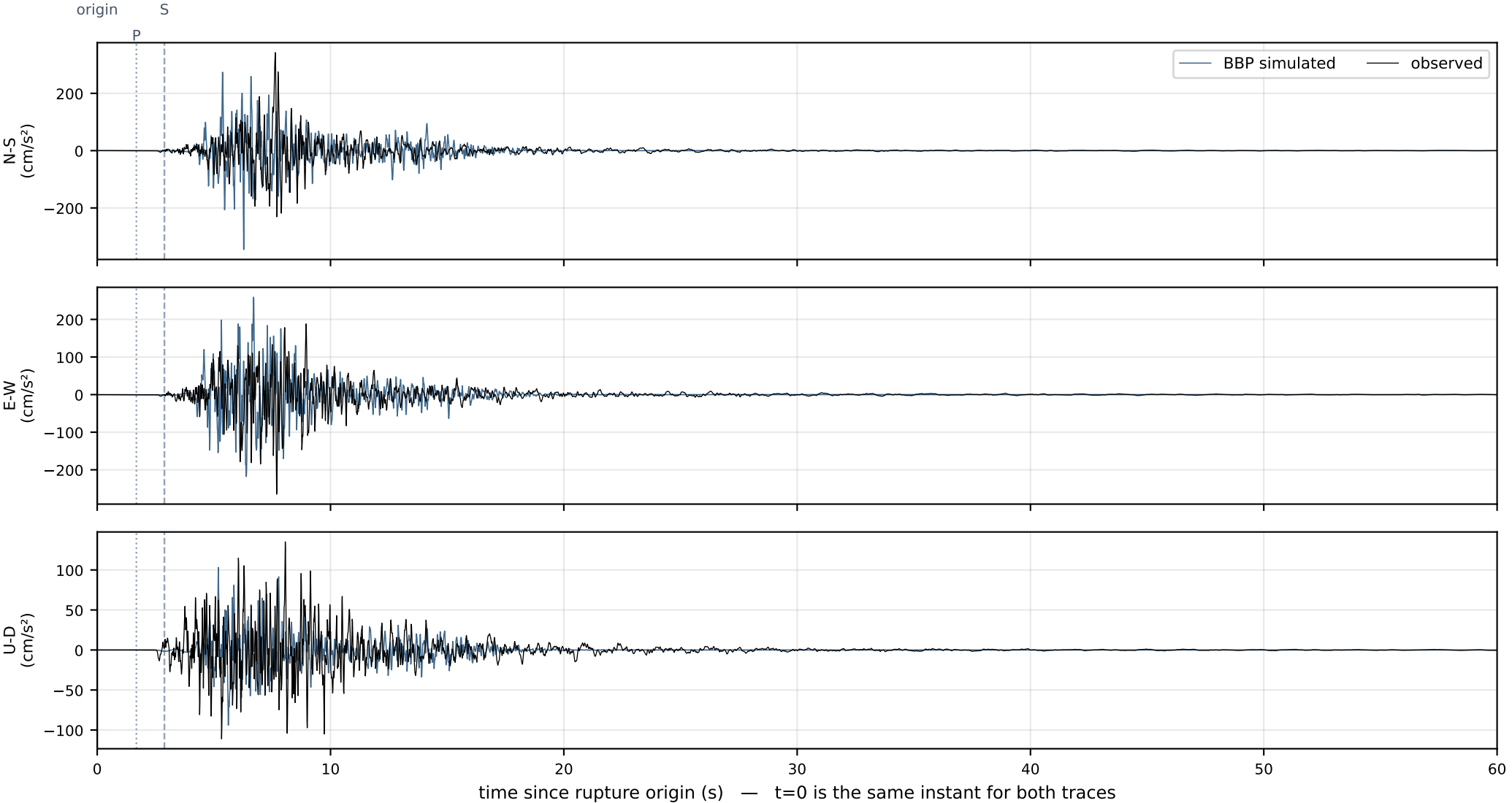
CE.68150 — 6.9 km, Vs30 272 m/s, HNE (NCEDC)
observed PGA 0.3700 g · simulated PGA 0.3915 g · $\ln(\text{obs}/\text{sim}) = -0.056$ · observed peak at +6.6 s
observed record starts 23.0 s before origin



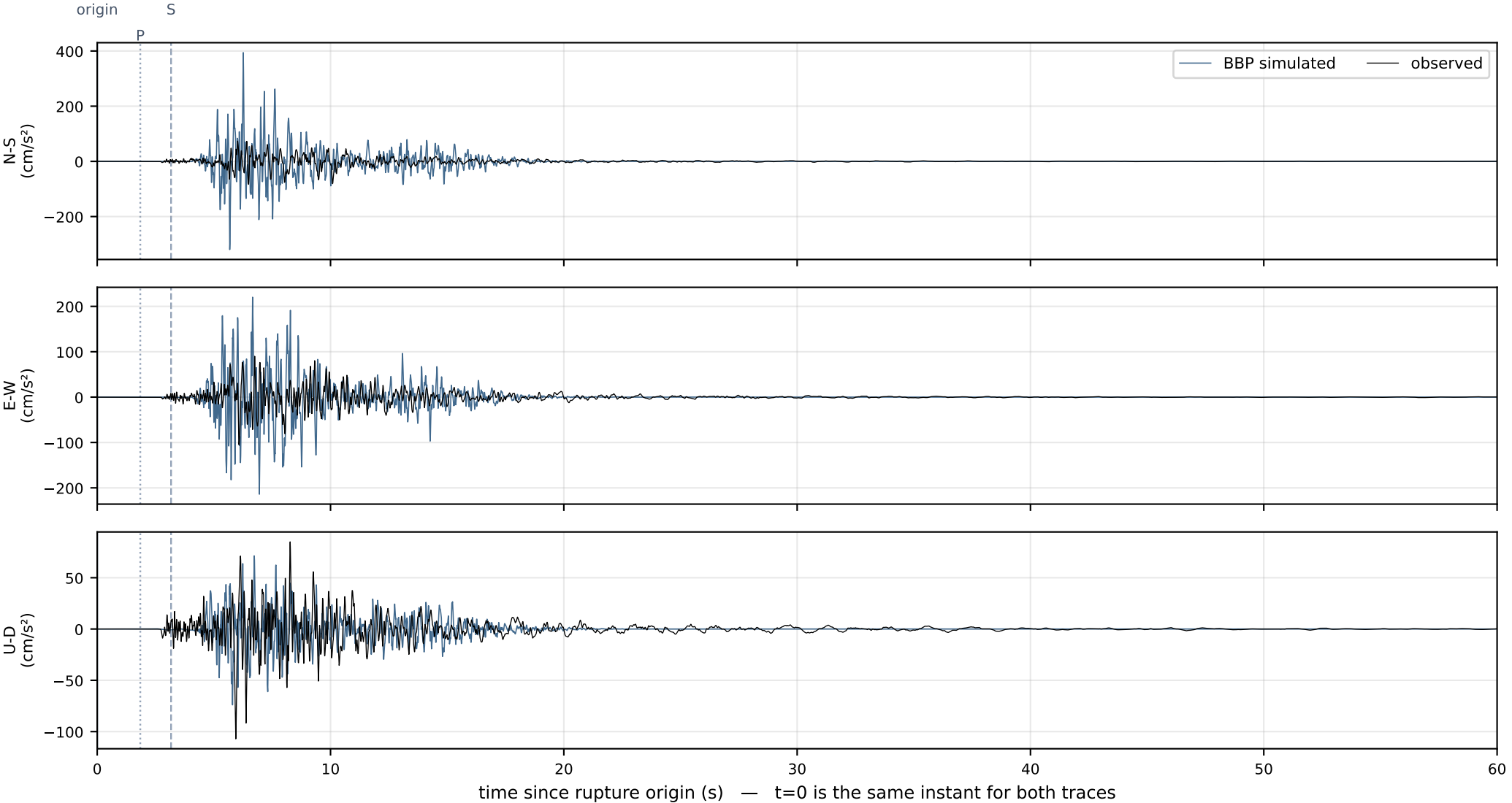
NC.N016 — 9.6 km, Vs30 291 m/s, HNE (NCEDC)
observed PGA 0.6101 g · simulated PGA 0.3858 g · $\ln(\text{obs}/\text{sim}) = +0.458$ · observed peak at +5.3 s
observed record starts 37.5 s before origin



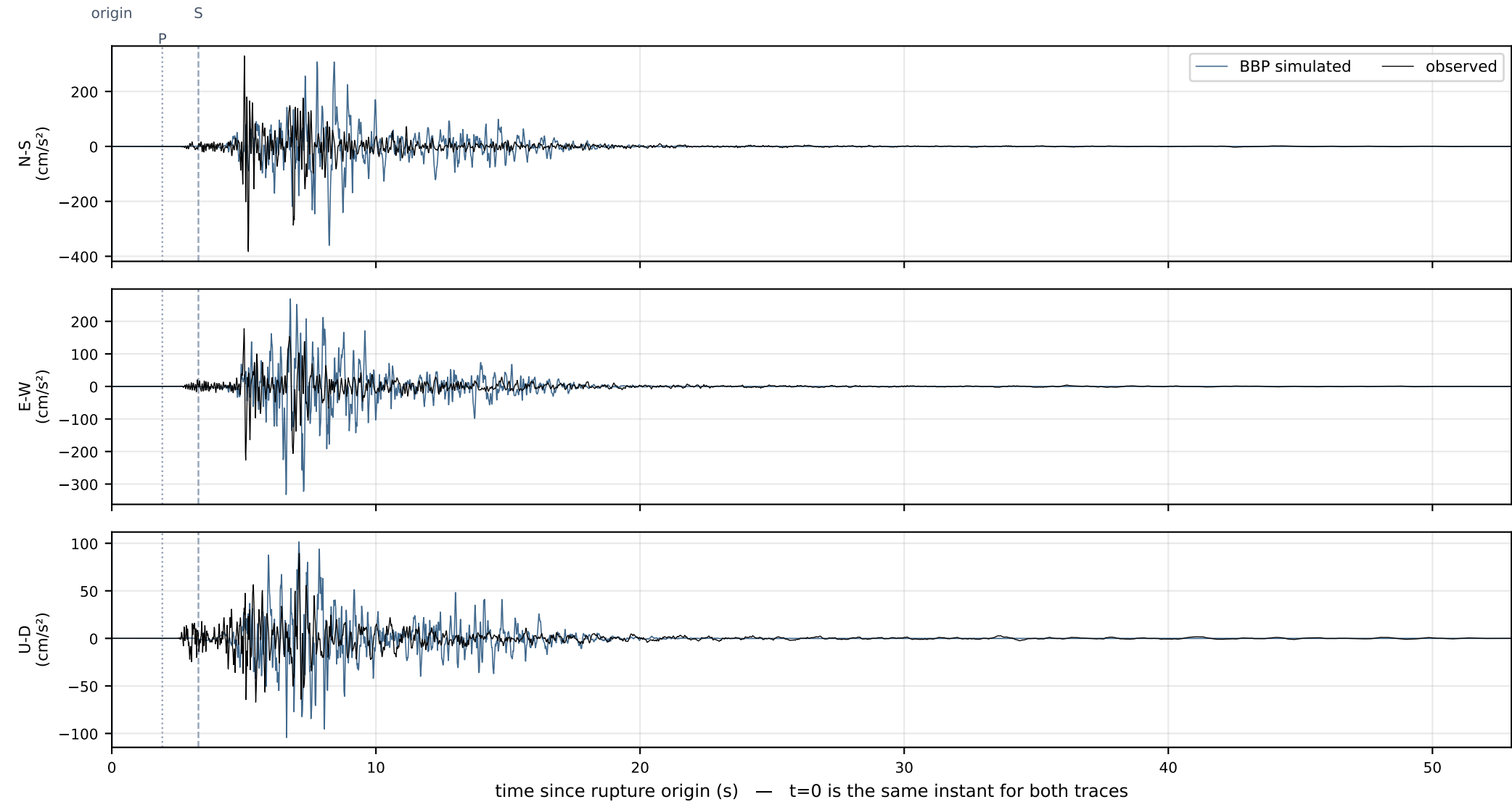
YK.KRE — 10.1 km, Vs30 674 m/s, ENE (EARTHSCOPE)
observed PGA 0.3491 g · simulated PGA 0.3521 g · $\ln(\text{obs}/\text{sim}) = -0.009$ · observed peak at +7.6 s
observed record starts 2.5 s before origin



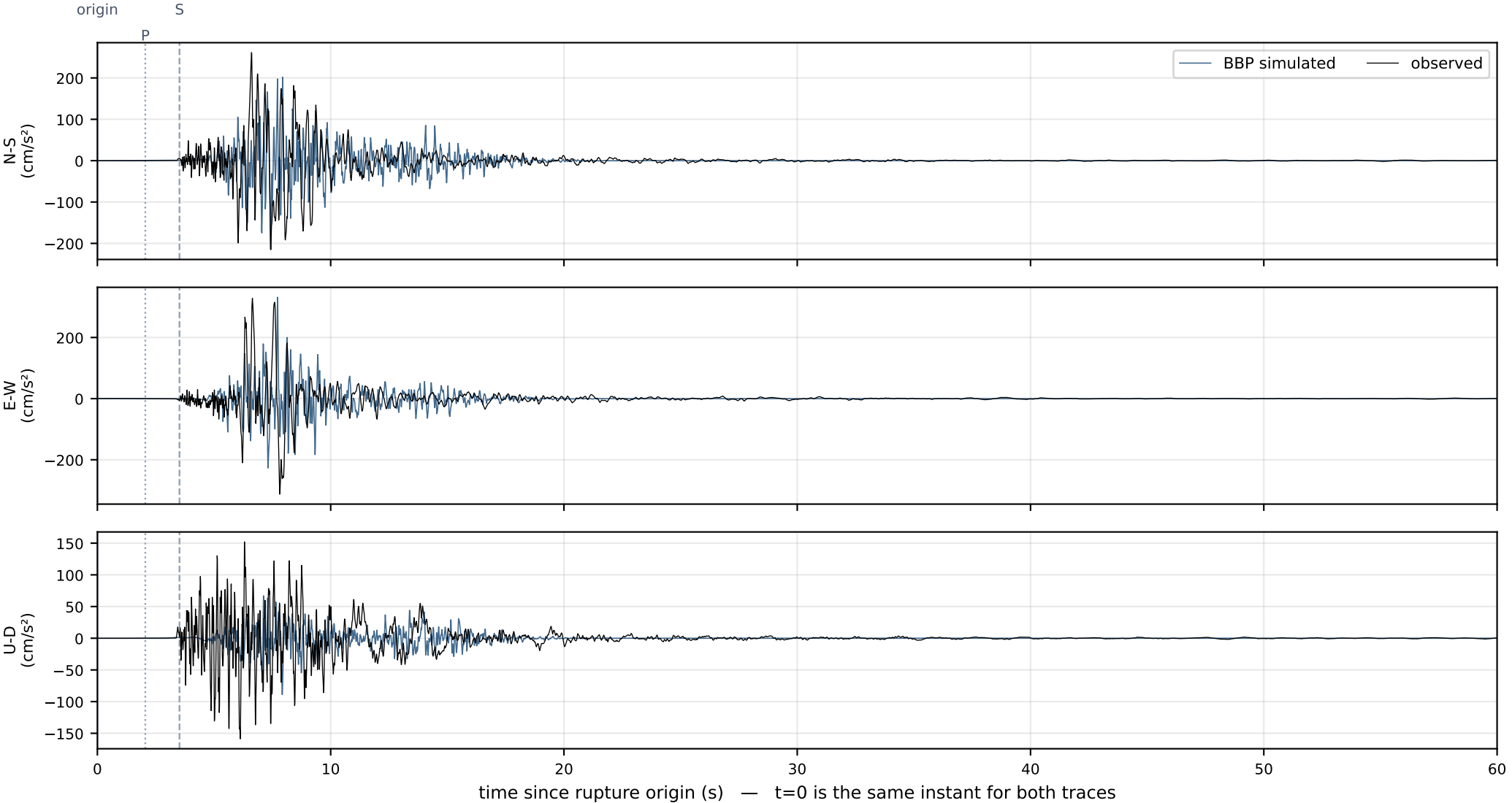
NC.NGVB — 11.1 km, Vs30 680 m/s, HNE (NCEDC)
observed PGA 0.1071 g · simulated PGA 0.4020 g · $\ln(\text{obs}/\text{sim}) = -1.323$ · observed peak at +6.1 s
observed record starts 60.0 s before origin



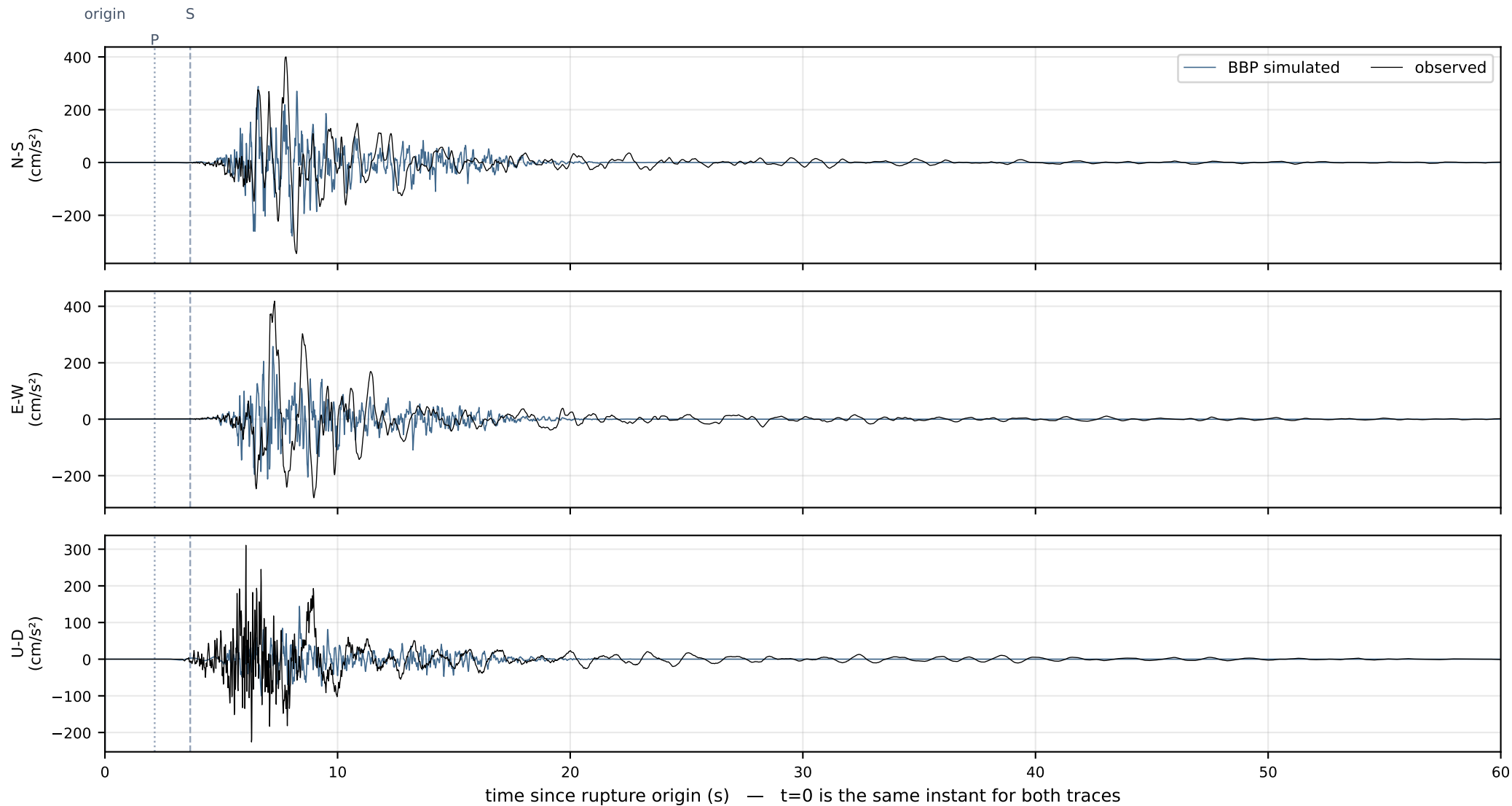
CE.68294 — 11.5 km, Vs30 375 m/s, HNE (NCEDC)
observed PGA 0.3903 g · simulated PGA 0.3675 g · $\ln(\text{obs}/\text{sim}) = +0.060$ · observed peak at +5.2 s
observed record starts 22.0 s before origin



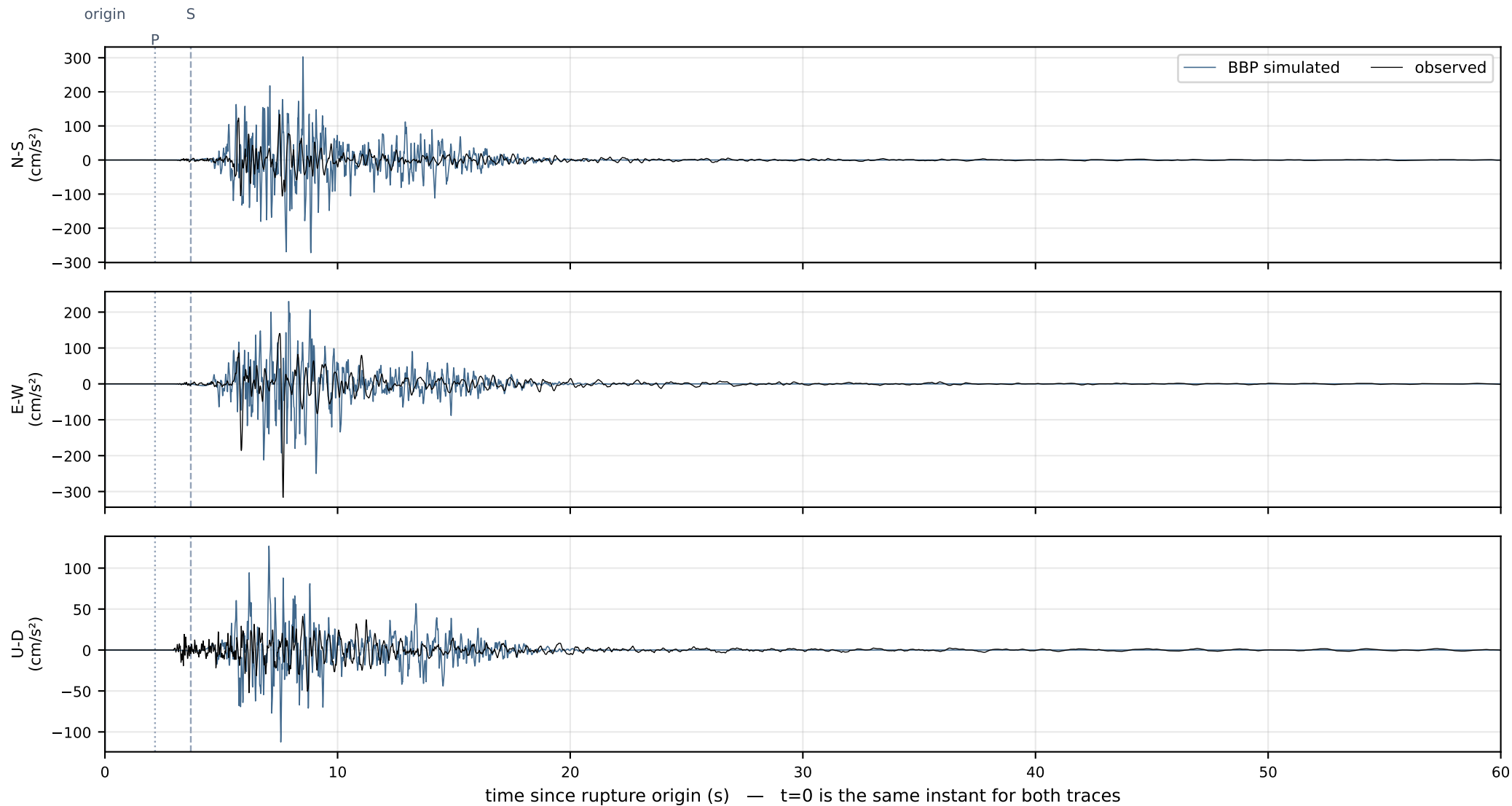
NC.N019B — 12.3 km, Vs30 685 m/s, HNE (NCEDC)
observed PGA 0.3349 g · simulated PGA 0.3383 g · $\ln(\text{obs}/\text{sim}) = -0.010$ · observed peak at +6.6 s
observed record starts 37.2 s before origin



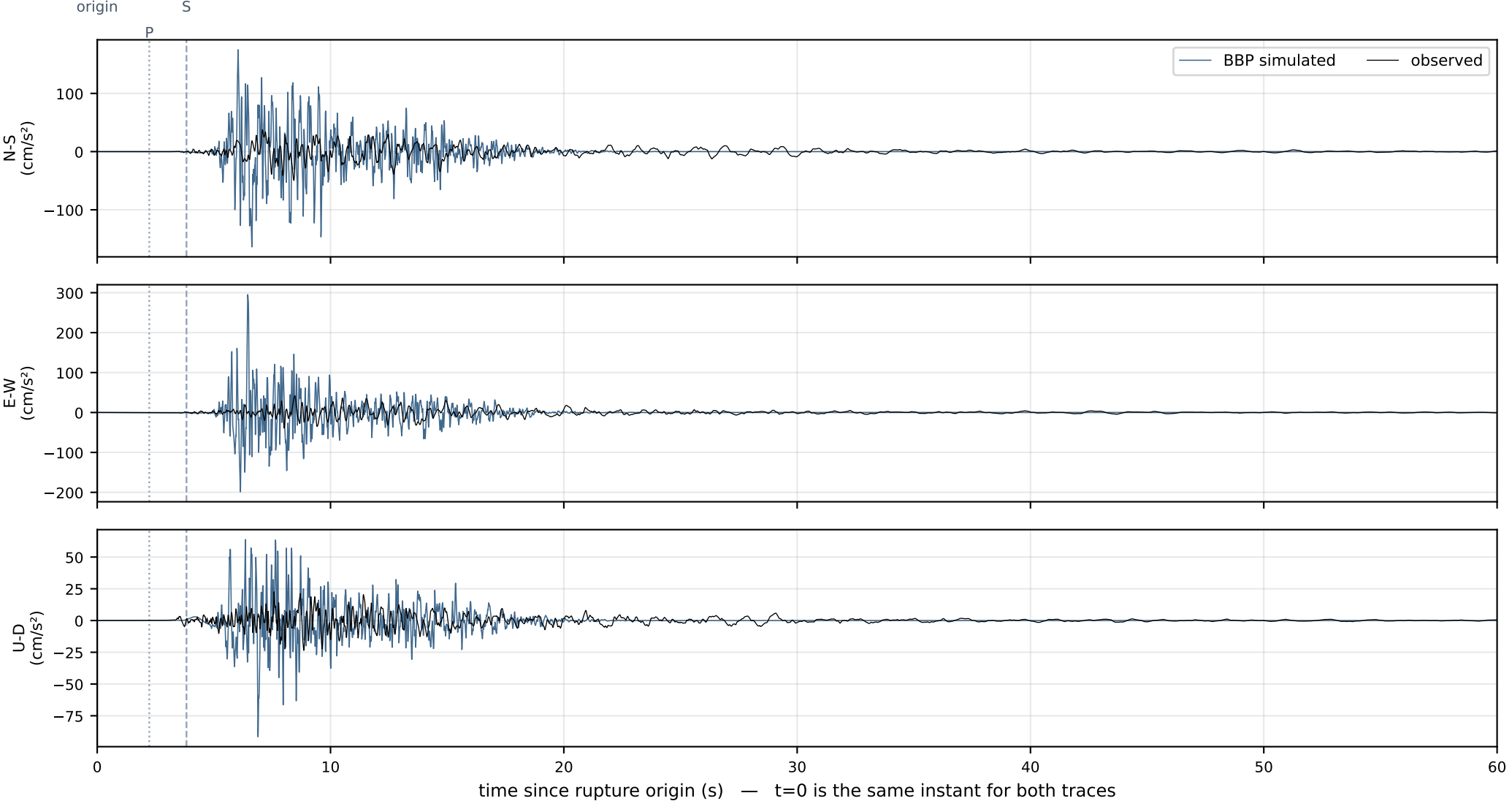
NP.1765 — 12.8 km, Vs30 325 m/s, HNE (NCEDC)
observed PGA 0.4268 g · simulated PGA 0.2941 g · $\ln(\text{obs}/\text{sim}) = +0.372$ · observed peak at +7.3 s
observed record starts 7.0 s before origin



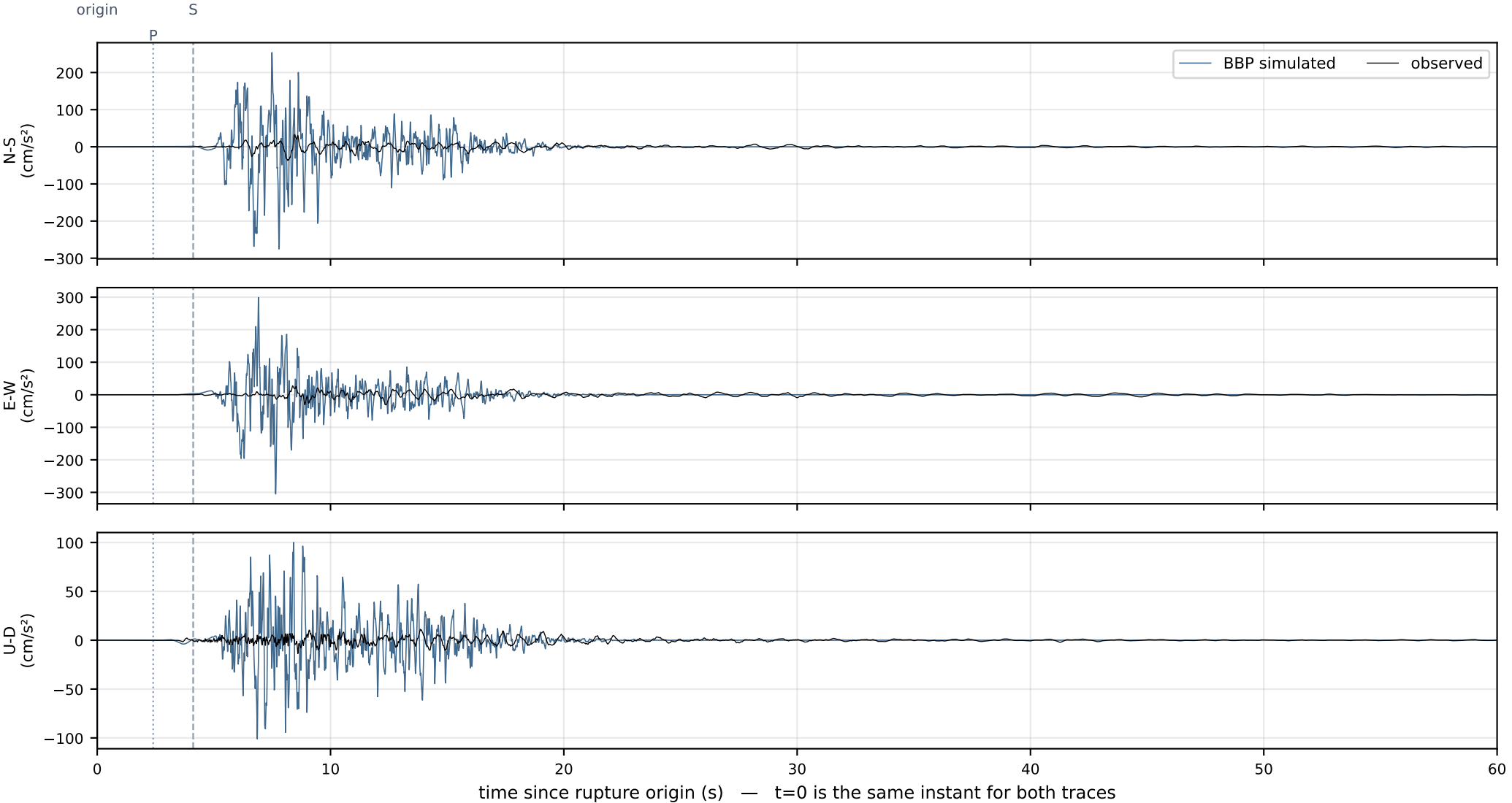
NP.1759 — 12.9 km, Vs30 450 m/s, HNE (NCEDC)
observed PGA 0.3225 g · simulated PGA 0.3088 g · $\ln(\text{obs}/\text{sim}) = +0.043$ · observed peak at +7.7 s
observed record starts 7.0 s before origin



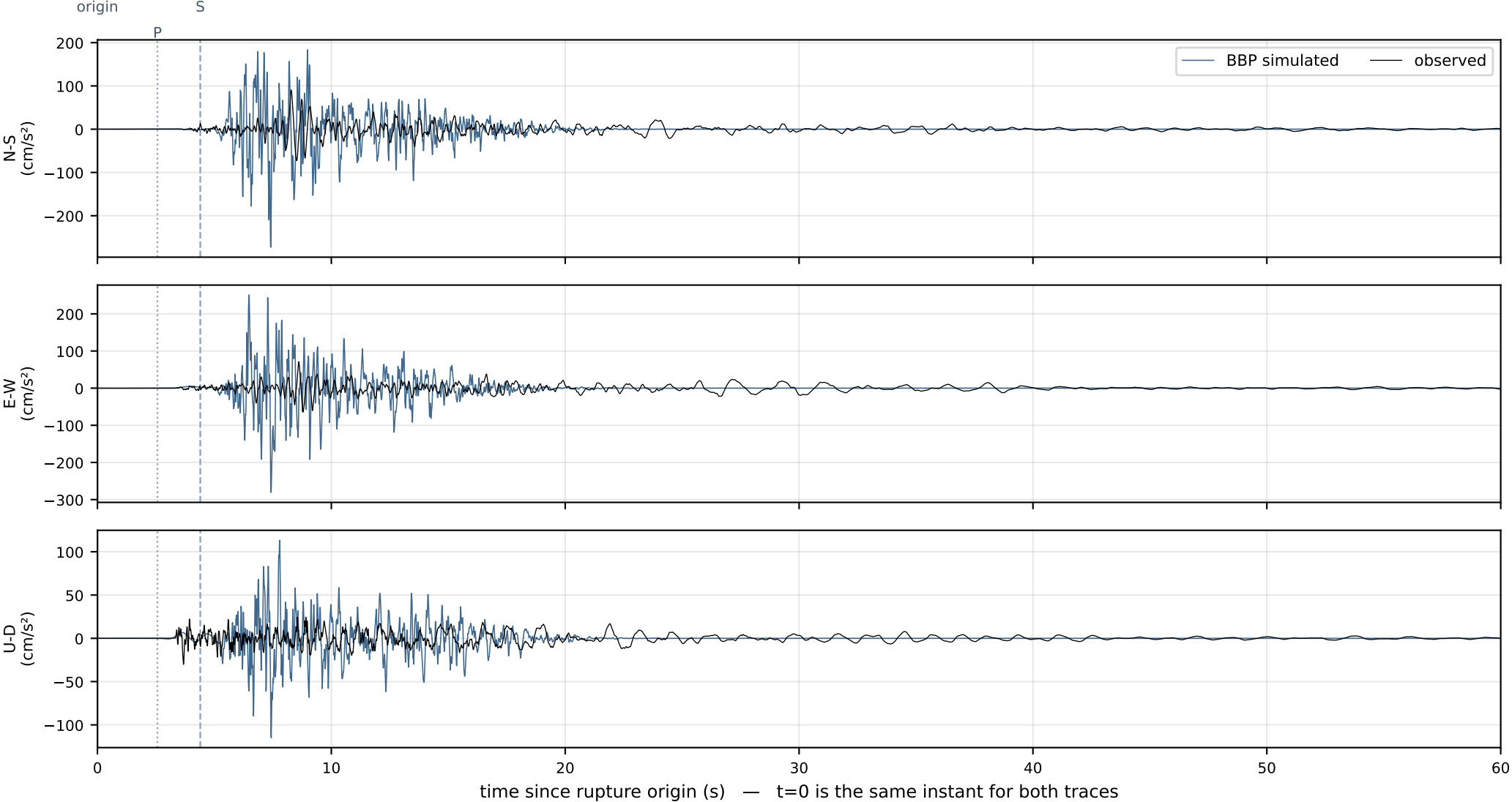
NC.NSP — 13.4 km, Vs30 674 m/s, HNE (NCEDC)
observed PGA 0.0506 g · simulated PGA 0.3010 g · $\ln(\text{obs}/\text{sim}) = -1.784$ · observed peak at +8.4 s
observed record starts 5.0 s before origin



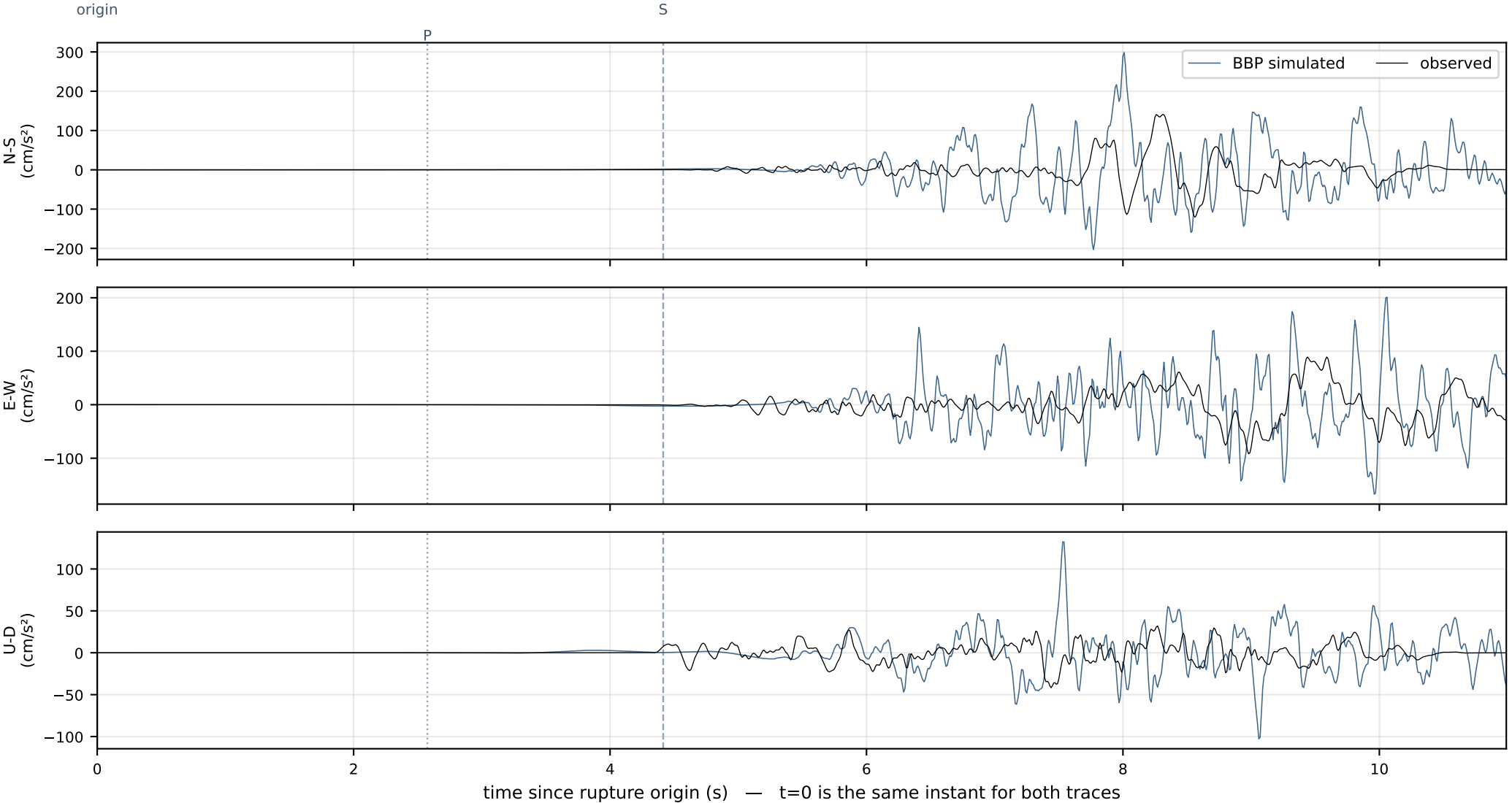
NC.NTO — 14.4 km, Vs30 279 m/s, HNE (NCEDC)
observed PGA 0.0374 g · simulated PGA 0.3109 g · $\ln(\text{obs}/\text{sim}) = -2.117$ · observed peak at +8.2 s
observed record starts 60.0 s before origin



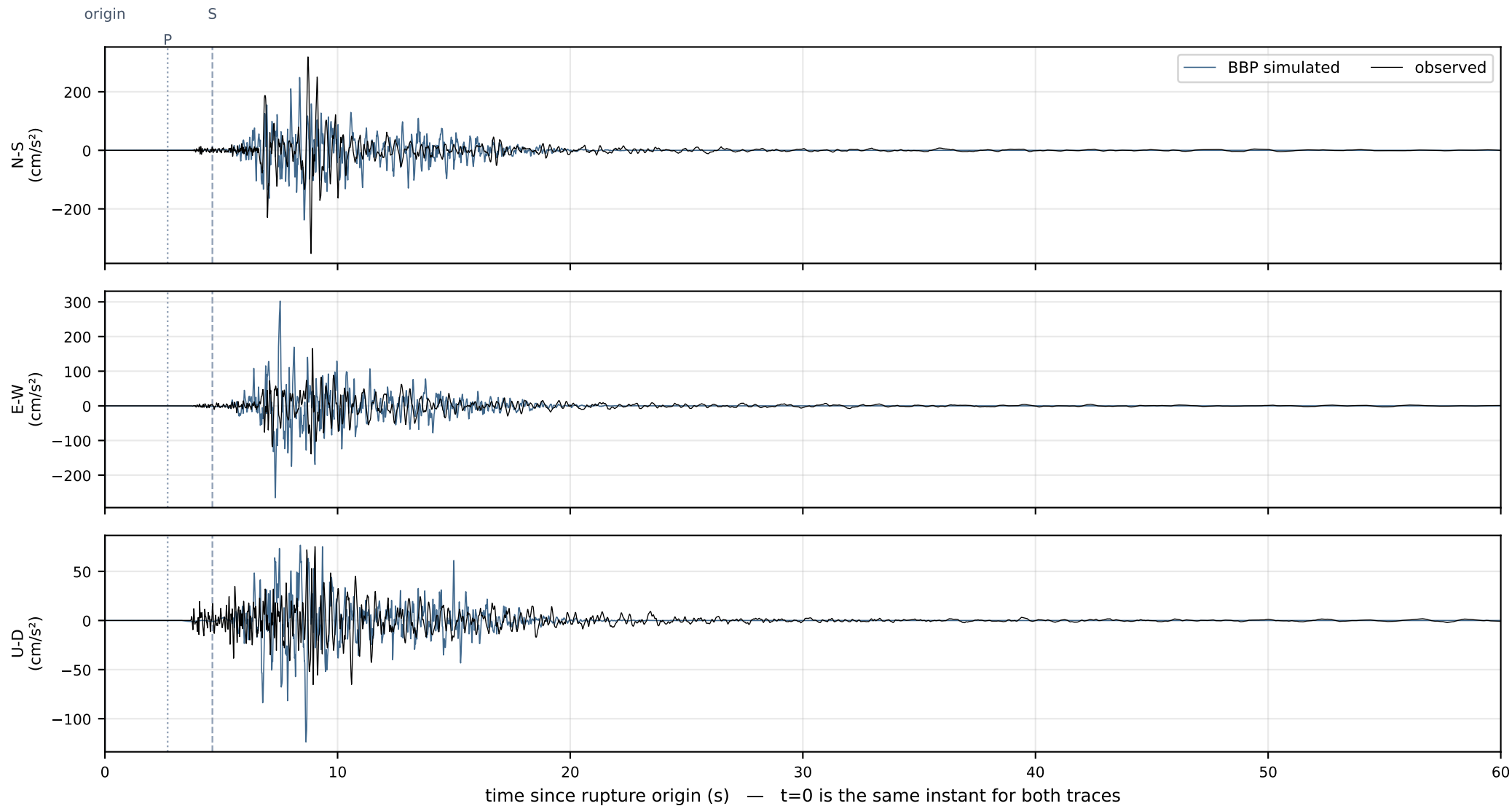
NC.N002 — 15.4 km, Vs30 274 m/s, HNE (NCEDC)
observed PGA 0.0922 g · simulated PGA 0.2864 g · $\ln(\text{obs}/\text{sim}) = -1.133$ · observed peak at +8.3 s
observed record starts 36.8 s before origin



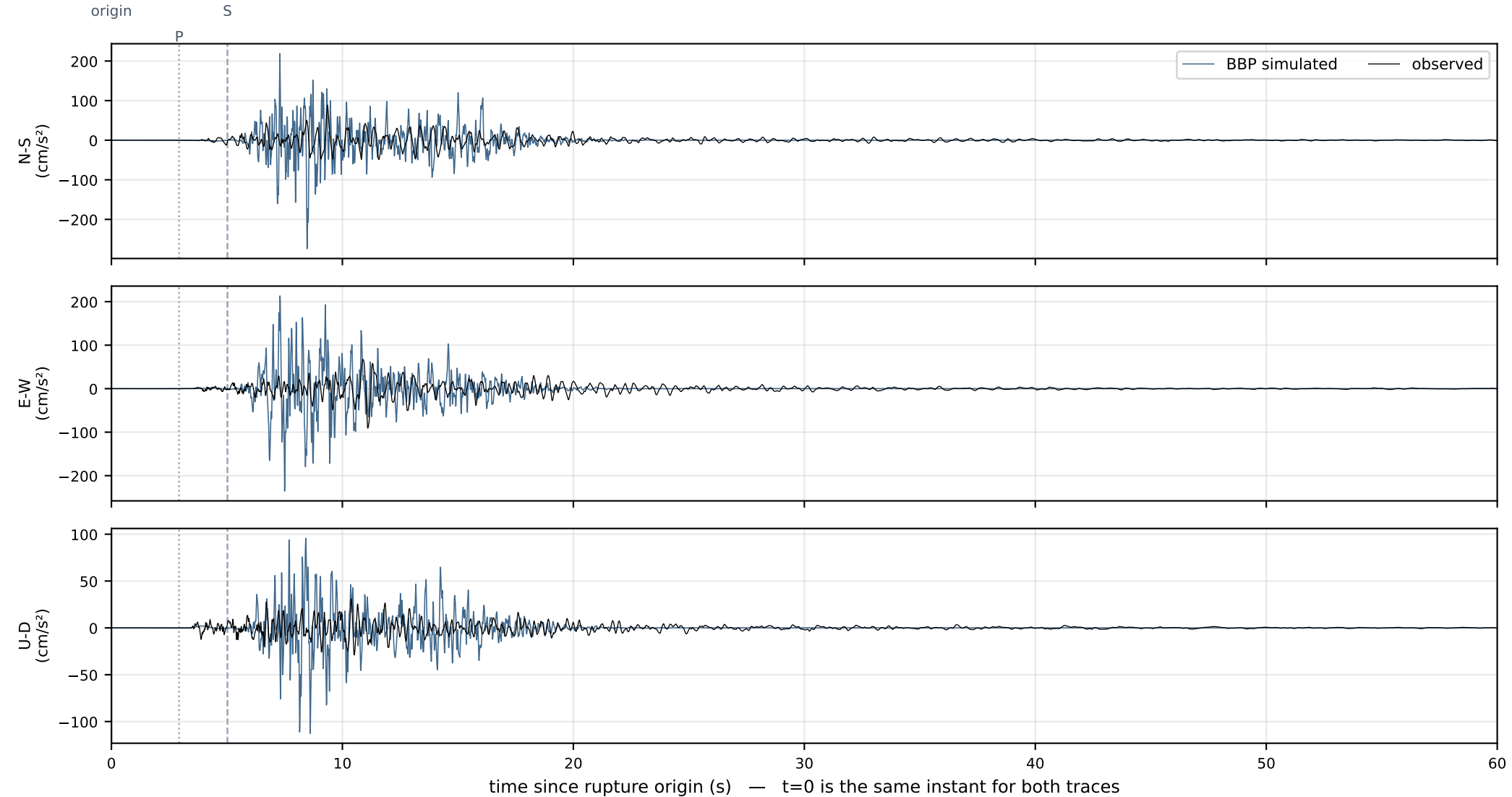
NP.1829 — 15.4 km, Vs30 357 m/s, HNE (NCEDC)
observed PGA 0.1438 g · simulated PGA 0.3043 g · $\ln(\text{obs}/\text{sim}) = -0.750$ · observed peak at +8.3 s
observed record starts 36.8 s before origin



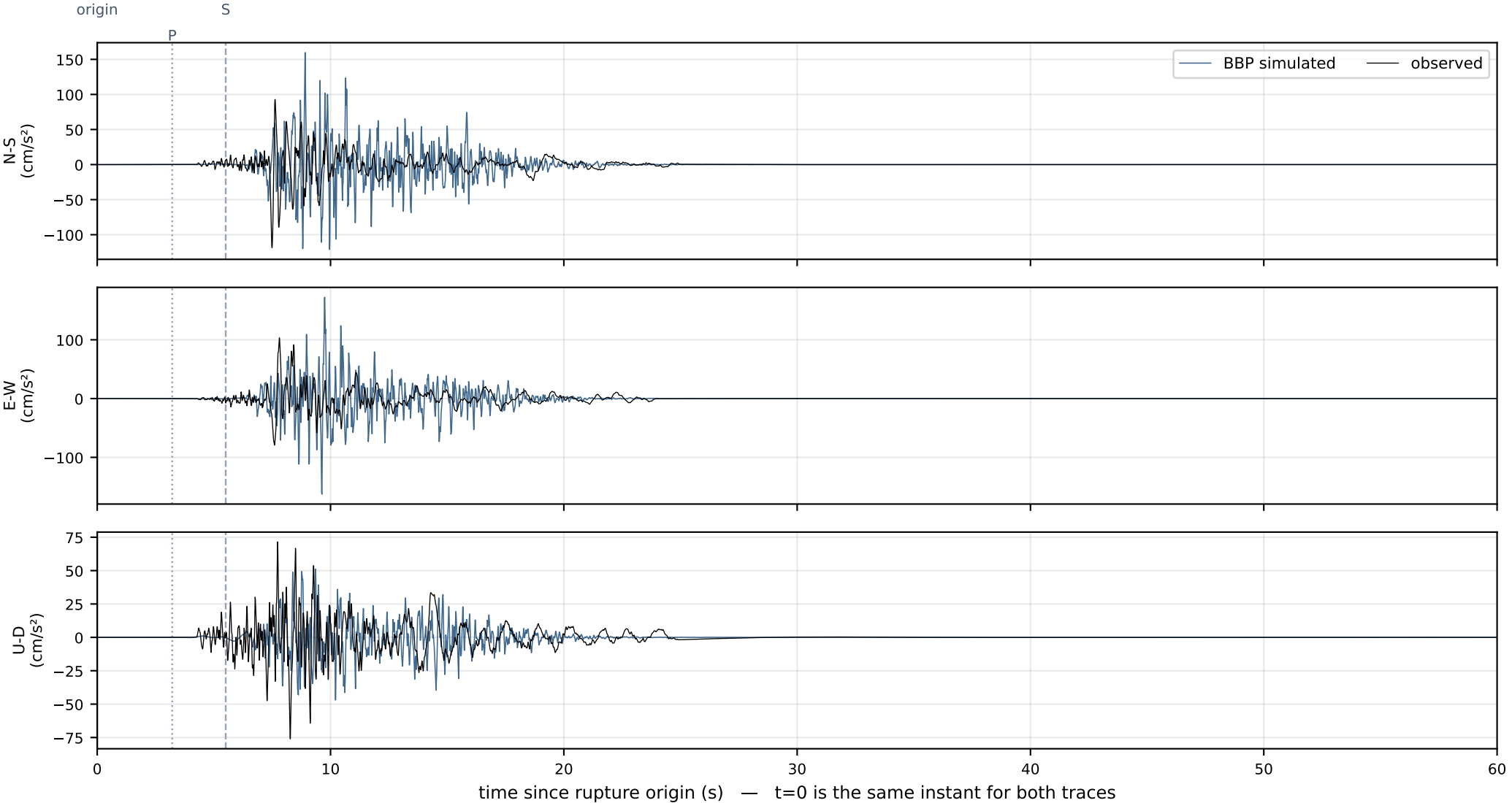
NC.NMI — 16.2 km, Vs30 377 m/s, HNE (NCEDC)
observed PGA 0.3594 g · simulated PGA 0.3083 g · $\ln(\text{obs}/\text{sim}) = +0.153$ · observed peak at +8.9 s
observed record starts 6.0 s before origin



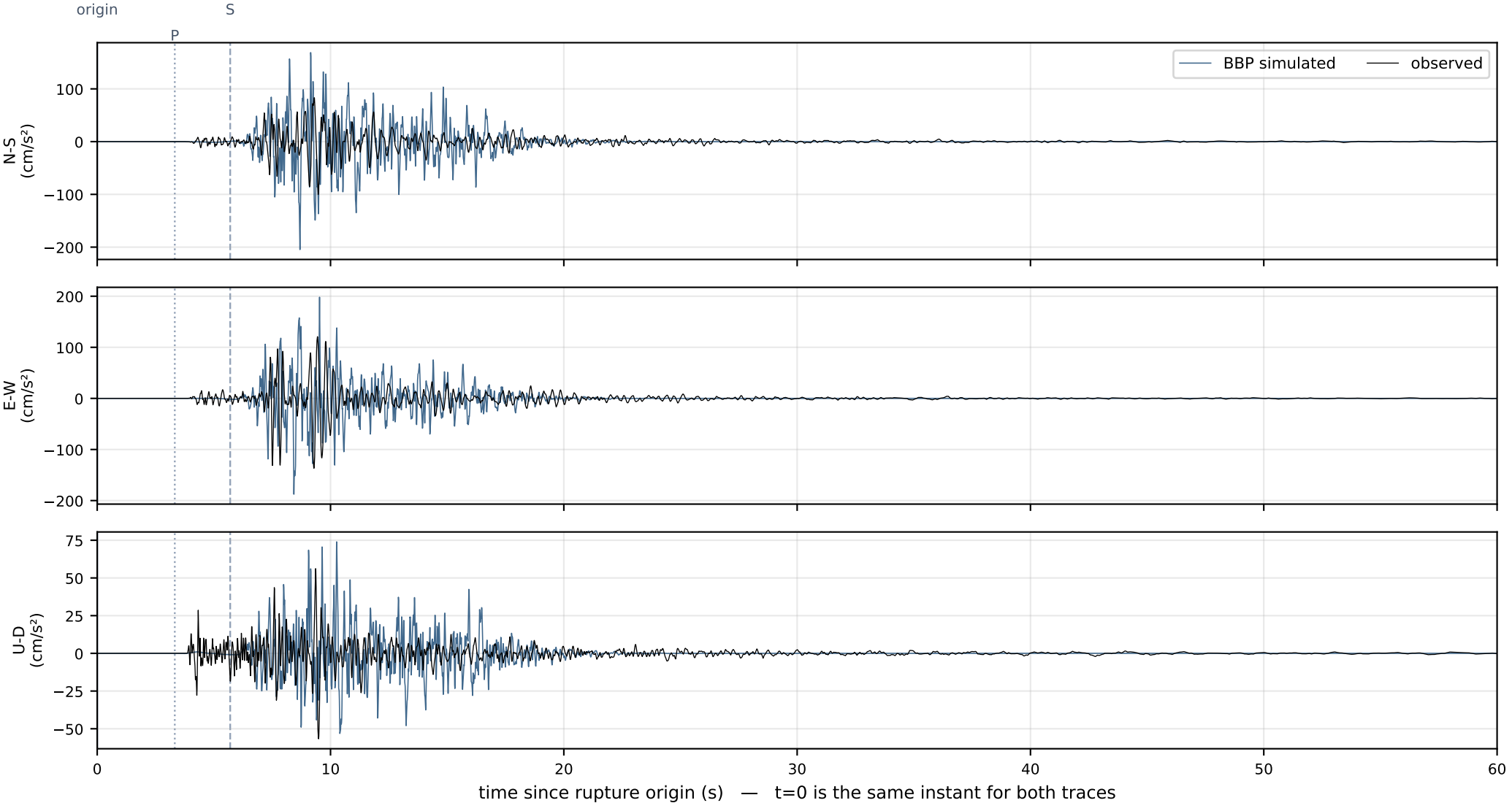
NC.NLH — 17.6 km, Vs30 452 m/s, HNE (NCEDC)
observed PGA 0.0926 g · simulated PGA 0.2795 g · $\ln(\text{obs}/\text{sim}) = -1.104$ · observed peak at +11.1 s
observed record starts 60.0 s before origin



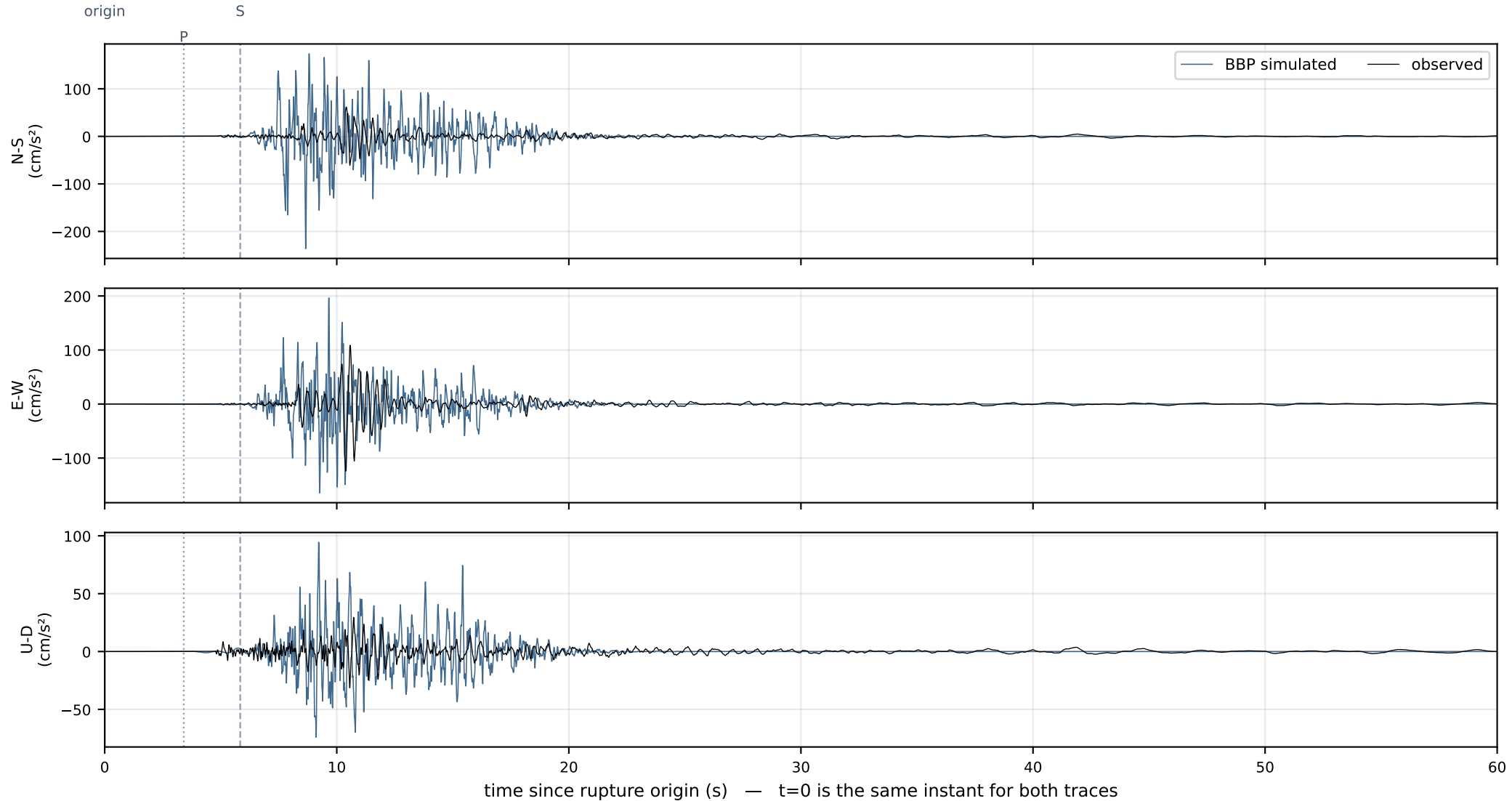
BK.CVS — 19.3 km, Vs30 692 m/s, HNE (SCEDC)
observed PGA 0.1208 g · simulated PGA 0.1757 g · $\ln(\text{obs}/\text{sim}) = -0.374$ · observed peak at +7.5 s
observed record starts 60.0 s before origin



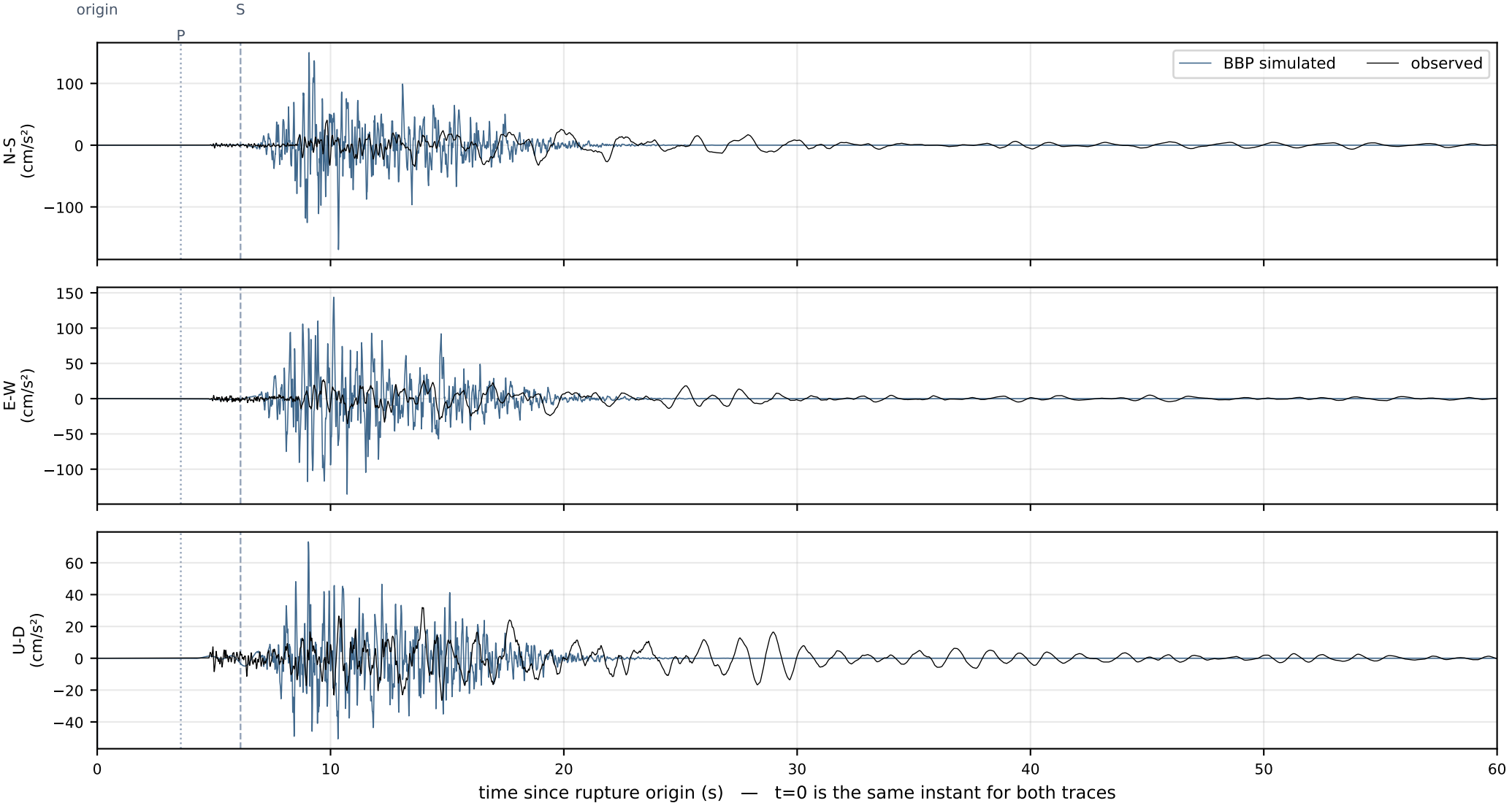
NC.C032 — 19.9 km, Vs30 464 m/s, HNE (NCEDC)
observed PGA 0.1395 g · simulated PGA 0.2087 g · $\ln(\text{obs}/\text{sim}) = -0.403$ · observed peak at +9.3 s
observed record starts 36.1 s before origin



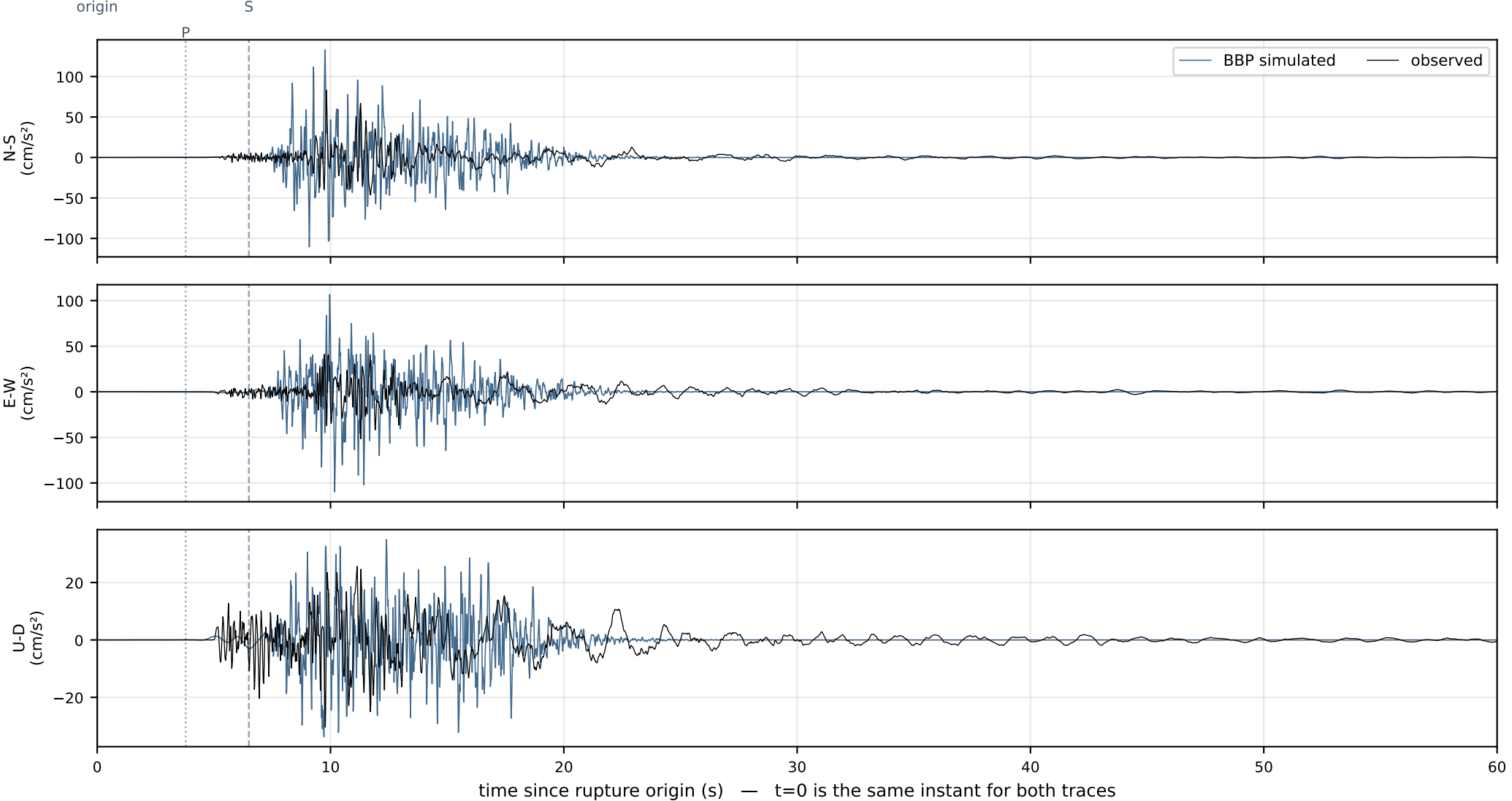
NP.1813 — 20.4 km, Vs30 422 m/s, HNE (NCEDC)
observed PGA 0.1265 g · simulated PGA 0.2409 g · $\ln(\text{obs}/\text{sim}) = -0.644$ · observed peak at +10.4 s
observed record starts 36.0 s before origin



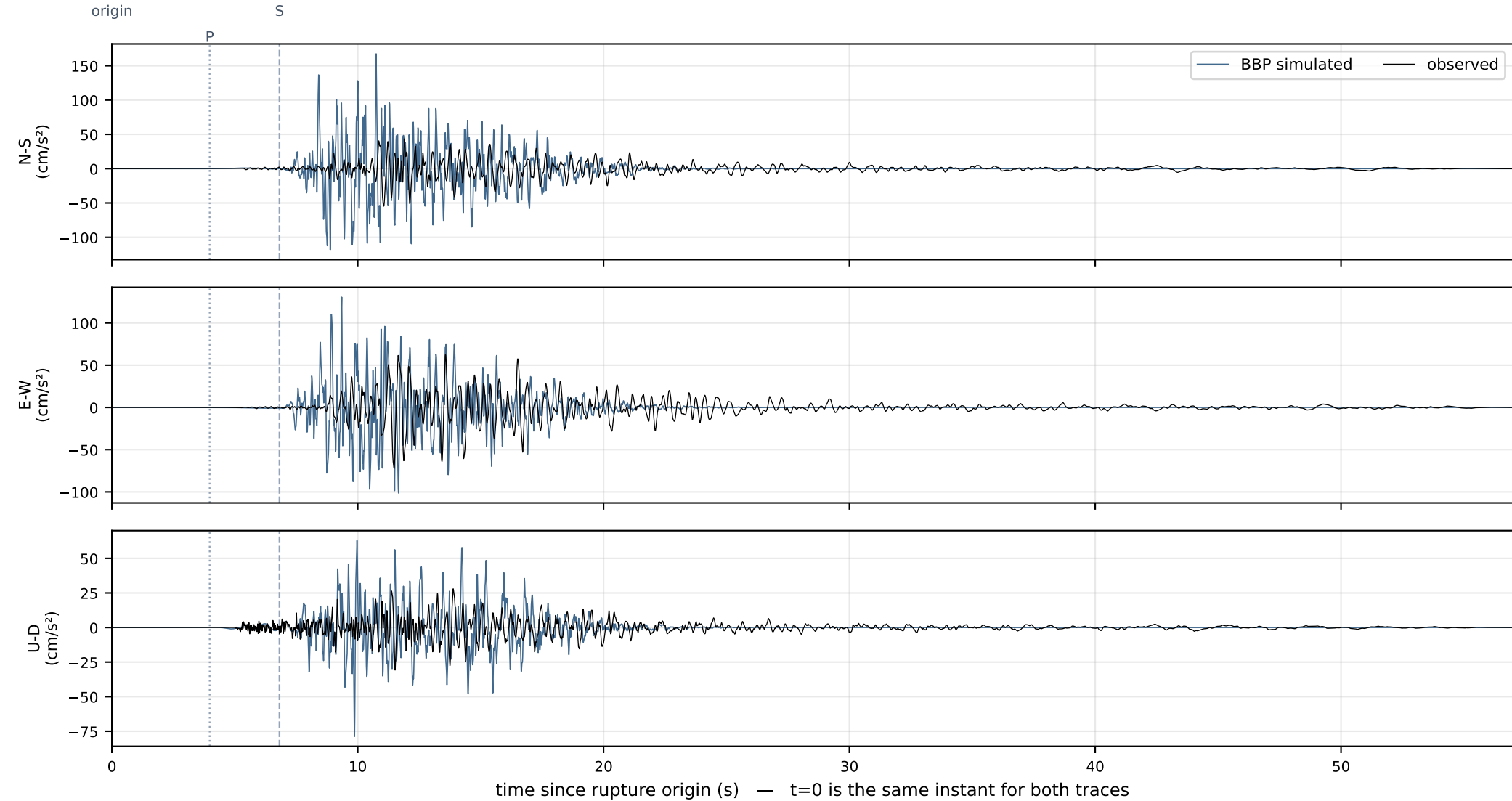
NC.NBRB — 21.5 km, Vs30 624 m/s, HNE (NCEDC)
observed PGA 0.0414 g · simulated PGA 0.1724 g · $\ln(\text{obs}/\text{sim}) = -1.427$ · observed peak at +9.8 s
observed record starts 2.0 s before origin



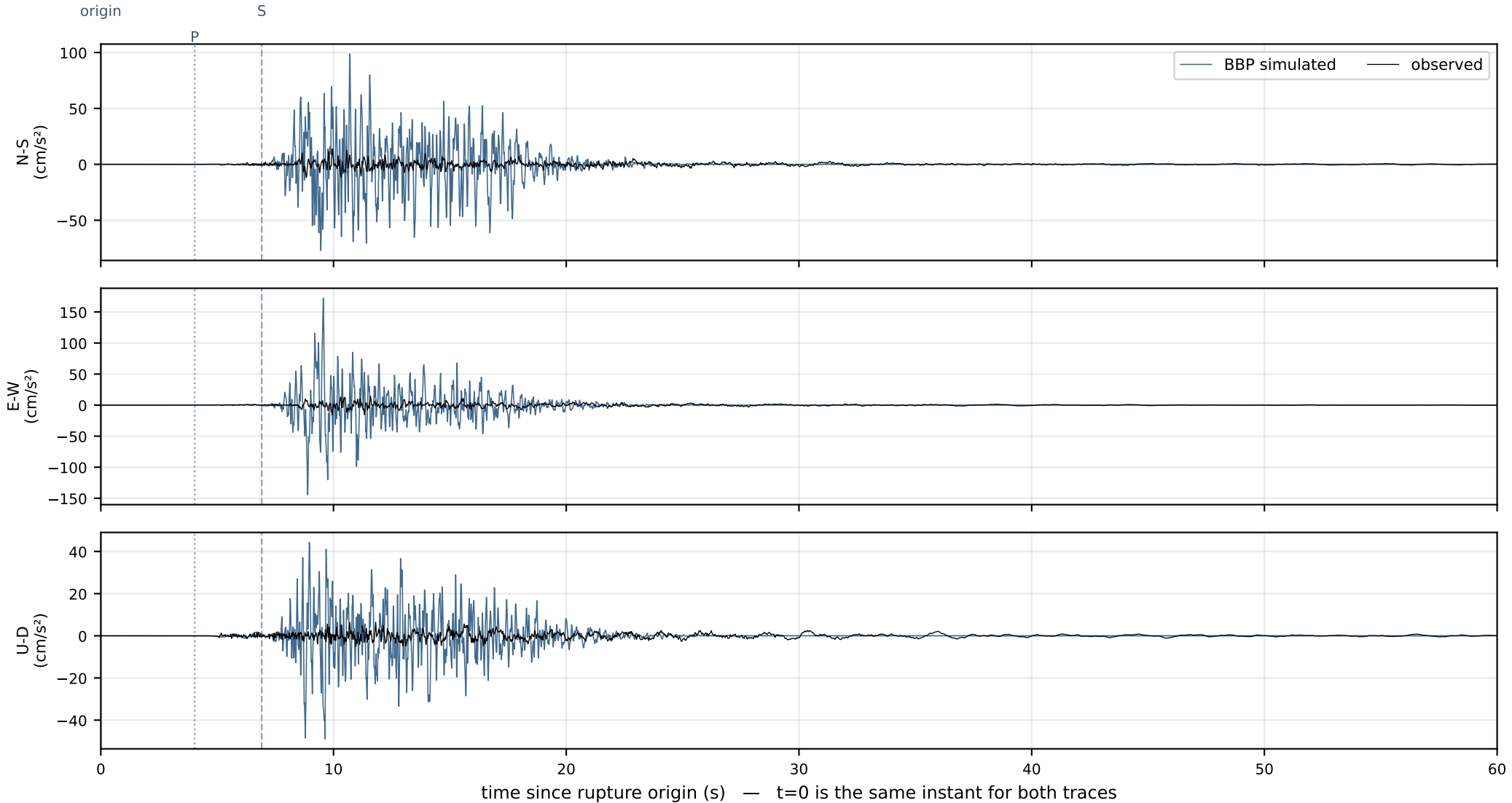
NC.N013 — 22.8 km, Vs30 693 m/s, HNE (NCEDC)
observed PGA 0.0850 g · simulated PGA 0.1357 g · $\ln(\text{obs}/\text{sim}) = -0.468$ · observed peak at +9.8 s
observed record starts 35.7 s before origin



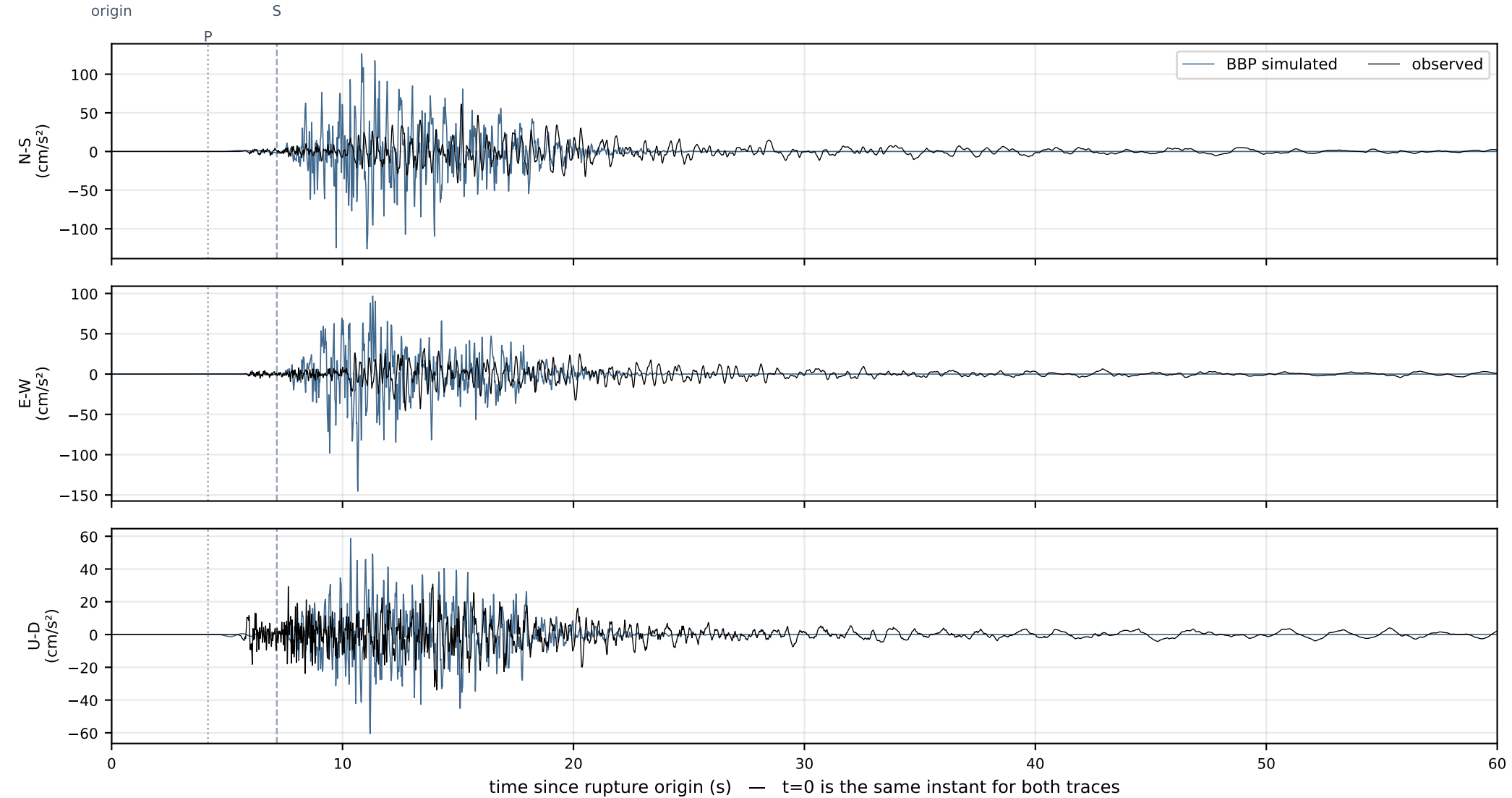
CE.68367 — 23.9 km, Vs30 373 m/s, HNE (NCEDC)
observed PGA 0.0738 g · simulated PGA 0.1708 g · $\ln(\text{obs}/\text{sim}) = -0.839$ · observed peak at +11.5 s
observed record starts 17.0 s before origin



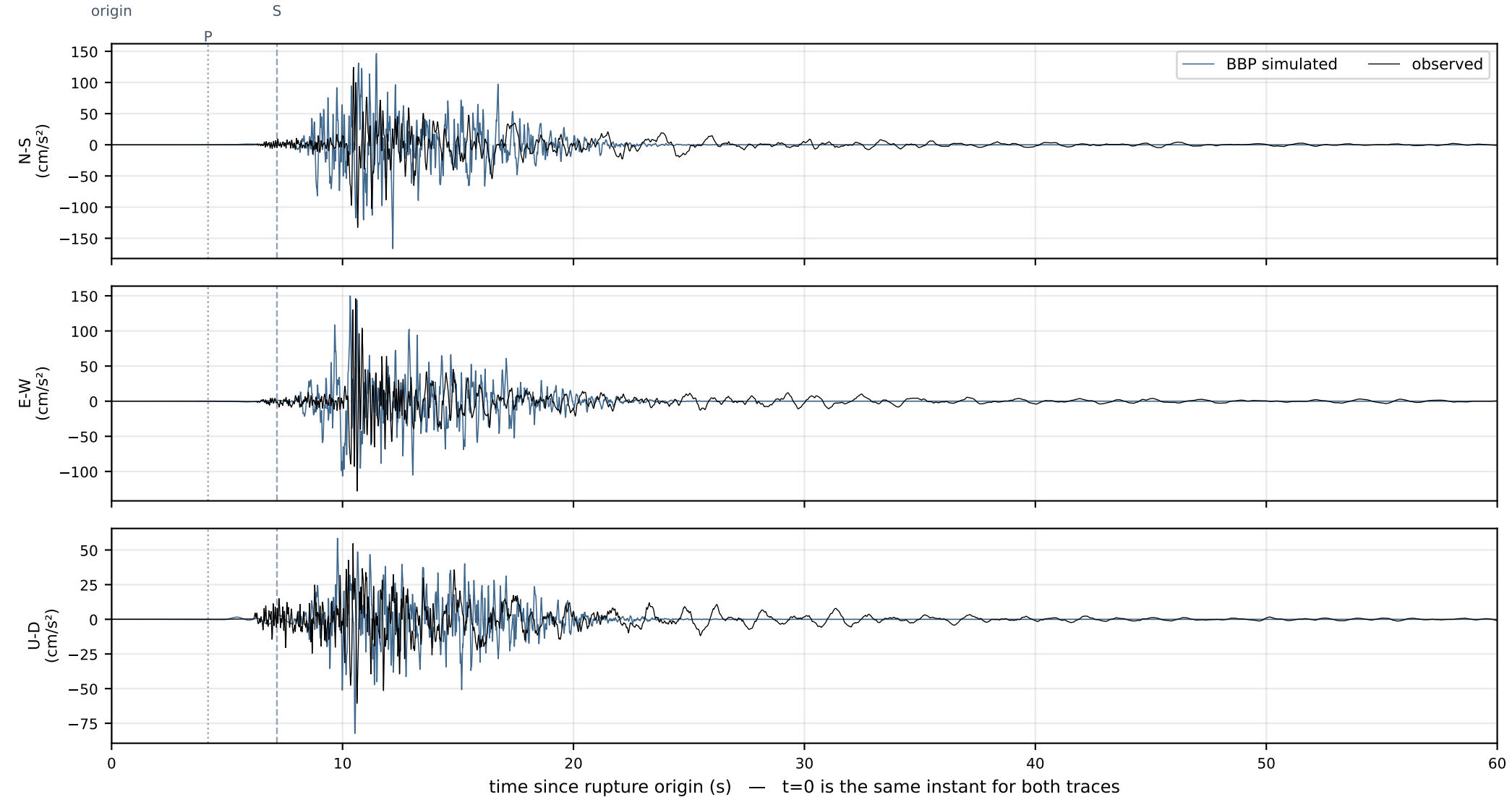
NC.N003 — 24.2 km, Vs30 667 m/s, HNE (NCEDC)
observed PGA 0.0162 g · simulated PGA 0.1757 g · $\ln(\text{obs}/\text{sim}) = -2.384$ · observed peak at +10.0 s
observed record starts 35.5 s before origin



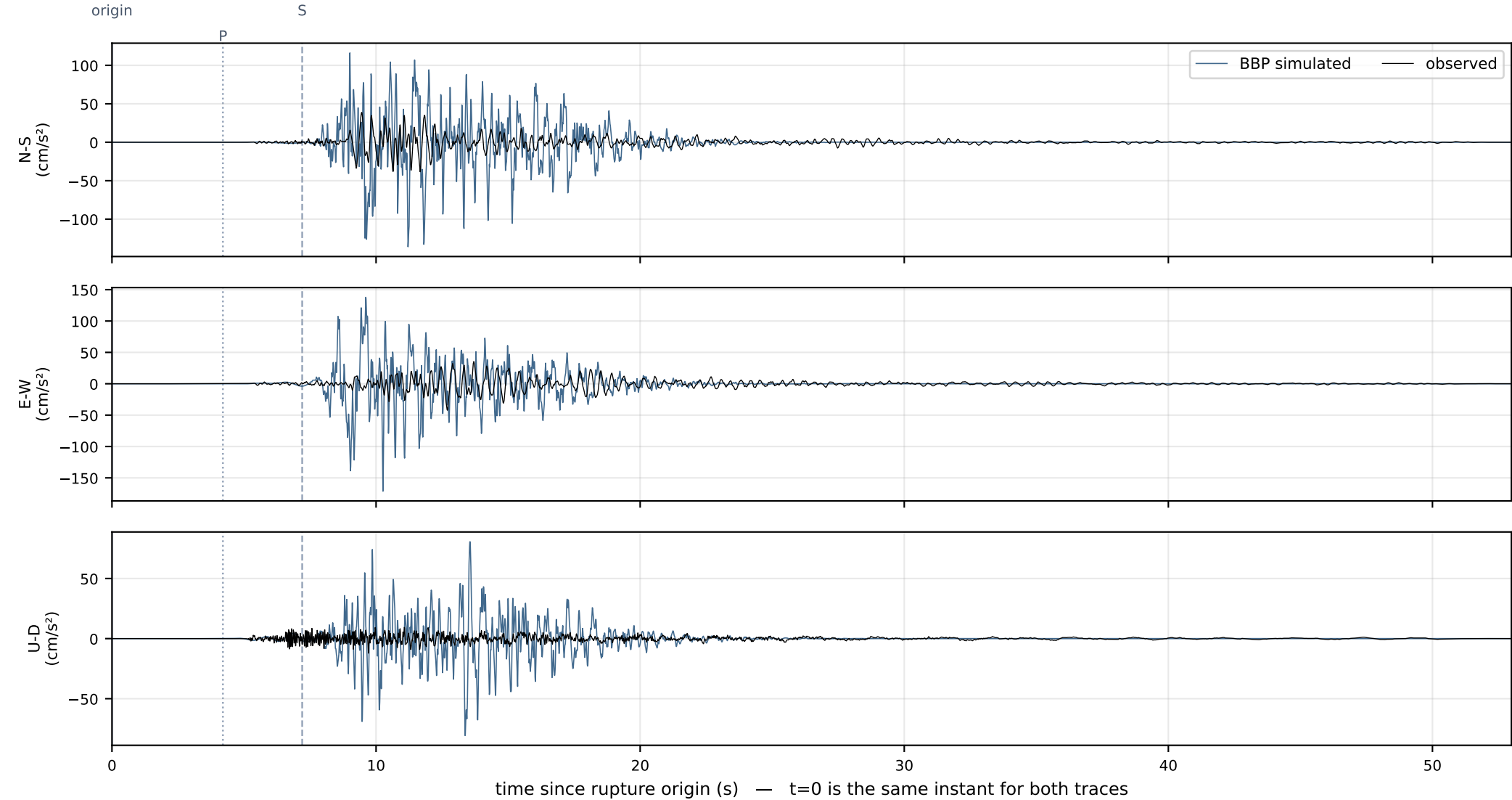
NC.C040 — 25.0 km, Vs30 442 m/s, HNE (NCEDC)
observed PGA 0.0625 g · simulated PGA 0.1482 g · $\ln(\text{obs}/\text{sim}) = -0.864$ · observed peak at +15.1 s
observed record starts 35.3 s before origin



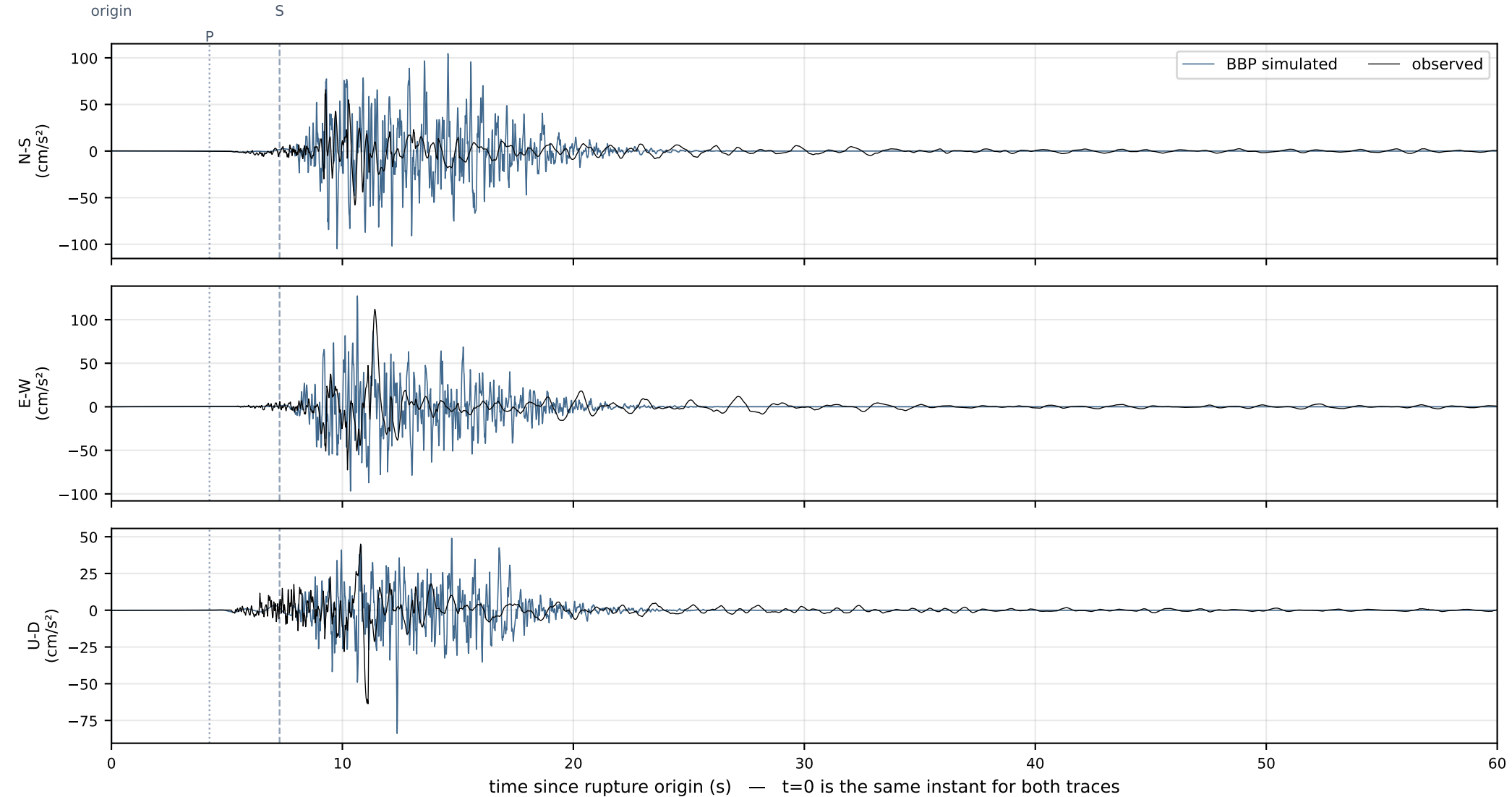
NP.1848 — 25.1 km, Vs30 414 m/s, HNE (NCEDC)
observed PGA 0.1489 g · simulated PGA 0.1701 g · $\ln(\text{obs}/\text{sim}) = -0.133$ · observed peak at +10.6 s
observed record starts 35.4 s before origin



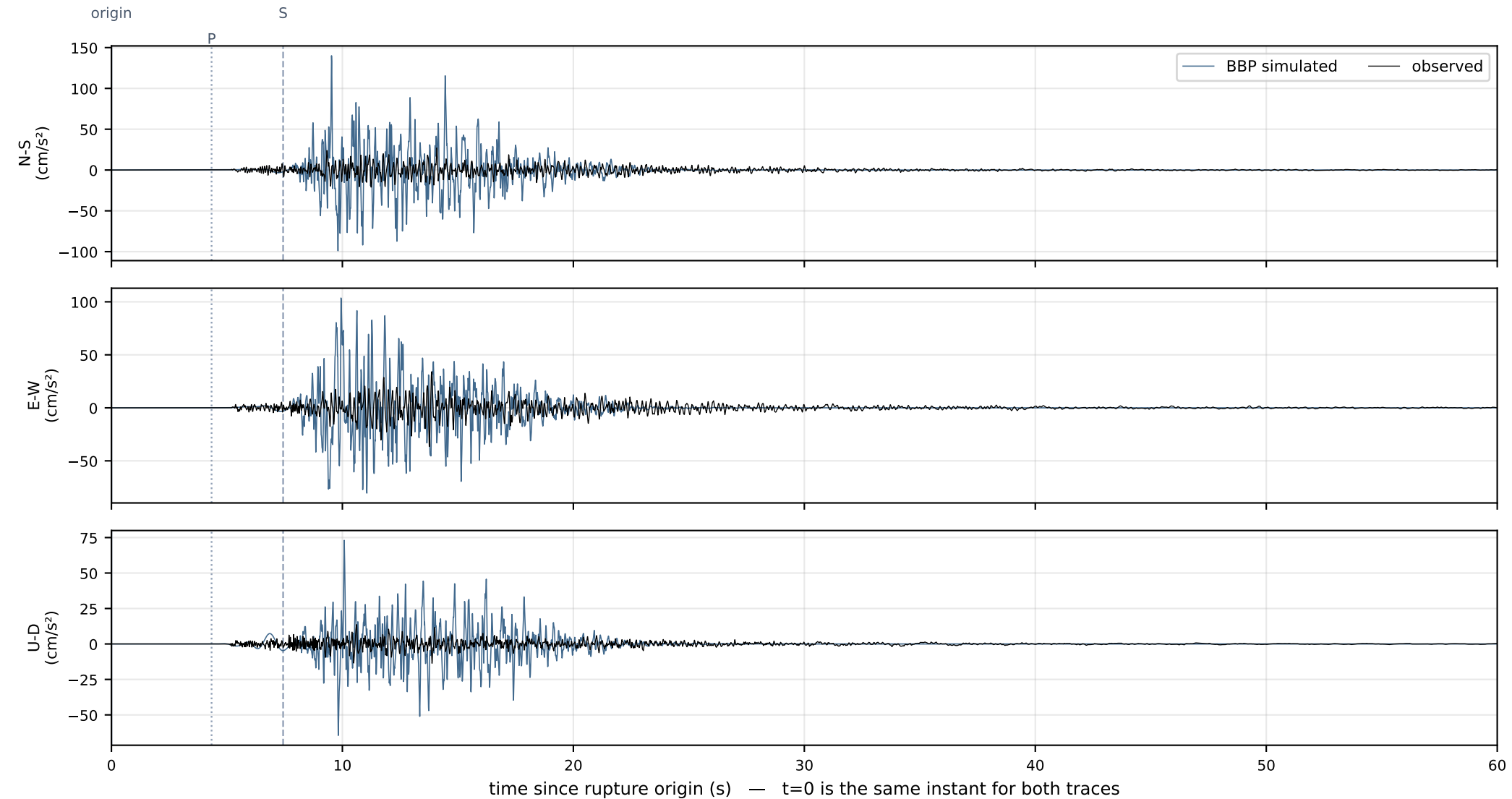
CE.68433 — 25.2 km, Vs30 312 m/s, HNE (NCEDC)
observed PGA 0.0431 g · simulated PGA 0.1746 g · $\ln(\text{obs}/\text{sim}) = -1.398$ · observed peak at +12.7 s
observed record starts 17.0 s before origin



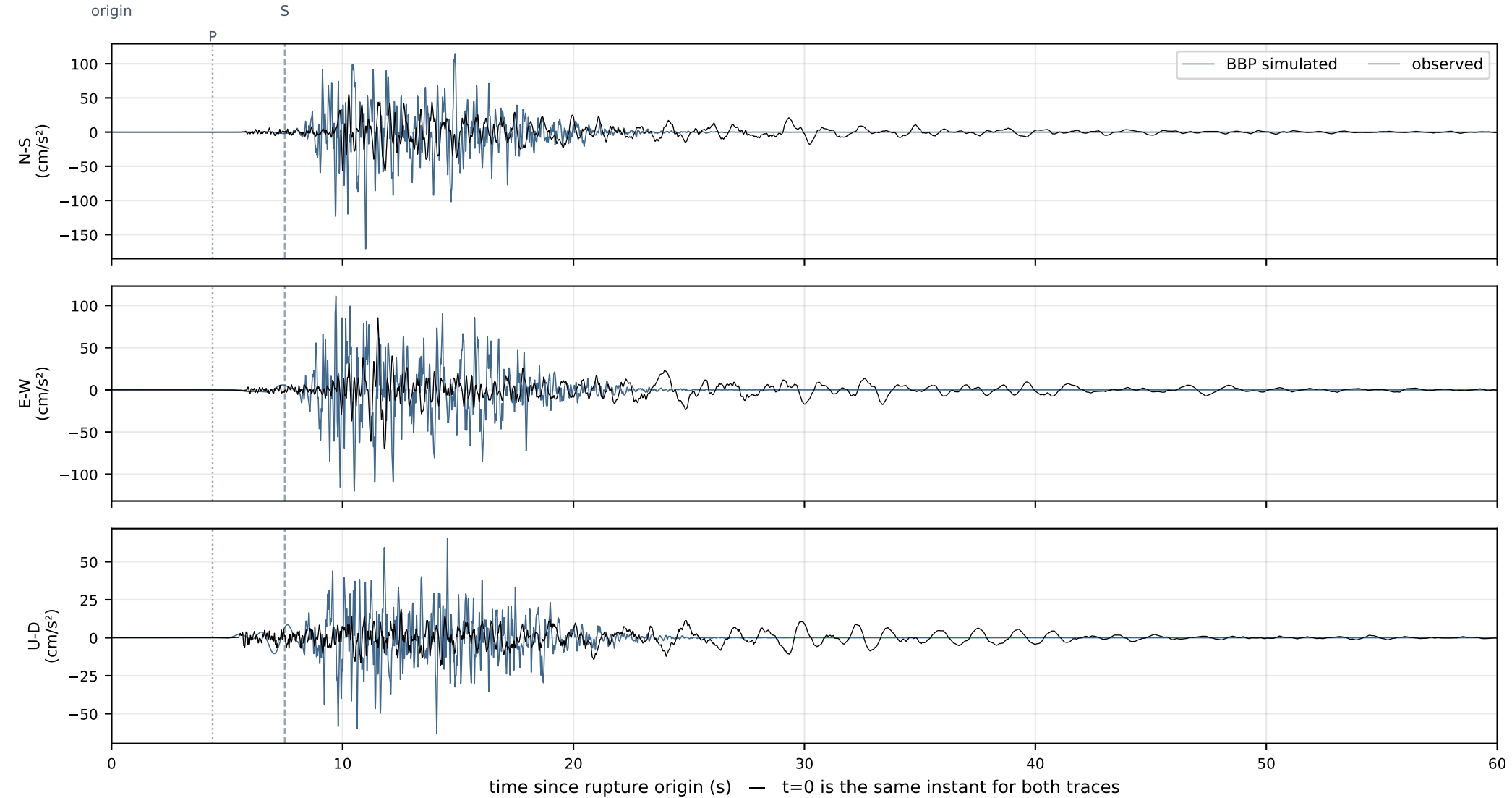
NC.NAPC — 25.5 km, Vs30 520 m/s, HNE (NCEDC)
observed PGA 0.1141 g · simulated PGA 0.1298 g · $\ln(\text{obs}/\text{sim}) = -0.129$ · observed peak at +11.4 s
observed record starts 3.0 s before origin



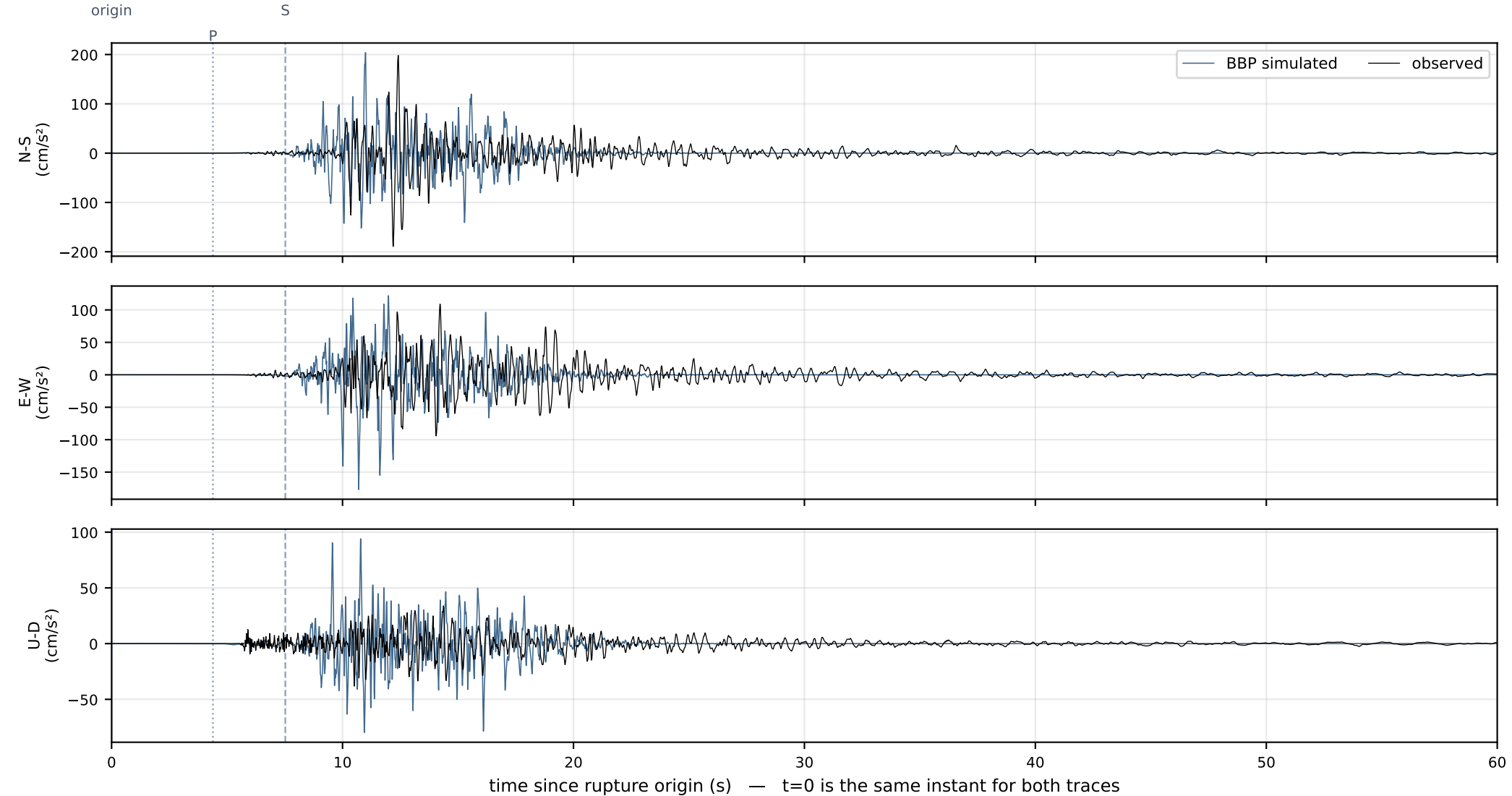
NC.NHF — 26.0 km, Vs30 514 m/s, HNE (NCEDC)
observed PGA 0.0372 g · simulated PGA 0.1428 g · $\ln(\text{obs}/\text{sim}) = -1.345$ · observed peak at +13.8 s
observed record starts 60.0 s before origin



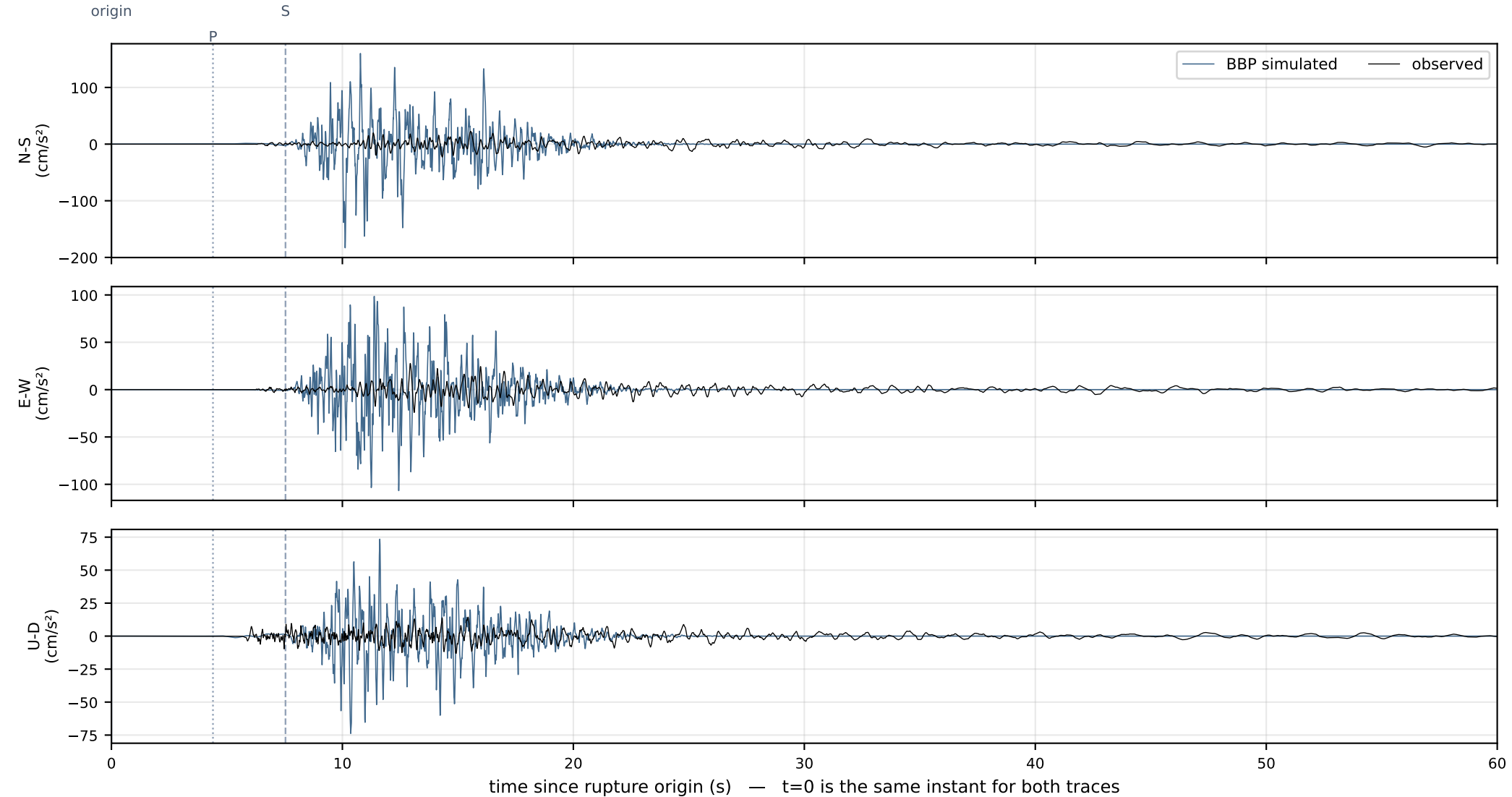
NC.N014 — 26.2 km, Vs30 324 m/s, HNE (NCEDC)
observed PGA 0.0872 g · simulated PGA 0.1741 g · $\ln(\text{obs}/\text{sim}) = -0.691$ · observed peak at +11.5 s
observed record starts 35.2 s before origin



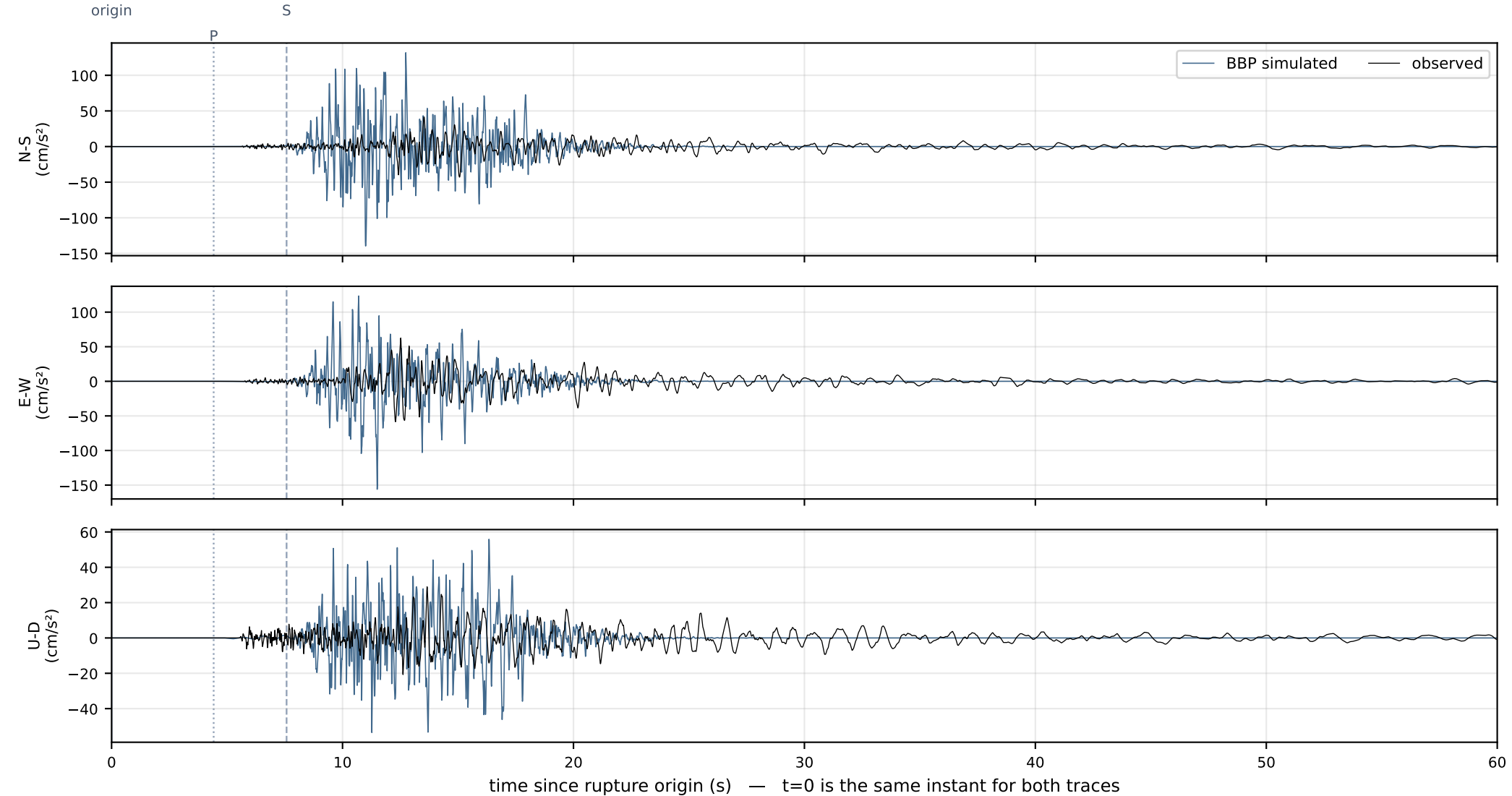
CE.58368 — 26.3 km, Vs30 383 m/s, HNE (NCEDC)
observed PGA 0.2022 g · simulated PGA 0.2077 g · $\ln(\text{obs}/\text{sim}) = -0.027$ · observed peak at +12.4 s
observed record starts 18.0 s before origin



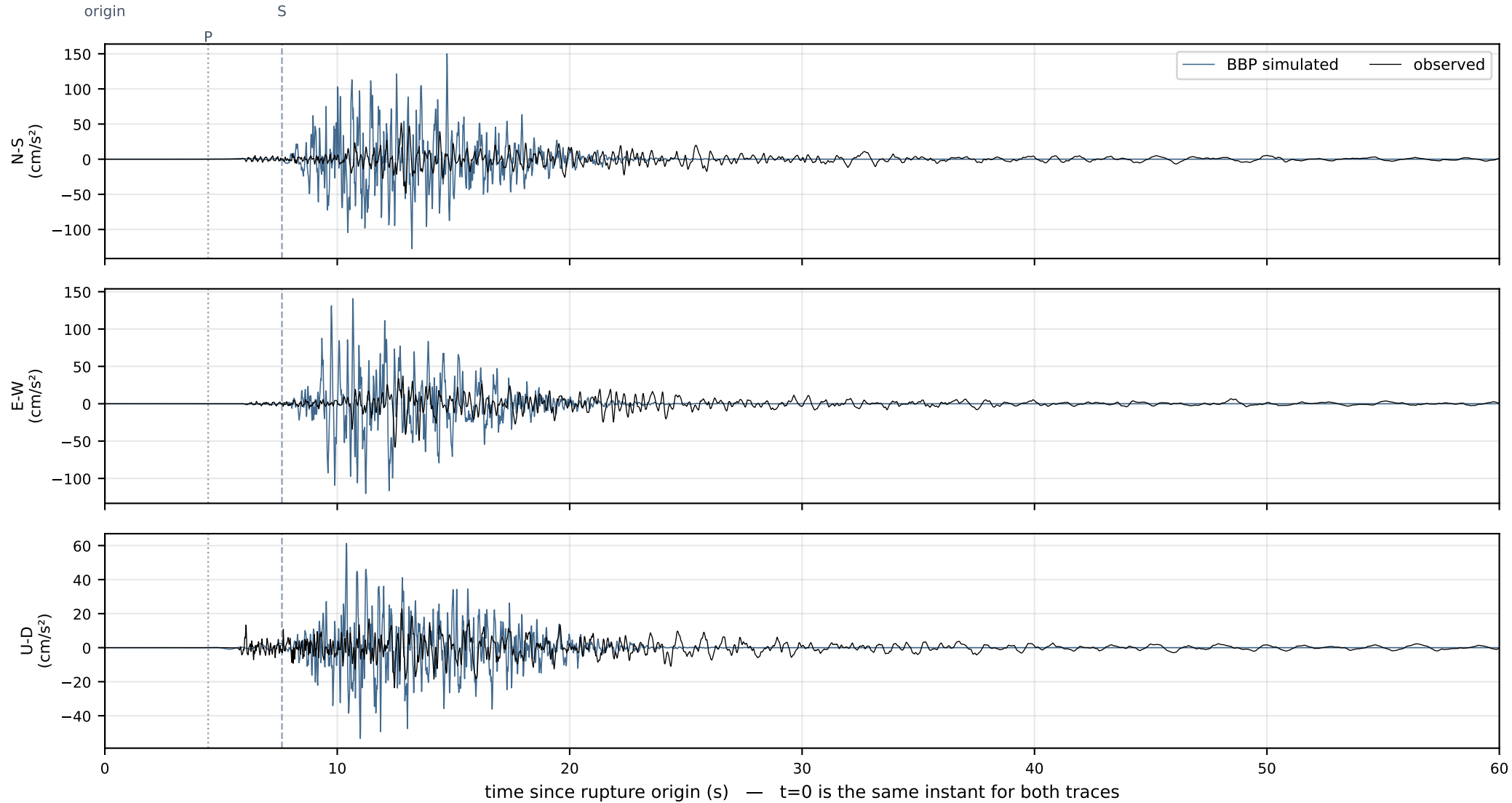
CE.58558 — 26.4 km, Vs30 443 m/s, HNE (NCEDC)
observed PGA 0.0283 g · simulated PGA 0.1866 g · $\ln(\text{obs}/\text{sim}) = -1.888$ · observed peak at +12.9 s
observed record starts 15.0 s before origin



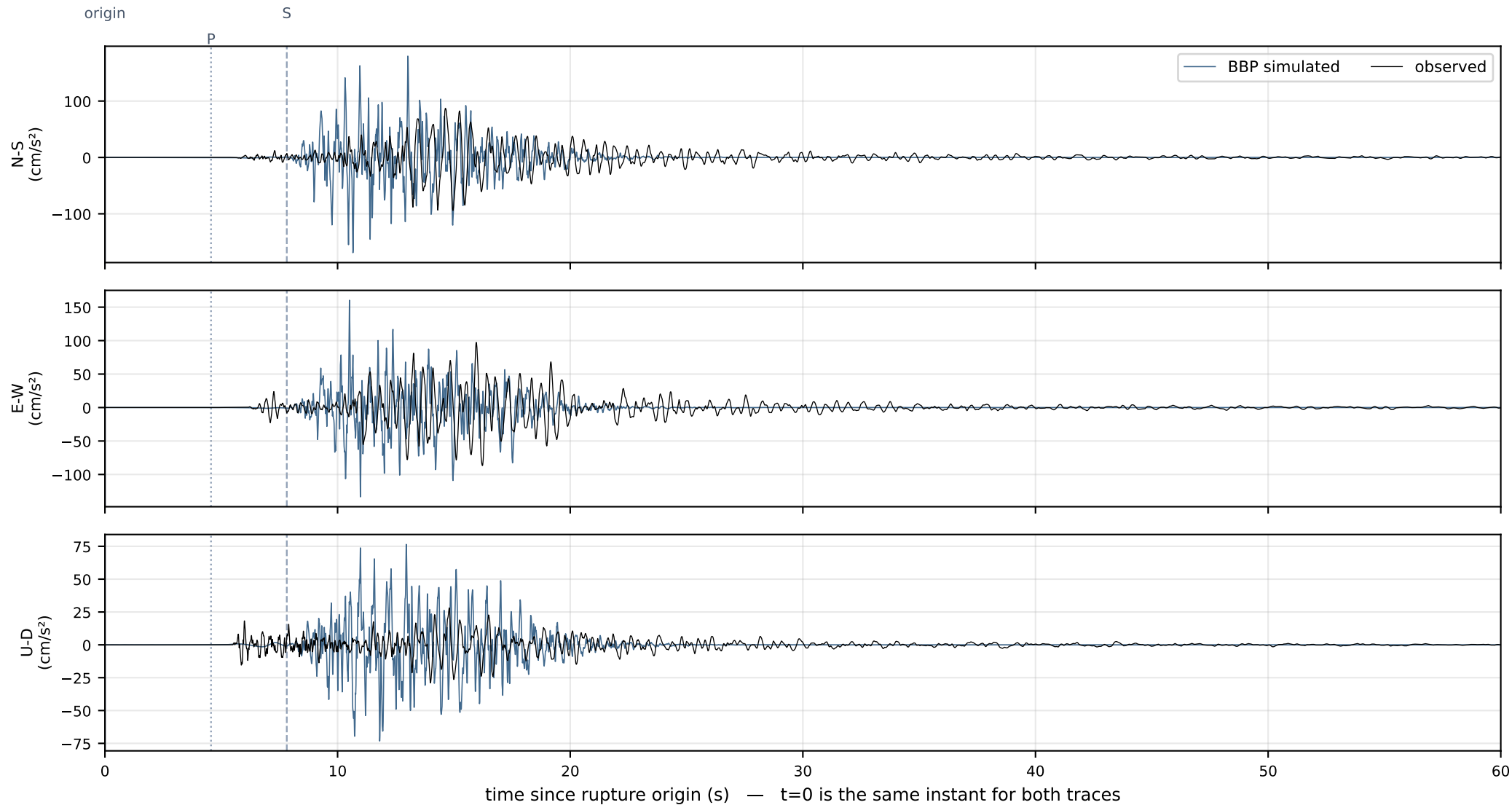
NC.CPI — 26.5 km, Vs30 436 m/s, HNE (NCEDC)
observed PGA 0.0637 g · simulated PGA 0.1591 g · $\ln(\text{obs}/\text{sim}) = -0.915$ · observed peak at +12.5 s
observed record starts 60.0 s before origin



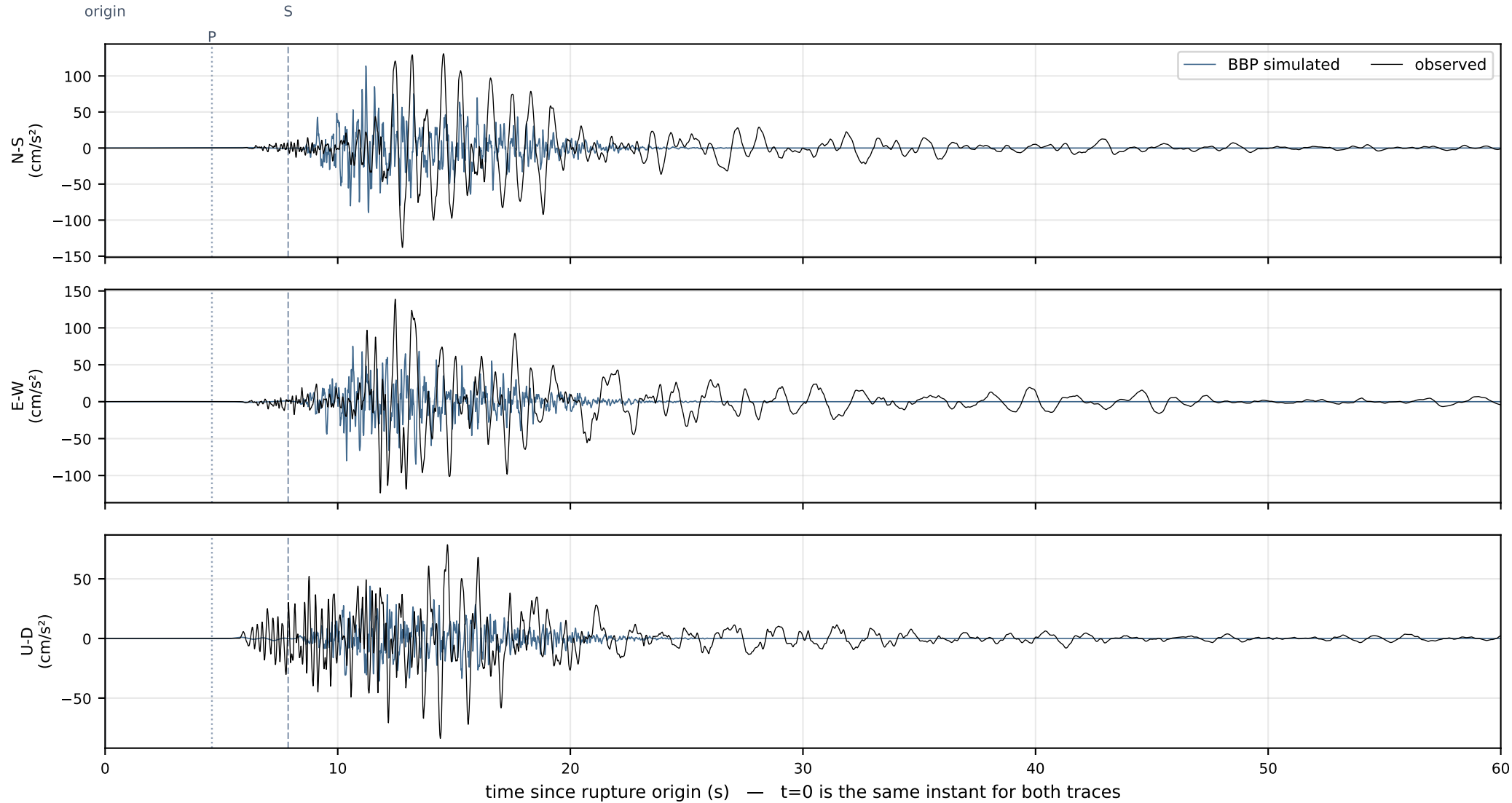
NC.C067 — 26.7 km, Vs30 441 m/s, HNE (NCEDC)
observed PGA 0.0594 g · simulated PGA 0.1529 g · $\ln(\text{obs}/\text{sim}) = -0.946$ · observed peak at +12.5 s
observed record starts 35.1 s before origin



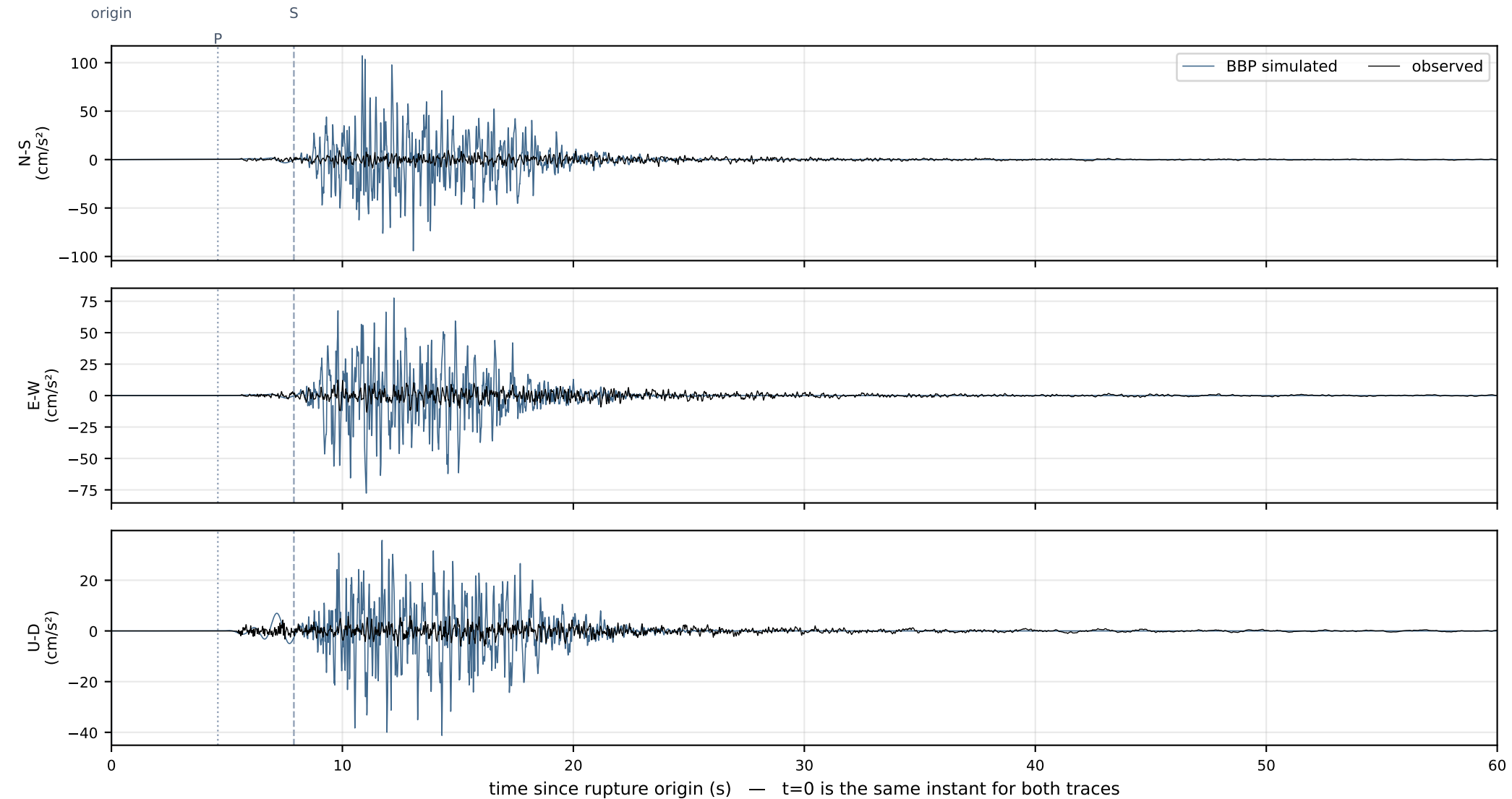
NP.1847 — 27.4 km, Vs30 303 m/s, HNE (NCEDC)
observed PGA 0.0992 g · simulated PGA 0.1832 g · $\ln(\text{obs}/\text{sim}) = -0.613$ · observed peak at +16.0 s
observed record starts 35.0 s before origin



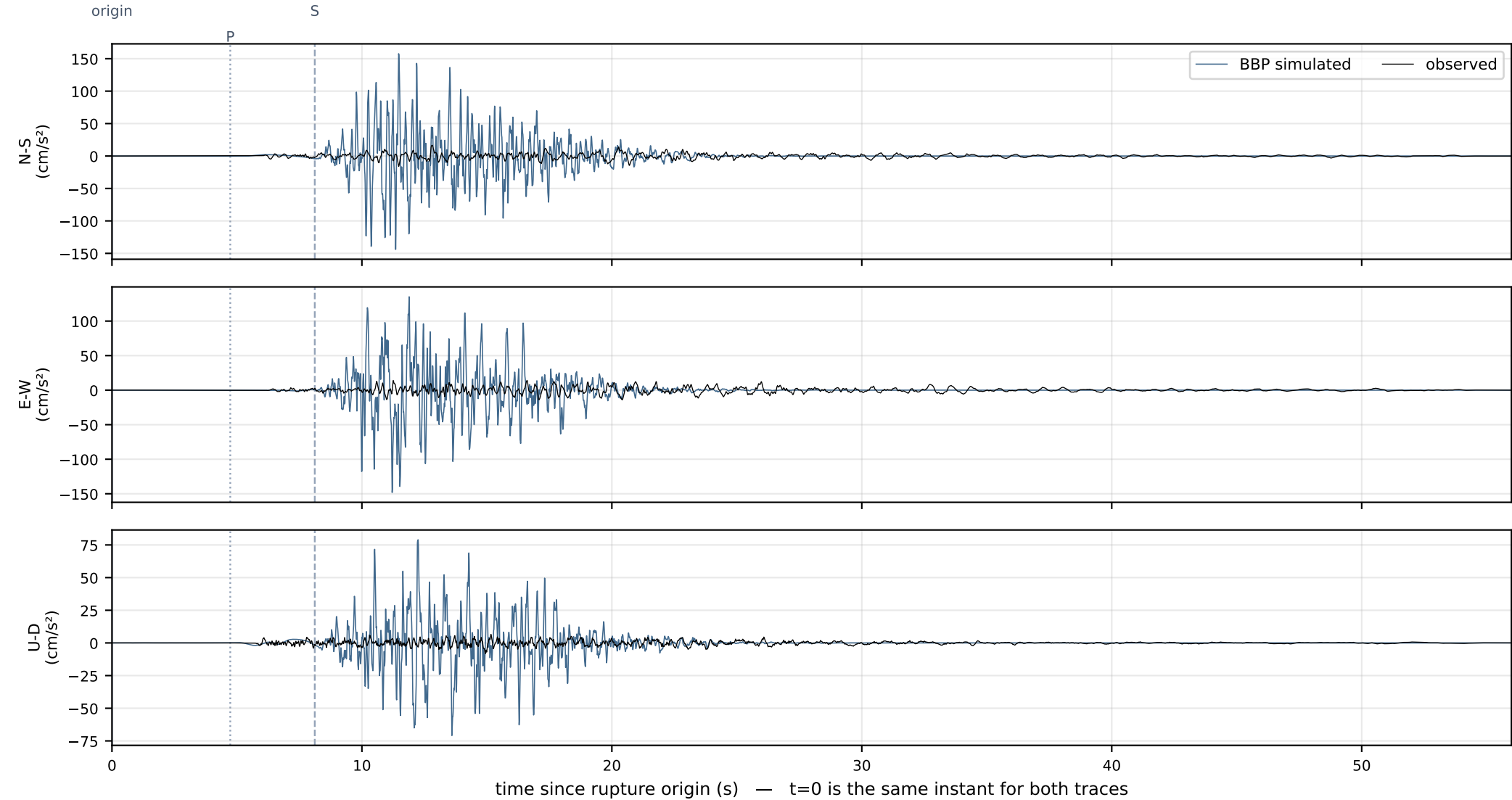
NC.NSM — 27.6 km, Vs30 698 m/s, HNE (NCEDC)
observed PGA 0.1415 g · simulated PGA 0.1161 g · $\ln(\text{obs}/\text{sim}) = +0.199$ · observed peak at +12.5 s
observed record starts 60.0 s before origin



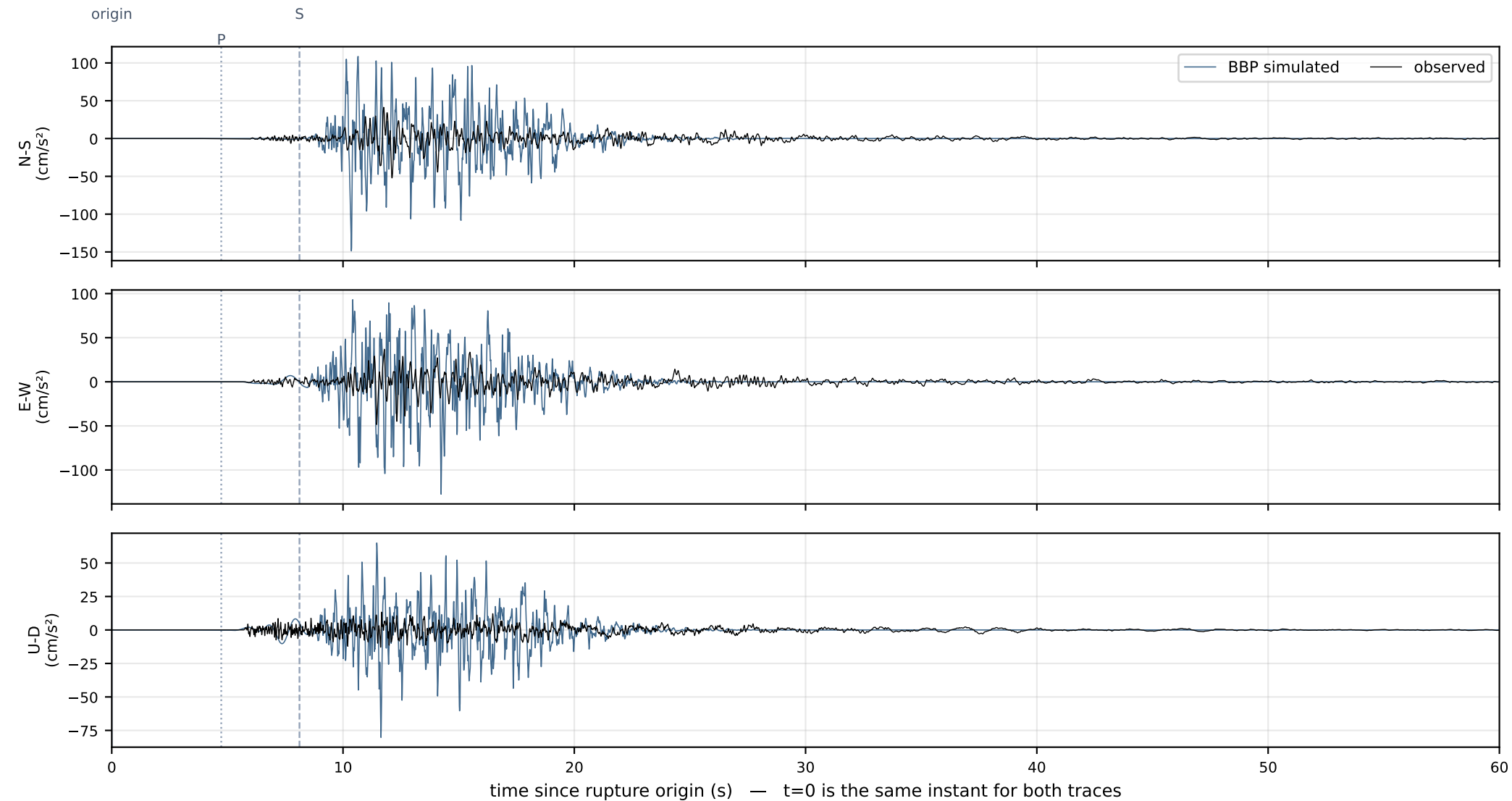
NC.NCC — 27.6 km, Vs30 706 m/s, HNE (NCEDC)
observed PGA 0.0136 g · simulated PGA 0.1093 g · $\ln(\text{obs}/\text{sim}) = -2.083$ · observed peak at +11.1 s
observed record starts 60.0 s before origin



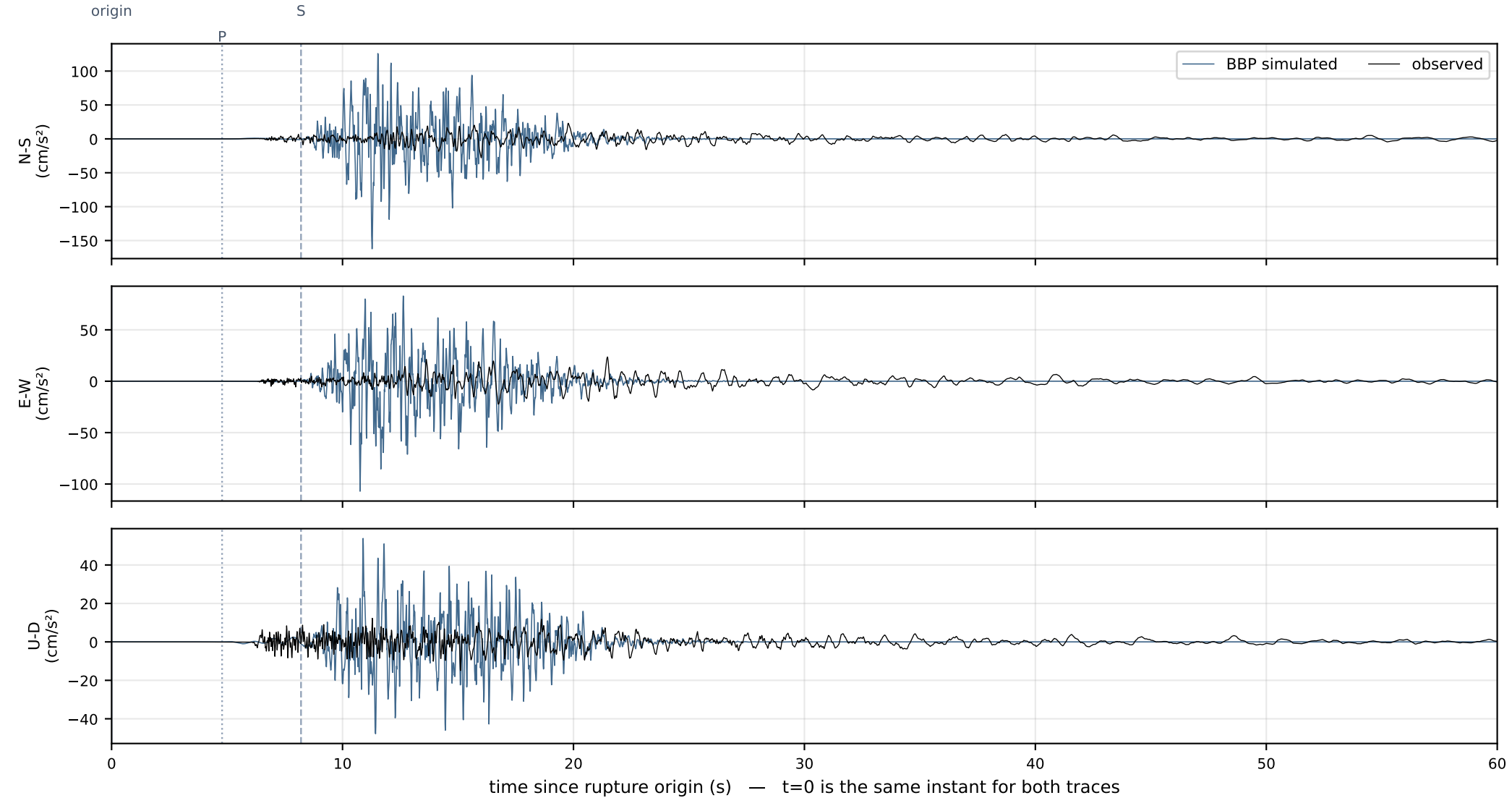
CE.58408 — 28.4 km, Vs30 255 m/s, HNE (NCEDC)
observed PGA 0.0168 g · simulated PGA 0.1608 g · $\ln(\text{obs}/\text{sim}) = -2.258$ · observed peak at +12.8 s
observed record starts 15.0 s before origin



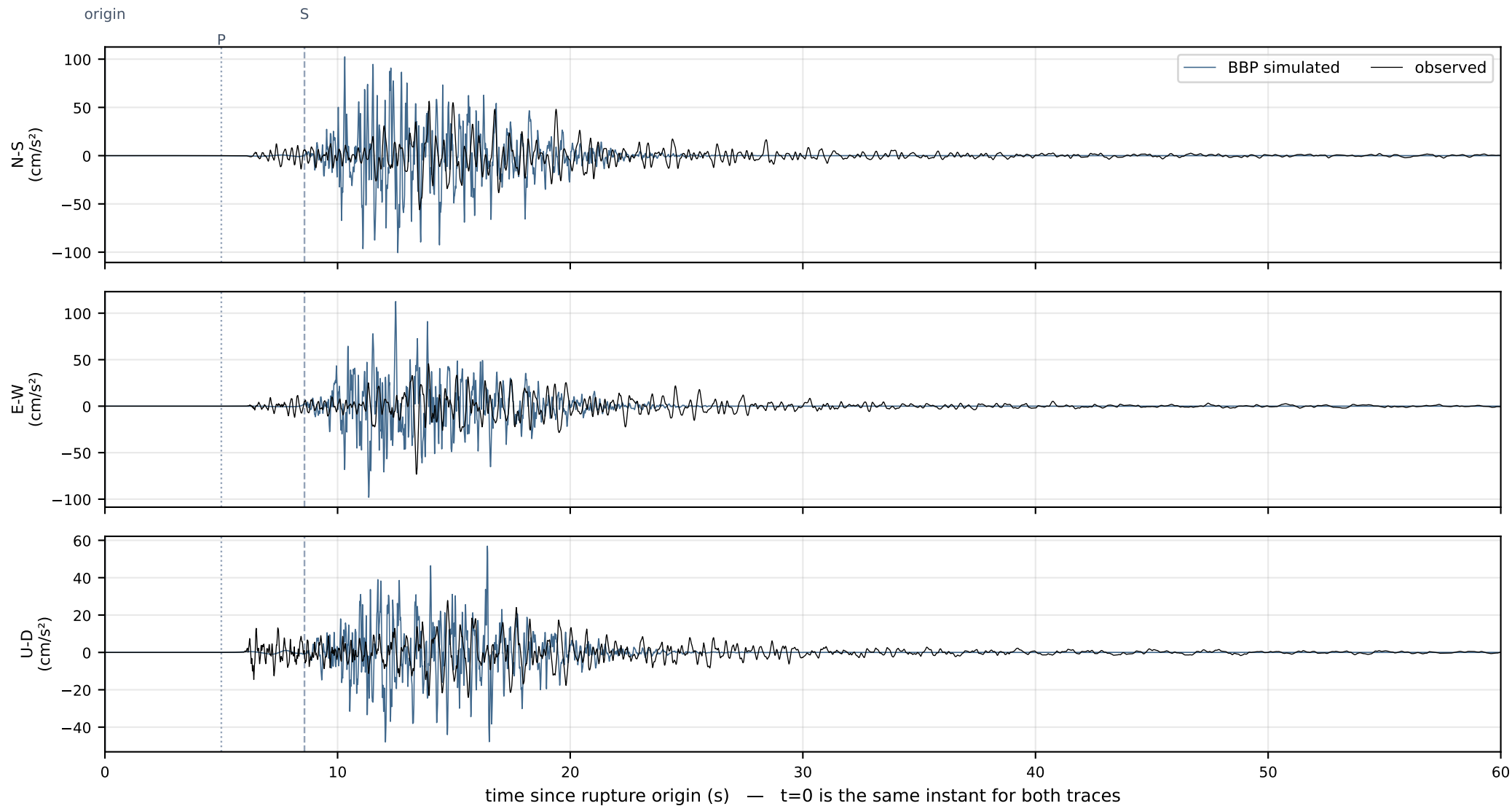
NP.1768 — 28.4 km, Vs30 325 m/s, HNE (NCEDC)
observed PGA 0.0532 g · simulated PGA 0.1515 g · $\ln(\text{obs}/\text{sim}) = -1.047$ · observed peak at +12.1 s
observed record starts 34.8 s before origin



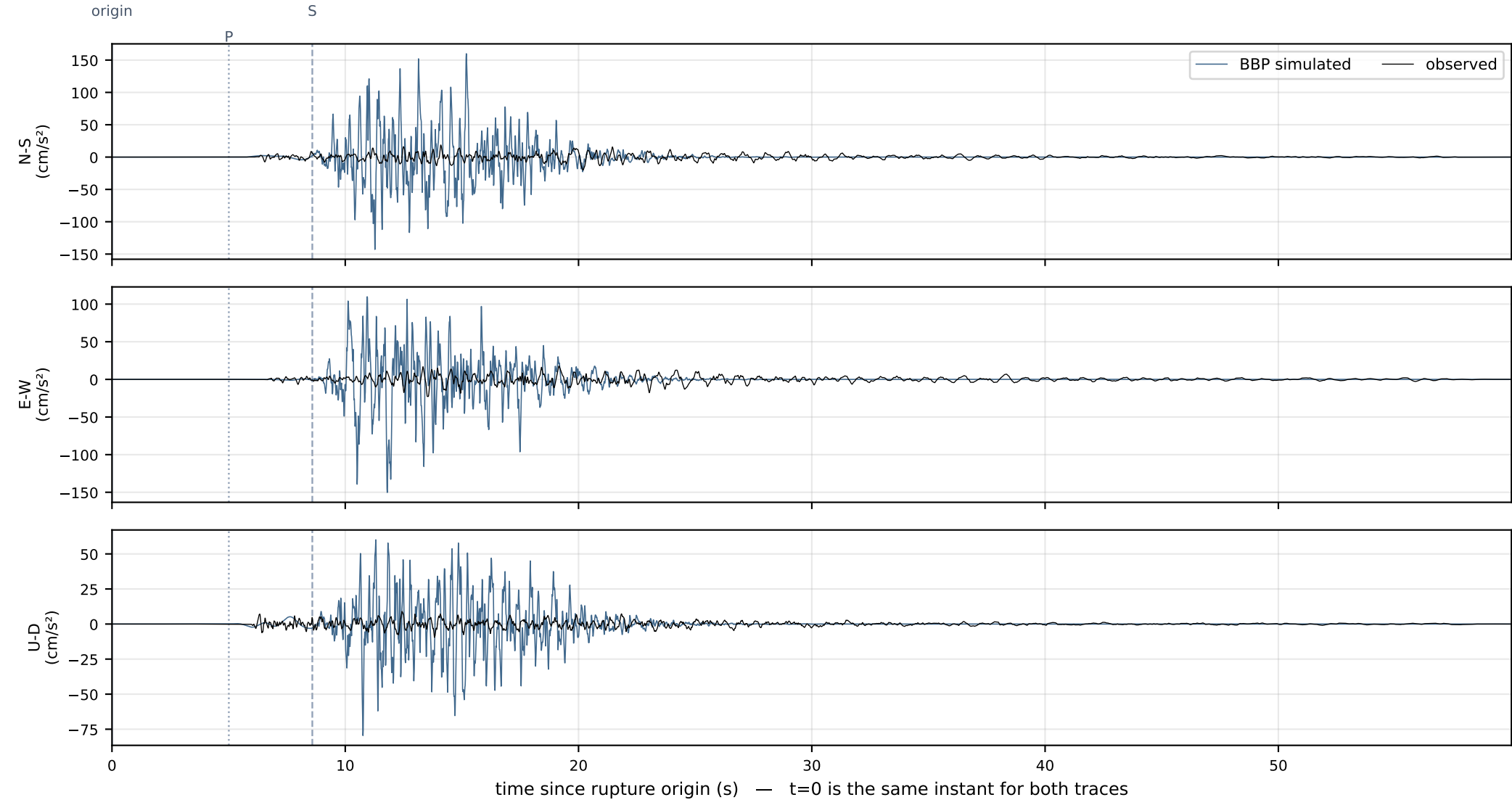
NC.CSPB — 28.7 km, Vs30 447 m/s, HNE (NCEDC)
observed PGA 0.0285 g · simulated PGA 0.1654 g · $\ln(\text{obs}/\text{sim}) = -1.759$ · observed peak at +16.0 s
observed record starts 60.0 s before origin



NP.1823 — 30.0 km, Vs30 479 m/s, HNE (NCEDC)
observed PGA 0.0747 g · simulated PGA 0.1148 g · $\ln(\text{obs}/\text{sim}) = -0.429$ · observed peak at +13.4 s
observed record starts 4.0 s before origin



CE.58421 — 30.1 km, Vs30 241 m/s, HNE (NCEDC)
observed PGA 0.0233 g · simulated PGA 0.1630 g · $\ln(\text{obs}/\text{sim}) = -1.947$ · observed peak at +13.5 s
observed record starts 19.0 s before origin



Animation input — displacement

the time series the Blender scenes render, per station

WHAT THESE PAGES SHOW

	The displacement time series handed to the Blender scene for each station: the array in the .npz file passed as --displacement-file. Everything earlier in this report concerns acceleration and response spectra, which is what goodness of fit is defined on. This is the quantity that becomes movement on screen.
observed	worker/observed_seismogram.py – response removed to acceleration, double-integrated with a detrend after each step, bandpassed, clipped from origin -5 s to the S-wave arrival + 10 s.
simulated	worker/bbp_seismogram.py – BBP's velocity output integrated once with a demean and a linear detrend, clipped to the peak -5 s / +15 s.
then, both	animations/ground_motion.clip_for_scene – a further clip to [first motion - 2 s, peak + 15 s] with the DC offset removed. That is the shaded band on each page, and it is what the table actually follows.

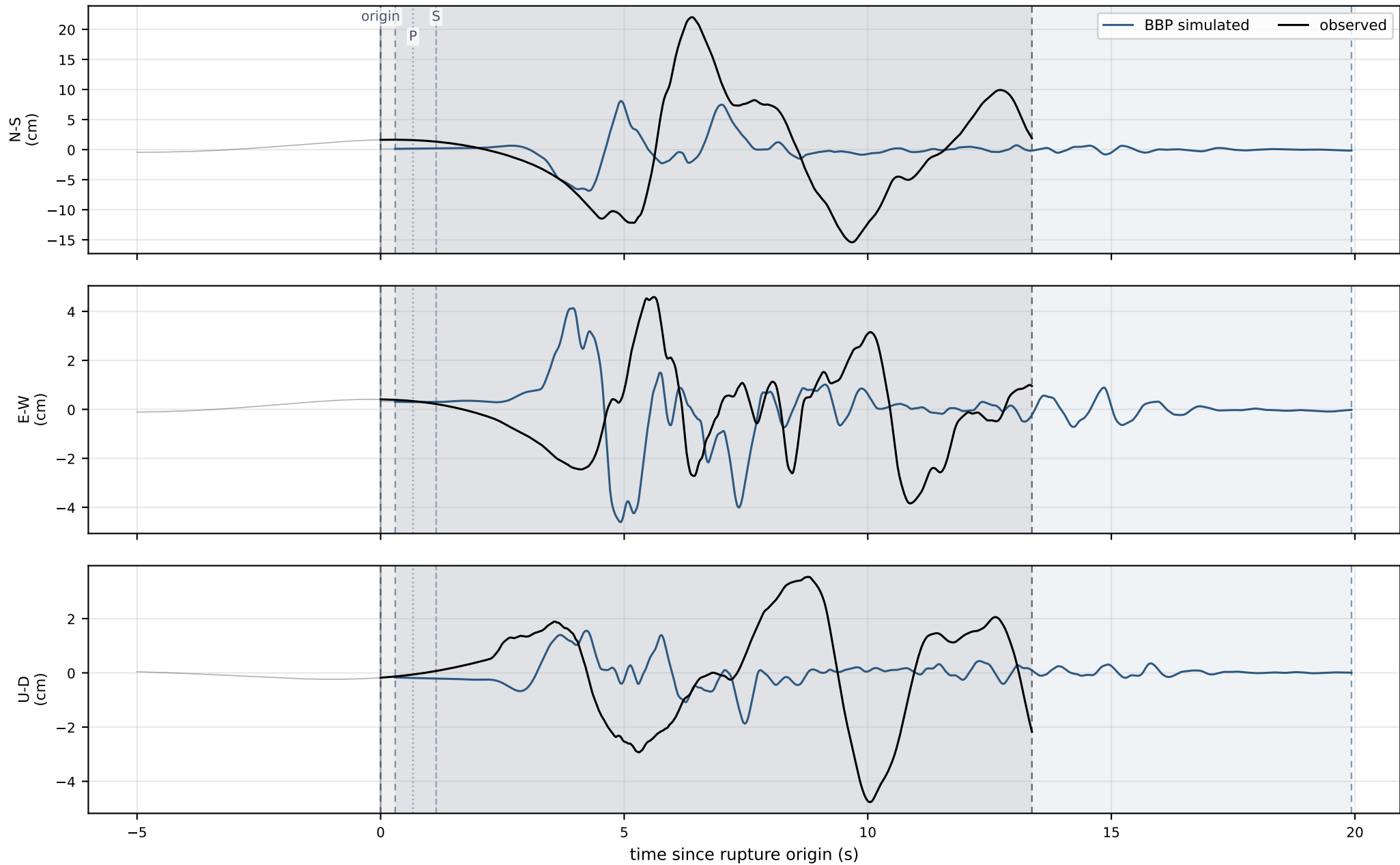
HOW TO READ A DISAGREEMENT

not a residual	The two traces come from different code over different windows, so a difference here is part processing and part physics and this page cannot separate them. The acceleration overlays and the spectra are where the model is judged.
what it does show	Whether the animation was driven by a physically sensible record – right arrival, right duration, right order of magnitude – and whether the simulated and recorded motion would look like the same earthquake.
amplitude is the point	Peak displacement sets how far the table travels. A factor of two in PGD is a visibly different animation, where the same factor in PGA is not.

COVERAGE

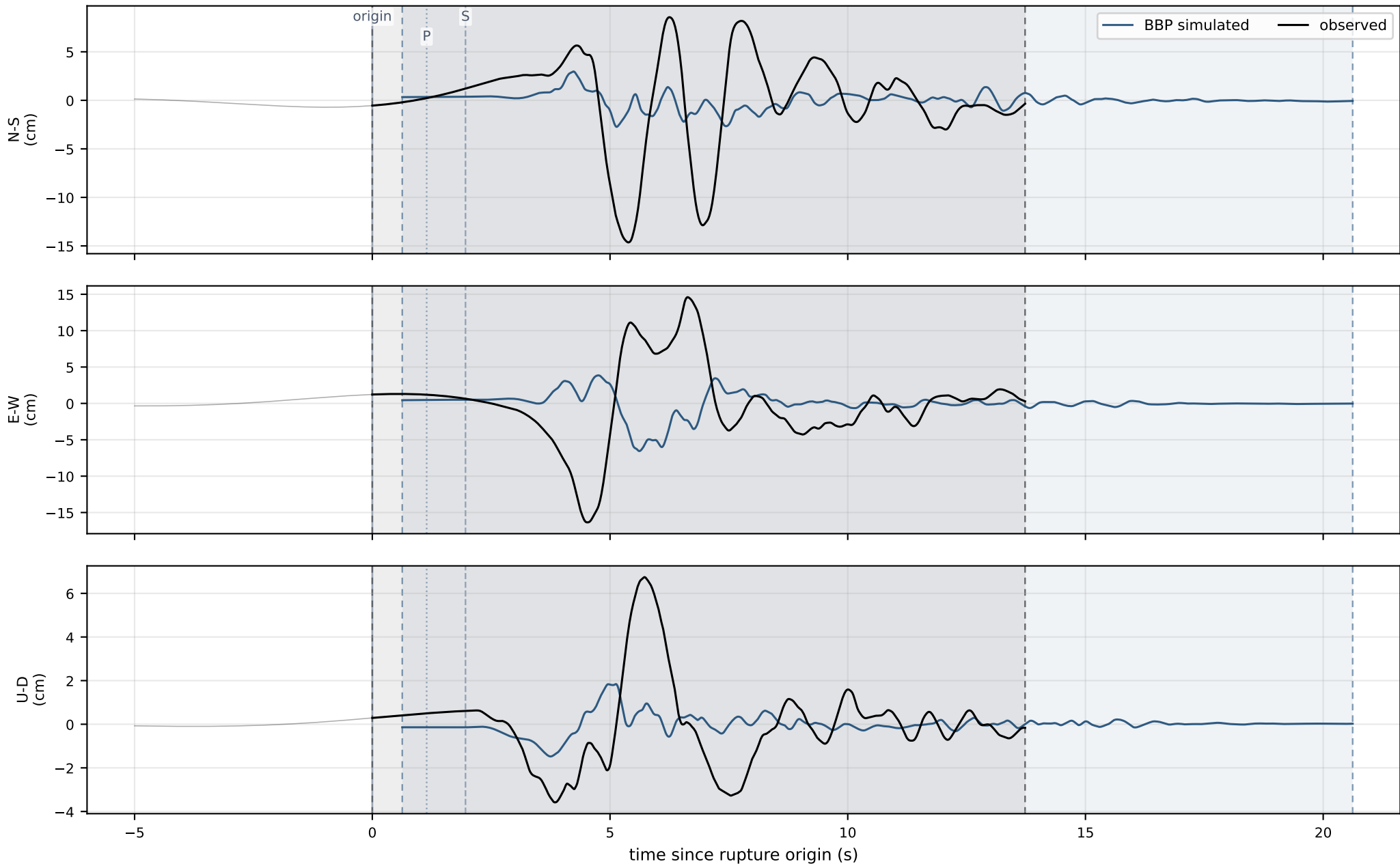
both records	40 station(s)
observed only	0 station(s)
simulated only	0 station(s)
PGD ratio	geometric mean observed/simulated = 0.56x
simulated source	BBP simulated

NC.NHC — 4.0 km · displacement handed to the animation
 observed PGD 22.03 cm · simulated PGD 8.08 cm · obs/sim = 2.73x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s



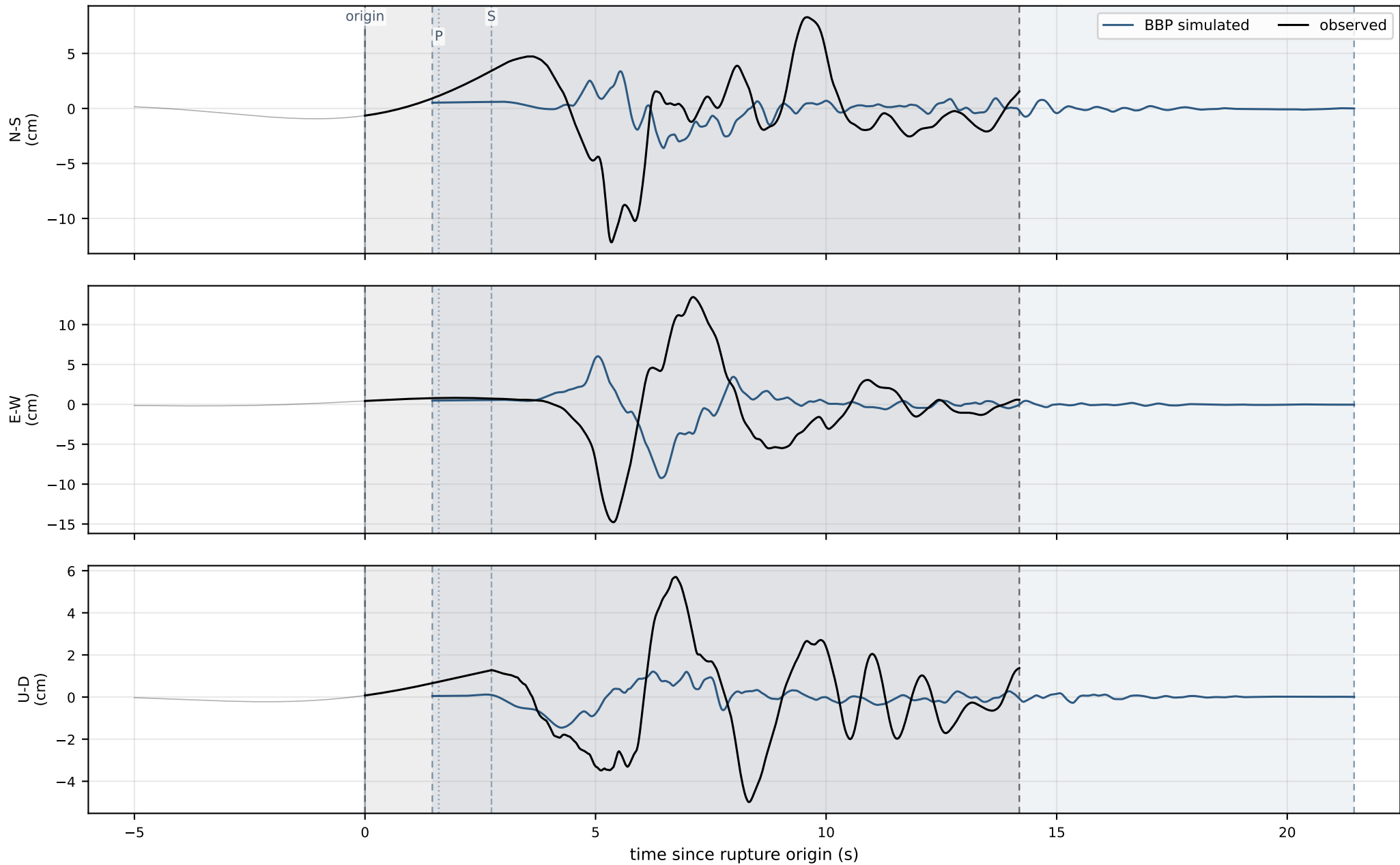
Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.68150 — 6.9 km · displacement handed to the animation
 observed PGD 16.36 cm · simulated PGD 6.56 cm · obs/sim = 2.50x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.N016 — 9.6 km · displacement handed to the animation
 observed PGD 14.77 cm · simulated PGD 9.24 cm · obs/sim = 1.60x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

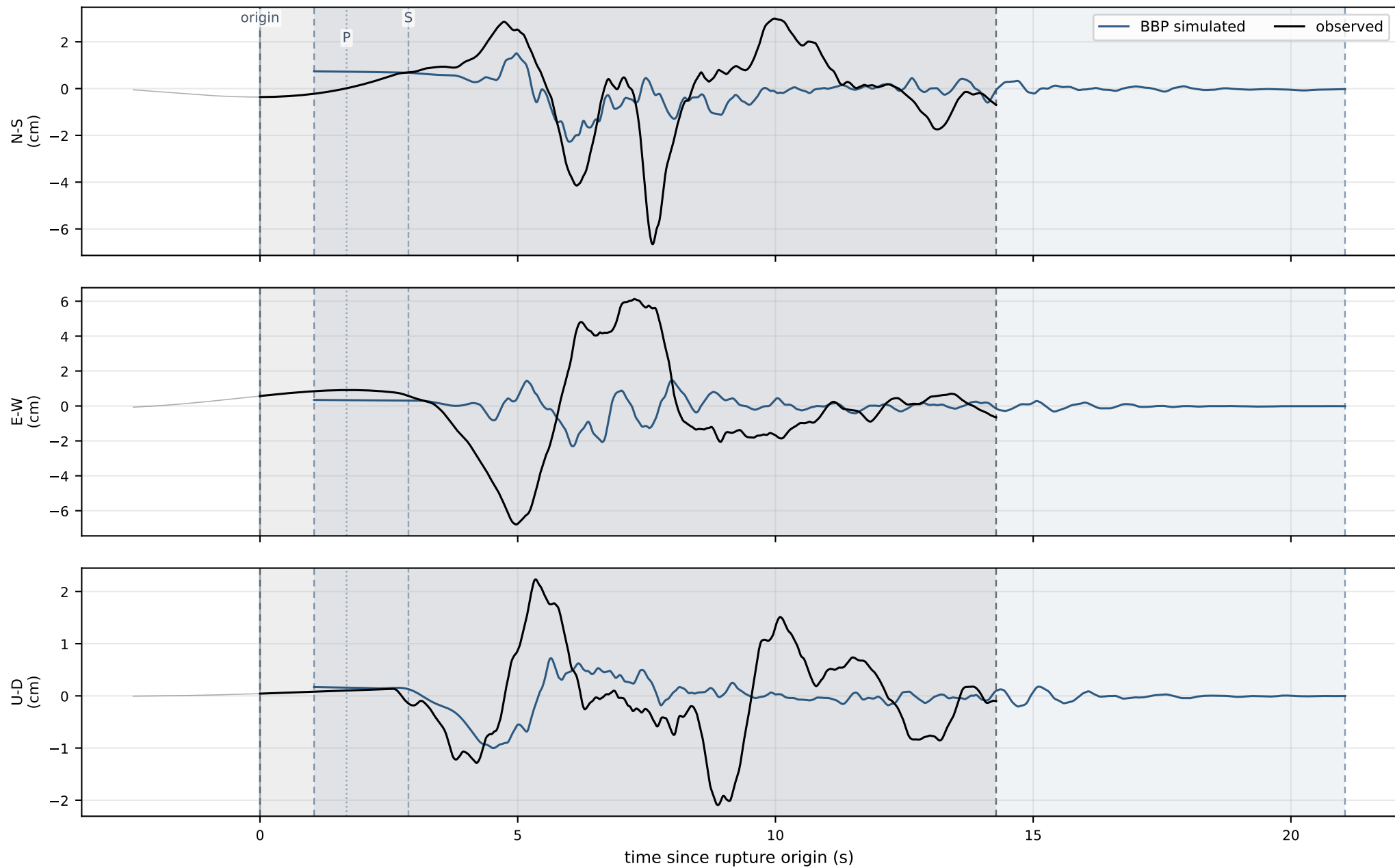


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

YK.KRE — 10.1 km · displacement handed to the animation

observed PGD 6.79 cm · simulated PGD 2.31 cm · obs/sim = 2.94x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

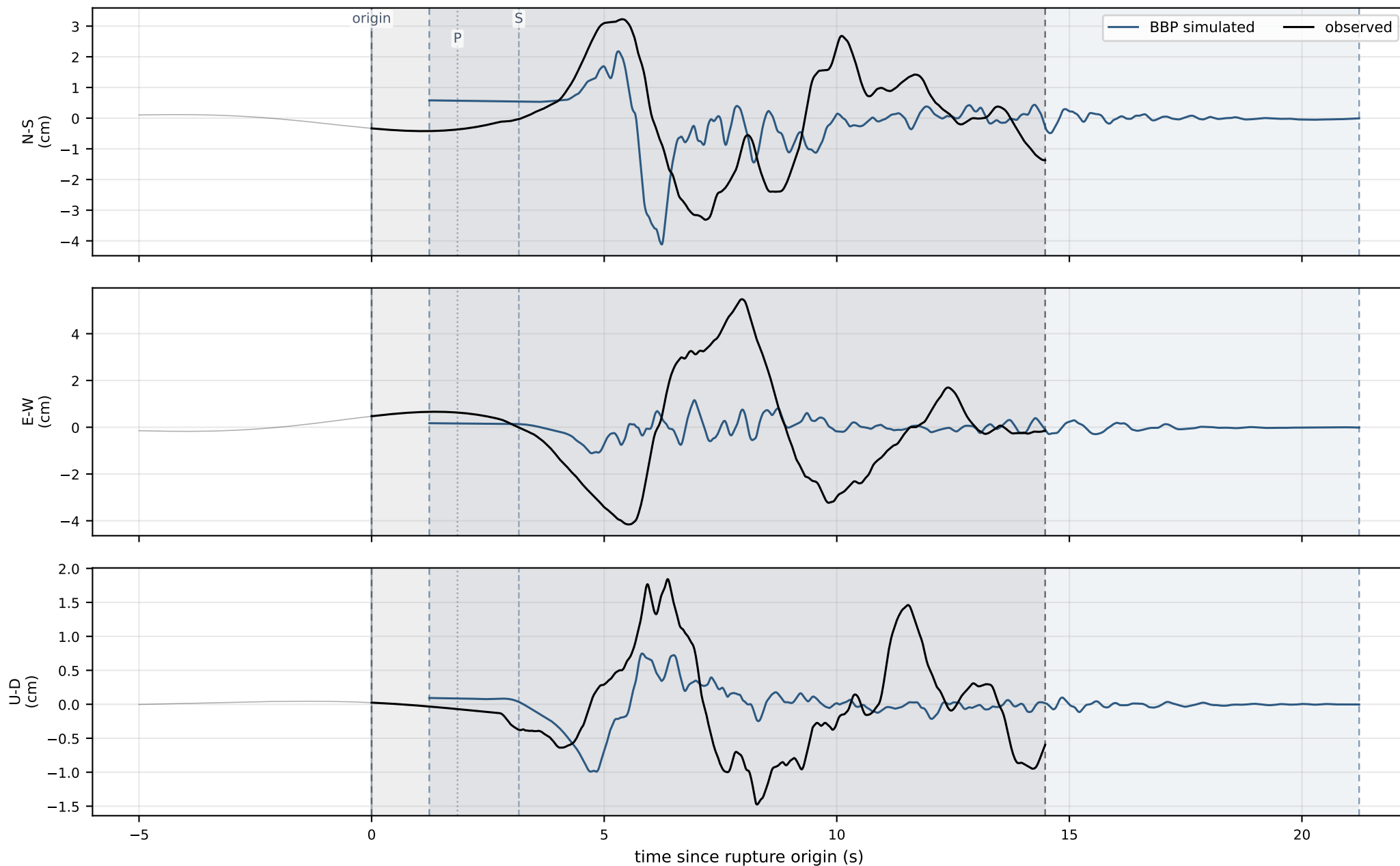


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NGVB — 11.1 km · displacement handed to the animation

observed PGD 5.48 cm · simulated PGD 4.12 cm · obs/sim = 1.33x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

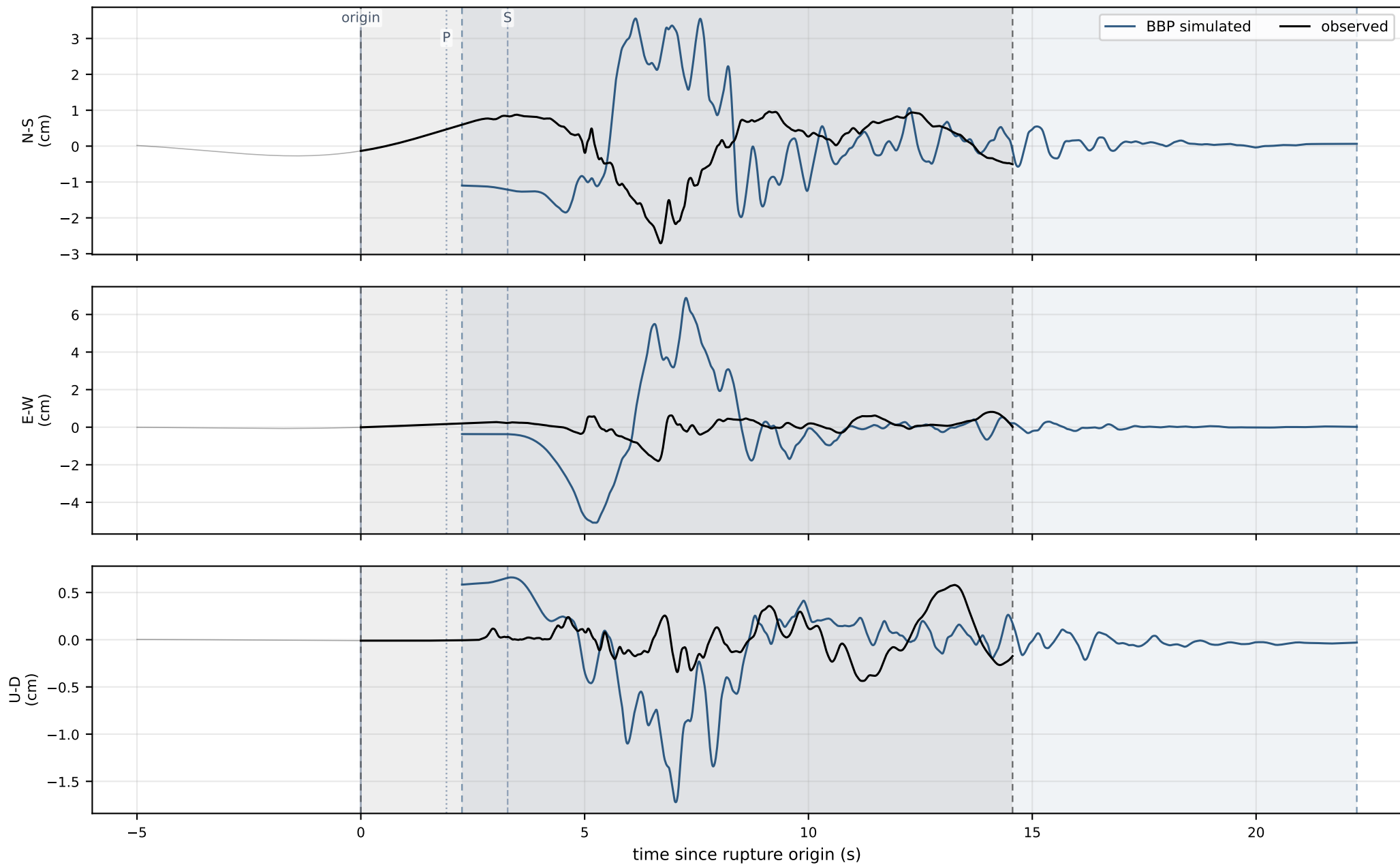


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.68294 — 11.5 km · displacement handed to the animation

observed PGD 2.71 cm · simulated PGD 6.88 cm · obs/sim = 0.39x

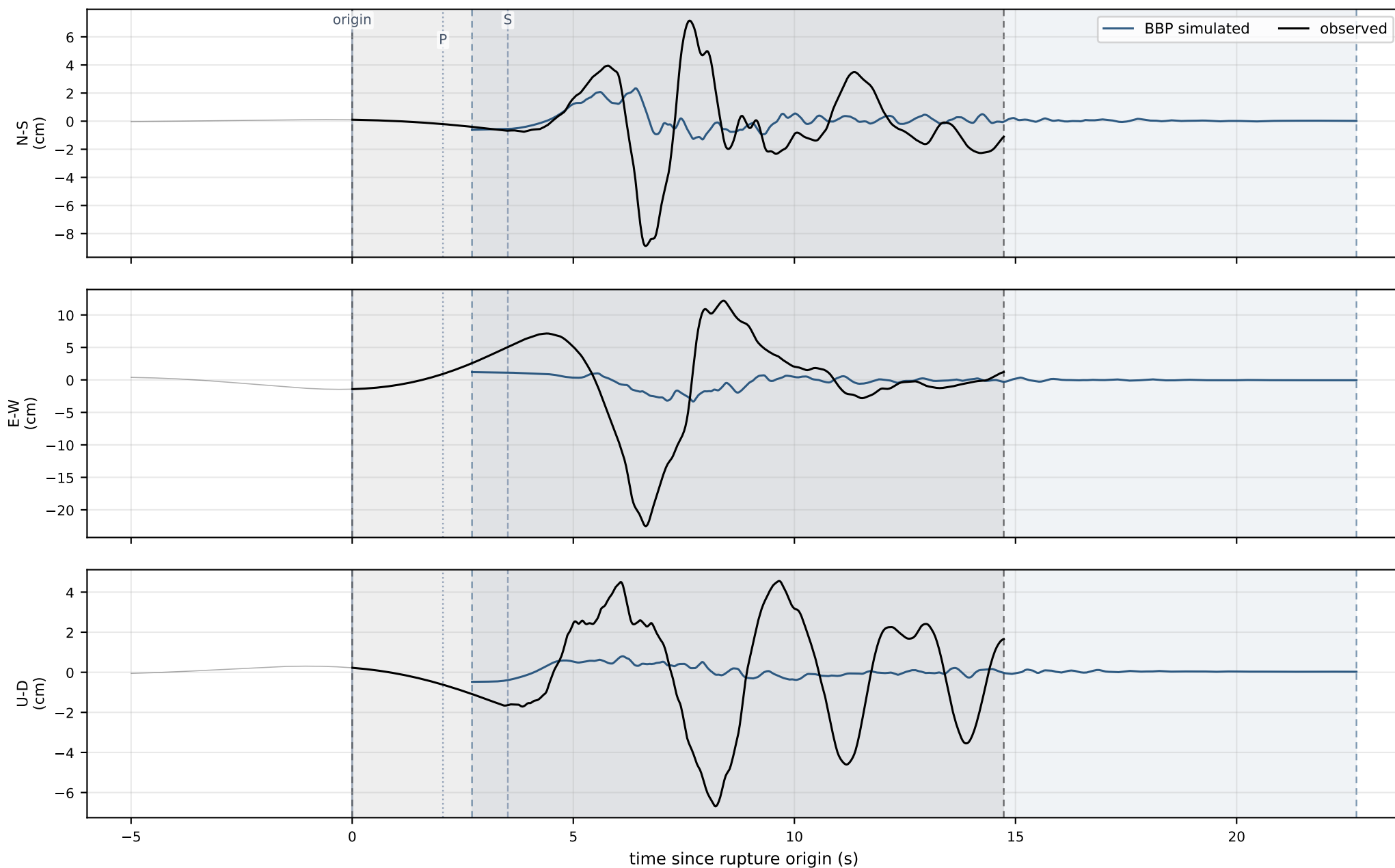
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



NC.N019B — 12.3 km · displacement handed to the animation

observed PGD 22.52 cm · simulated PGD 3.33 cm · obs/sim = 6.76x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

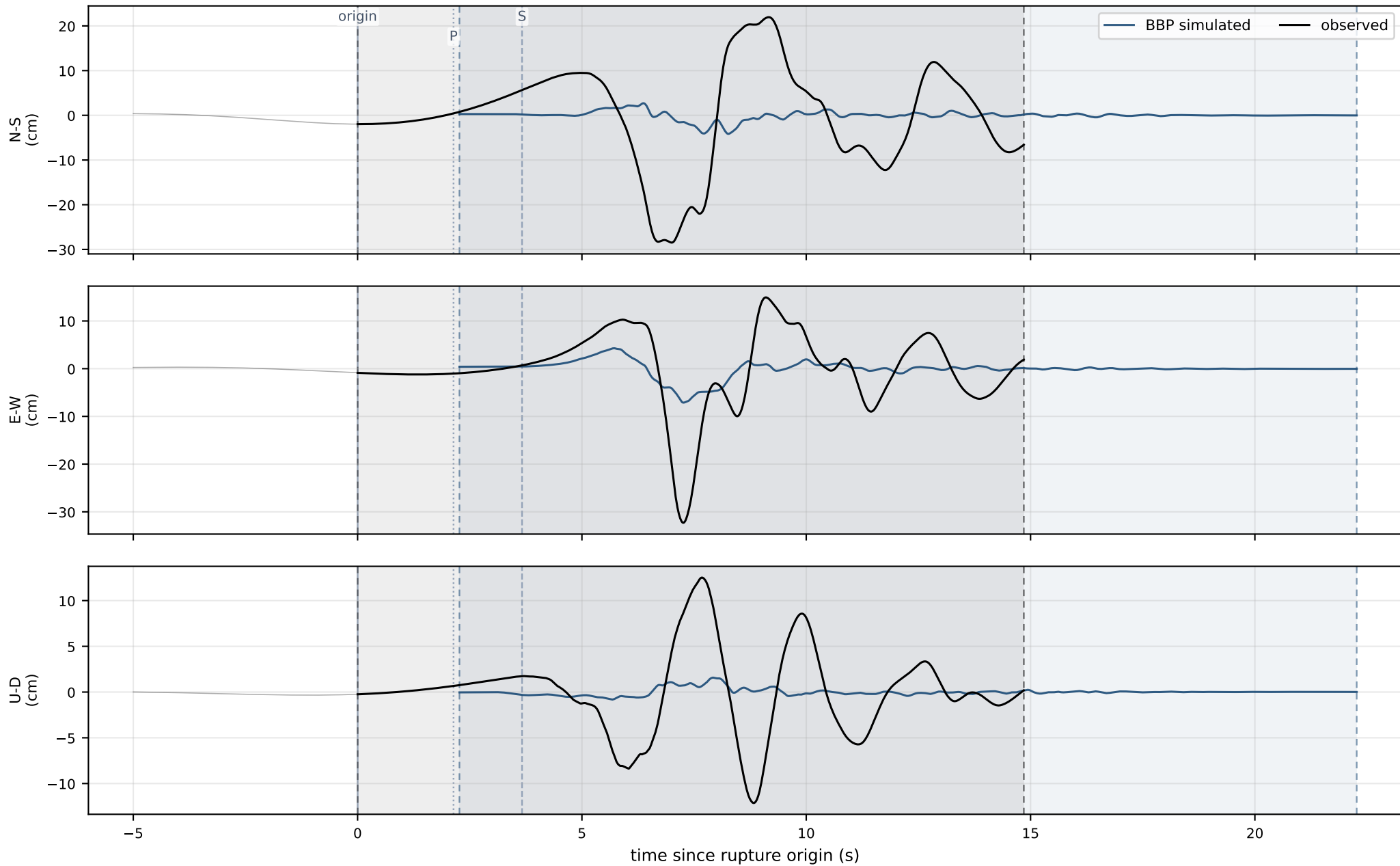


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1765 — 12.8 km · displacement handed to the animation

observed PGD 32.30 cm · simulated PGD 7.12 cm · obs/sim = 4.54x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

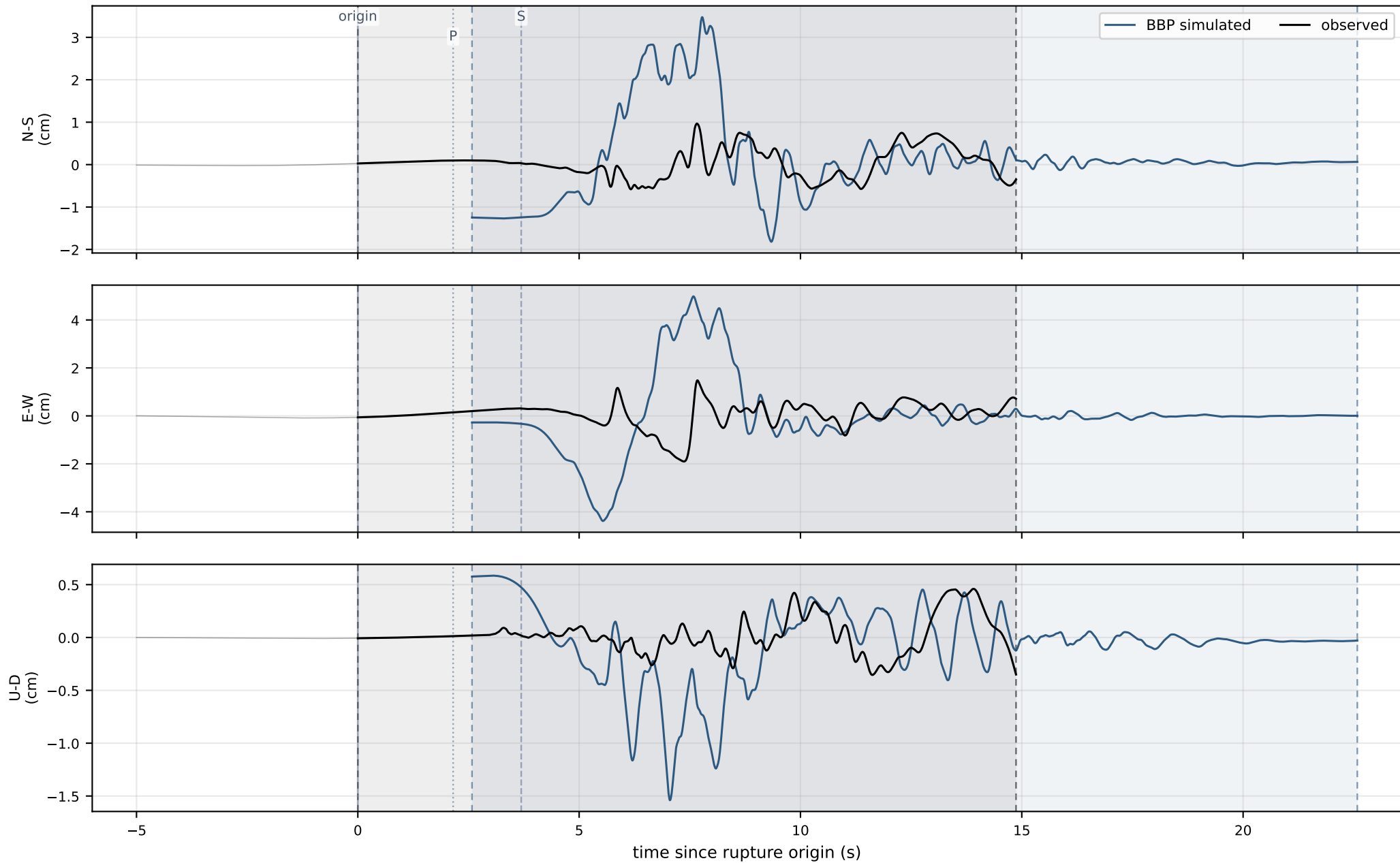


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1759 — 12.9 km · displacement handed to the animation

observed PGD 1.90 cm · simulated PGD 4.98 cm · obs/sim = 0.38x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

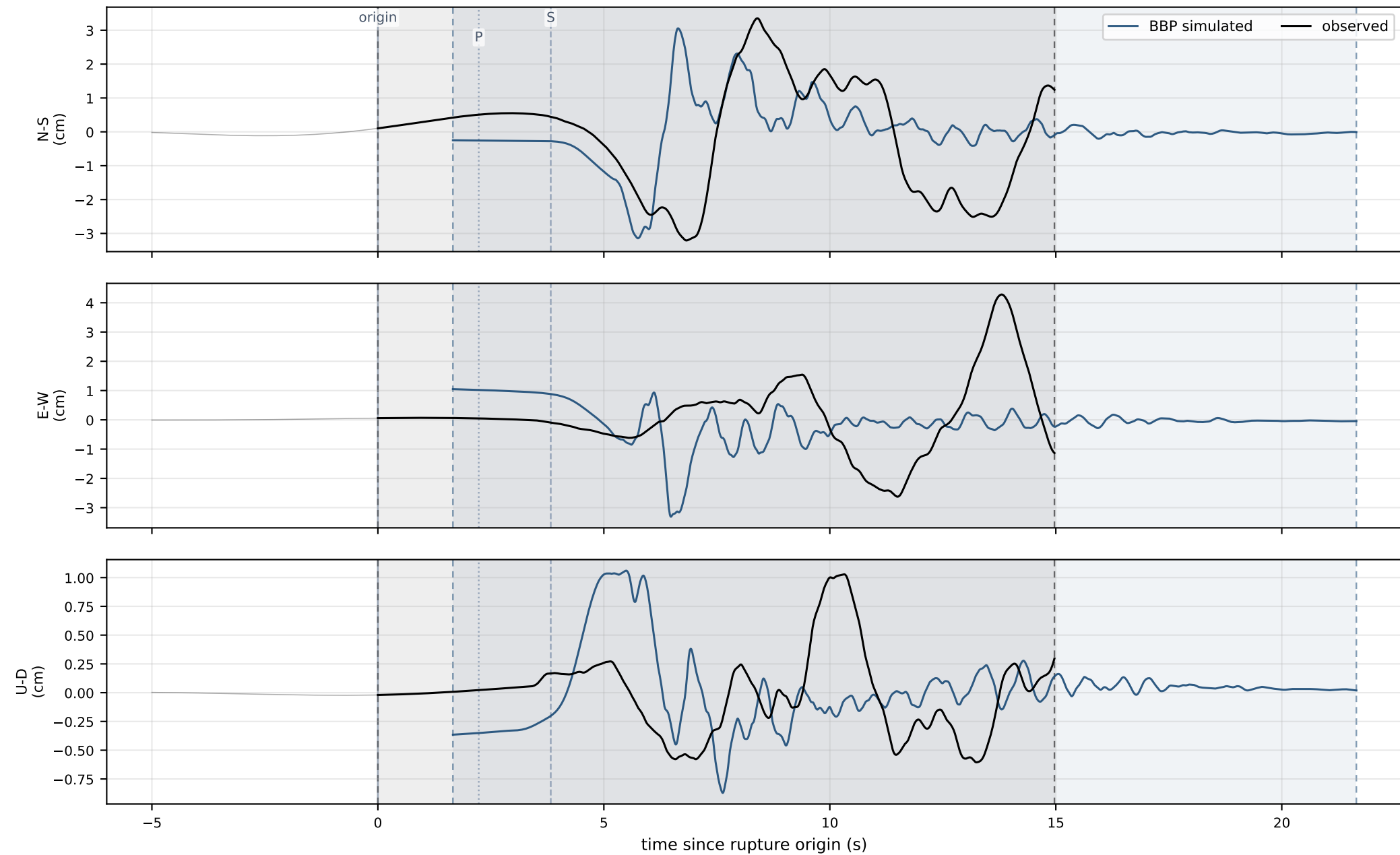


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NSP — 13.4 km · displacement handed to the animation

observed PGD 4.28 cm · simulated PGD 3.31 cm · obs/sim = 1.29x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

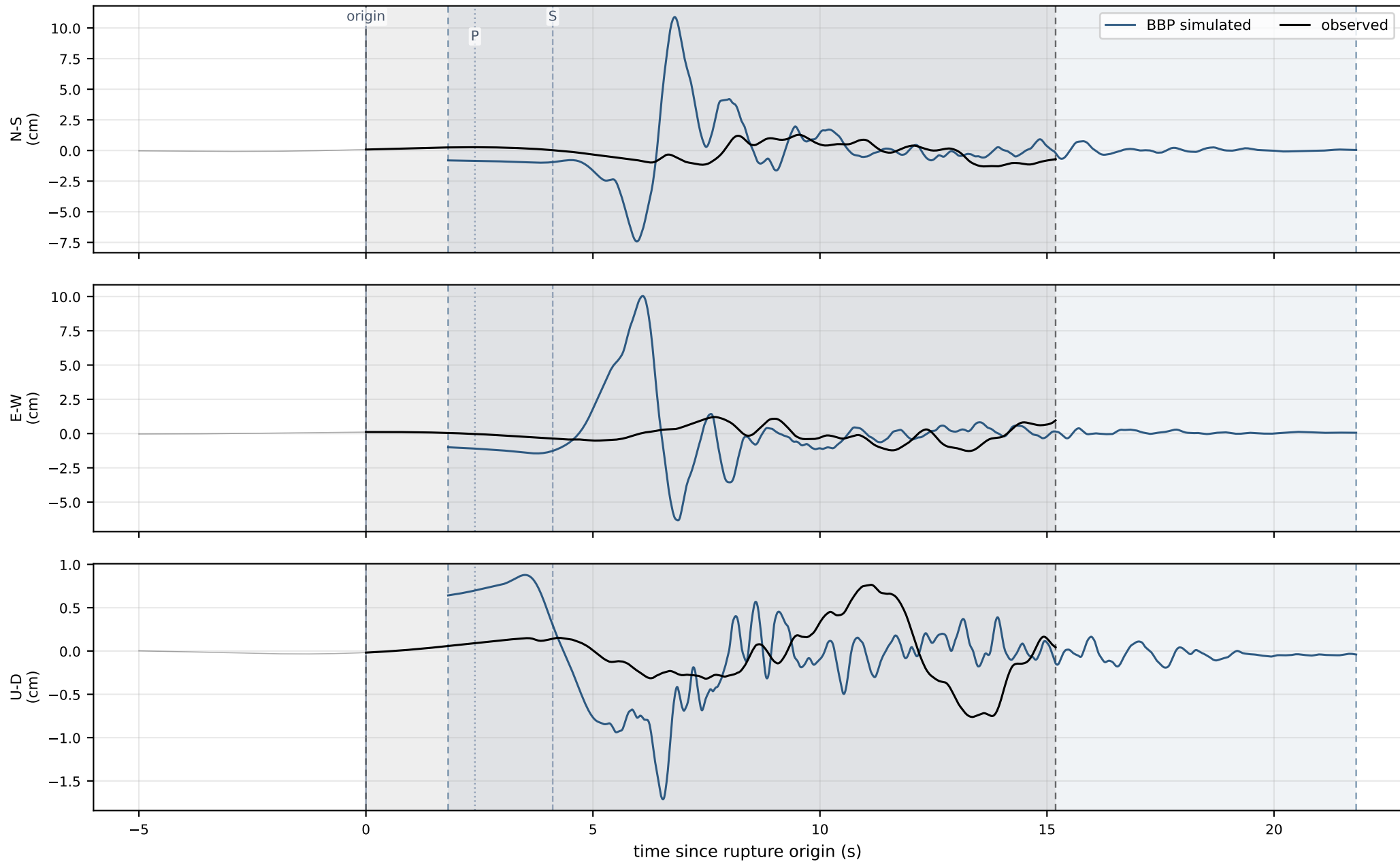


Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NTO — 14.4 km · displacement handed to the animation

observed PGD 1.30 cm · simulated PGD 10.89 cm · obs/sim = 0.12x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

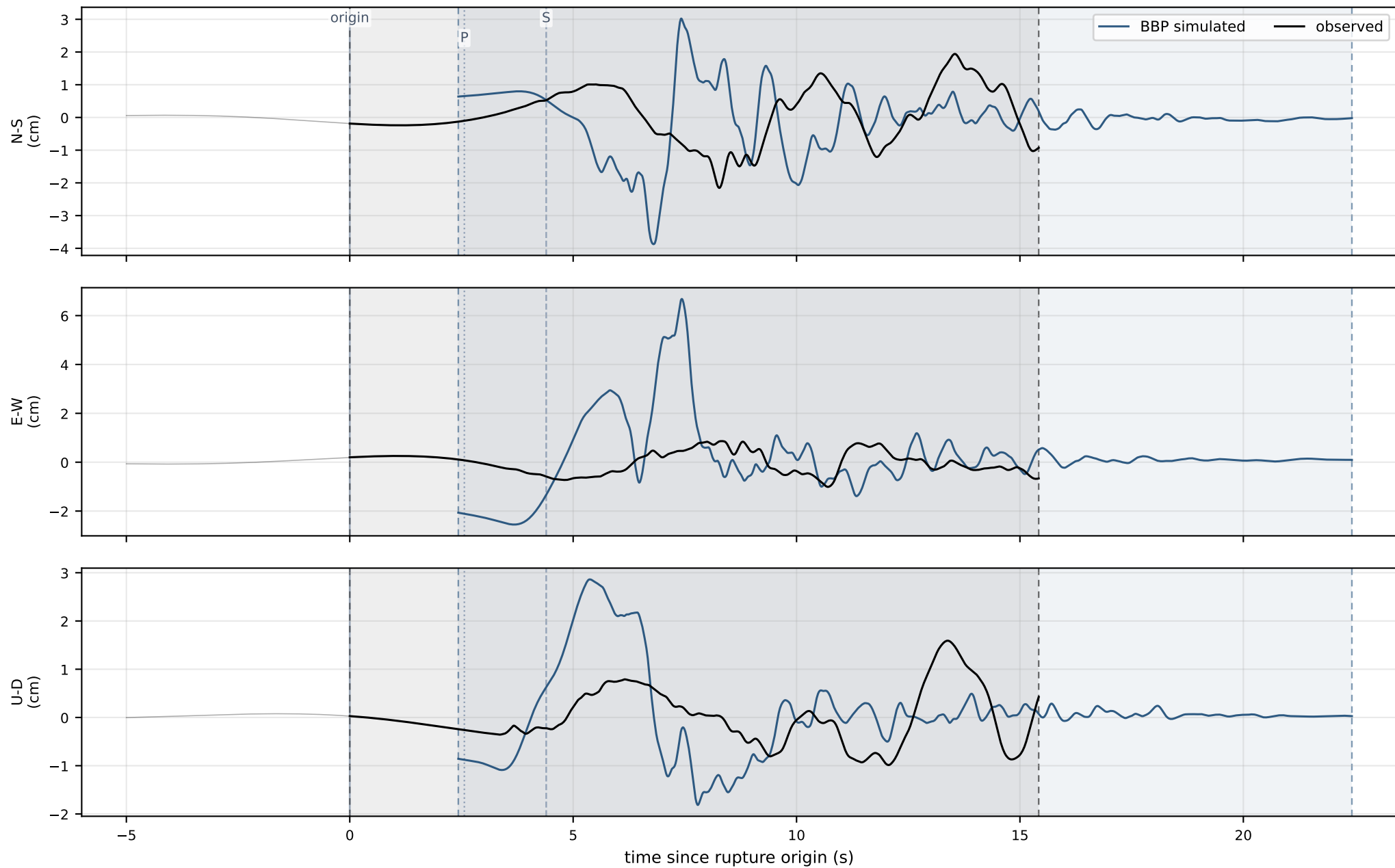


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.N002 — 15.4 km · displacement handed to the animation

observed PGD 2.15 cm · simulated PGD 6.68 cm · obs/sim = 0.32x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

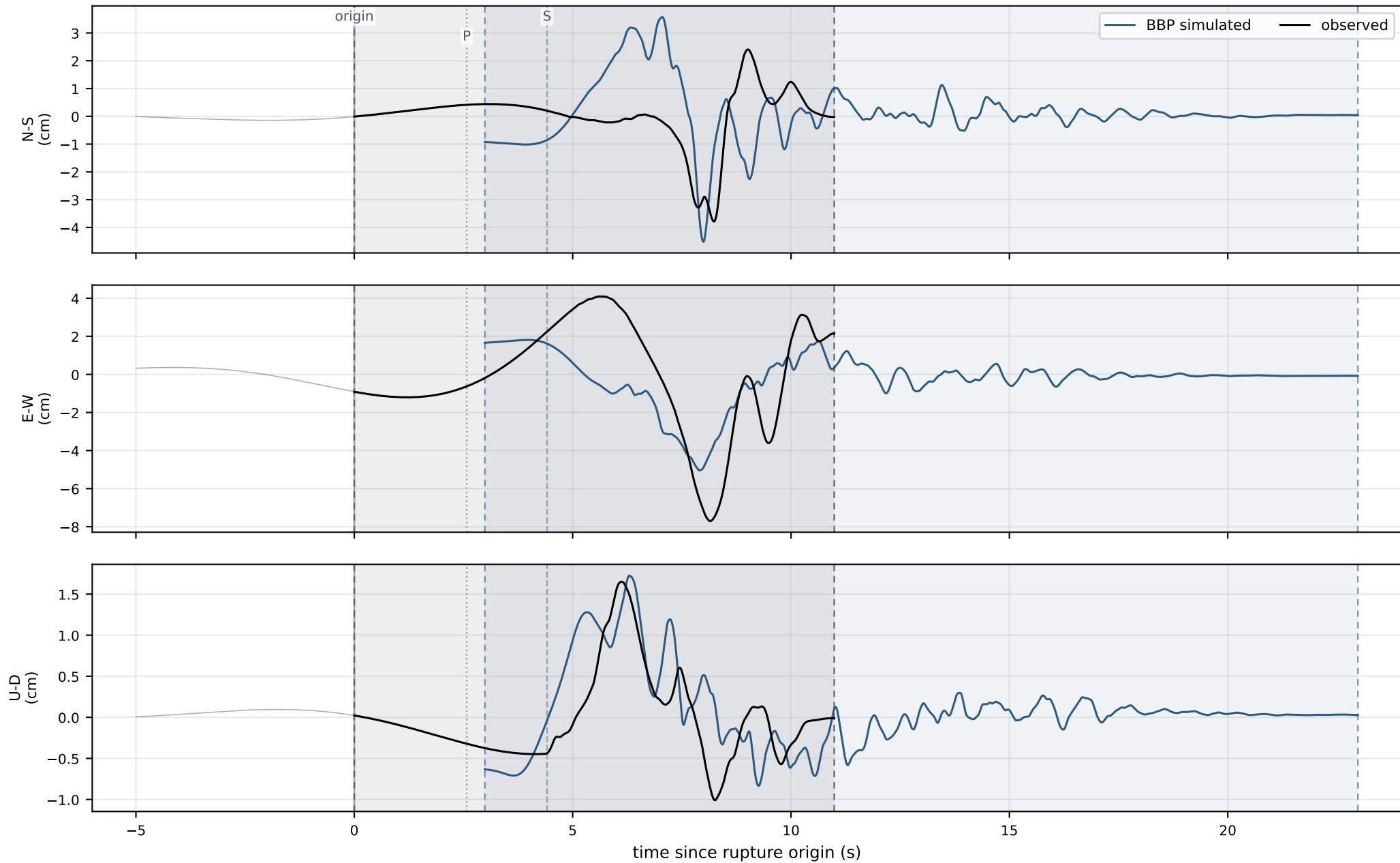


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1829 — 15.4 km · displacement handed to the animation

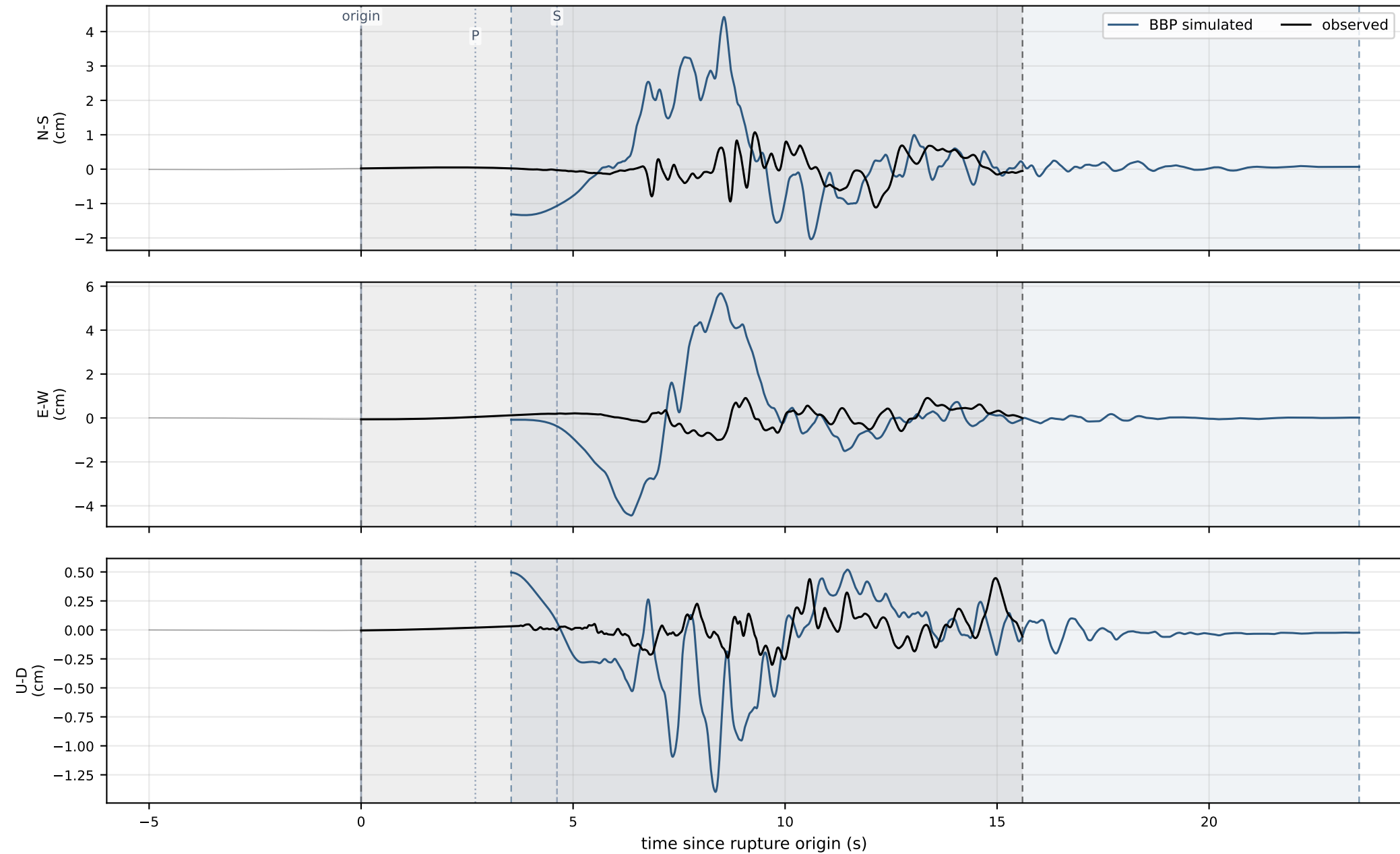
observed PGD 7.70 cm · simulated PGD 5.05 cm · obs/sim = 1.53x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NMI — 16.2 km · displacement handed to the animation
 observed PGD 1.12 cm · simulated PGD 5.68 cm · obs/sim = 0.20x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

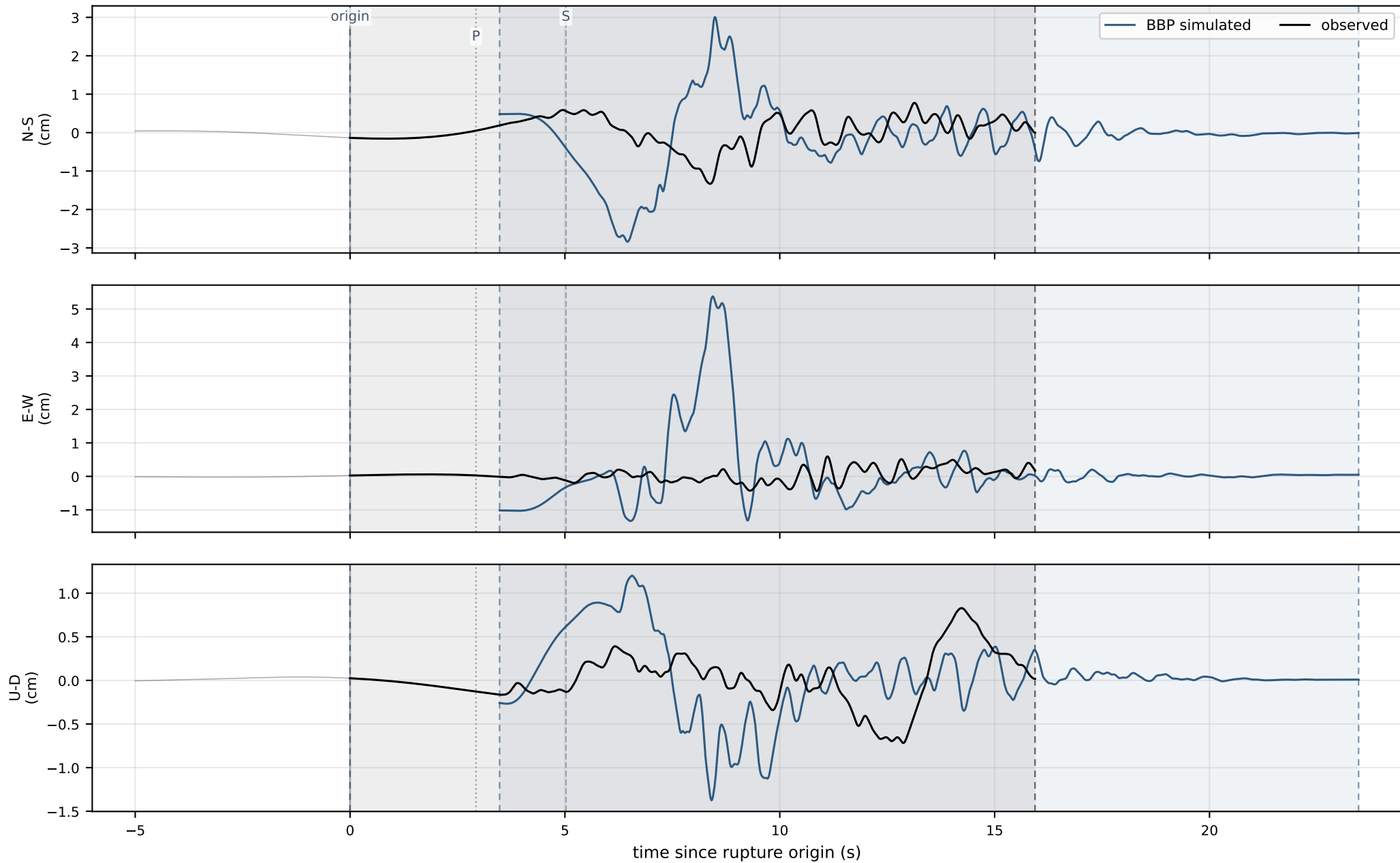


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NLH — 17.6 km · displacement handed to the animation

observed PGD 1.33 cm · simulated PGD 5.38 cm · obs/sim = 0.25x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

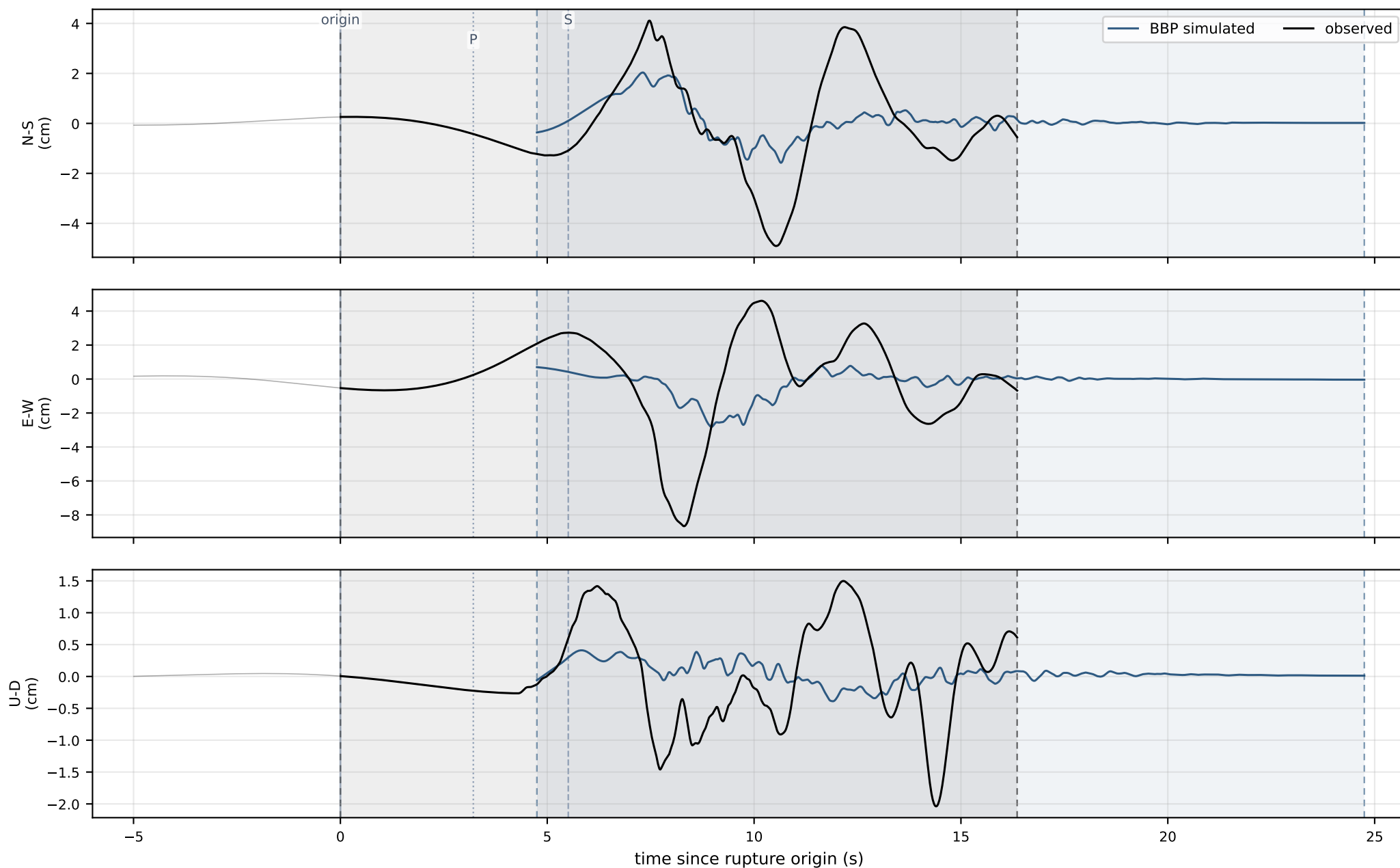


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

BK.CVS — 19.3 km · displacement handed to the animation

observed PGD 8.66 cm · simulated PGD 2.82 cm · obs/sim = 3.07x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

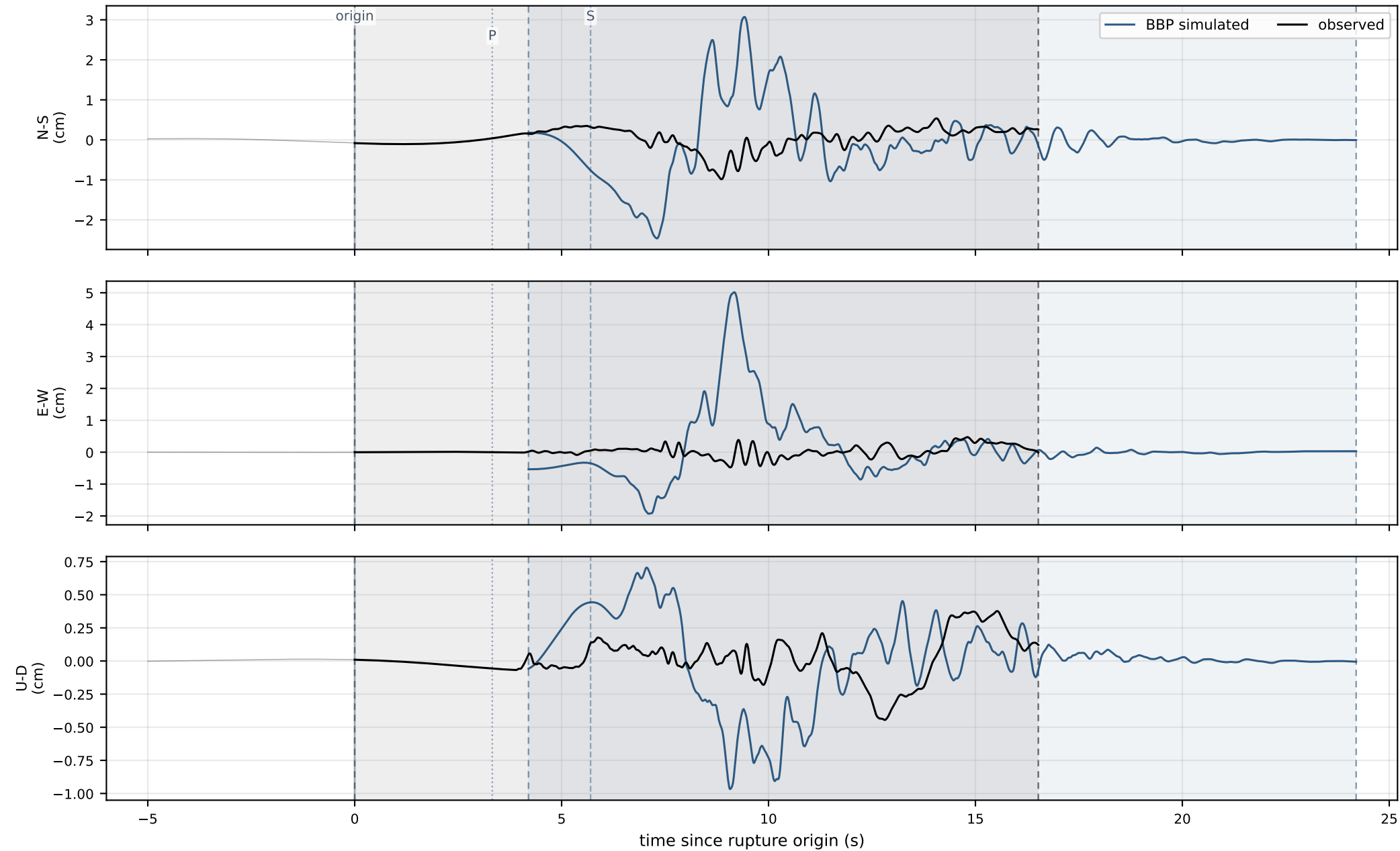


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.C032 — 19.9 km · displacement handed to the animation

observed PGD 0.99 cm · simulated PGD 5.02 cm · obs/sim = 0.20x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

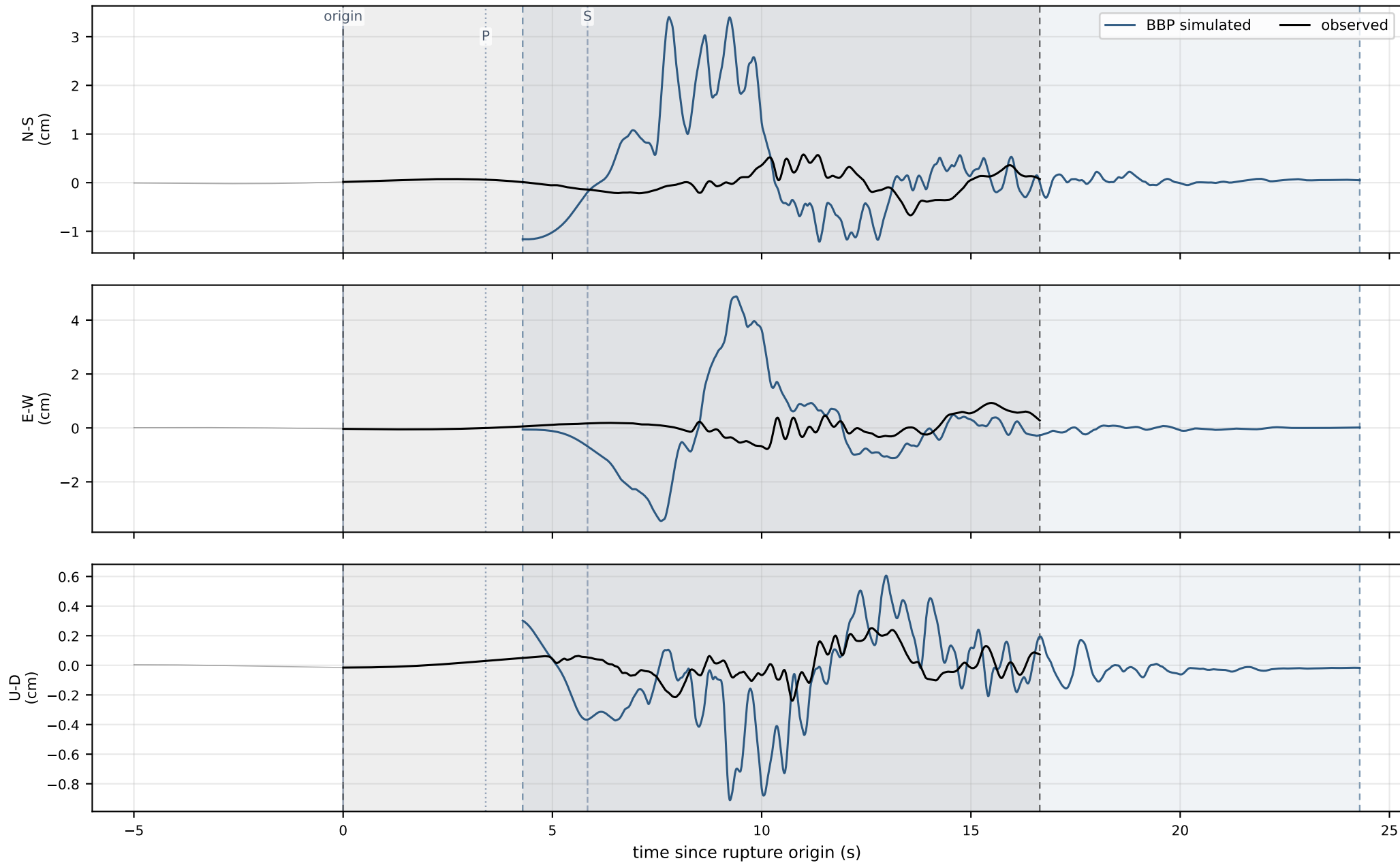


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1813 — 20.4 km · displacement handed to the animation

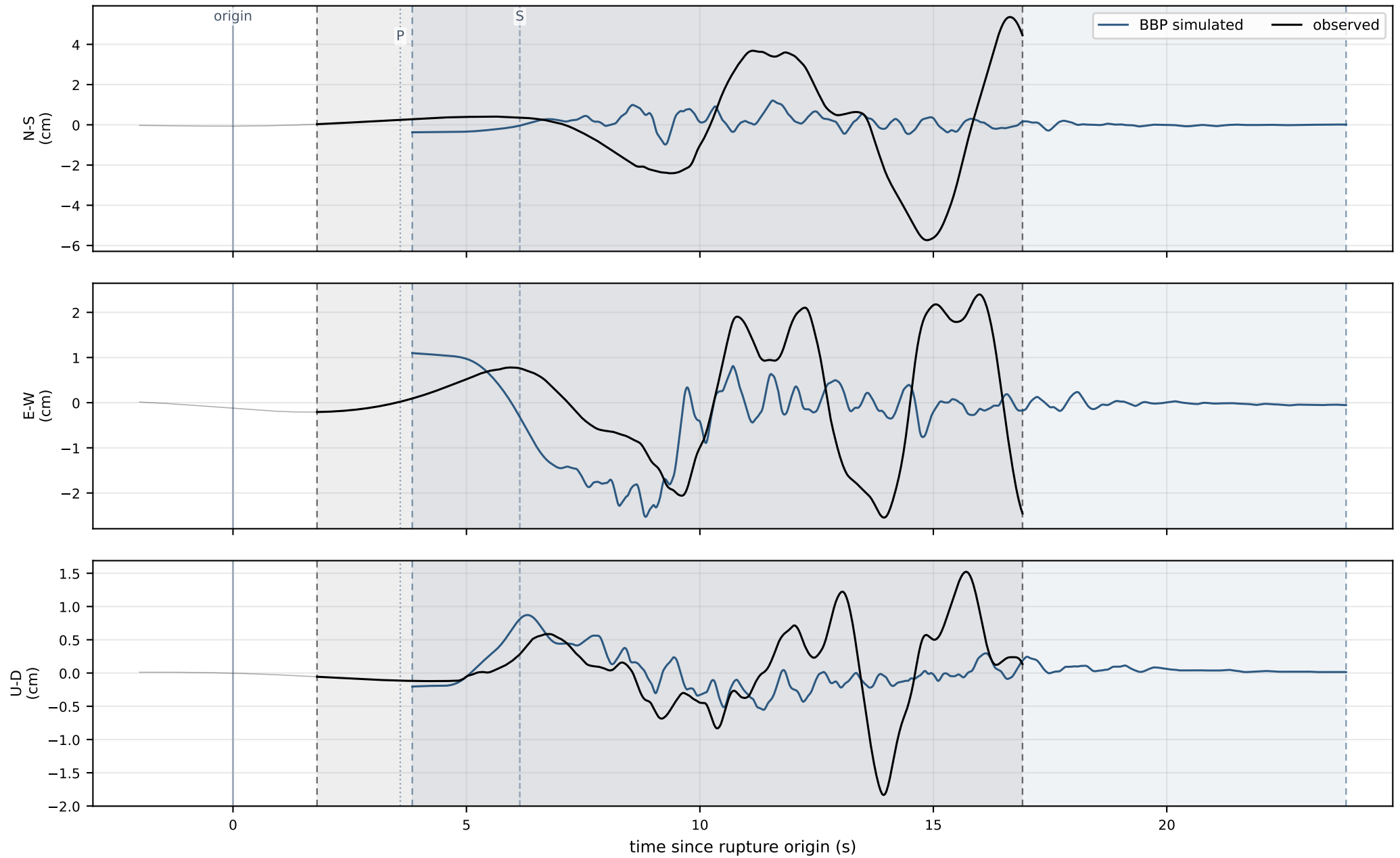
observed PGD 0.93 cm · simulated PGD 4.88 cm · obs/sim = 0.19x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NBRB — 21.5 km · displacement handed to the animation
 observed PGD 5.74 cm · simulated PGD 2.53 cm · obs/sim = 2.27x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

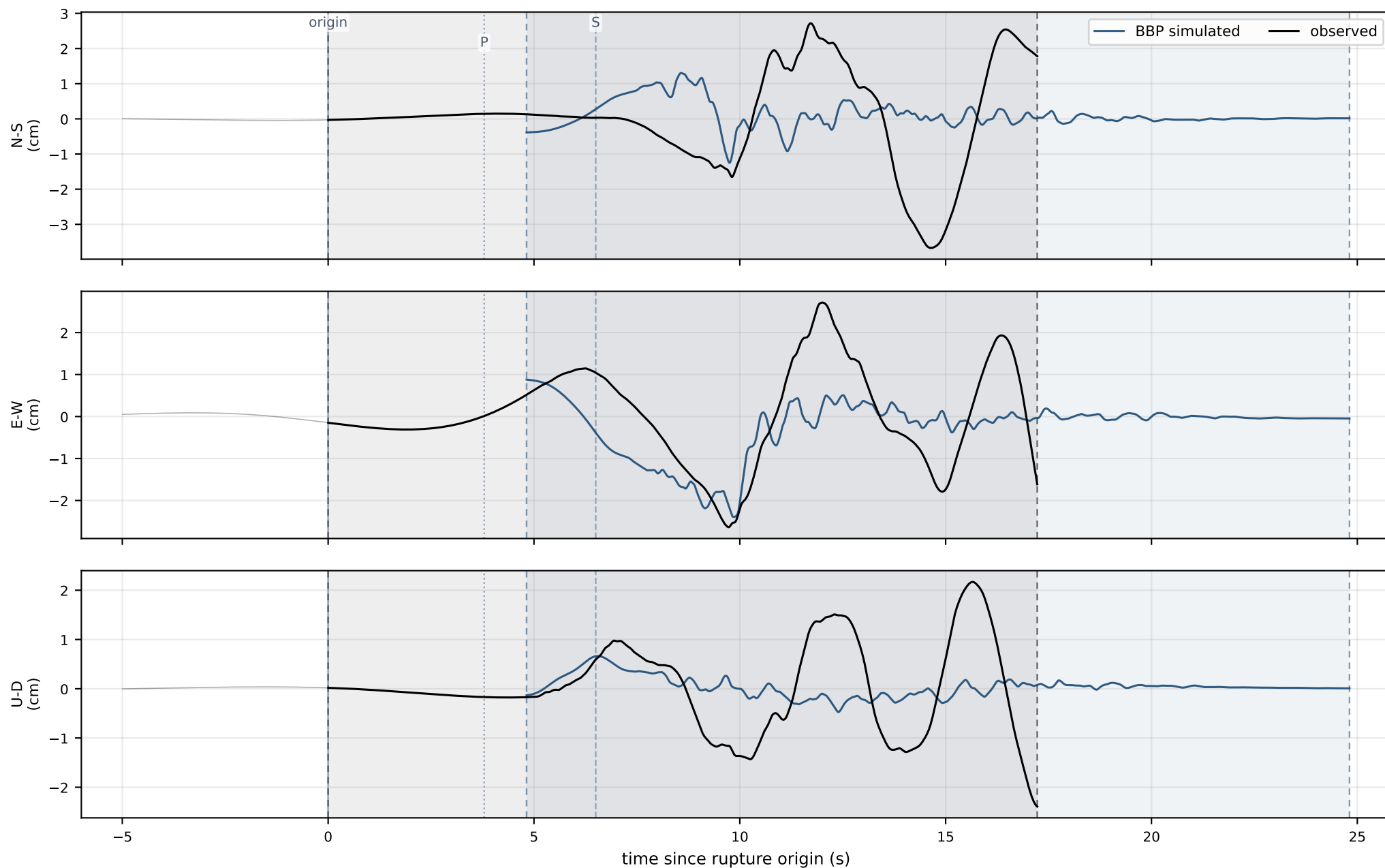


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.N013 — 22.8 km · displacement handed to the animation

observed PGD 3.67 cm · simulated PGD 2.39 cm · obs/sim = 1.54x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

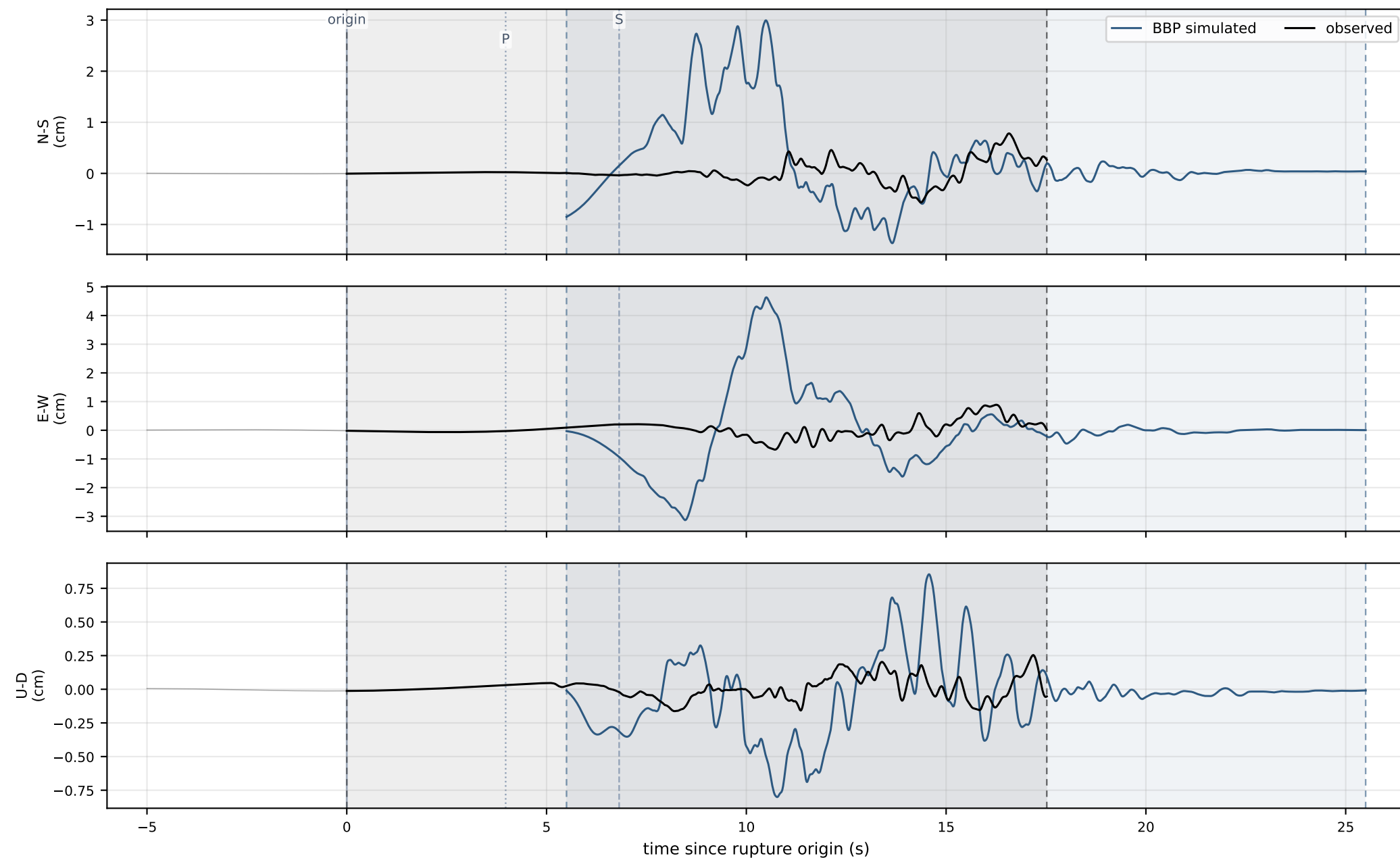


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.68367 — 23.9 km · displacement handed to the animation

observed PGD 0.89 cm · simulated PGD 4.63 cm · obs/sim = 0.19x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

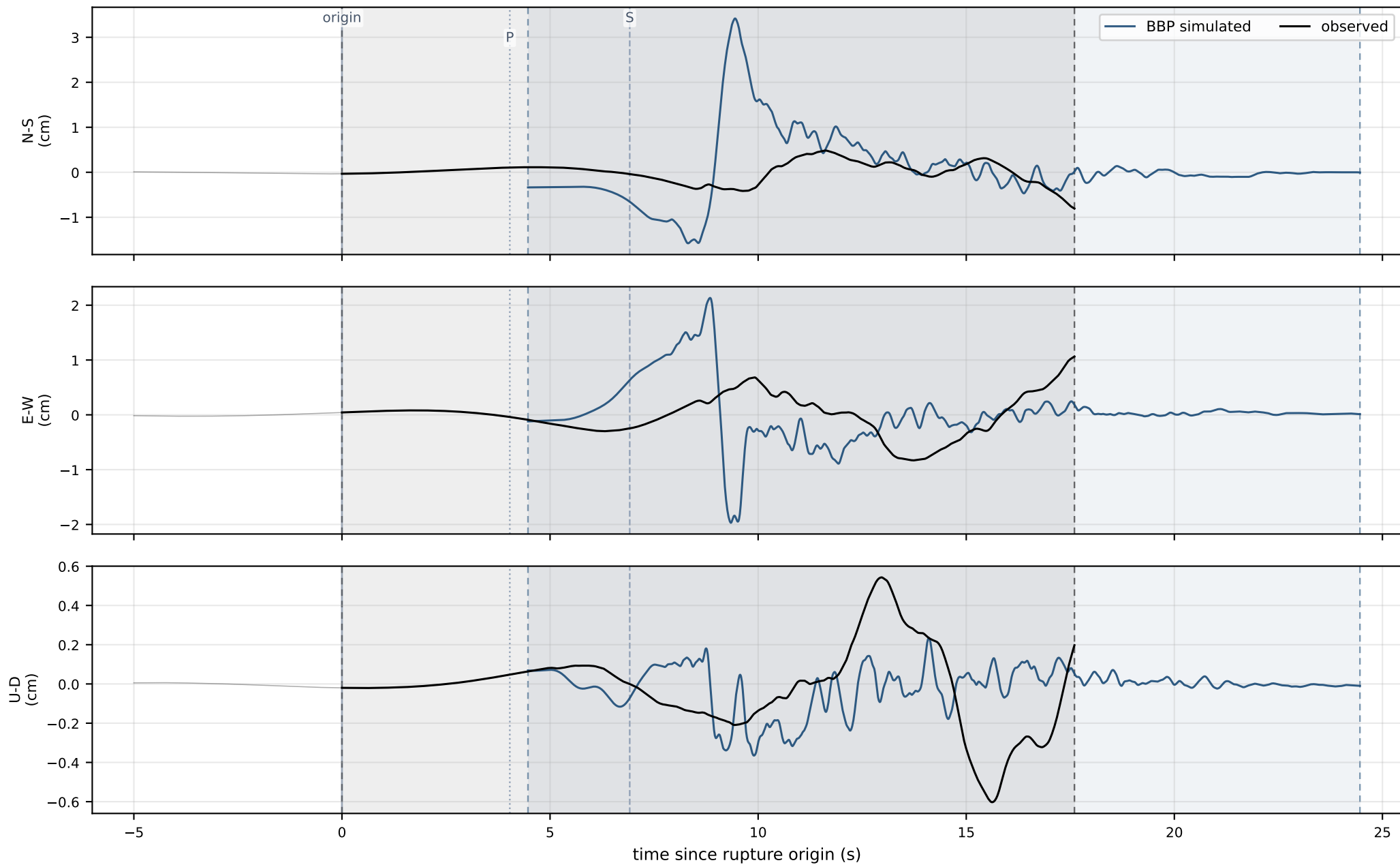


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.N003 — 24.2 km · displacement handed to the animation

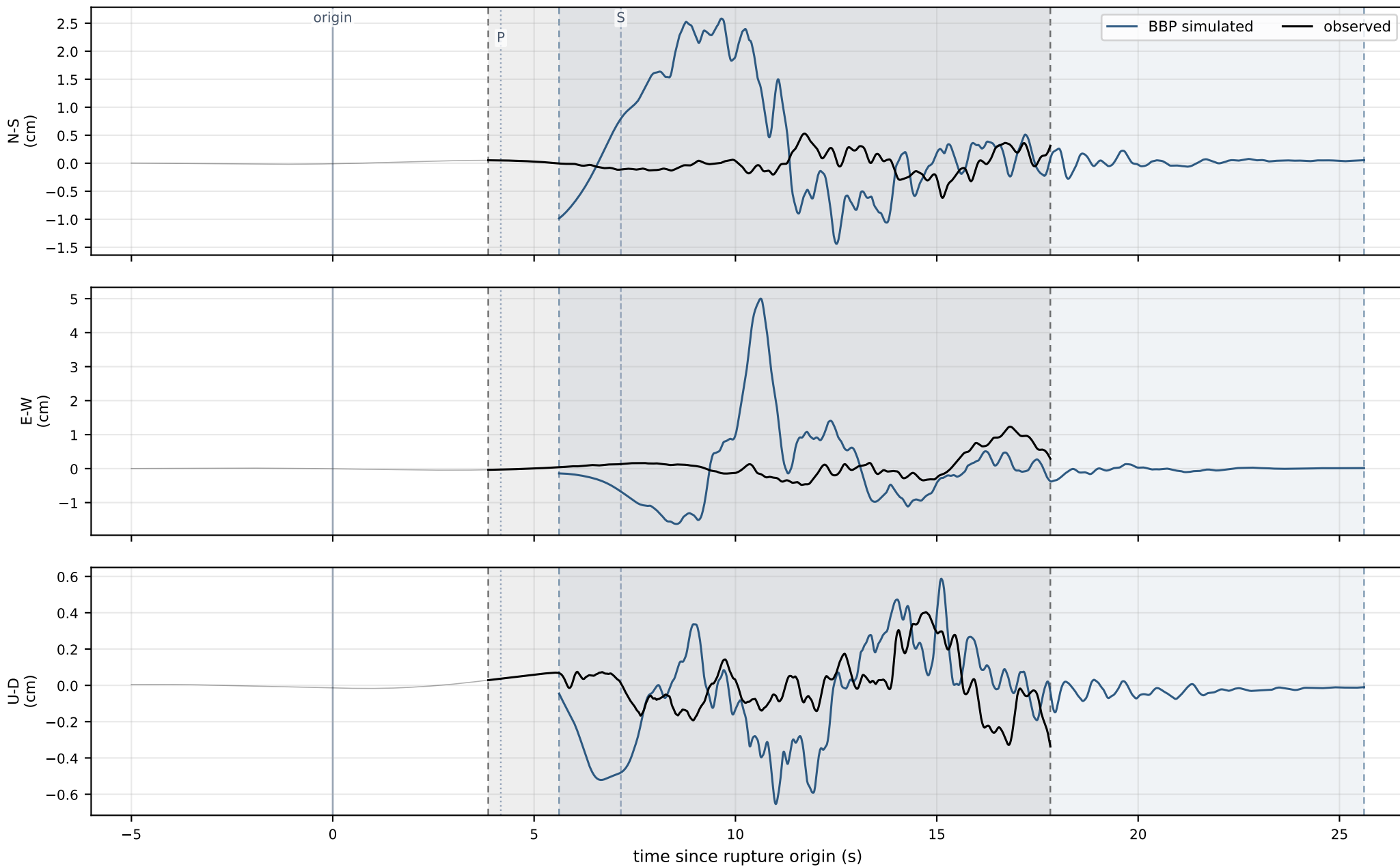
observed PGD 1.06 cm · simulated PGD 3.42 cm · obs/sim = 0.31x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.C040 — 25.0 km · displacement handed to the animation
 observed PGD 1.23 cm · simulated PGD 5.00 cm · obs/sim = 0.25x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

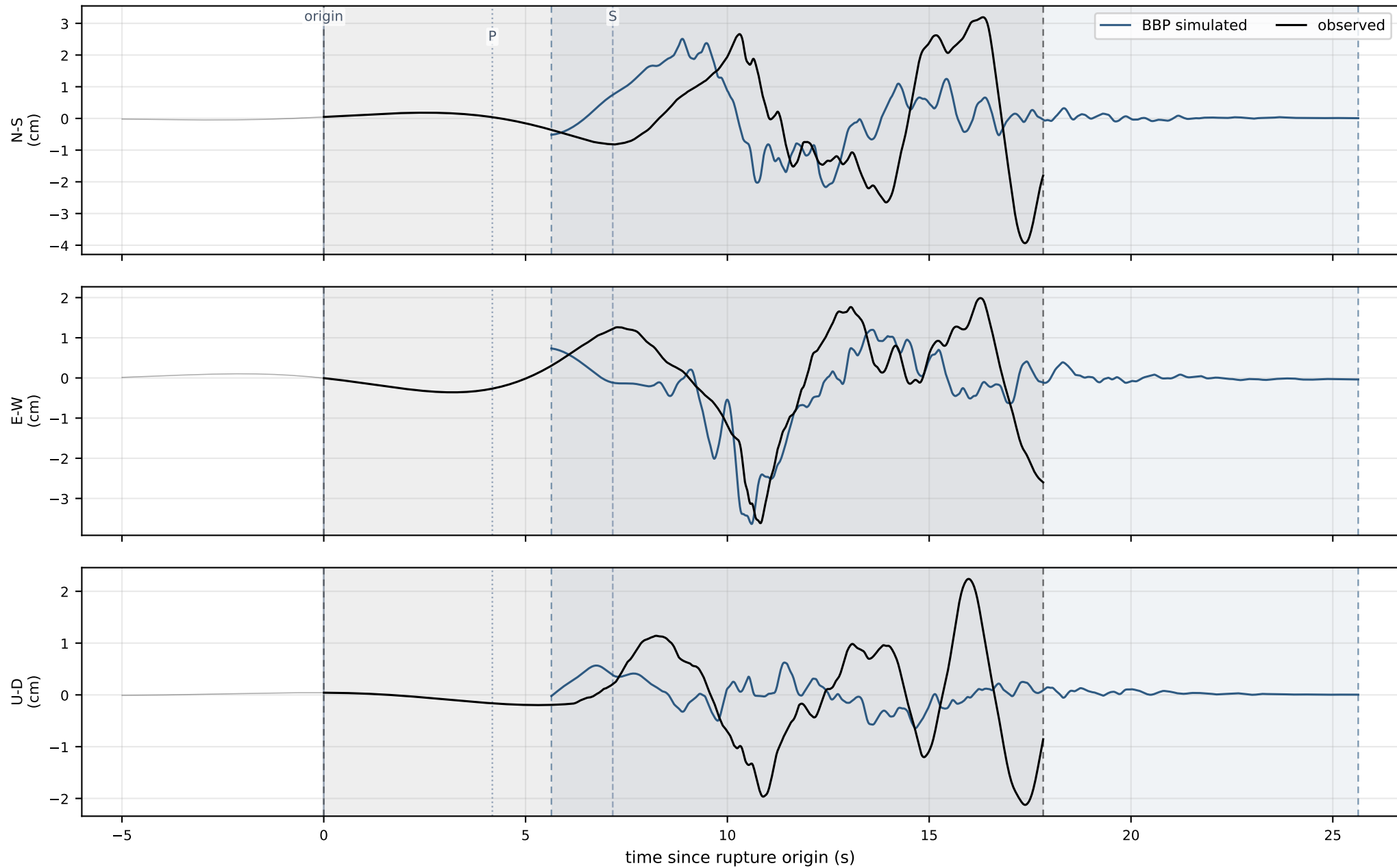


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1848 — 25.1 km · displacement handed to the animation

observed PGD 3.94 cm · simulated PGD 3.64 cm · obs/sim = 1.08x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

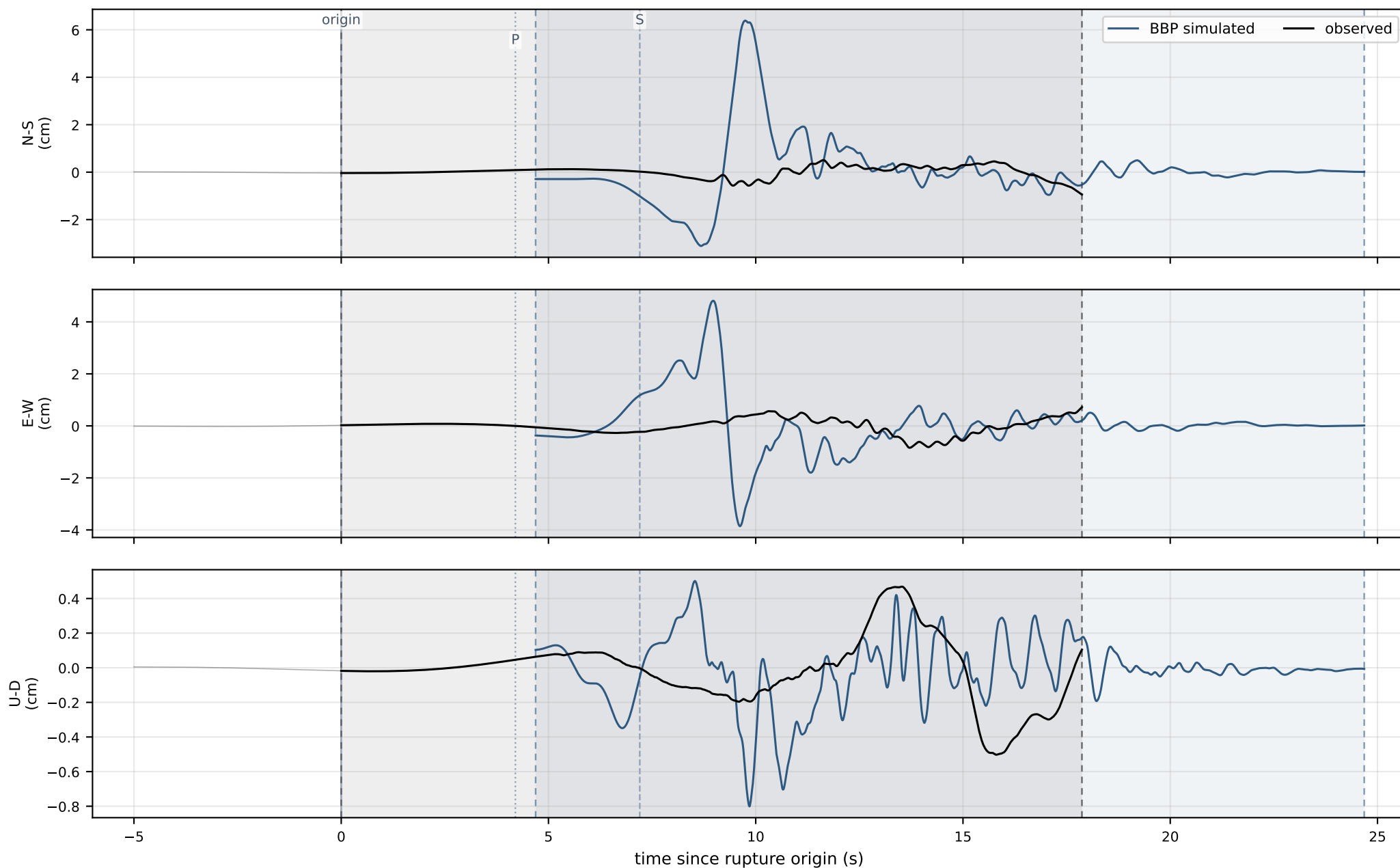


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.68433 — 25.2 km · displacement handed to the animation

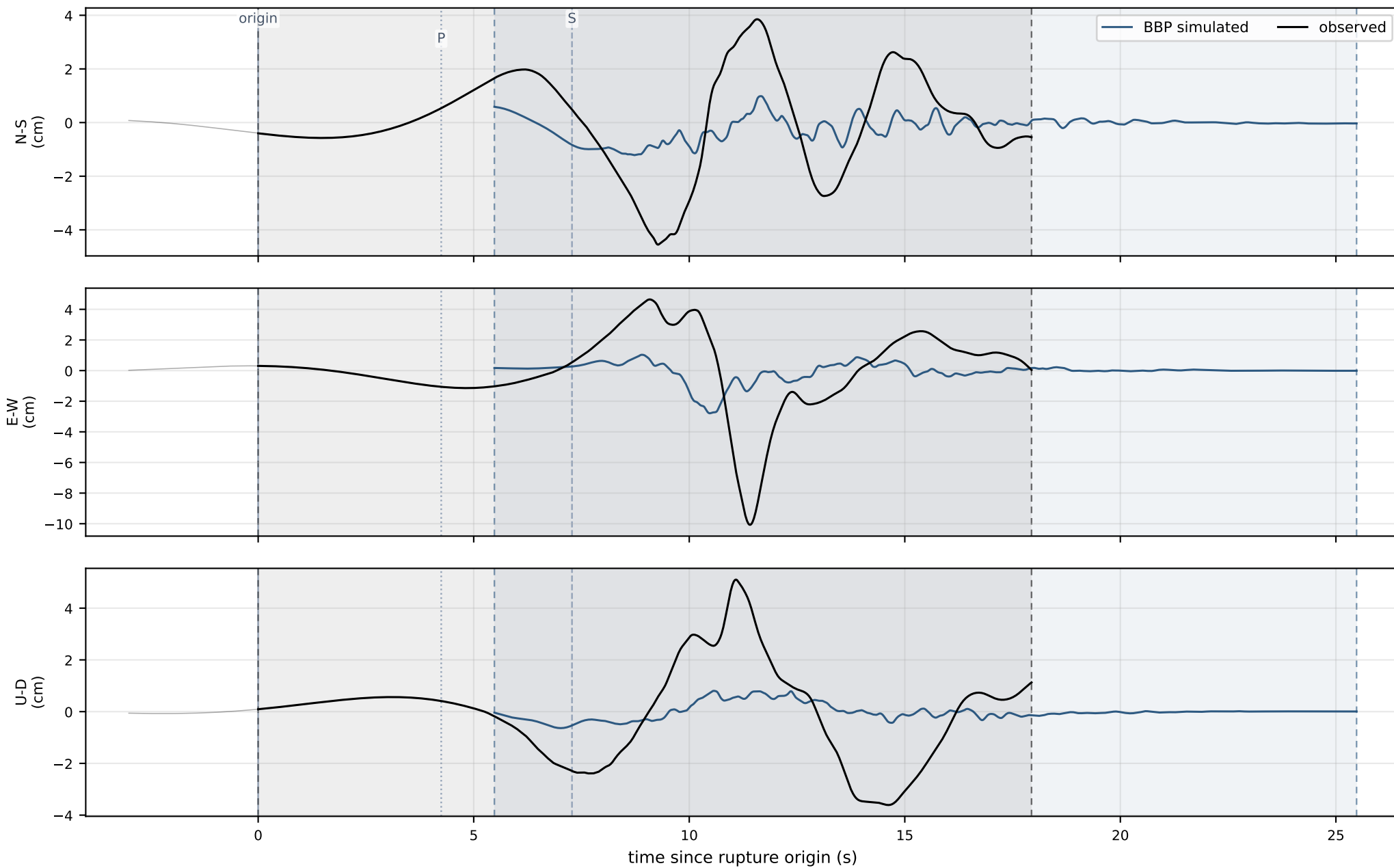
observed PGD 0.94 cm · simulated PGD 6.39 cm · obs/sim = 0.15x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NAPC — 25.5 km · displacement handed to the animation
 observed PGD 10.07 cm · simulated PGD 2.79 cm · obs/sim = 3.61x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

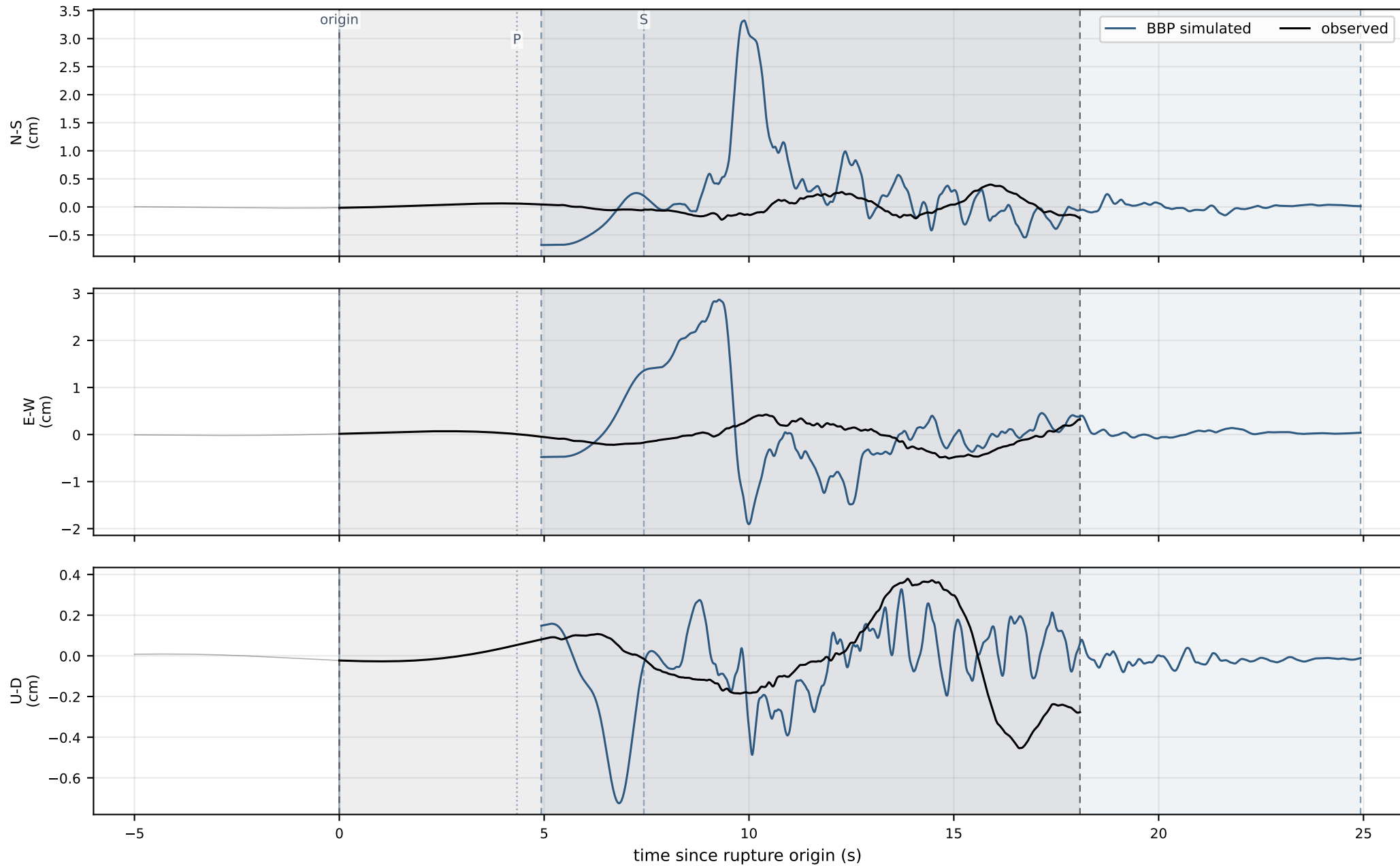


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NHF — 26.0 km · displacement handed to the animation

observed PGD 0.51 cm · simulated PGD 3.32 cm · obs/sim = 0.15x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

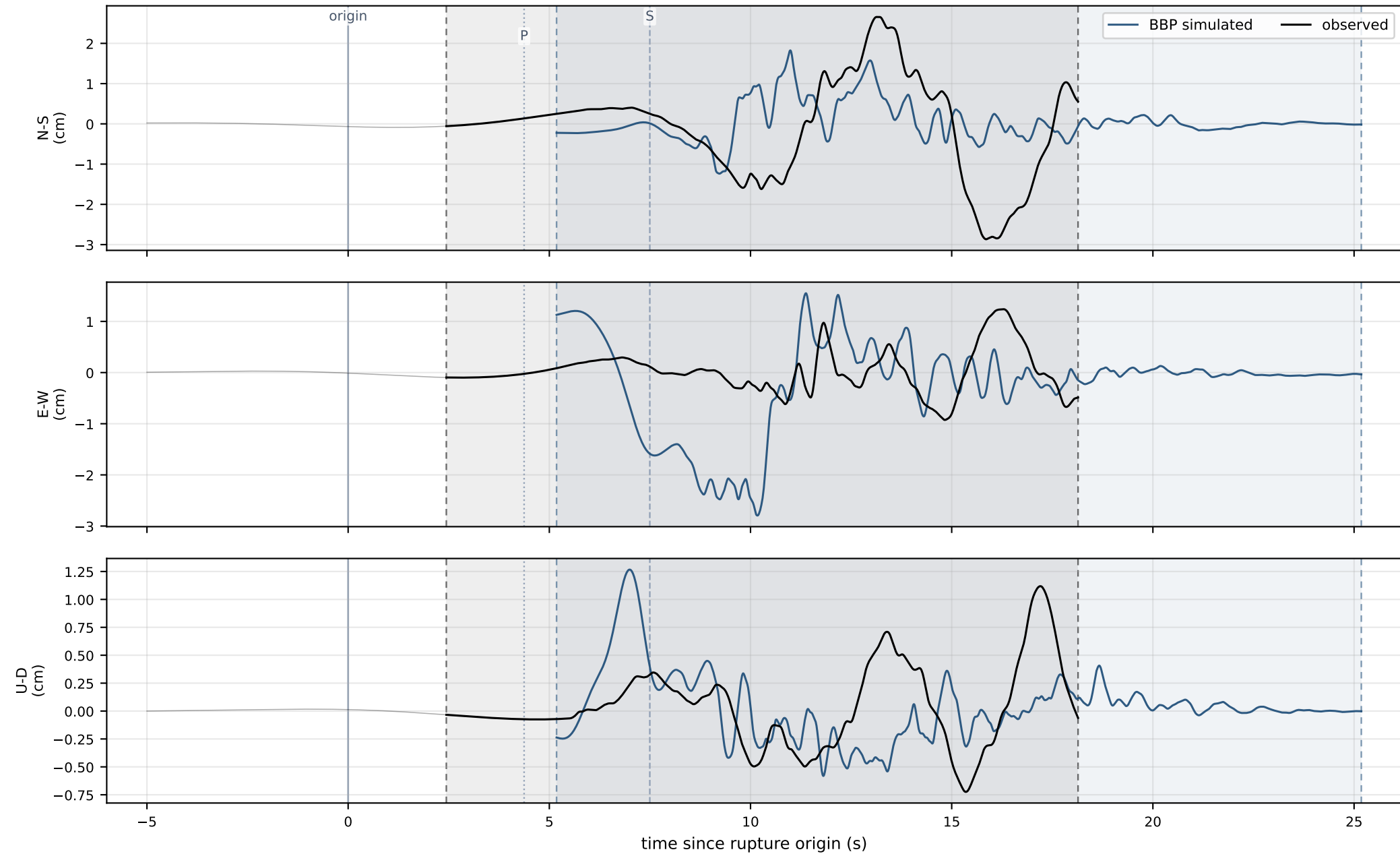


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.N014 — 26.2 km · displacement handed to the animation

observed PGD 2.87 cm · simulated PGD 2.80 cm · obs/sim = 1.03x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

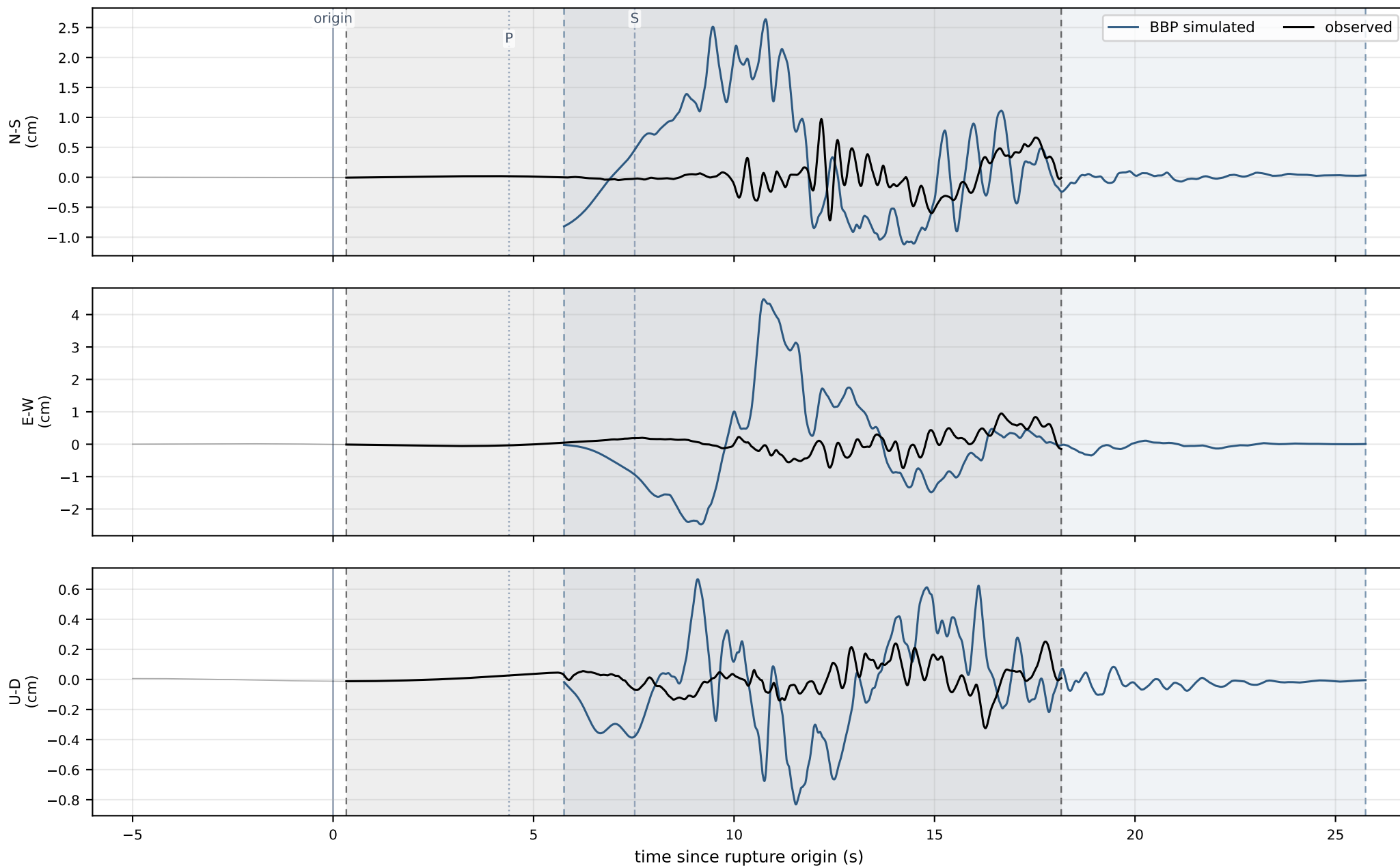


Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.58368 — 26.3 km · displacement handed to the animation

observed PGD 0.97 cm · simulated PGD 4.47 cm · obs/sim = 0.22x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

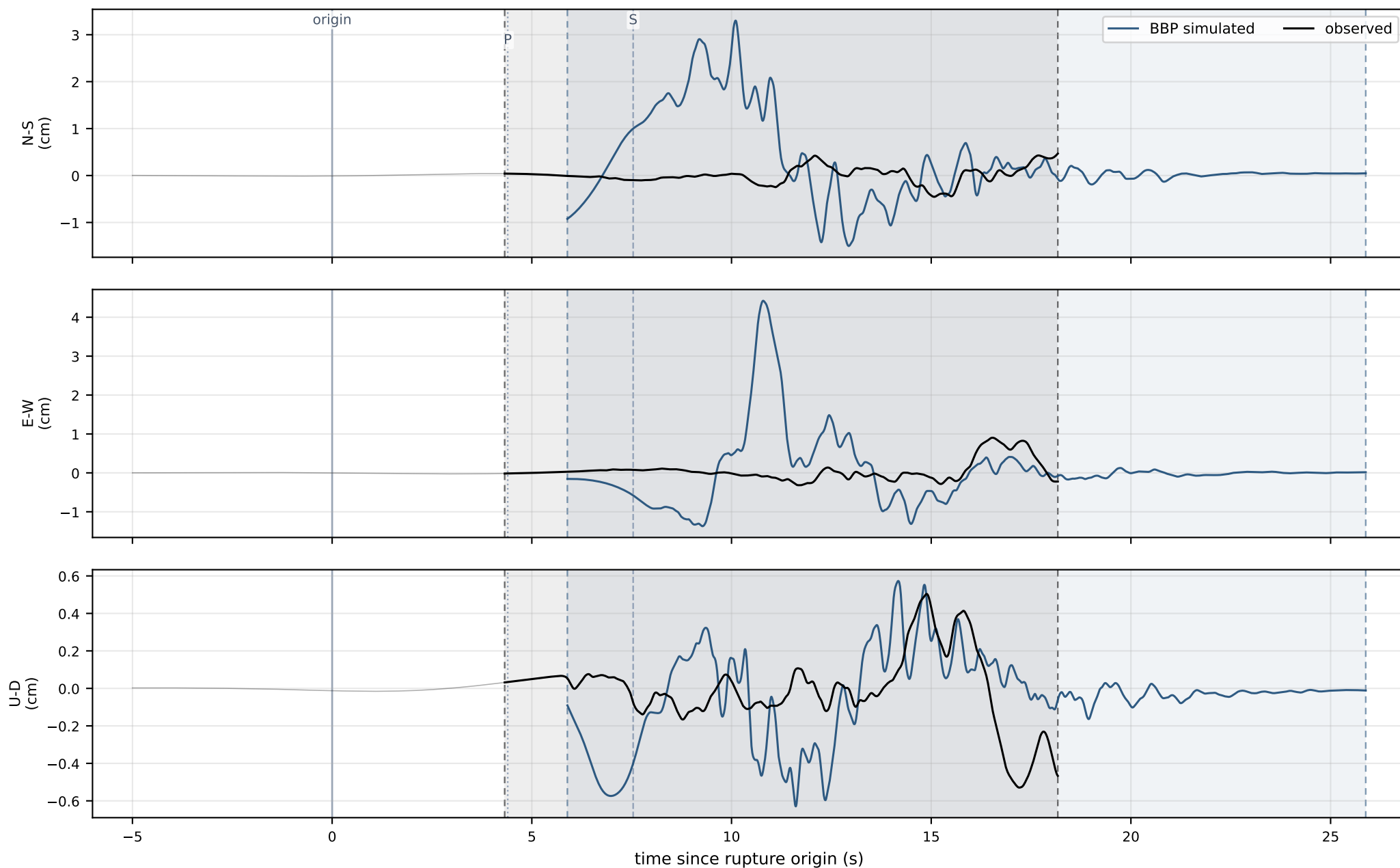


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.58558 — 26.4 km · displacement handed to the animation

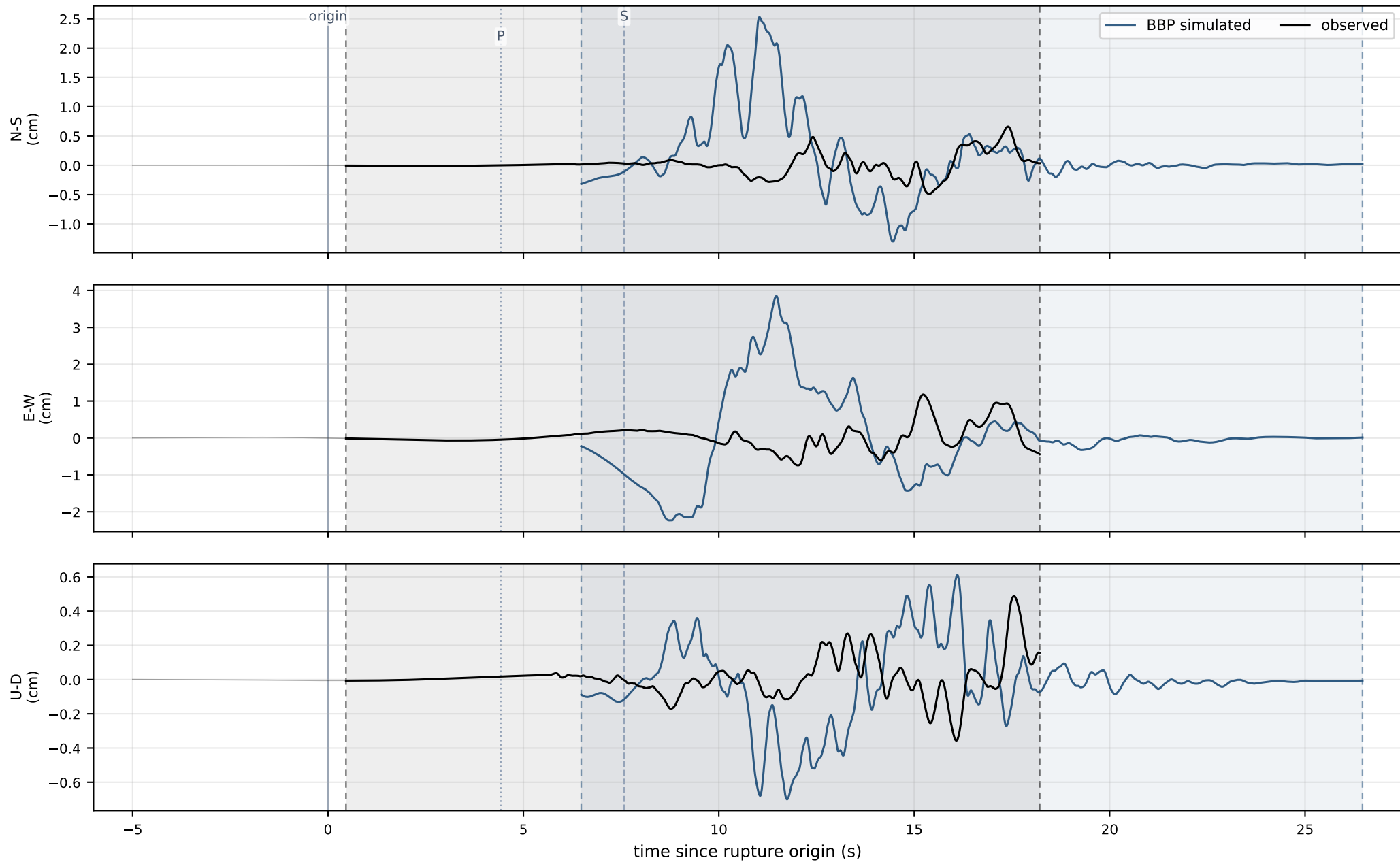
observed PGD 0.90 cm · simulated PGD 4.42 cm · obs/sim = 0.20x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.CPI — 26.5 km · displacement handed to the animation
 observed PGD 1.18 cm · simulated PGD 3.85 cm · obs/sim = 0.31x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

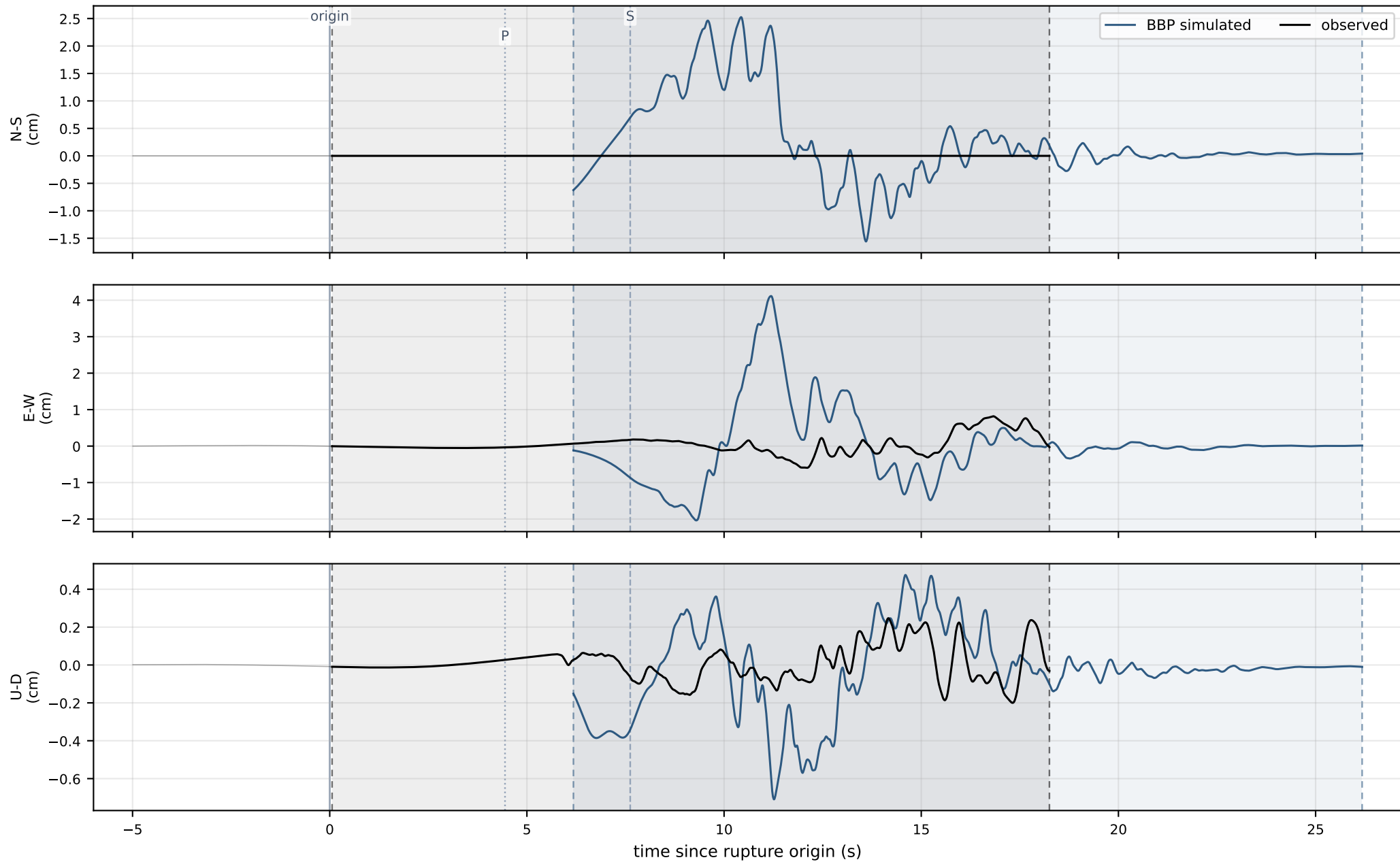


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.C067 — 26.7 km · displacement handed to the animation

observed PGD 0.82 cm · simulated PGD 4.11 cm · obs/sim = 0.20x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

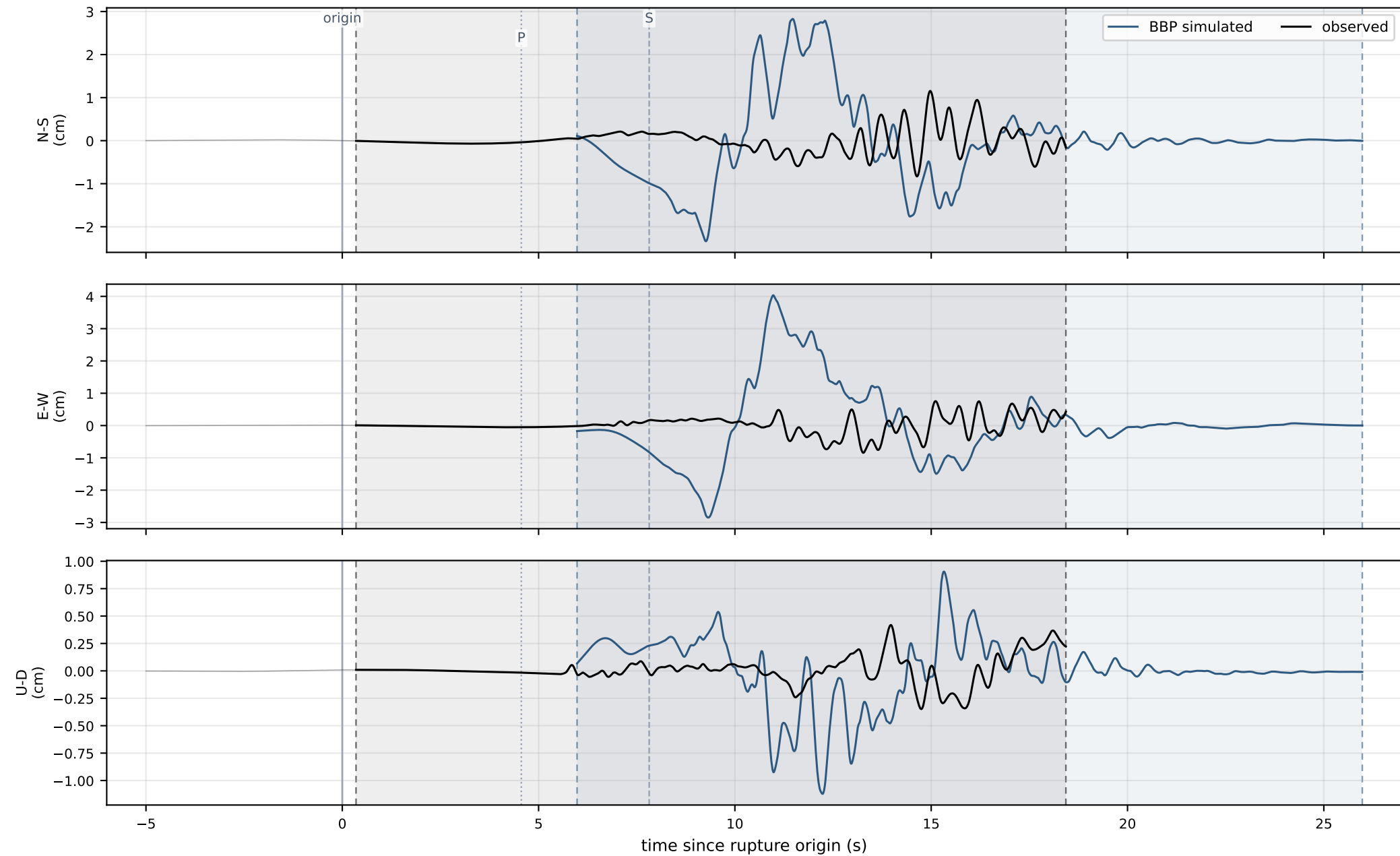


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1847 — 27.4 km · displacement handed to the animation

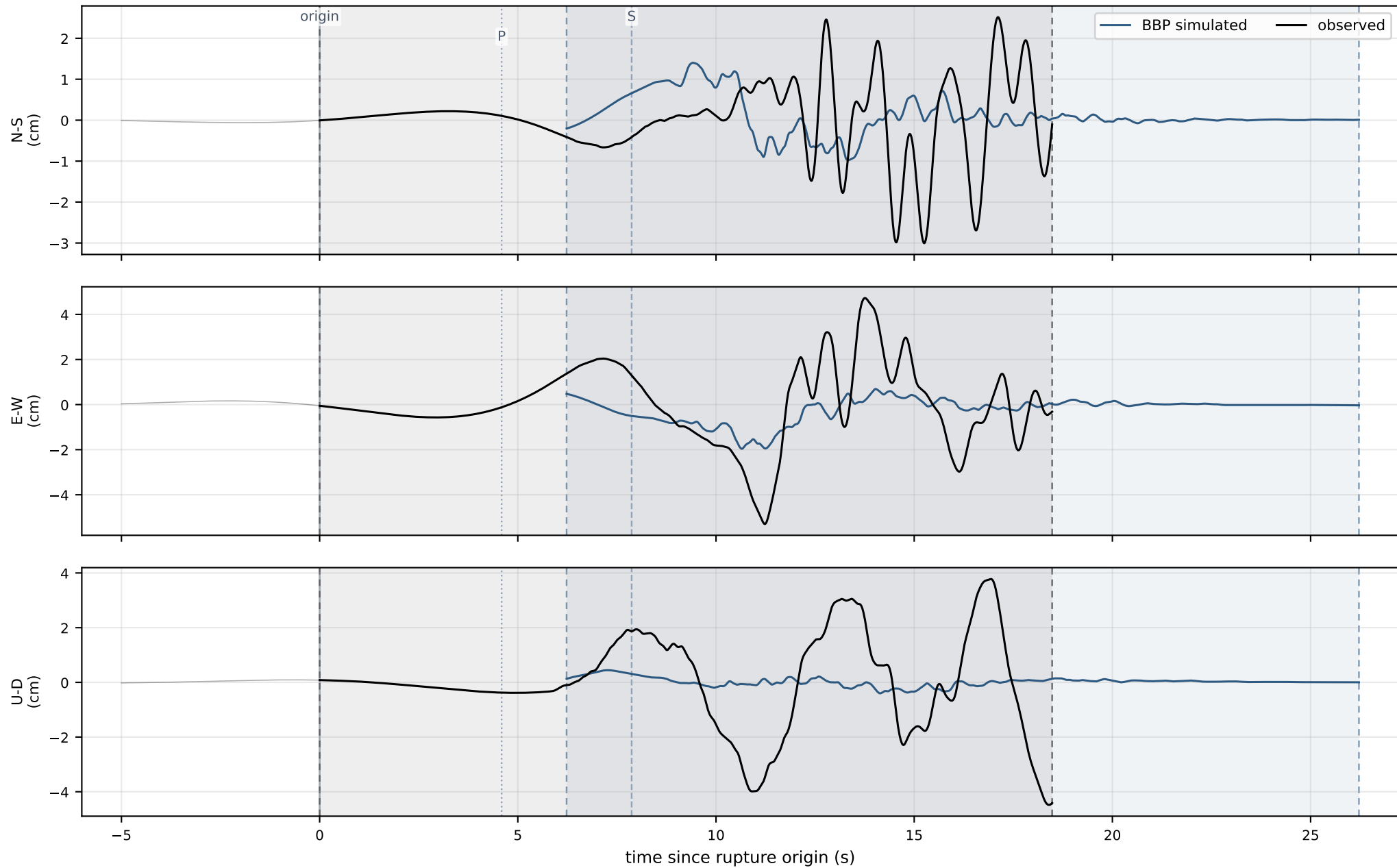
observed PGD 1.15 cm · simulated PGD 4.03 cm · obs/sim = 0.29x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NSM — 27.6 km · displacement handed to the animation
 observed PGD 5.30 cm · simulated PGD 1.96 cm · obs/sim = 2.70x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

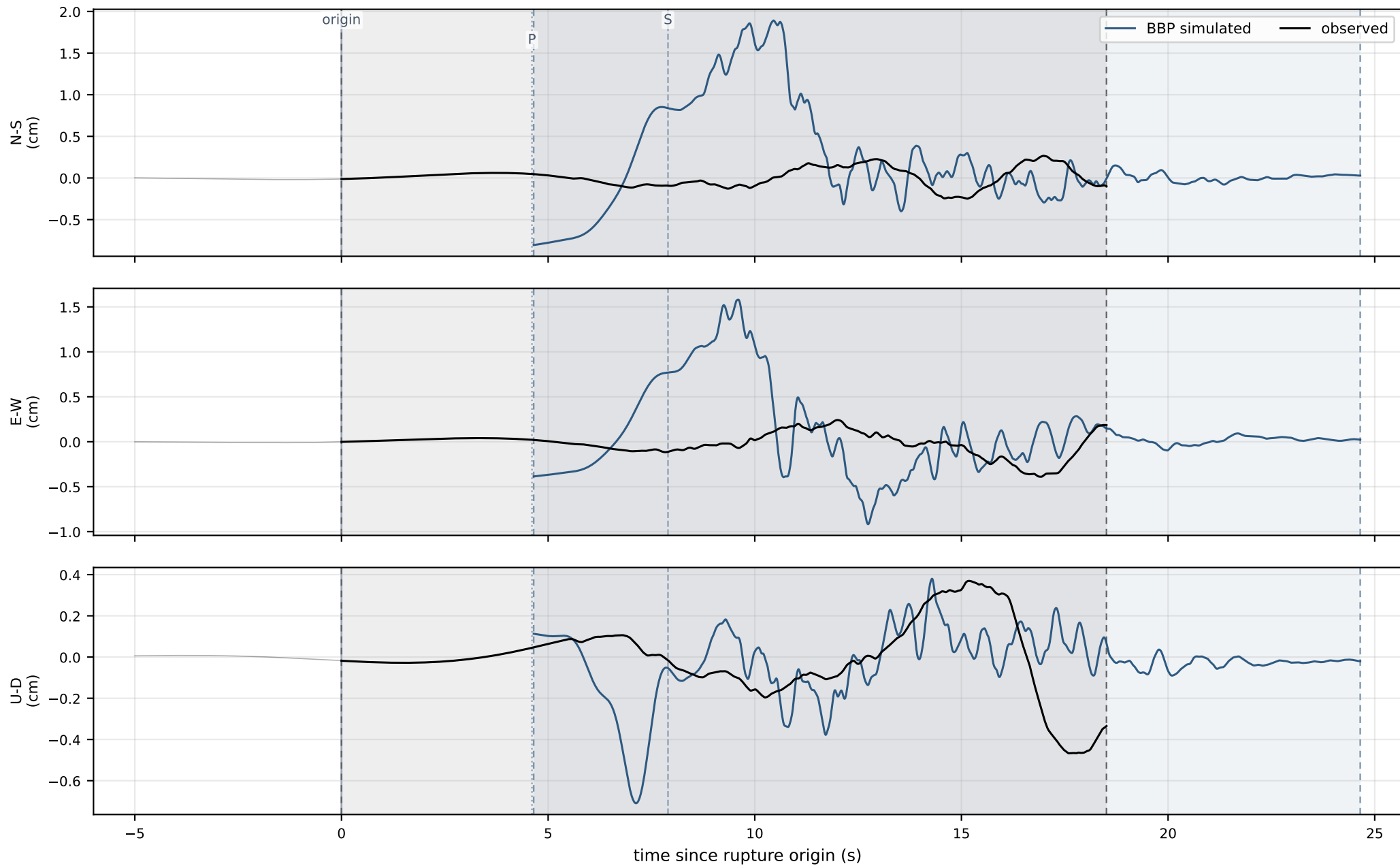


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.NCC — 27.6 km · displacement handed to the animation

observed PGD 0.39 cm · simulated PGD 1.89 cm · obs/sim = 0.21x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

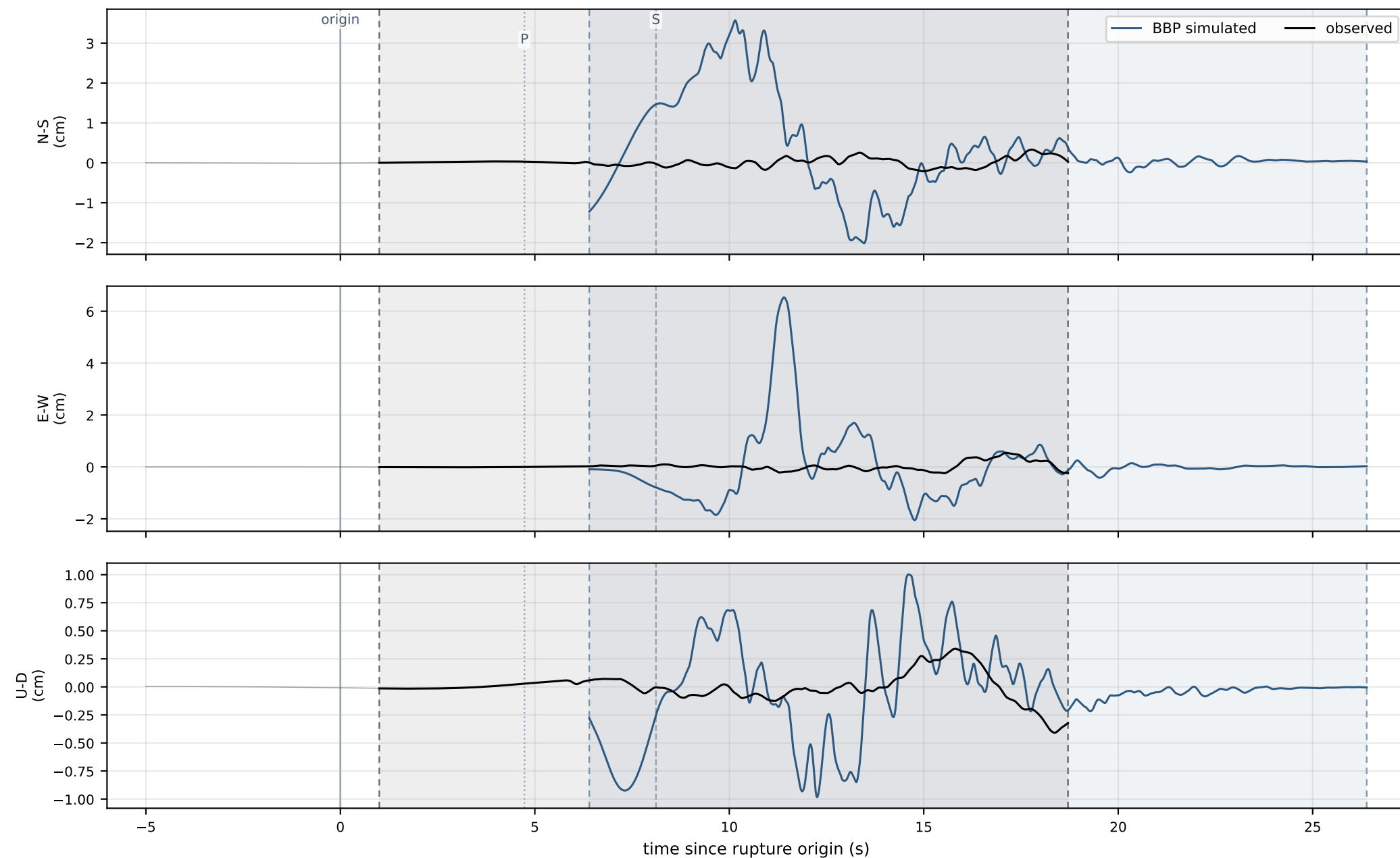


Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.58408 — 28.4 km · displacement handed to the animation

observed PGD 0.55 cm · simulated PGD 6.54 cm · obs/sim = 0.08x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

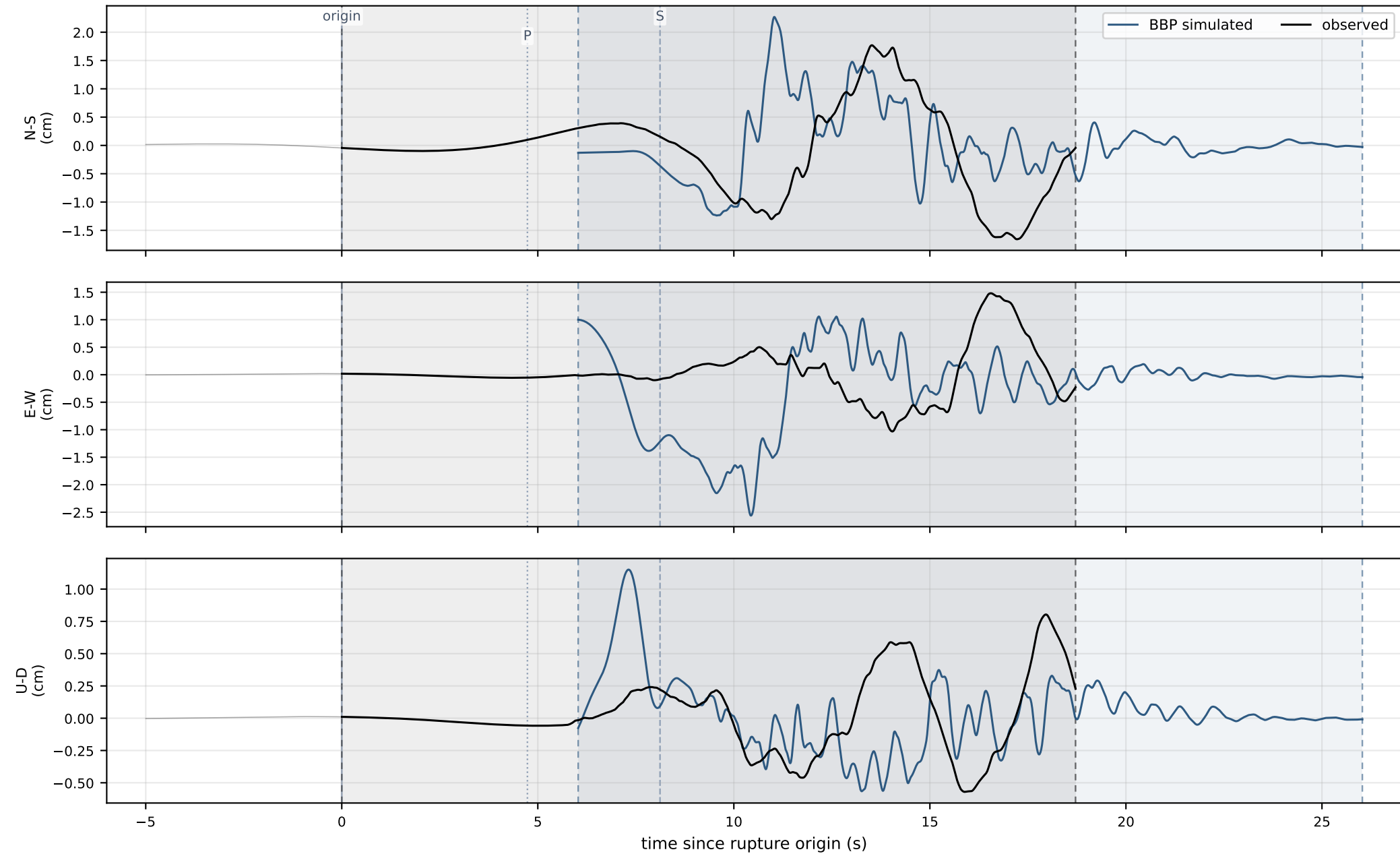


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1768 — 28.4 km · displacement handed to the animation

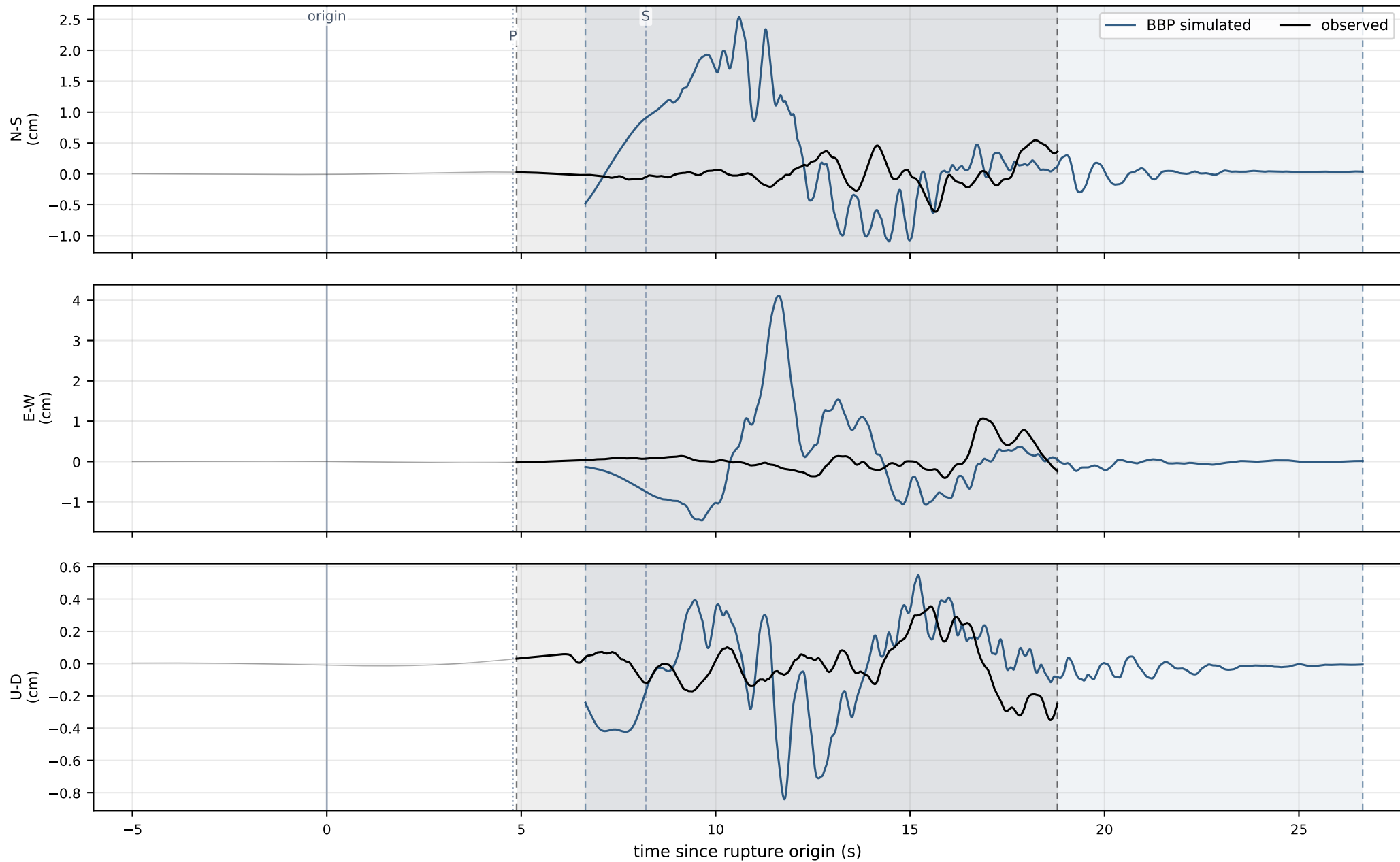
observed PGD 1.77 cm · simulated PGD 2.56 cm · obs/sim = 0.69x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NC.CSPB — 28.7 km · displacement handed to the animation
 observed PGD 1.07 cm · simulated PGD 4.10 cm · obs/sim = 0.26x
 observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s

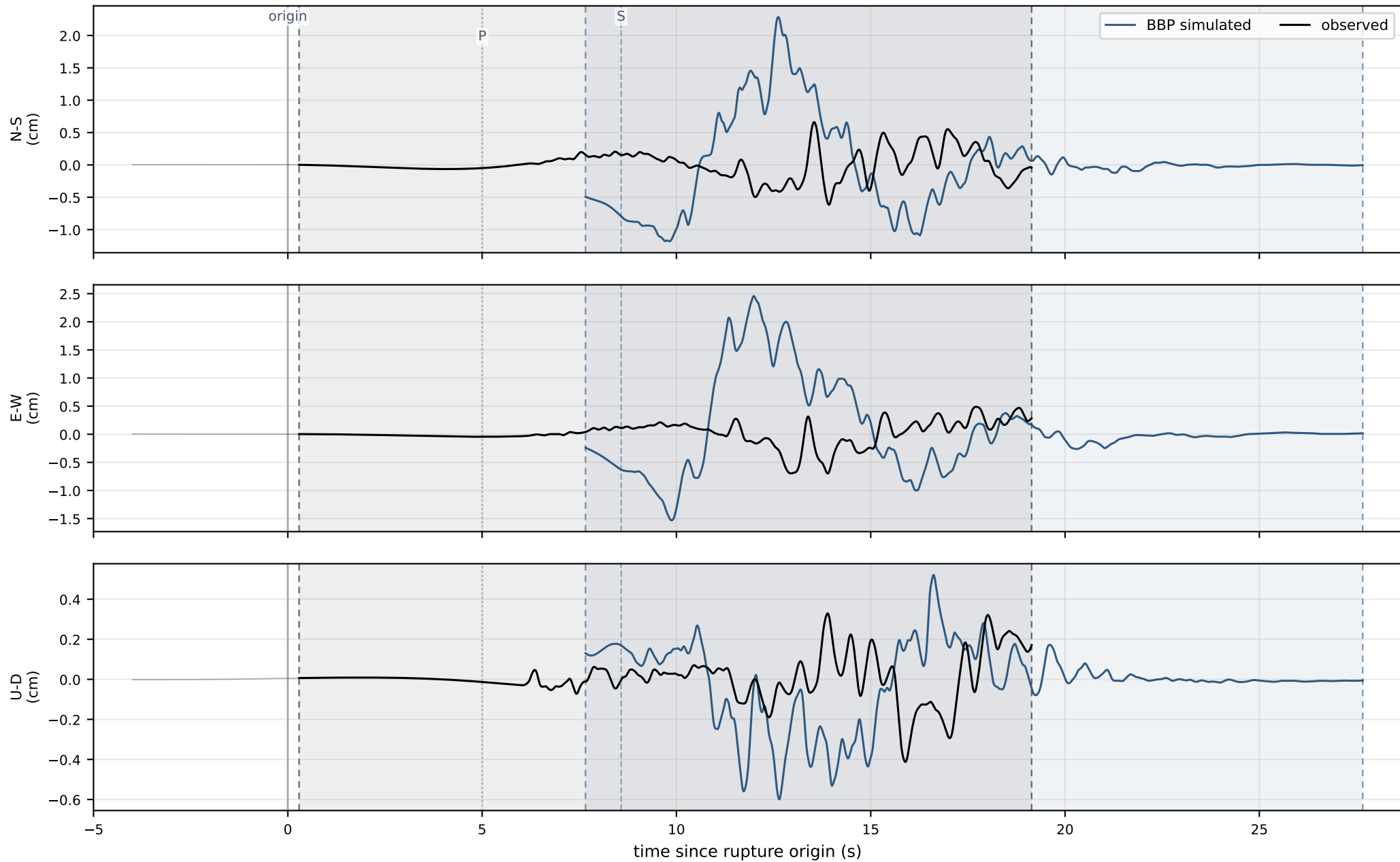


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
 Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

NP.1823 — 30.0 km · displacement handed to the animation

observed PGD 0.70 cm · simulated PGD 2.46 cm · obs/sim = 0.28x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s

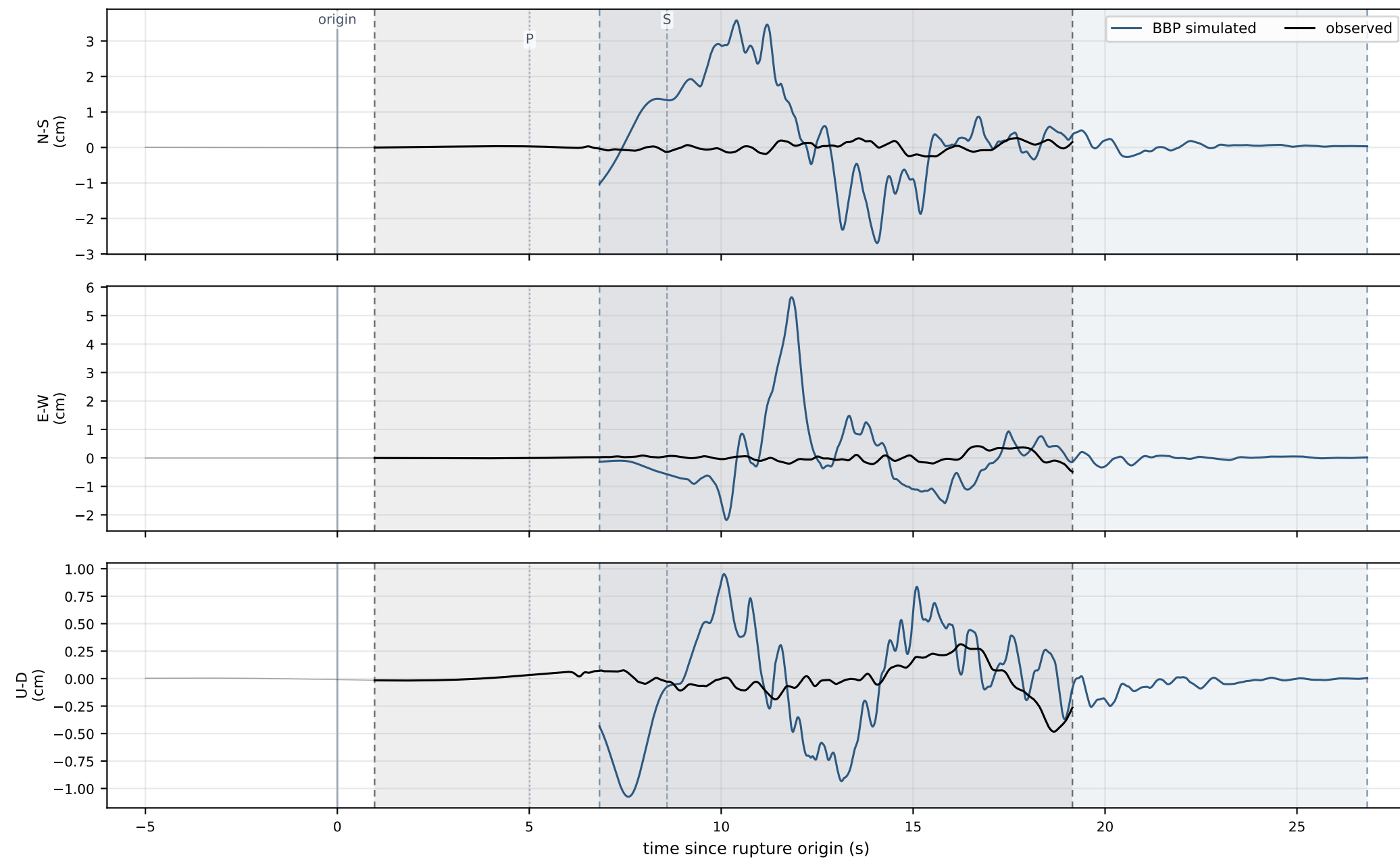


Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

CE.58421 — 30.1 km · displacement handed to the animation

observed PGD 0.49 cm · simulated PGD 5.65 cm · obs/sim = 0.09x

observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak $\pm 5/15$ s



Each source has its own shaded band, dashed edges in its own colour: the window `shake_scene.py` renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.