Observed vs Simulated — Goodness of Fit

intensitylab.com · ground motion validation report

WITHIN BAND · mean |bias| 0.165 · factor 1.18x

RESULT — BBP ROTD50 RESIDUALS (AUTHORITATIVE)

mean |bias|	0.165 (a factor of 1.18x)
mean sigma	1.24374 (station-to-station scatter)
stations compared	31
spectral periods	63
pass band	mean |bias| <= 0.69 (a factor of 1.99x), declared before the run
bias at 0.1s	-0.512 simulation over-predicts by 67%
bias at 0.3s	-0.283 simulation over-predicts by 33%
bias at 1s	-0.135 simulation over-predicts by 14%
bias at 3s	+0.178 simulation under-predicts by 19%

CROSS-CHECK — THIS REPORT'S OWN SPECTRA

mean |bias|	0.327 (a factor of 1.39x)
mean sigma	1.479
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	nc73821036
magnitude	M6.4 (mw)
origin time	2022-12-20 10:34:24 UTC
epicentre	40.5250, -124.4230
depth	17.9 km
region	15km WSW of Ferndale, CA

Provenance

nc73821036 · generated 2026-08-04 07:23 UTC

SIMULATION

produced by	BBP simulated
BBP job id	job_d6c24a71669e4cc9b1ff
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	2026-08-04T07:15:14Z
per-site Vs30 from	submit-time record (/app/plots/gof_work/nc73821036/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	M6.4 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

fetched 2026-08-04T07:13:08Z

STATION SELECTION

search radius	100.0 km
policy	all usable within radius
stations on event	596
without FDSN code	0 — cannot be queried at all
candidates	31
usable records	31 (0 returned no usable 3-component set)
in this report	31 with both observed and simulated
distance range	9.1 – 90.5 km

INSTRUMENTATION

channel priority	HN?, EN?, HH?, BH?, EH?
channels used	HH, HN
data centres	NCEDC
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	11 of 31 — 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(observed / 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 ±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.
PGD is the animation line'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.
* / Vs30d: 4 of 31 sites were simulated with a Vs30 value repeated across three or more stations — a lookup default rather than a site measurement. Vs30 drives the site term, so a defaulted value produces bias at intermediate and long period that is not the model's fault. Note also that the two Vs30 columns come from different sources and need not agree.

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
NC.KCT	9.1	466	466	HNE	0.1239	0.1189	0.3334	30.0	30.2	27.1	5.70	8.08	0.71x	-1.031	—
NP.1584B	11.4	458	458	HNE	0.2212	0.0190	0.2577	10.3	0.7	17.5	—	7.06	—	-2.608	—
NP.1023	14.6	296	296	HNE	0.2561	0.0465	0.3508	22.3	1.5	43.0	—	15.34	—	-2.022	—
NP.1586	21.6	384	384	HNE	0.3000	0.2968	0.1976	25.8	27.3	19.6	6.30	7.74	0.81x	+0.407	—
CE.89486	24.3	339	339	HNE	0.3938	0.3974	0.1934	28.7	34.9	22.3	7.45	7.44	1.00x	+0.720	—
CE.89255	24.5	382	382	HNE	0.8010	0.6483	0.1918	34.8	59.7	23.4	19.17	6.65	2.88x	+1.218	—
BK.PETL	27.2	347	347	HNE	0.1236	0.1232	0.2198	8.5	8.5	48.5	2.15	12.82	0.17x	-0.579	—
CE.89462	27.3	302	302	HNE	1.4387	1.3867	0.1864	63.4	178.6	21.5	124.56	6.63	18.78x	+2.007	—
NP.1582	27.4	334	334	HNE	0.4536	0.0719	0.1724	34.1	2.3	24.2	—	8.10	—	-0.875	—
NC.KMPB	28.2	490	490	HNE	0.1237	0.1226	0.1539	11.7	12.5	10.5	3.56	3.81	0.93x	-0.228	—
NP.1581	29.6	326	326	HNE	0.2748	0.2718	0.2098	32.5	31.5	21.4	7.87	8.08	0.97x	+0.259	—
NC.KCO	32.7	487	487	HNE	0.1201	0.1201	0.1240	15.3	15.6	19.6	3.33	7.33	0.45x	-0.033	—
BK.RBOW	33.8	490	490	HNE	0.0795	0.0802	0.1075	10.5	11.0	10.5	3.63	3.90	0.93x	-0.293	—
CE.89641	38.3	290	290	HNE	0.2959	0.3021	0.2068	21.4	24.8	17.9	6.16	6.19	1.00x	+0.379	—
BK.BJES	45.9	744	744	HNE	0.1254	0.1238	0.0723	22.0	20.8	6.0	6.89	2.53	2.72x	+0.538	—
NC.KPR	46.0	492	492	HNE	0.1402	0.1397	0.0900	15.6	15.6	6.9	3.76	3.27	1.15x	+0.440	—
BK.KNEE	48.9	730	730	HNE	0.1636	0.1644	0.0583	39.2	38.2	5.3	11.13	2.45	4.55x	+1.037	—
NC.KCR	52.1	715	715	HNE	0.0585	0.0586	0.0563	6.8	6.7	4.0	1.67	1.69	0.99x	+0.040	—
BK.PRDS	56.6	493*	493	HNE	0.1806	0.1786	0.0742	9.7	10.6	6.0	2.61	2.96	0.88x	+0.879	Vs30d
NC.KBU	57.4	493*	493	HNE	0.1382	0.1406	0.0608	18.5	17.6	3.6	4.08	1.89	2.15x	+0.838	Vs30d
CE.89688	62.1	493*	493	HNE	0.0506	0.0511	0.0630	2.4	2.5	5.5	0.59	3.18	0.18x	-0.209	Vs30d
NC.KTD	63.1	701	701	HNE	0.0195	0.0188	0.0449	3.1	3.3	3.0	1.42	1.19	1.19x	-0.871	—
BK.BRIC	64.0	493*	493	HNE	0.0752	0.0743	0.0600	7.8	8.8	4.6	3.51	1.84	1.91x	+0.214	Vs30d
BK.DMOR	64.1	743	743	HNE	0.2033	0.2086	0.0458	47.8	45.6	4.2	13.77	1.90	7.25x	+1.517	Manu,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.
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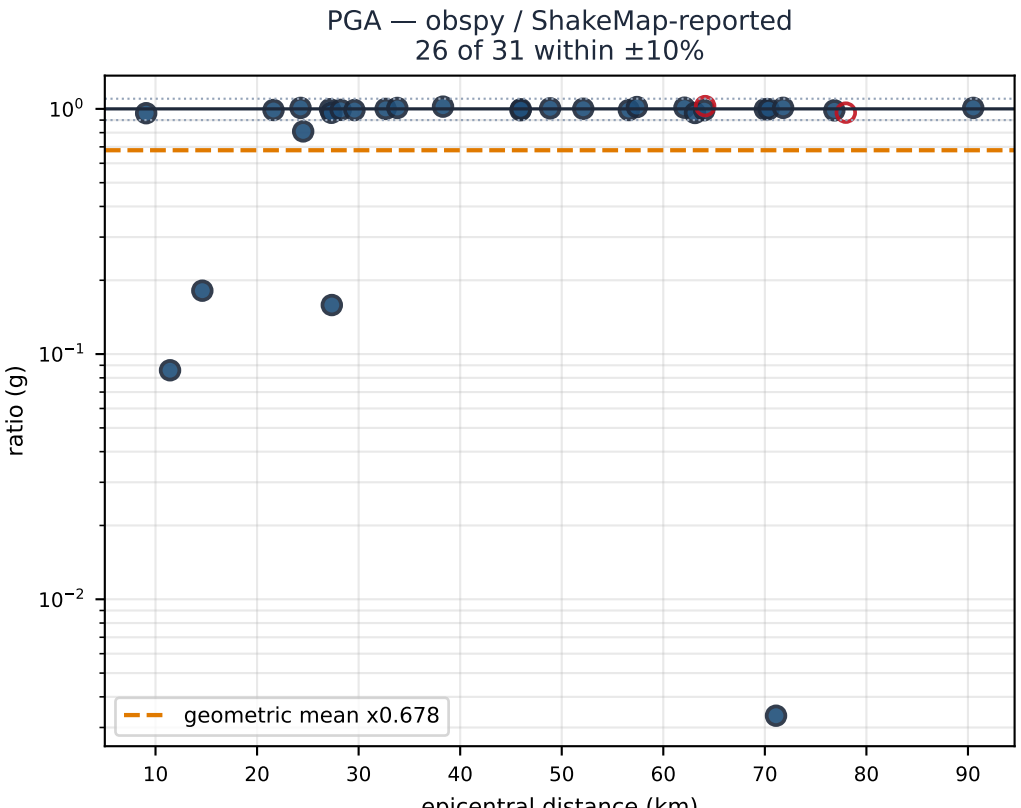
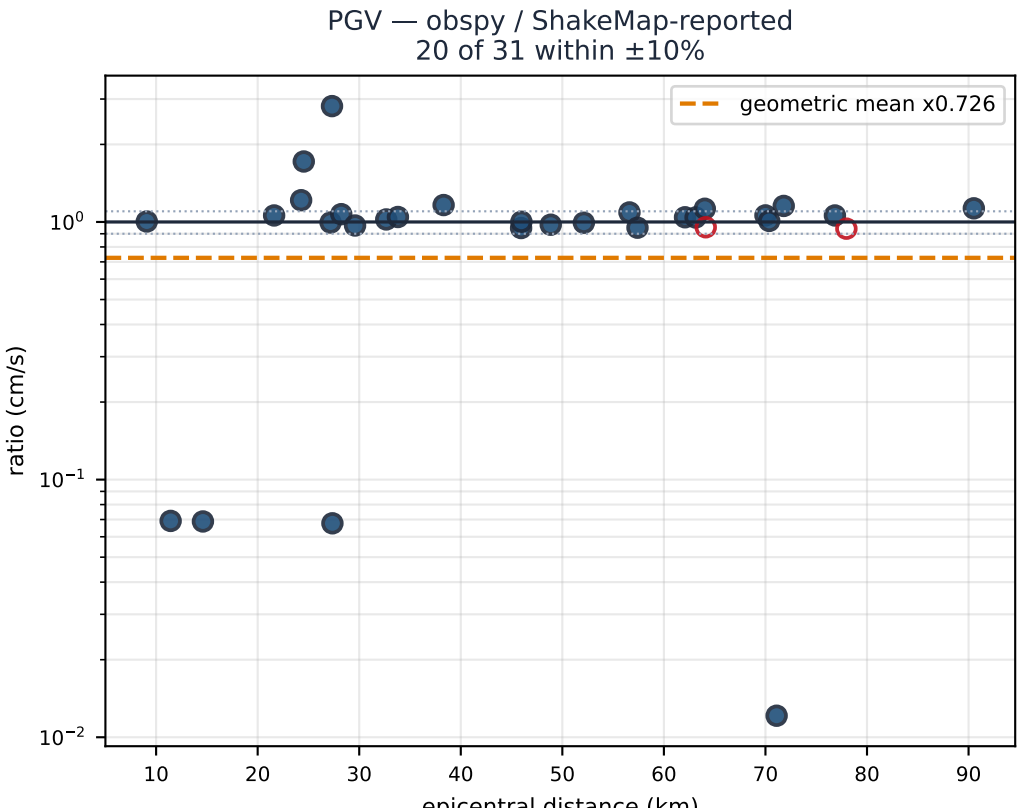
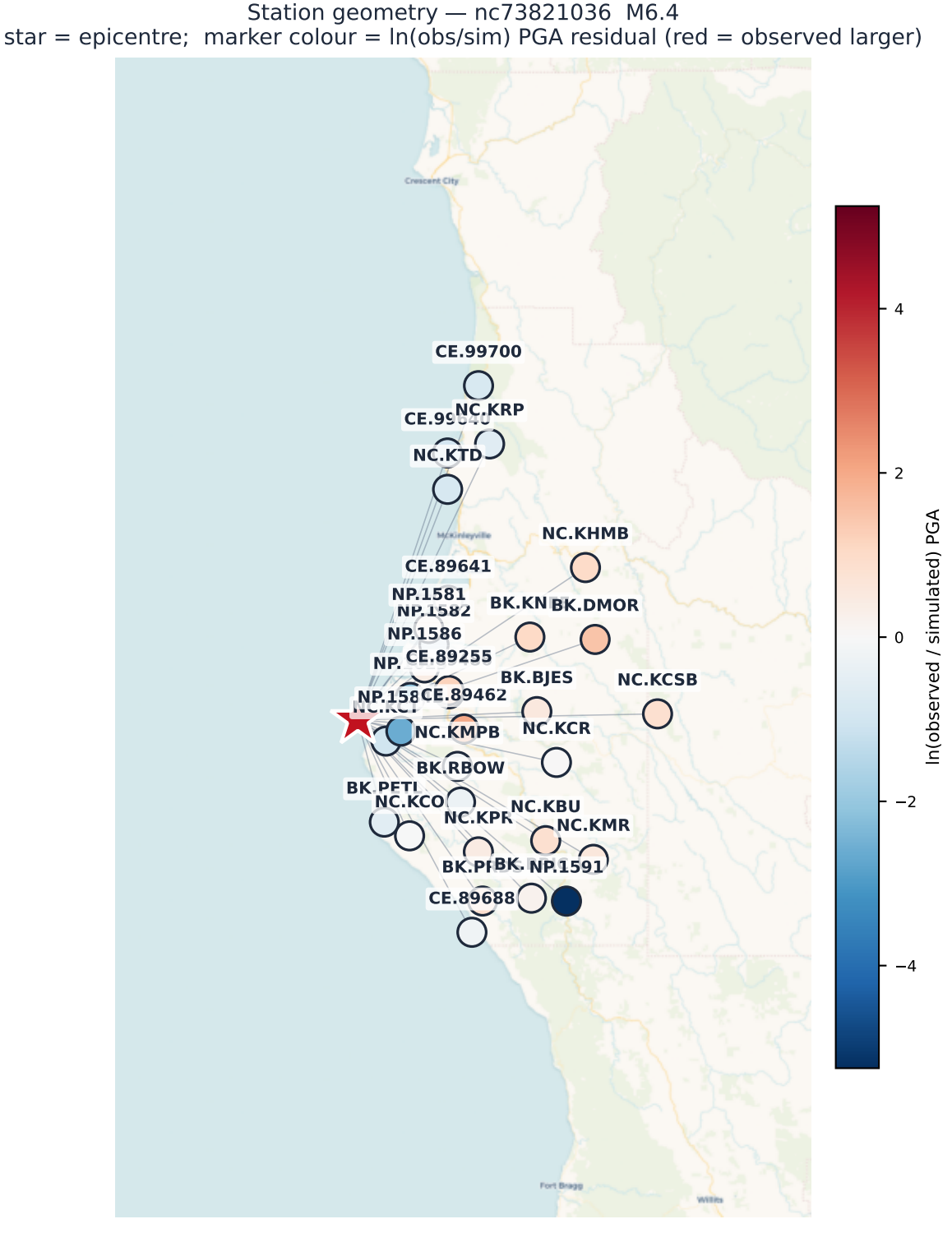
Station	Dist (km)	Vs30 BBP	Vs30 ShakeMap	Chan	PGA (g) ShakeMap	PGA (g) obspy	PGA (g) BBP	PGV (cm/s) ShakeMap	PGV (cm/s) obspy	PGV (cm/s) BBP	PGD (cm) obspy	PGD (cm) BBP	PGD obs/sim	ln(obs/sim)	Flags
NC.KHMB	70.0	628	628	HNE	0.1253	0.1248	0.0452	15.1	16.0	4.1	4.03	1.46	2.75x	+1.016	—
NC.KMR	70.4	748	748	HNE	0.0721	0.0719	0.0393	9.5	9.6	2.7	1.45	0.95	1.52x	+0.603	—
NP.1591	71.1	453	453	HNE	0.0950	0.0003	0.0606	9.0	0.1	4.3	—	1.50	—	-5.250	—
CE.99640	71.8	501	501	HNE	0.0186	0.0188	0.0483	1.2	1.4	2.9	0.63	1.06	0.60x	-0.945	—
NC.KCSB	76.8	749	749	HNE	0.0868	0.0856	0.0374	12.7	13.5	4.0	3.29	1.60	2.06x	+0.828	—
NC.KRP	78.0	732	732	HHE	0.0199	0.0192	0.0355	1.9	1.8	1.9	1.00	0.59	1.69x	-0.616	1,Outl
CE.99700	90.5	524	524	HNE	0.0182	0.0183	0.0419	1.2	1.3	2.6	0.34	0.67	0.51x	-0.828	—

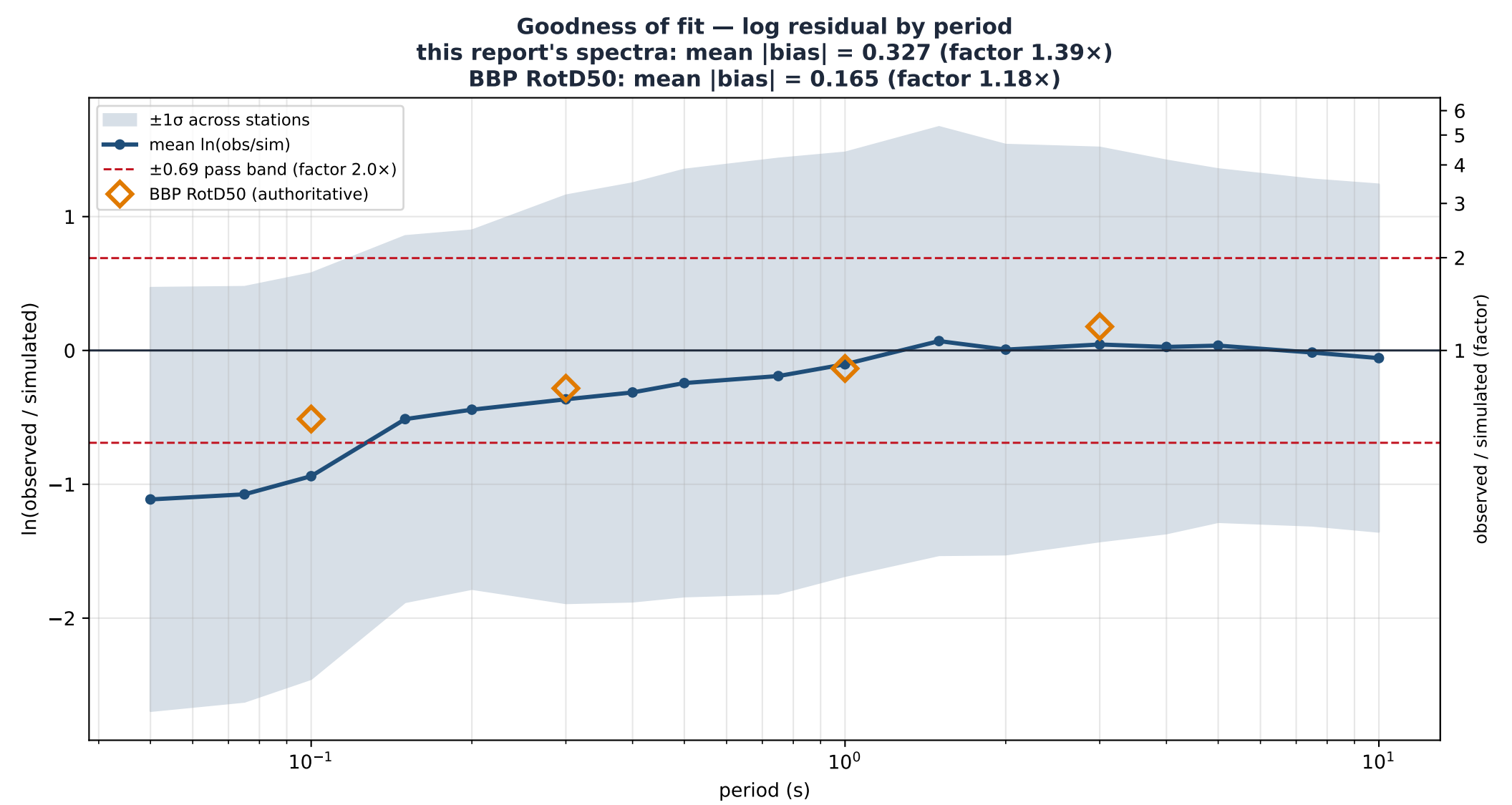
Cross-check — two processings of the same recordings

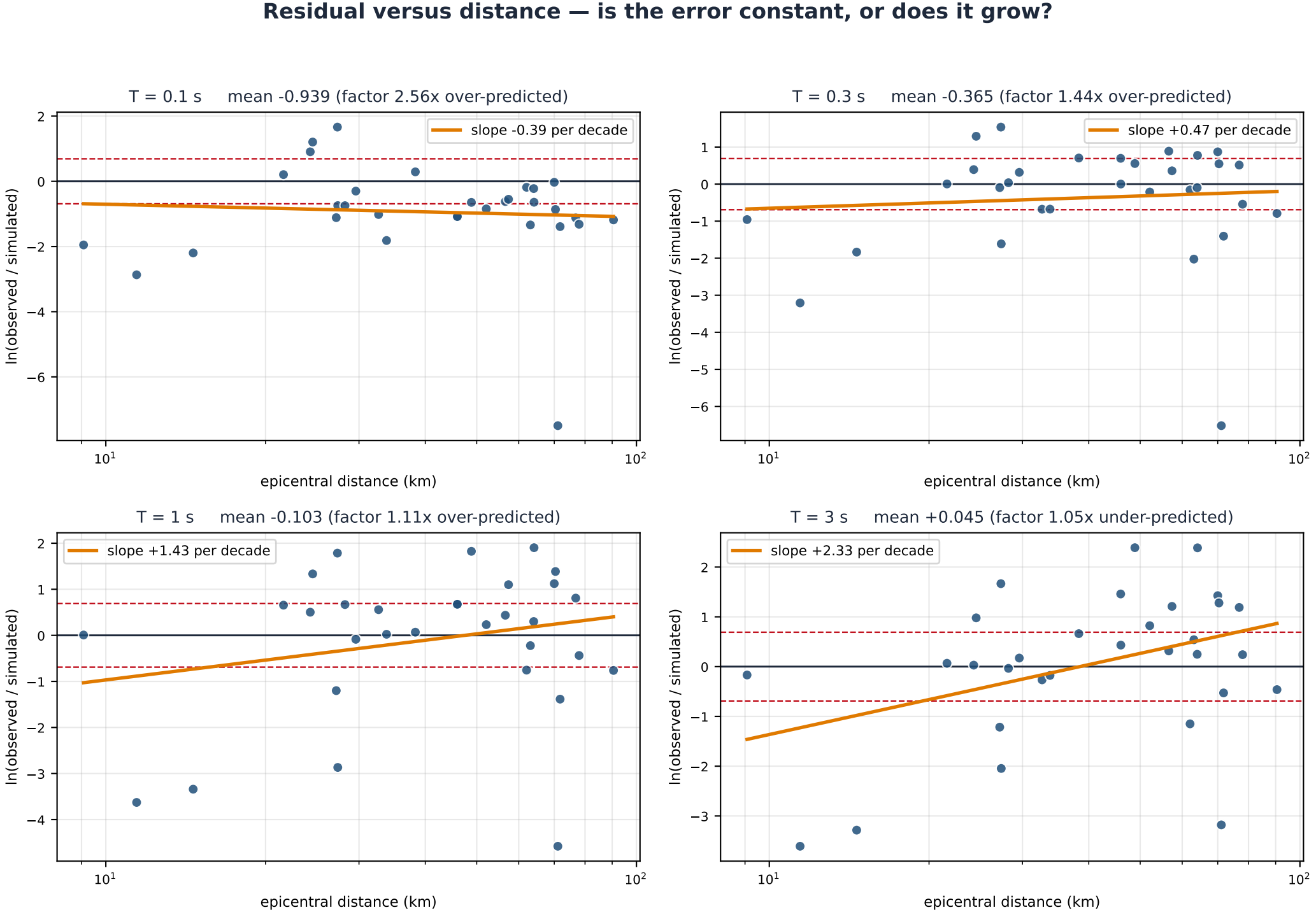




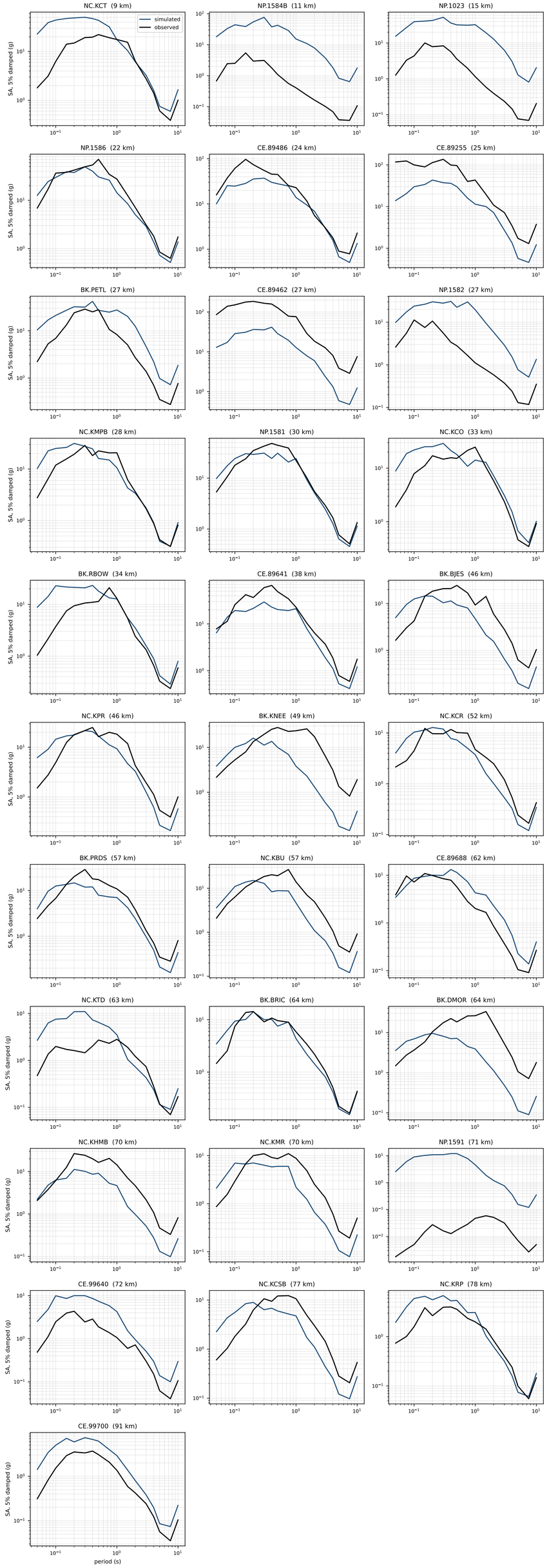
ow red markers are stations ShakeMap flagged (IncompleteRecord, Outlier, …). Dotted lines are ±10%. A consistent offset would mean our processing differs systematically from the networ

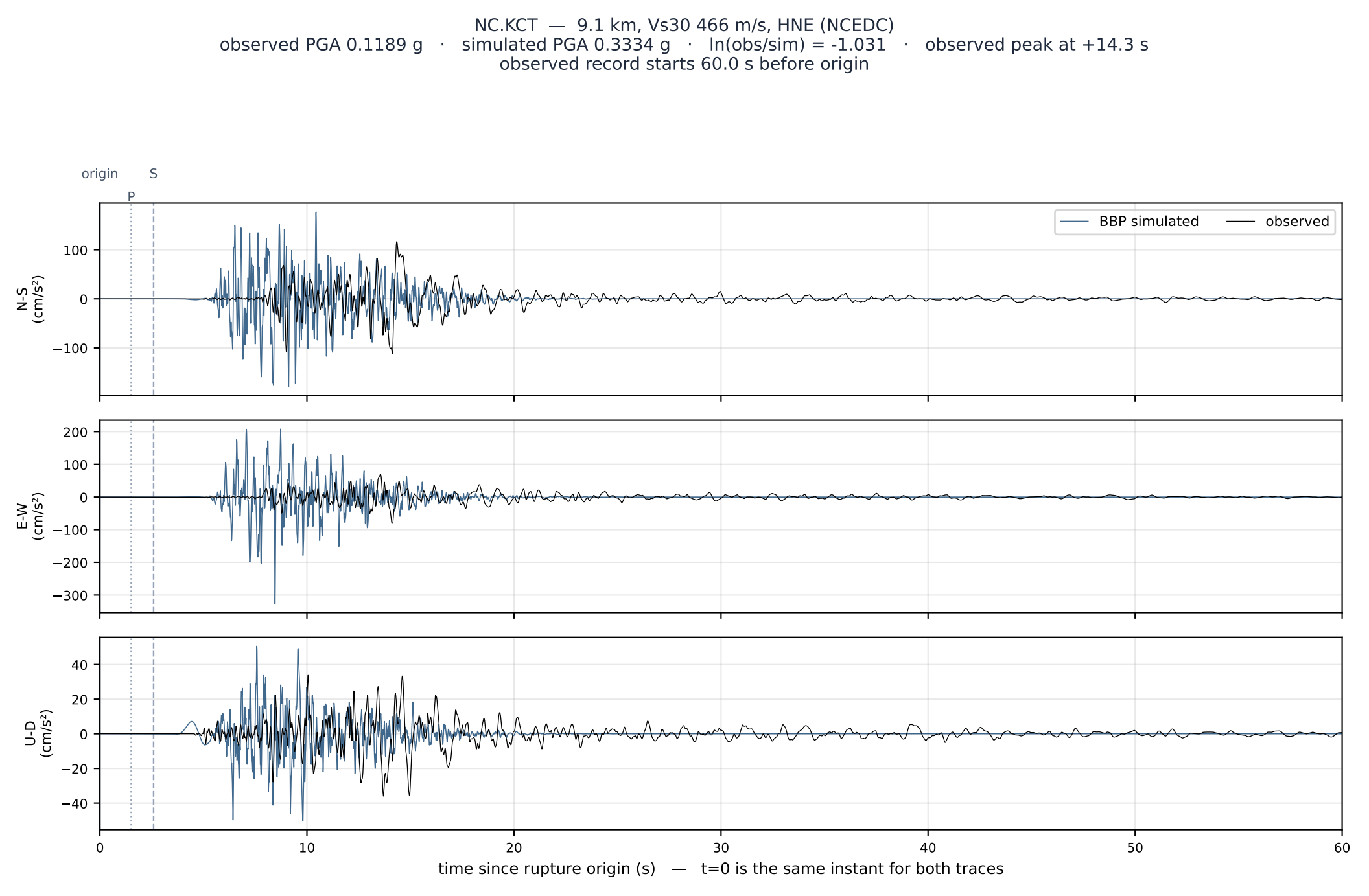

Station geometry — nc73821036 M6.4
star = epicentre; marker colour = ln(obs/sim) PGA residual (red = observed larger)
CE.99700
NC.KRP
NC.KTD
NC.KHMB
CE.89641
NP.1581
NP.1582
BK.KN
BK.DMOR
NP.1586
CE.89255
BK.BJES
NC.KCSB
CE.89462
NC.KMPB
NC.KCR
BK.RBOW
NC.KCO
NC.KBU
NC.KMR
NP.1591
CE.89688
ln(observed / simulated) PGA
4
2
0
−2
−4

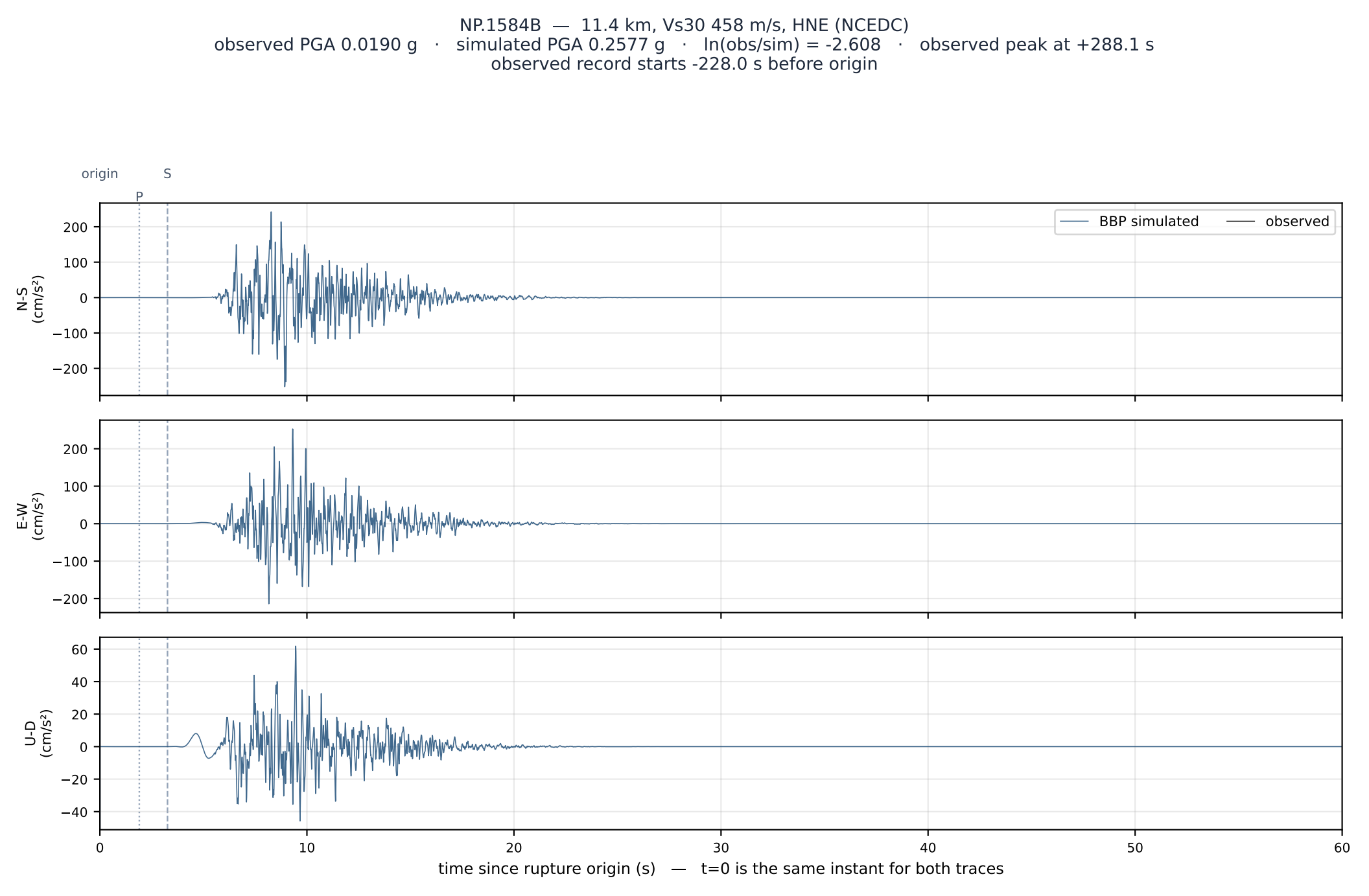

Goodness of fit — log residual by period
this report's spectra: mean |bias| = 0.327 (factor 1.39×)
BBP RotD50: mean |bias| = 0.165 (factor 1.18×)
±1σ across stations
mean ln(obs/sim)
±0.69 pass band (factor 2.0×)
BBP RotD50 (authoritative)
ln(observed / simulated)
observed / simulated (factor)
period (s)
Positive = the simulation under-predicts (real shaking was larger). Negative = it over-predicts.

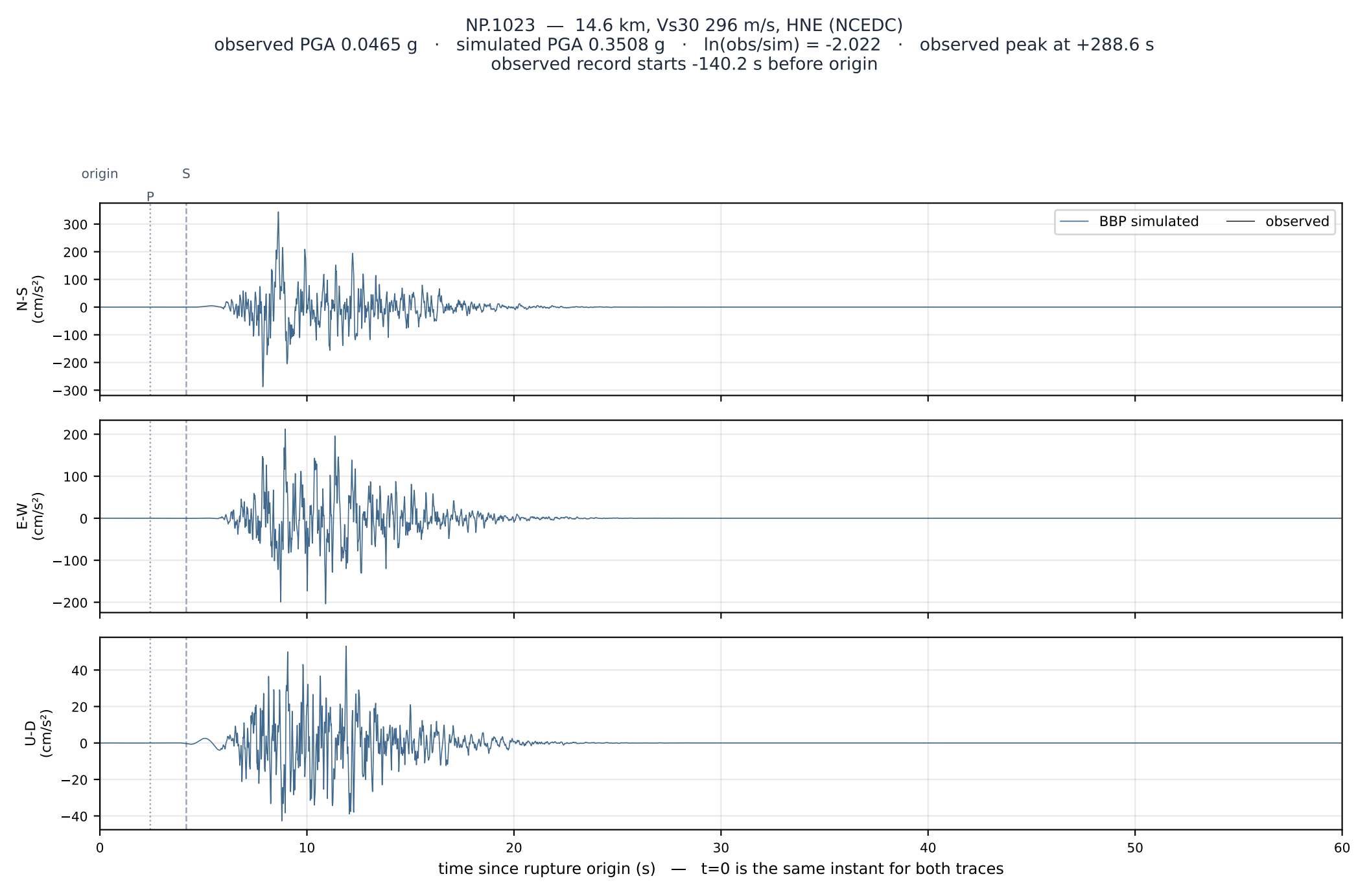

Residual versus distance — is the error constant, or does it grow?
T = 0.1 s mean -0.939 (factor 2.56x over-predicted)
slope -0.39 per decade
T = 0.3 s mean -0.365 (factor 1.44x over-predicted)
slope +0.47 per decade
T = 1 s mean -0.103 (factor 1.11x over-predicted)
slope +1.43 per decade
T = 3 s mean +0.045 (factor 1.05x under-predicted)
slope +2.33 per decade
ln(observed / simulated)
epicentral distance (km)
Flat offset = amplitude/site problem. Sloping = attenuation problem. Dashed lines are the ±0.69 pass band.

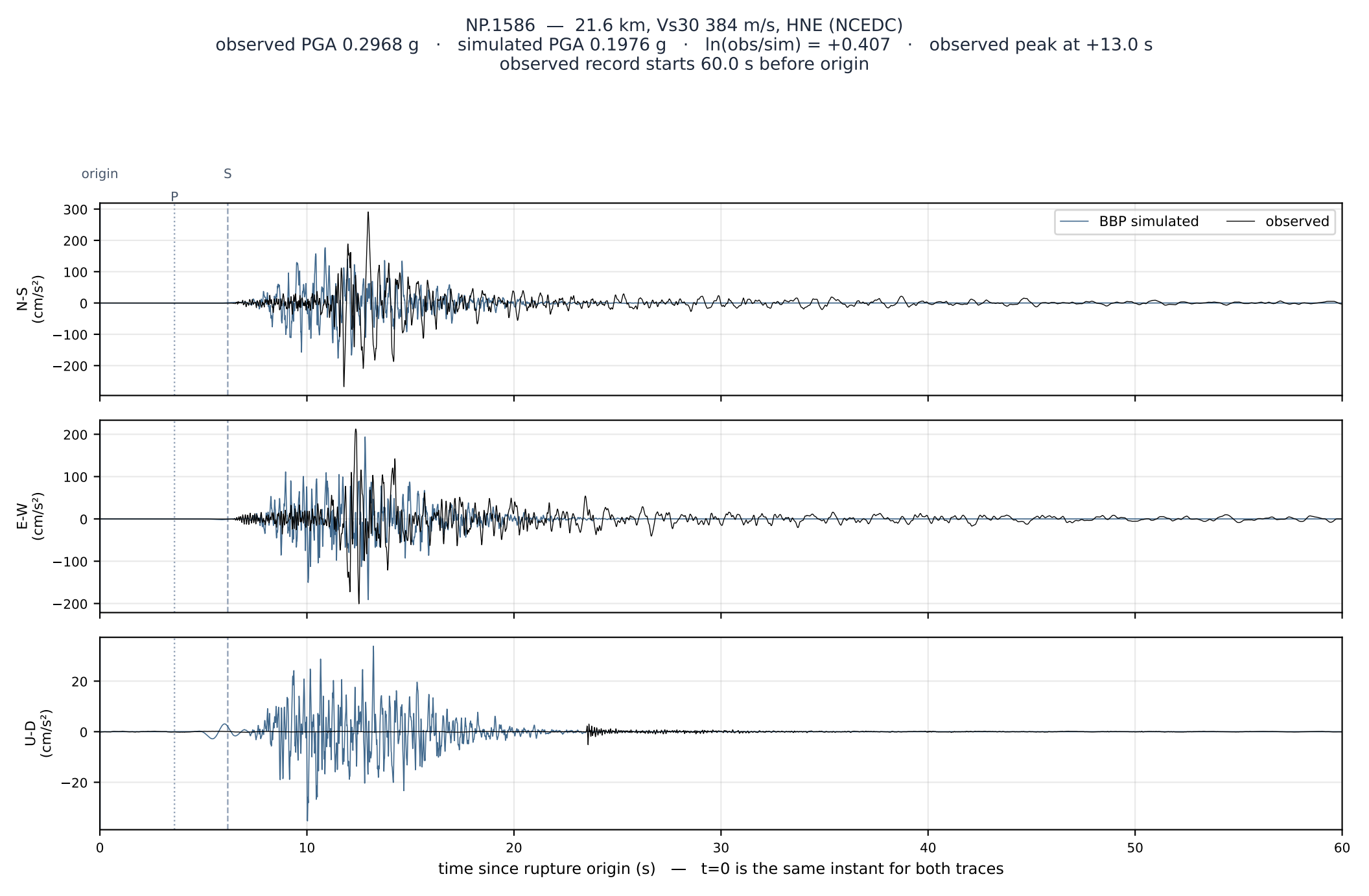
Response spectra — observed vs simulated (geometric-mean horizontal)

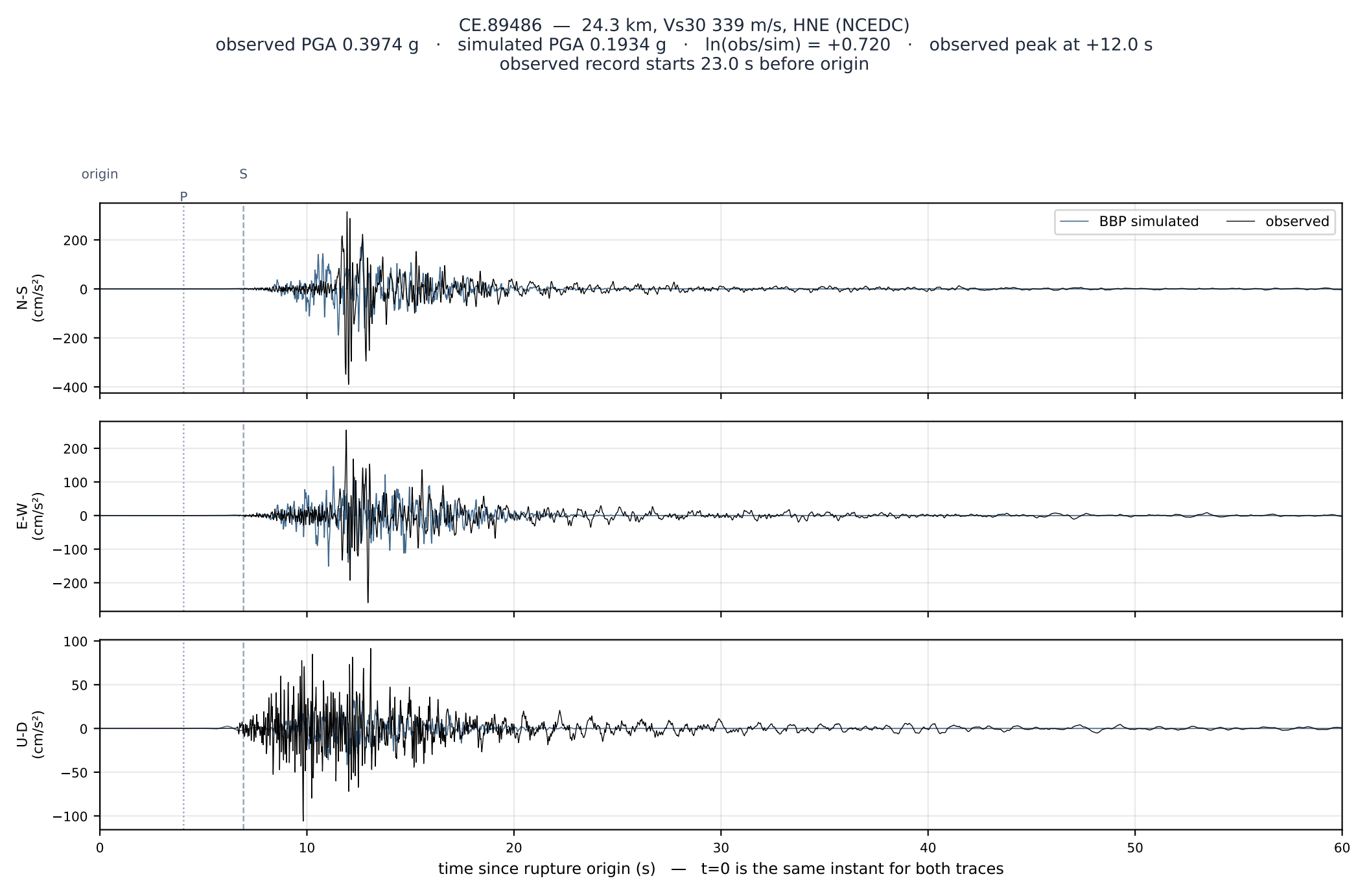


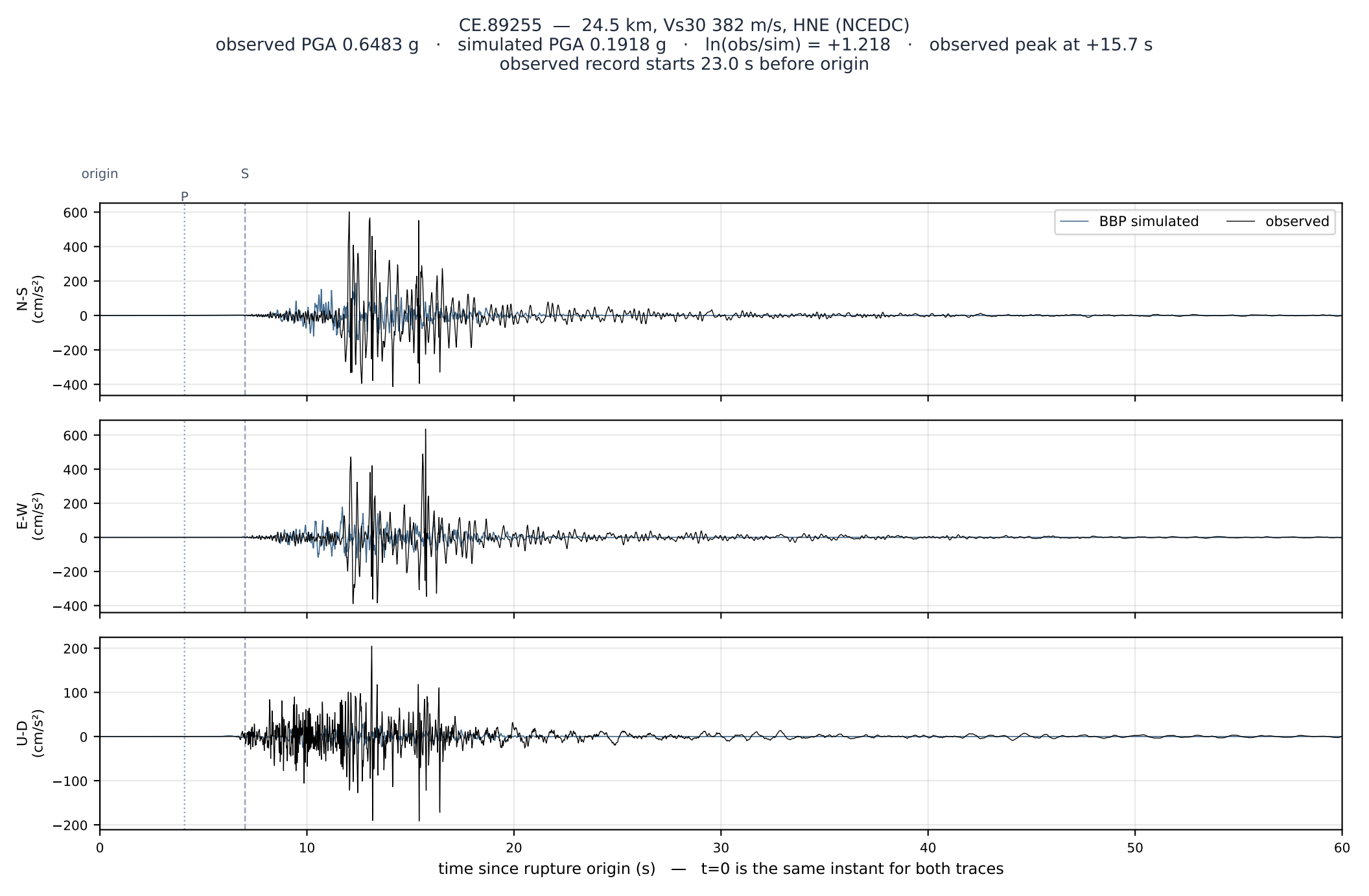

NC.KCT — 9.1 km, Vs30 466 m/s, HNE (NCEDC)
observed PGA 0.1189 g · simulated PGA 0.3334 g · ln(obs/sim) = -1.031 · observed peak at +14.3 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

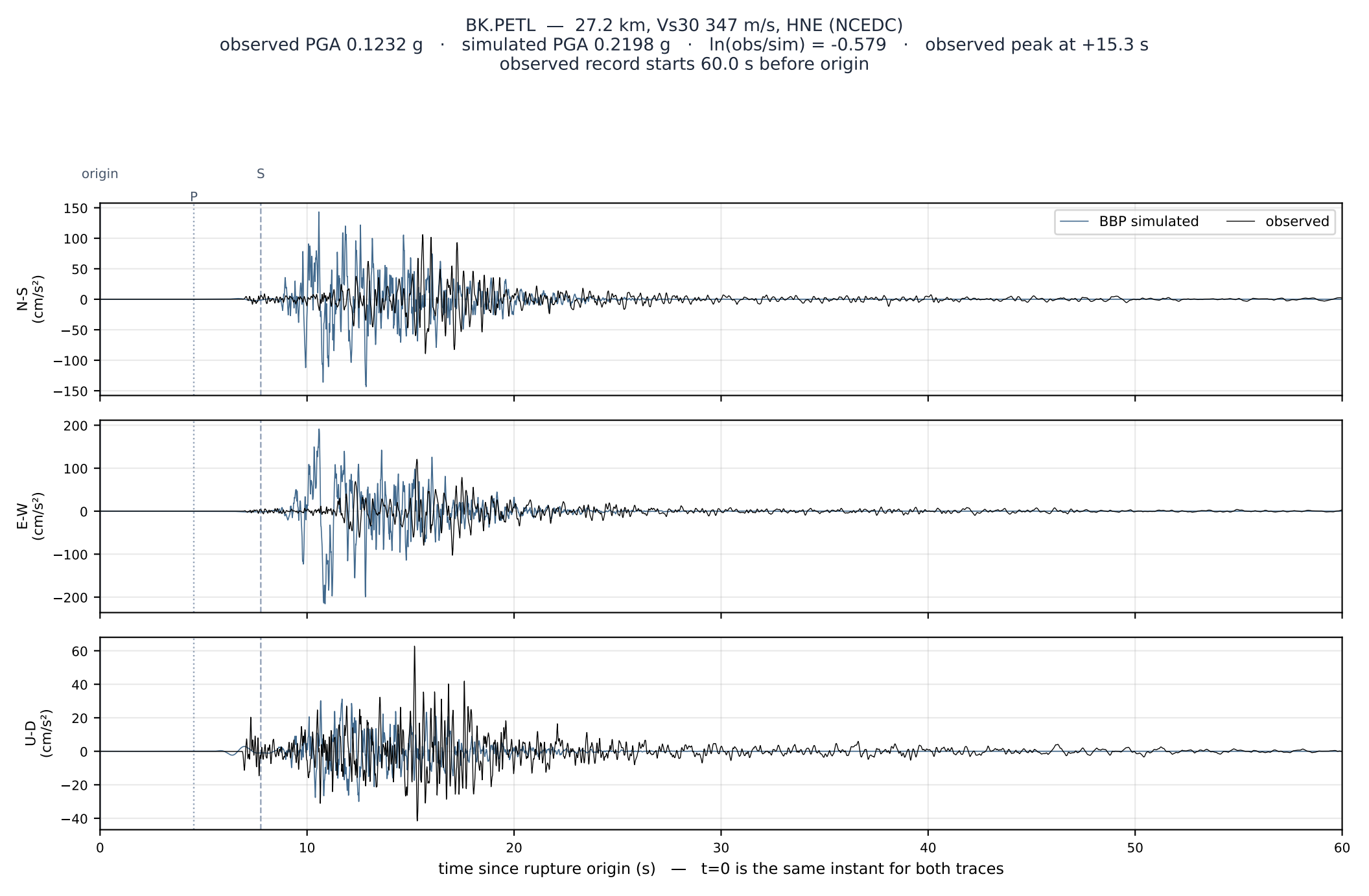

NP.1584B — 11.4 km, Vs30 458 m/s, HNE (NCEDC)
observed PGA 0.0190 g · simulated PGA 0.2577 g · ln(obs/sim) = -2.608 · observed peak at +288.1 s
observed record starts -228.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

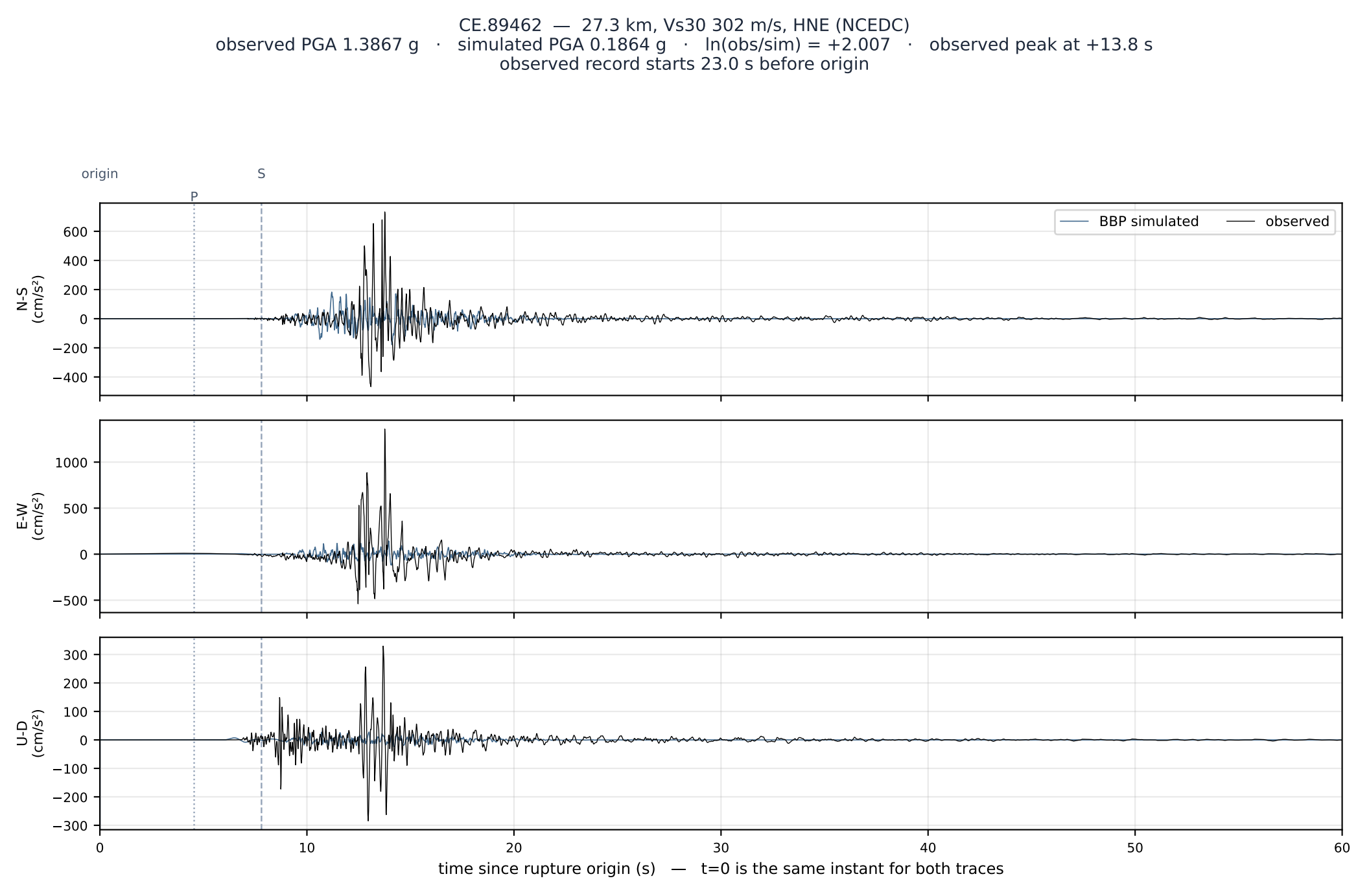

NP.1023 — 14.6 km, Vs30 296 m/s, HNE (NCEDC)
observed PGA 0.0465 g · simulated PGA 0.3508 g · ln(obs/sim) = -2.022 · observed peak at +288.6 s
observed record starts -140.2 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

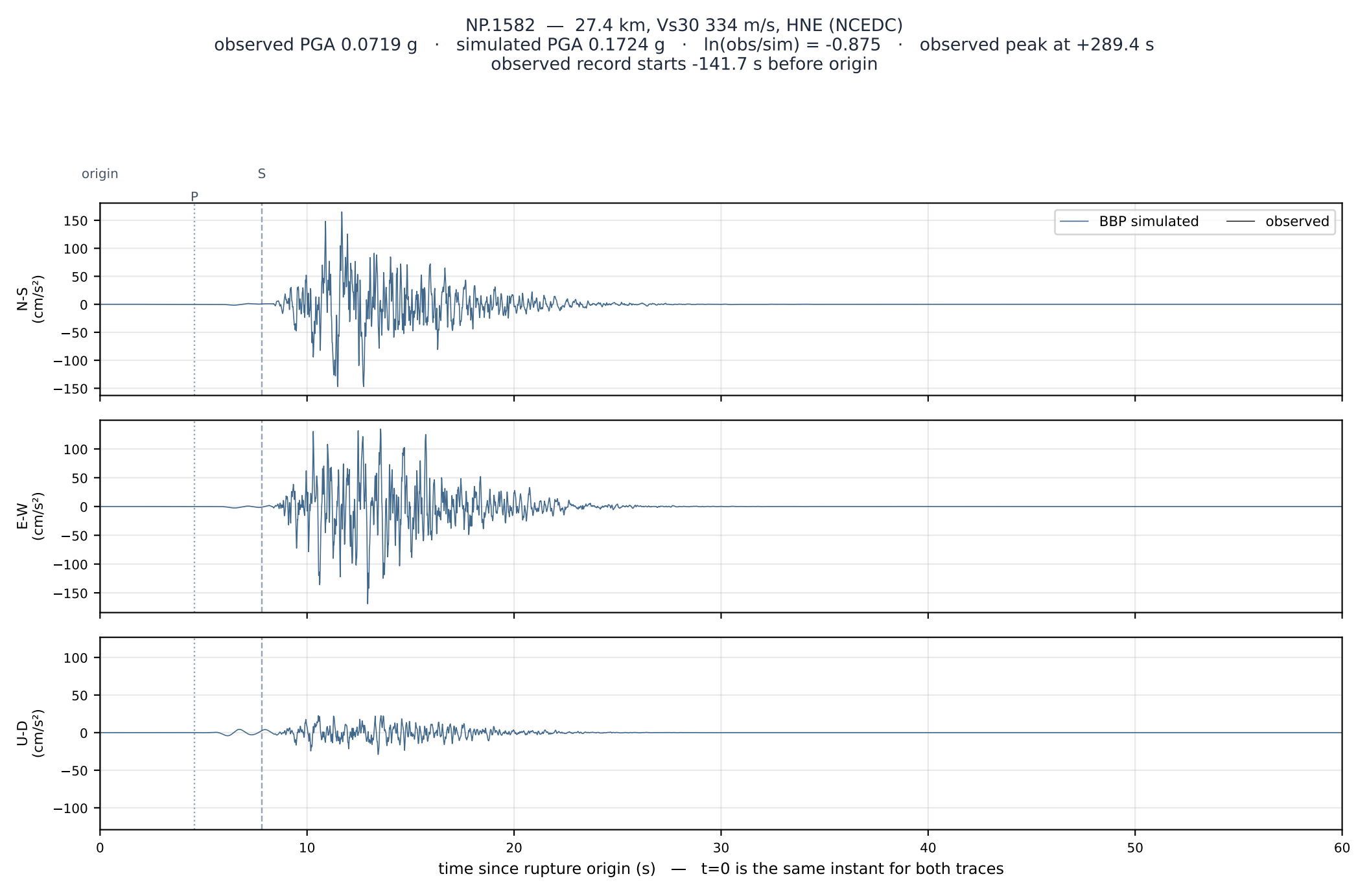

NP.1586 — 21.6 km, Vs30 384 m/s, HNE (NCEDC)
observed PGA 0.2968 g · simulated PGA 0.1976 g · ln(obs/sim) = +0.407 · observed peak at +13.0 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

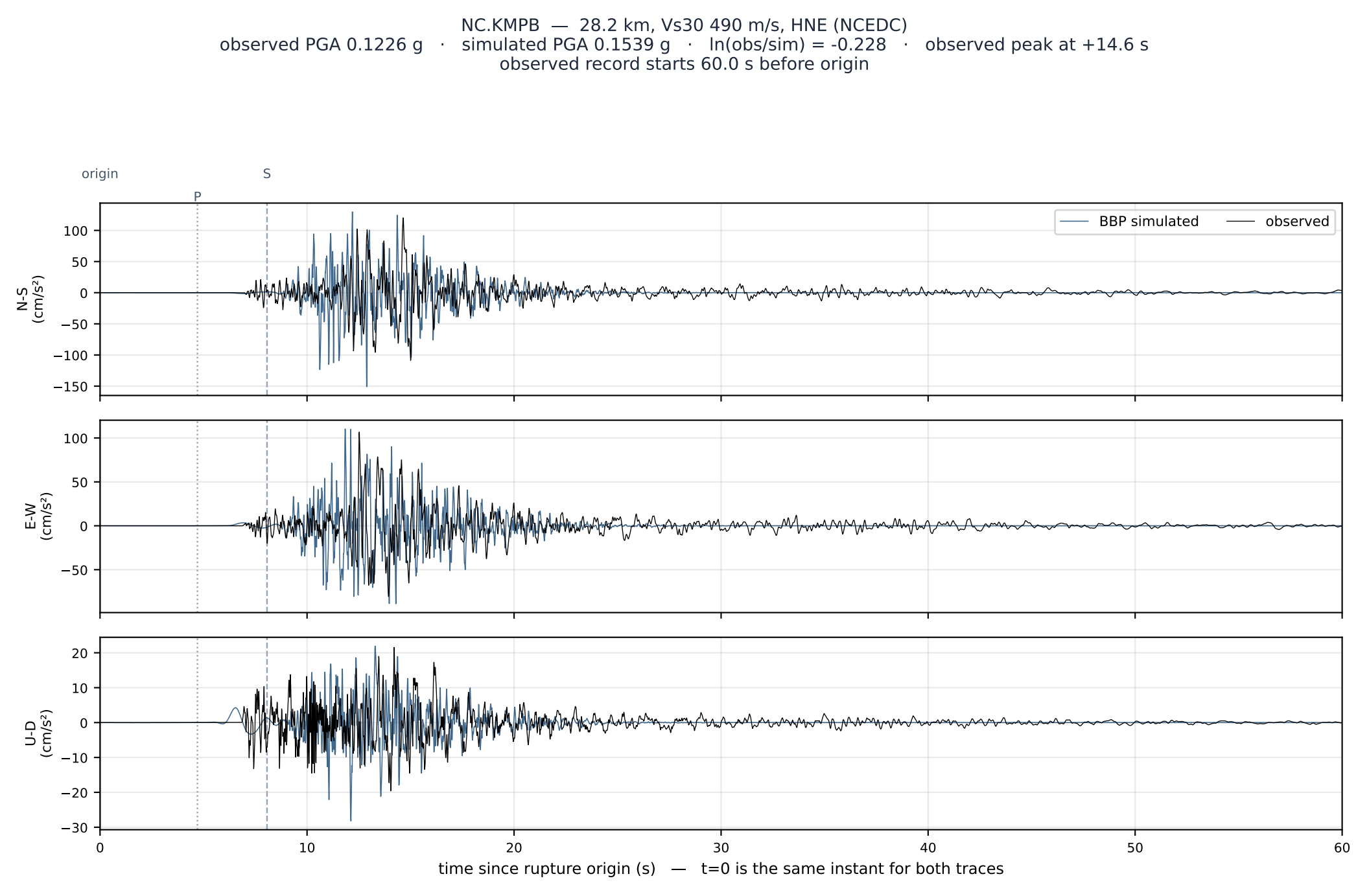

CE.89486 — 24.3 km, Vs30 339 m/s, HNE (NCEDC)
observed PGA 0.3974 g · simulated PGA 0.1934 g · ln(obs/sim) = +0.720 · observed peak at +12.0 s
observed record starts 23.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

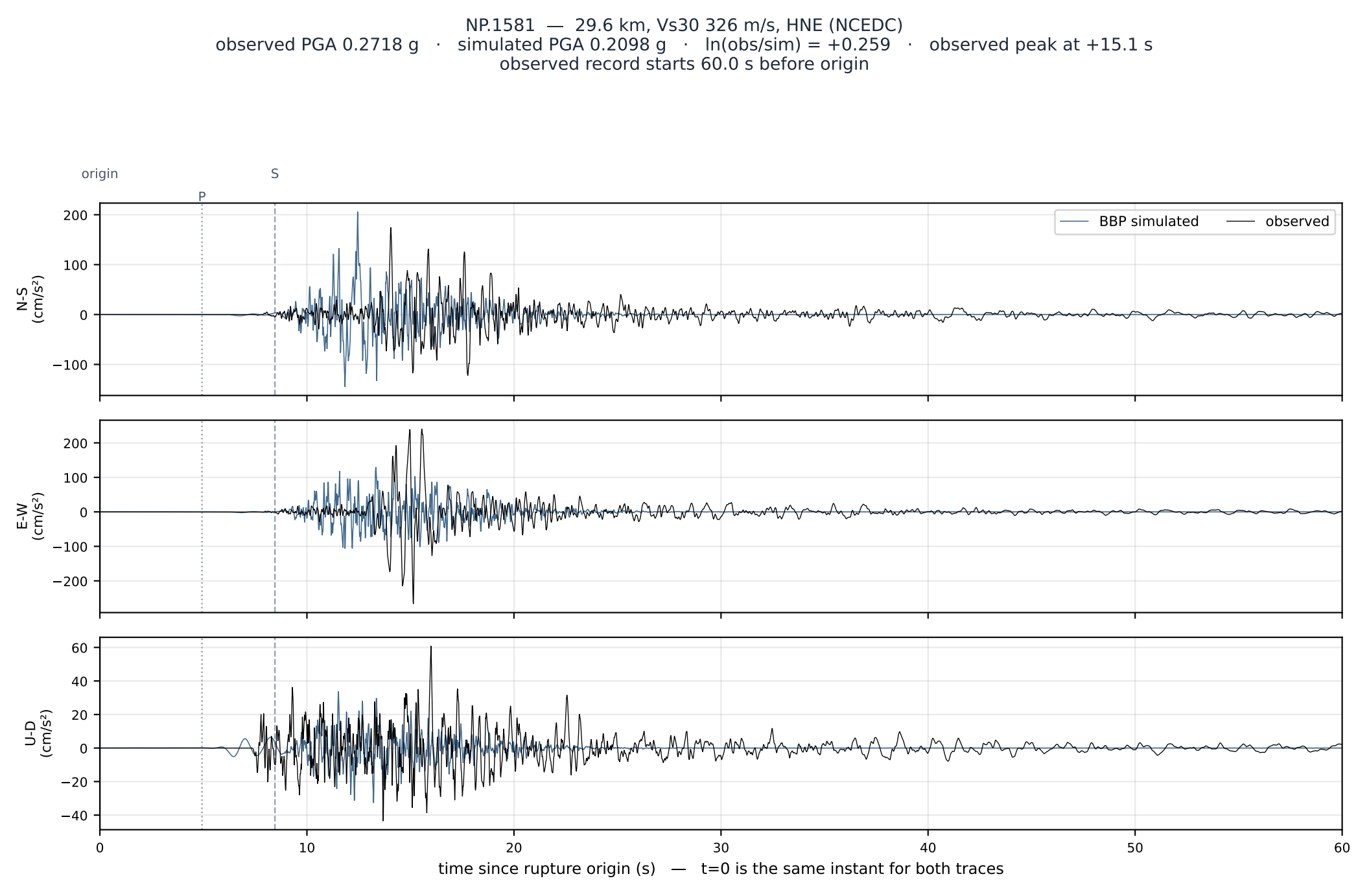

CE.89255 — 24.5 km, Vs30 382 m/s, HNE (NCEDC)
observed PGA 0.6483 g · simulated PGA 0.1918 g · ln(obs/sim) = +1.218 · observed peak at +15.7 s
observed record starts 23.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

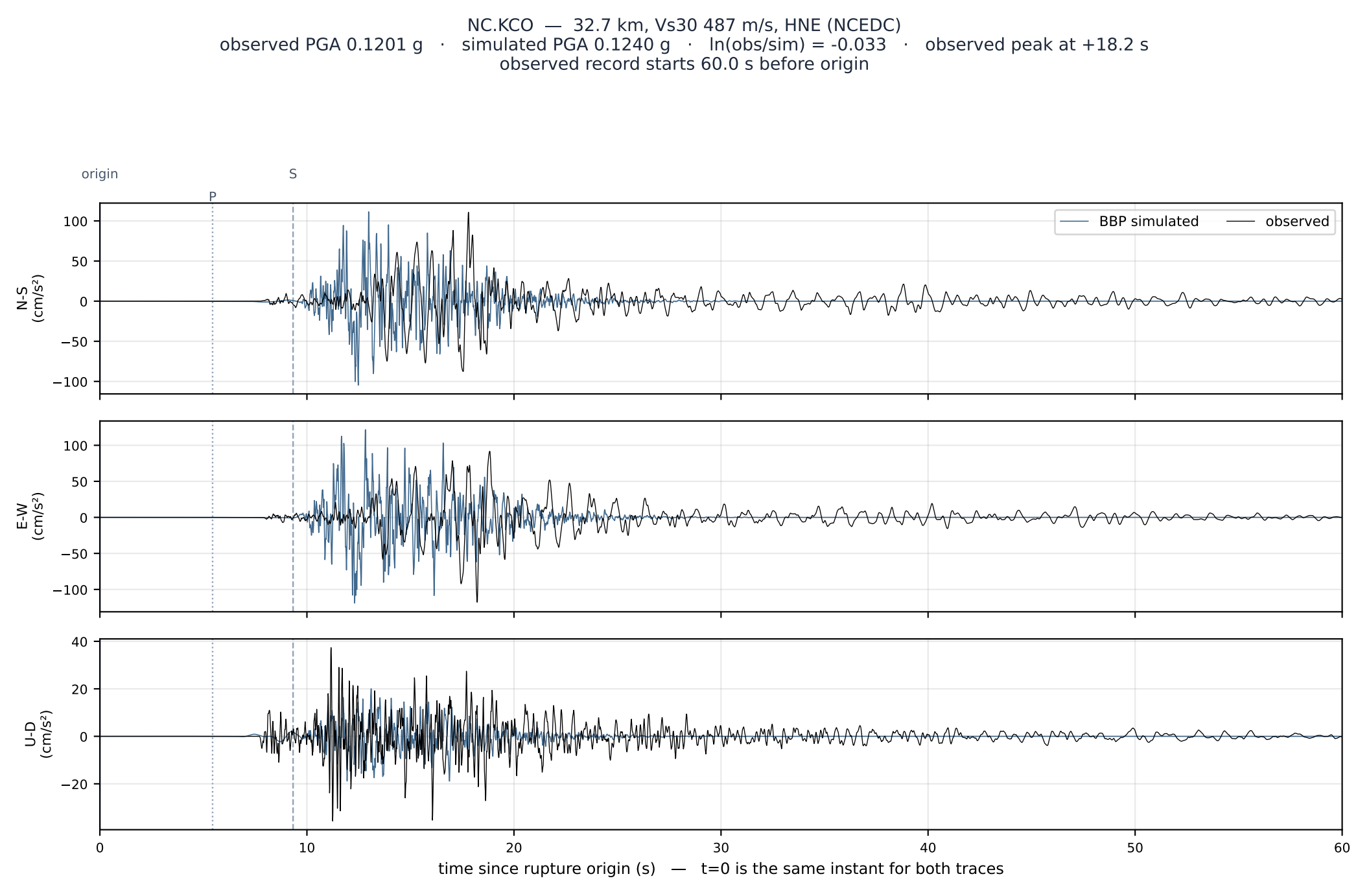

BK.PETL — 27.2 km, Vs30 347 m/s, HNE (NCEDC)
observed PGA 0.1232 g · simulated PGA 0.2198 g · ln(obs/sim) = -0.579 · observed peak at +15.3 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

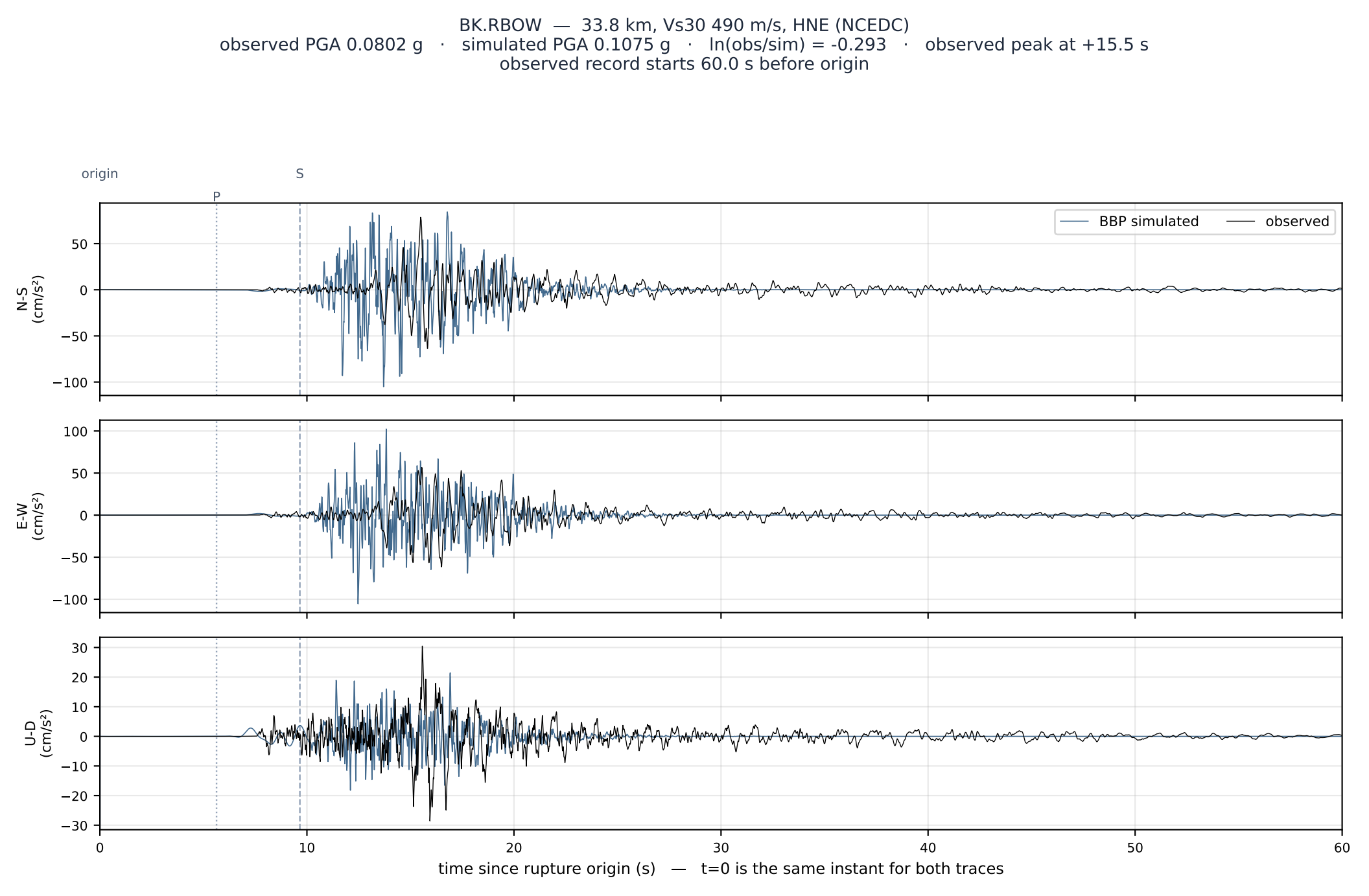

CE.89462 — 27.3 km, Vs30 302 m/s, HNE (NCEDC)
observed PGA 1.3867 g · simulated PGA 0.1864 g · ln(obs/sim) = +2.007 · observed peak at +13.8 s
observed record starts 23.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

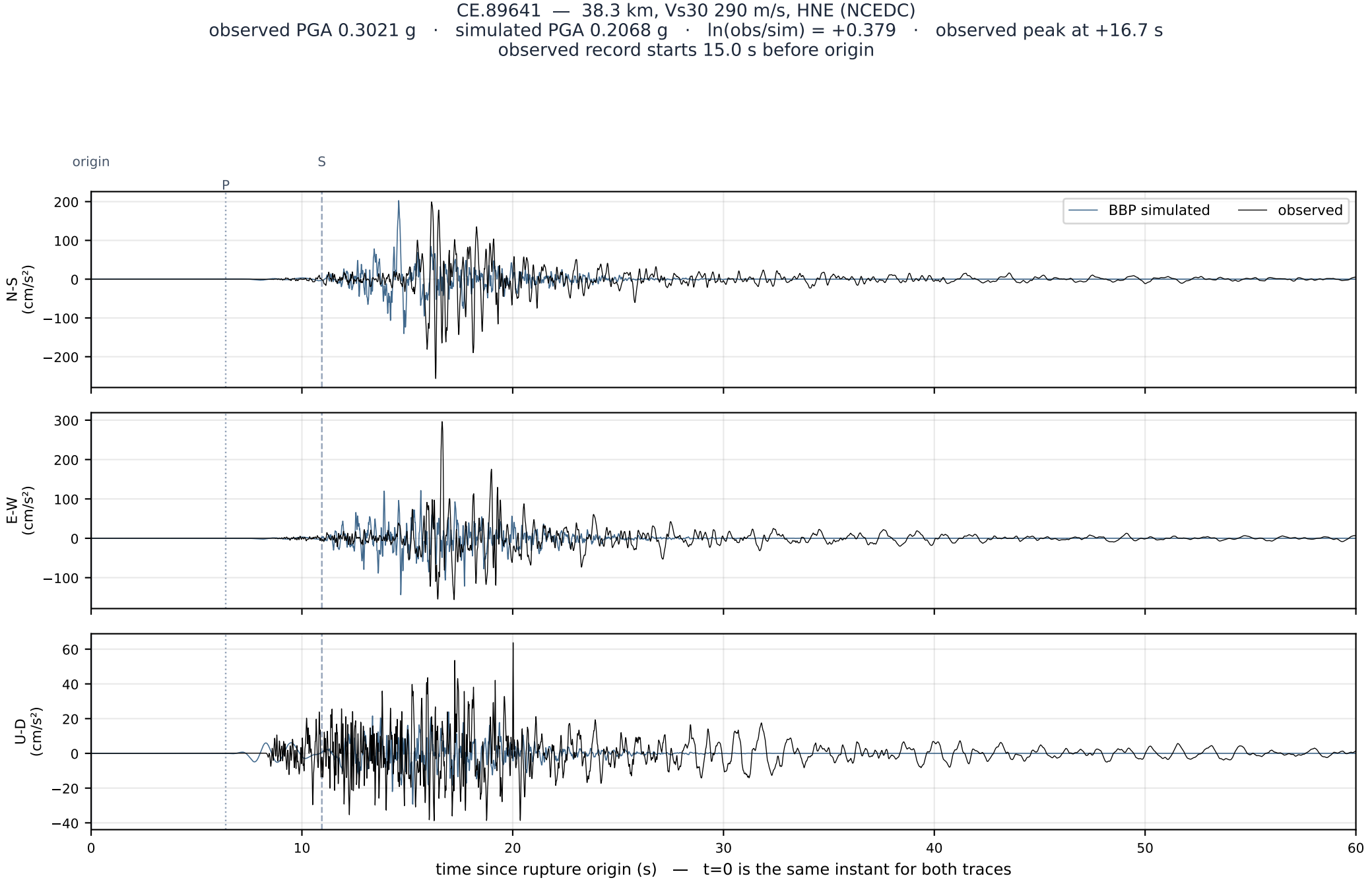

NP.1582 — 27.4 km, Vs30 334 m/s, HNE (NCEDC)
observed PGA 0.0719 g · simulated PGA 0.1724 g · ln(obs/sim) = -0.875 · observed peak at +289.4 s
observed record starts -141.7 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

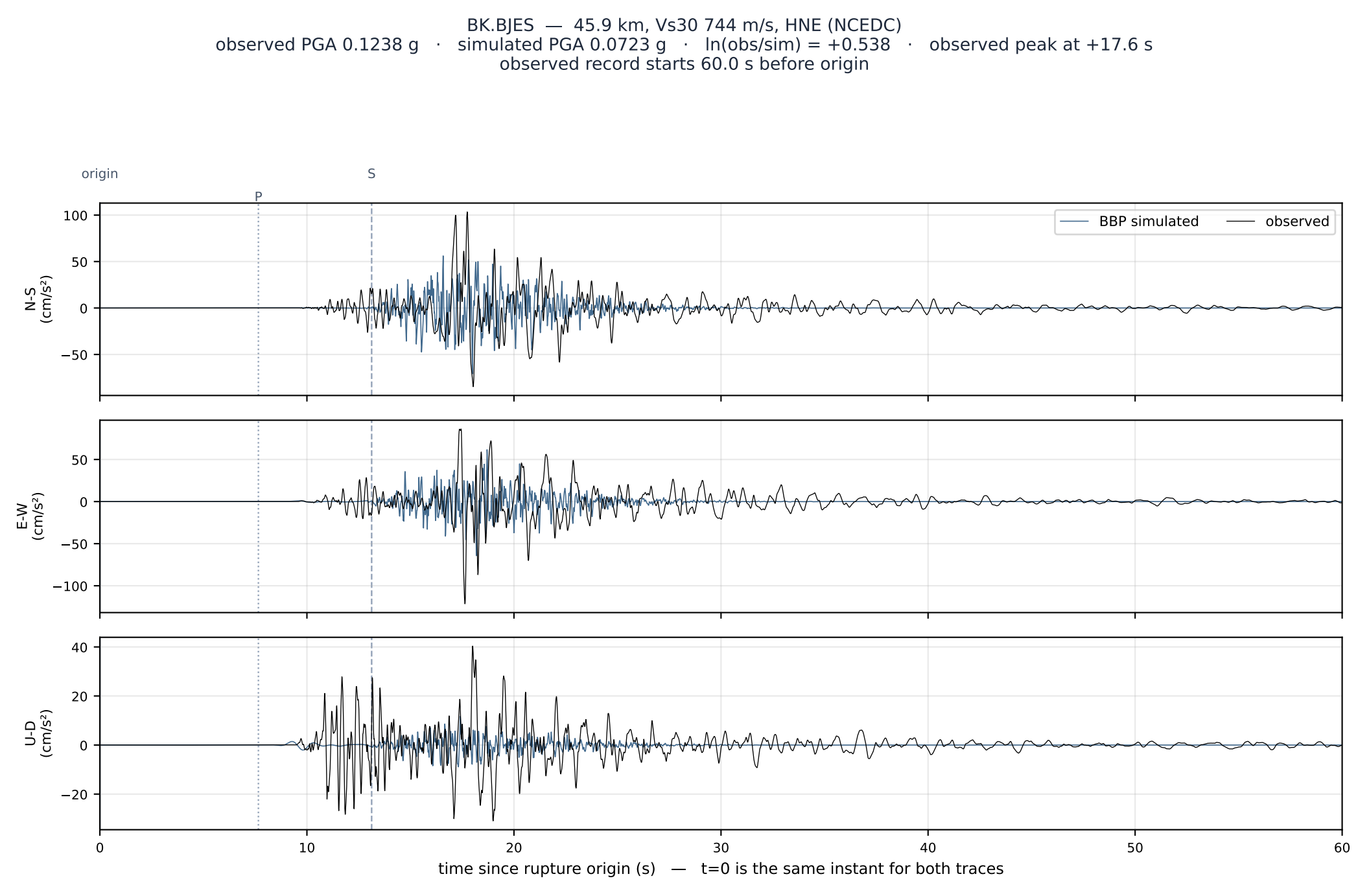

NC.KMPB — 28.2 km, Vs30 490 m/s, HNE (NCEDC)
observed PGA 0.1226 g · simulated PGA 0.1539 g · ln(obs/sim) = -0.228 · observed peak at +14.6 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

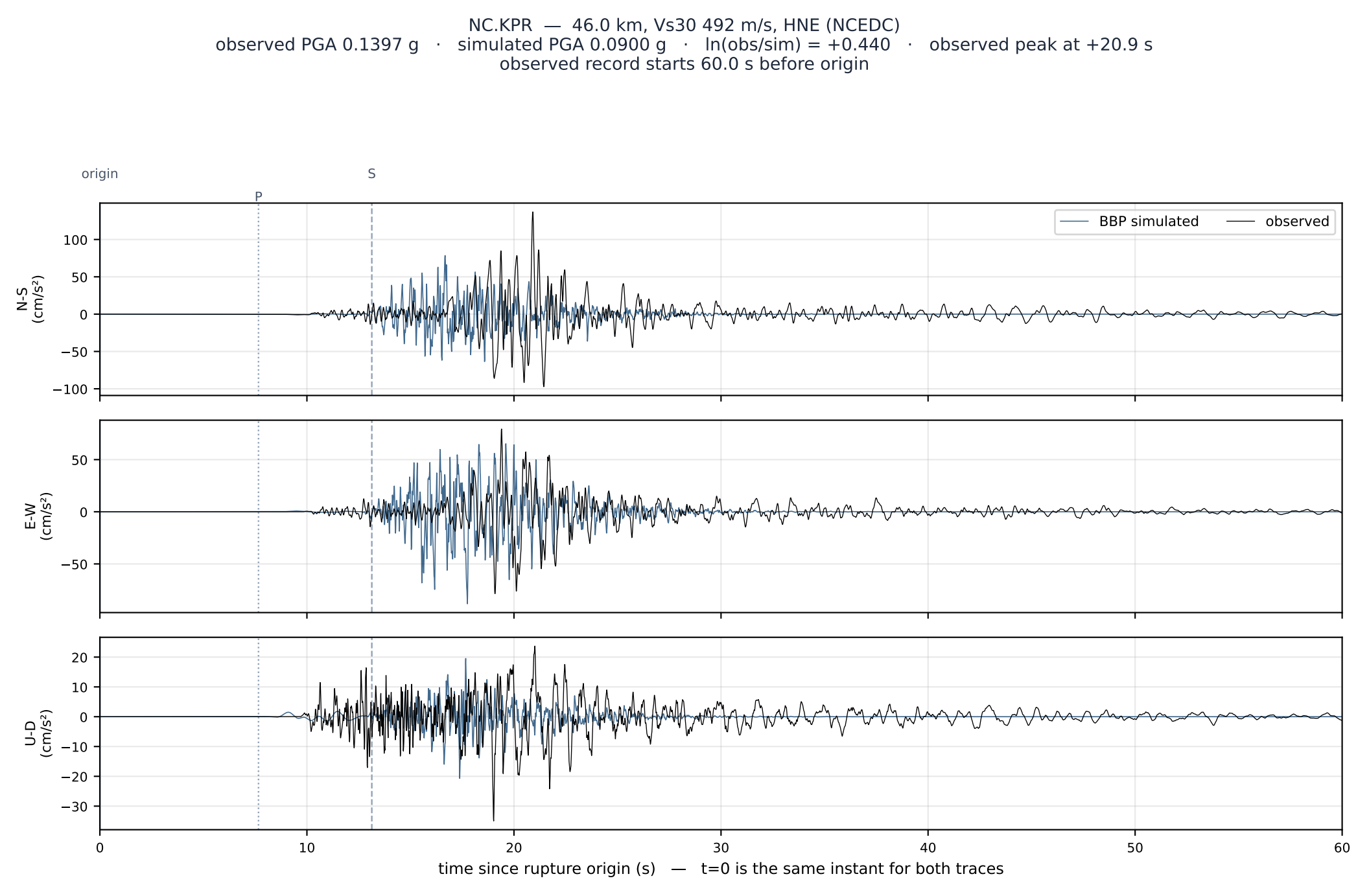

NP.1581 — 29.6 km, Vs30 326 m/s, HNE (NCEDC)
observed PGA 0.2718 g · simulated PGA 0.2098 g · ln(obs/sim) = +0.259 · observed peak at +15.1 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

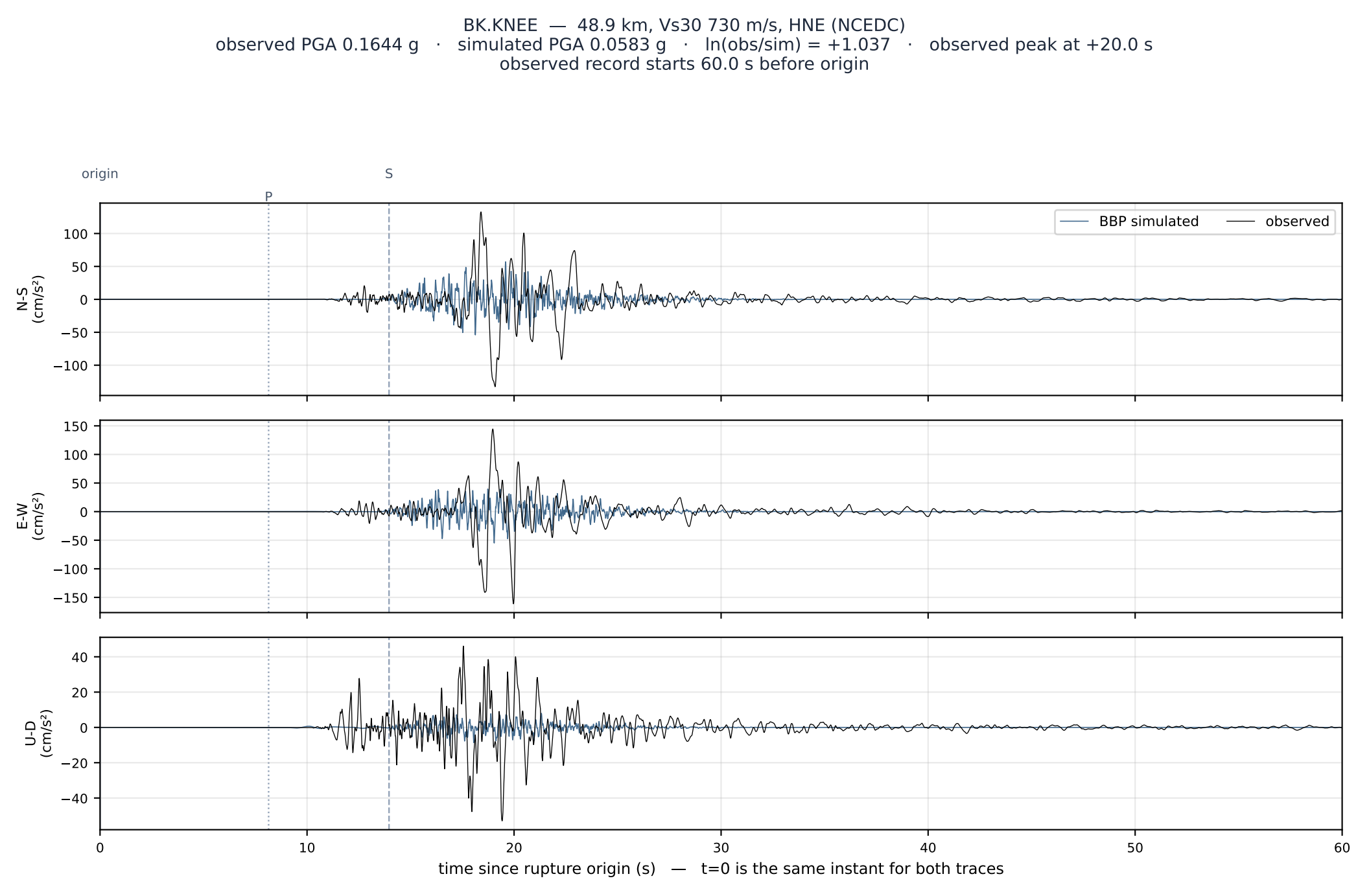

NC.KCO — 32.7 km, Vs30 487 m/s, HNE (NCEDC)
observed PGA 0.1201 g · simulated PGA 0.1240 g · ln(obs/sim) = -0.033 · observed peak at +18.2 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

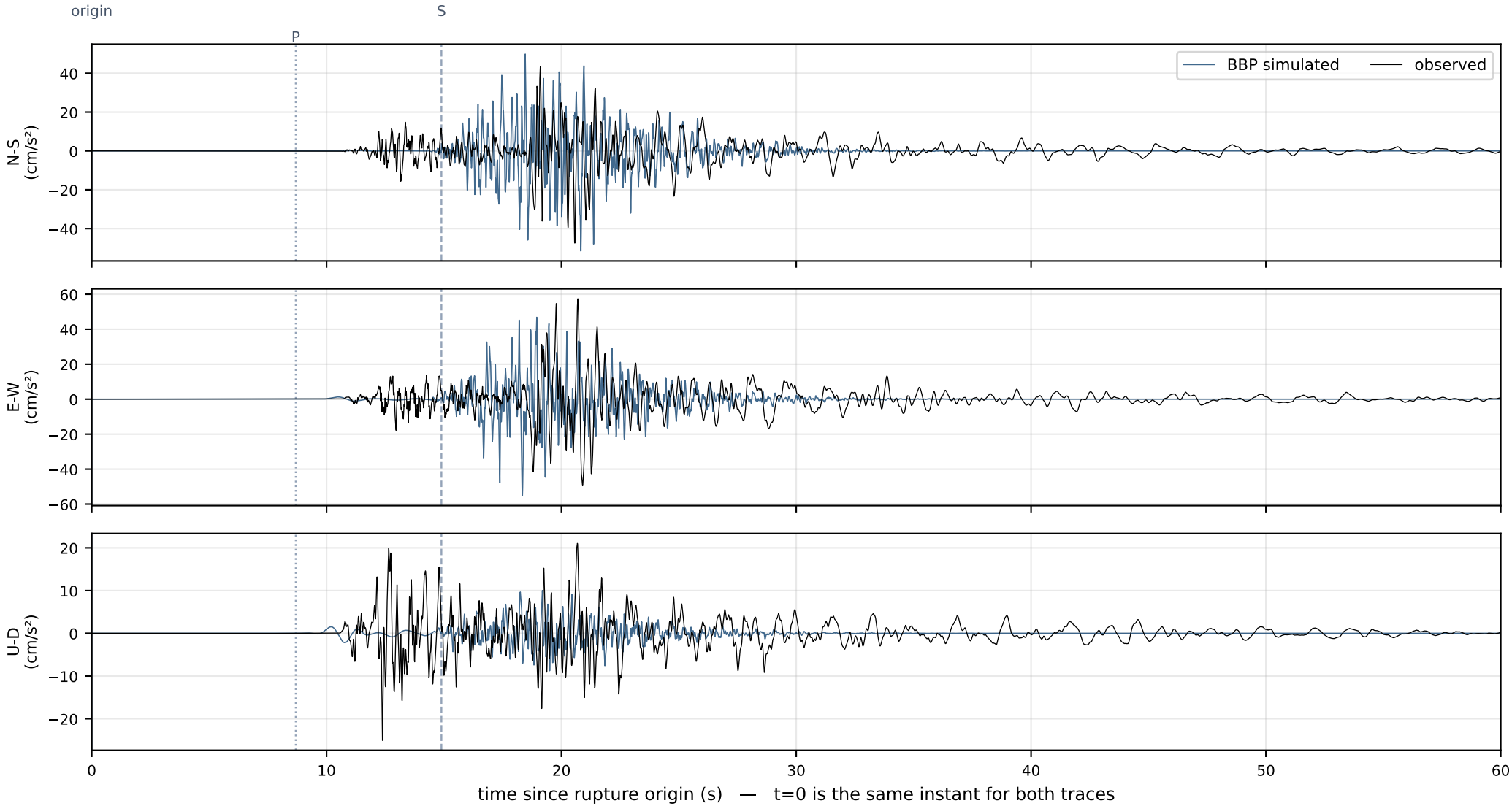

BK.RBOW — 33.8 km, Vs30 490 m/s, HNE (NCEDC)
observed PGA 0.0802 g · simulated PGA 0.1075 g · ln(obs/sim) = -0.293 · observed peak at +15.5 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

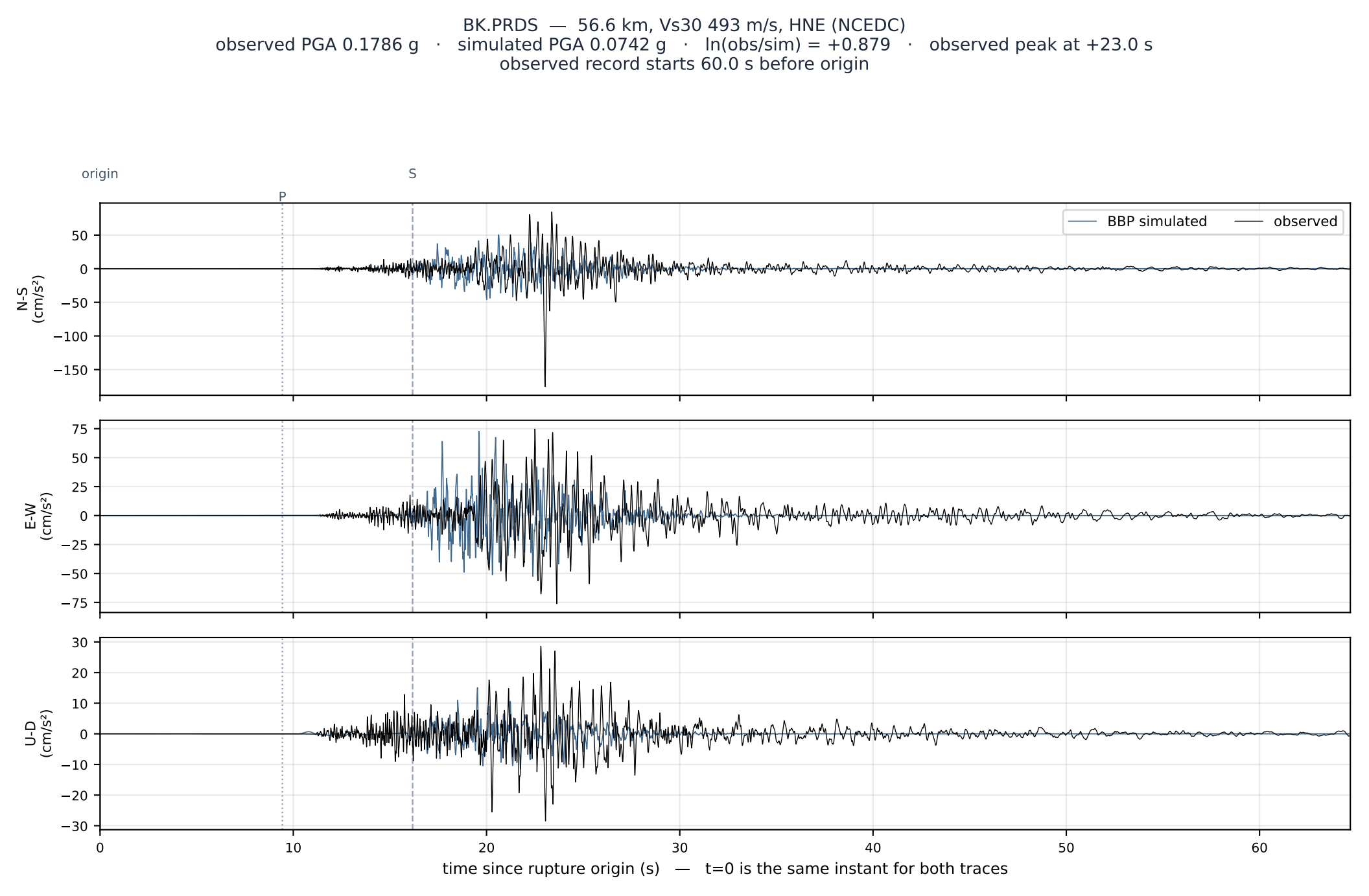

CE.89641 — 38.3 km, Vs30 290 m/s, HNE (NCEDC)
observed PGA 0.3021 g · simulated PGA 0.2068 g · ln(obs/sim) = +0.379 · observed peak at +16.7 s
observed record starts 15.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

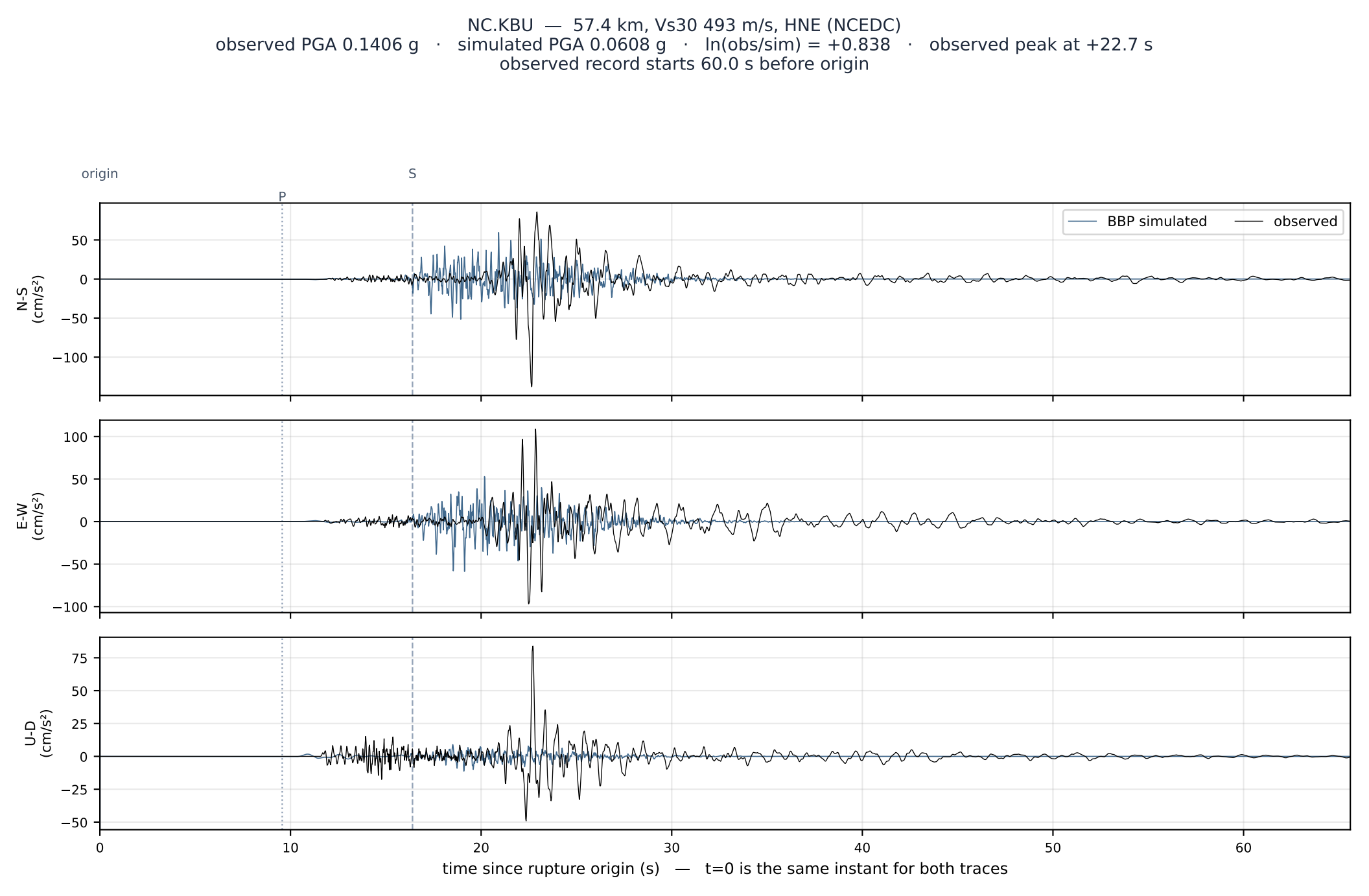

BK.BJES — 45.9 km, Vs30 744 m/s, HNE (NCEDC)
observed PGA 0.1238 g · simulated PGA 0.0723 g · ln(obs/sim) = +0.538 · observed peak at +17.6 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

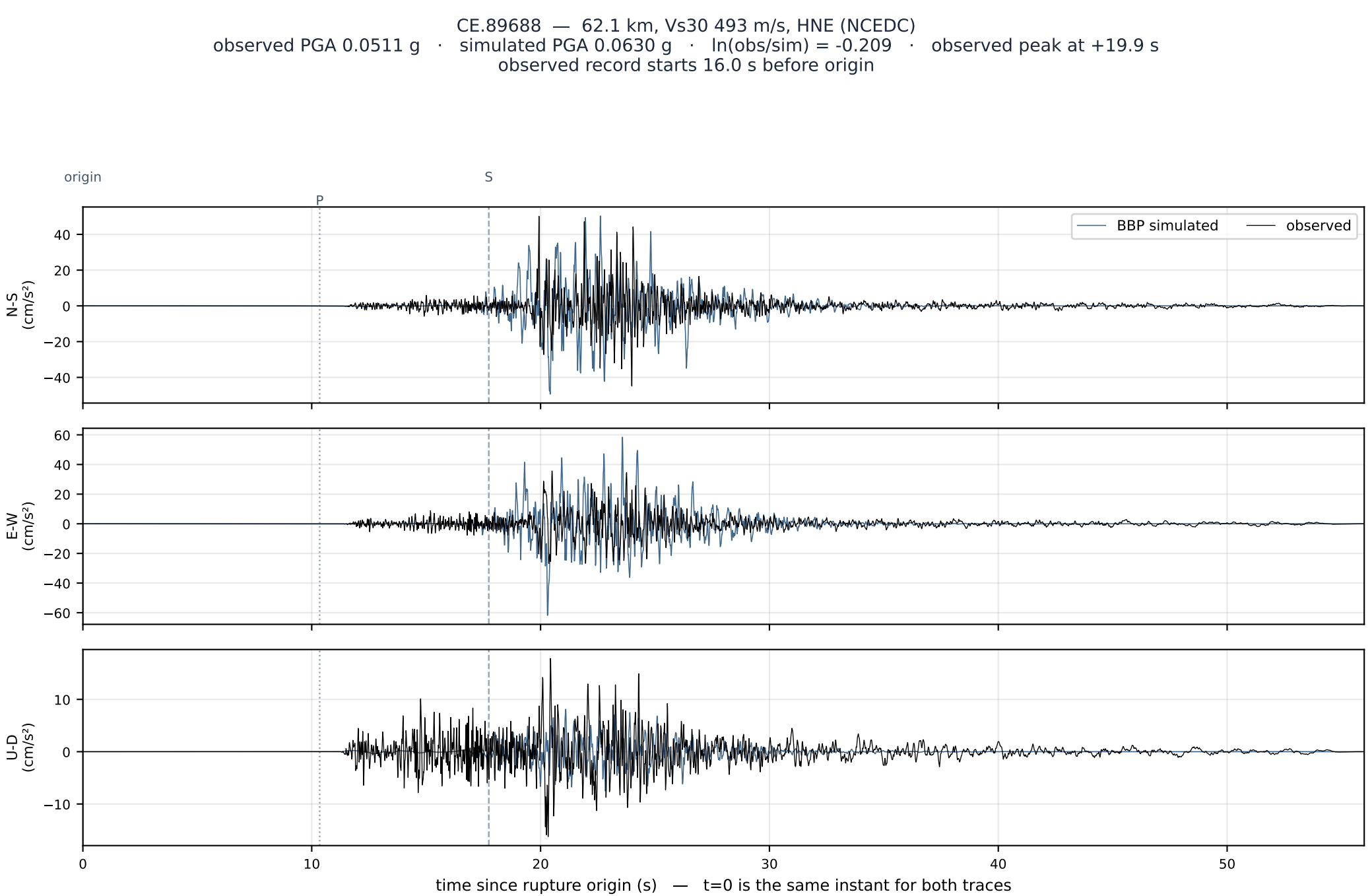

NC.KPR — 46.0 km, Vs30 492 m/s, HNE (NCEDC)
observed PGA 0.1397 g · simulated PGA 0.0900 g · ln(obs/sim) = +0.440 · observed peak at +20.9 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

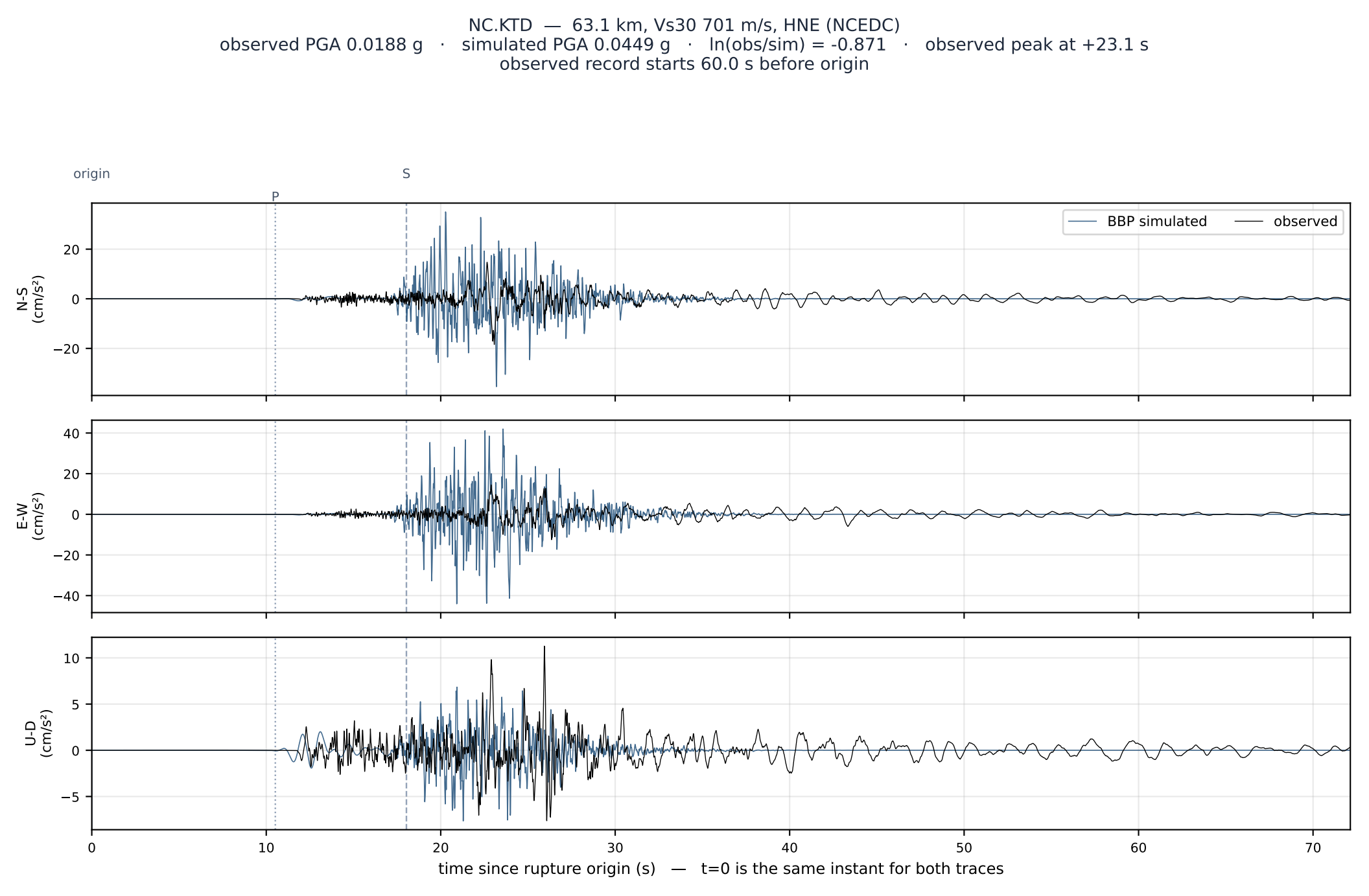

BK.KNEE — 48.9 km, Vs30 730 m/s, HNE (NCEDC)
observed PGA 0.1644 g · simulated PGA 0.0583 g · ln(obs/sim) = +1.037 · observed peak at +20.0 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

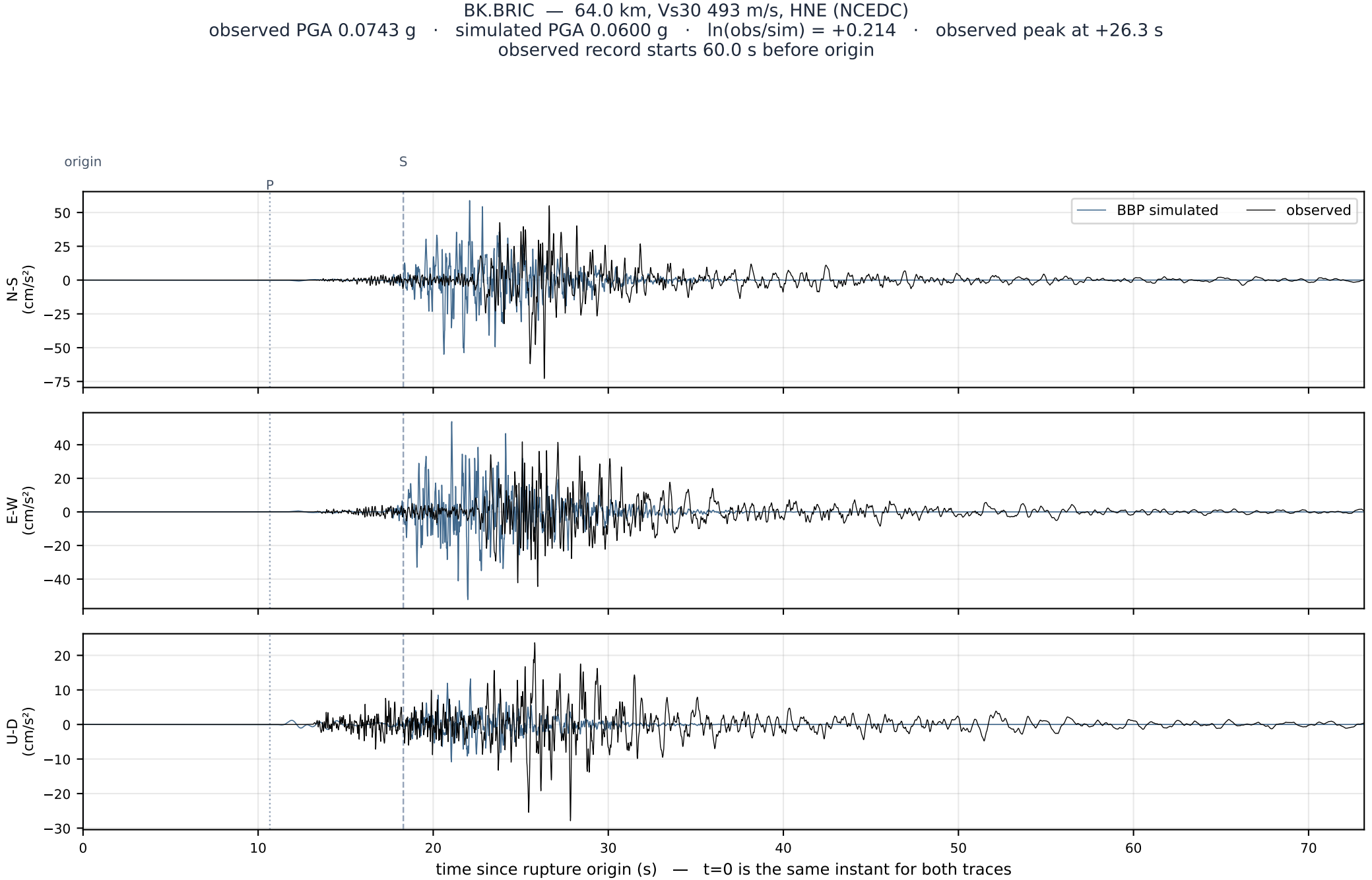

NC.KCR — 52.1 km, Vs30 715 m/s, HNE (NCEDC)
observed PGA 0.0586 g · simulated PGA 0.0563 g · ln(obs/sim) = +0.040 · observed peak at +20.7 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

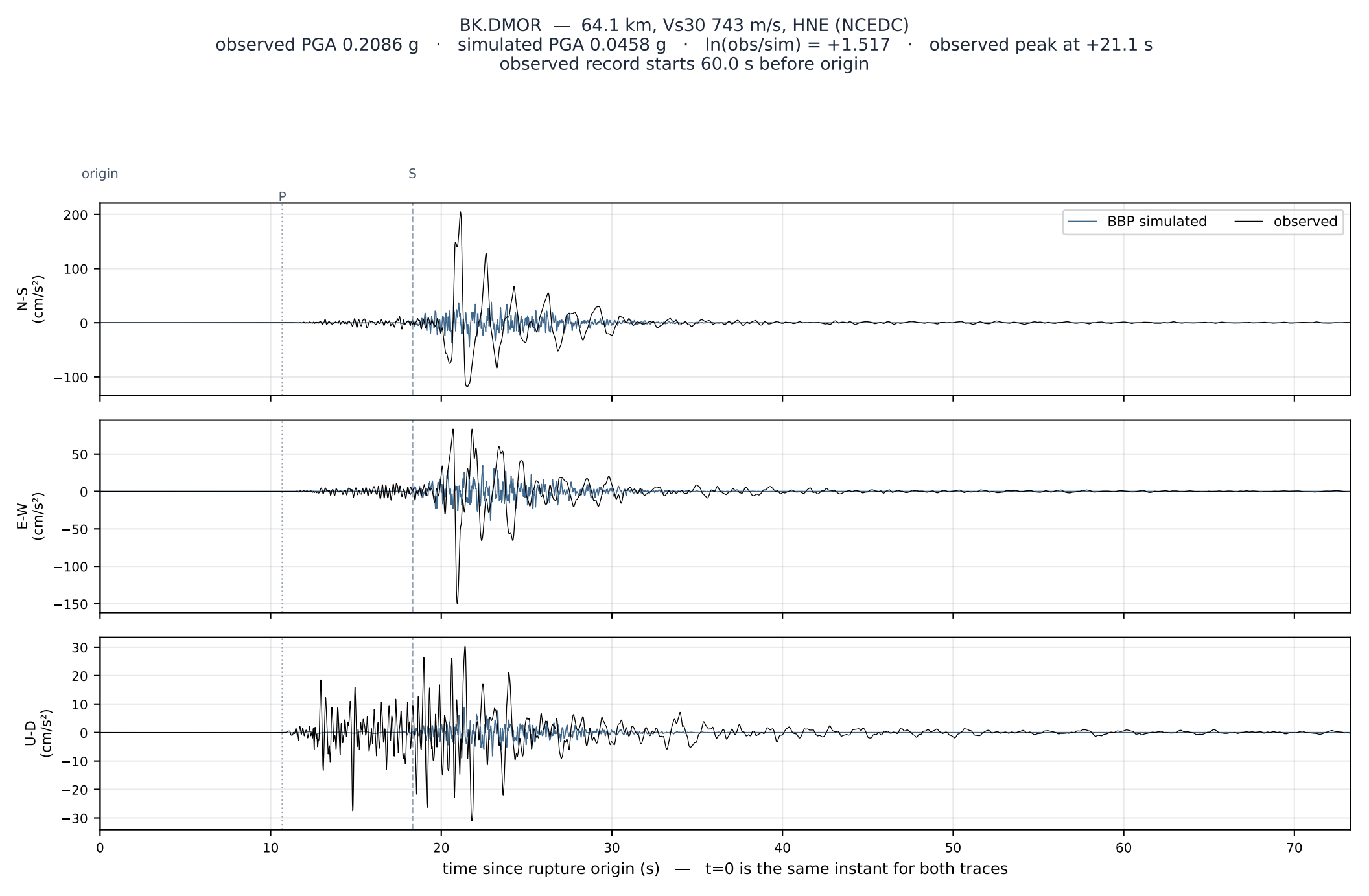

BK.PRDS — 56.6 km, Vs30 493 m/s, HNE (NCEDC)
observed PGA 0.1786 g · simulated PGA 0.0742 g · ln(obs/sim) = +0.879 · observed peak at +23.0 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

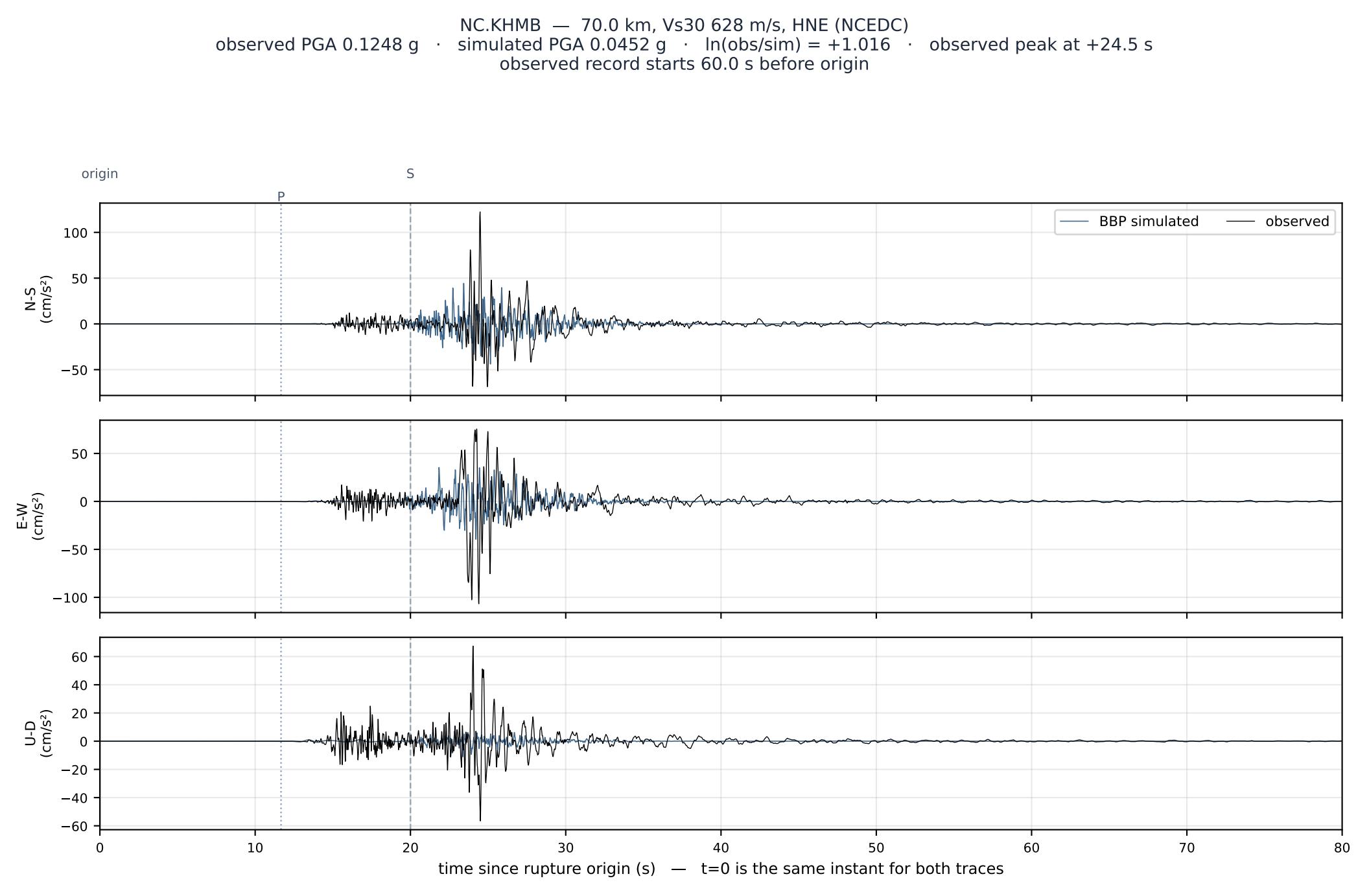

NC.KBU — 57.4 km, Vs30 493 m/s, HNE (NCEDC)
observed PGA 0.1406 g · simulated PGA 0.0608 g · ln(obs/sim) = +0.838 · observed peak at +22.7 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

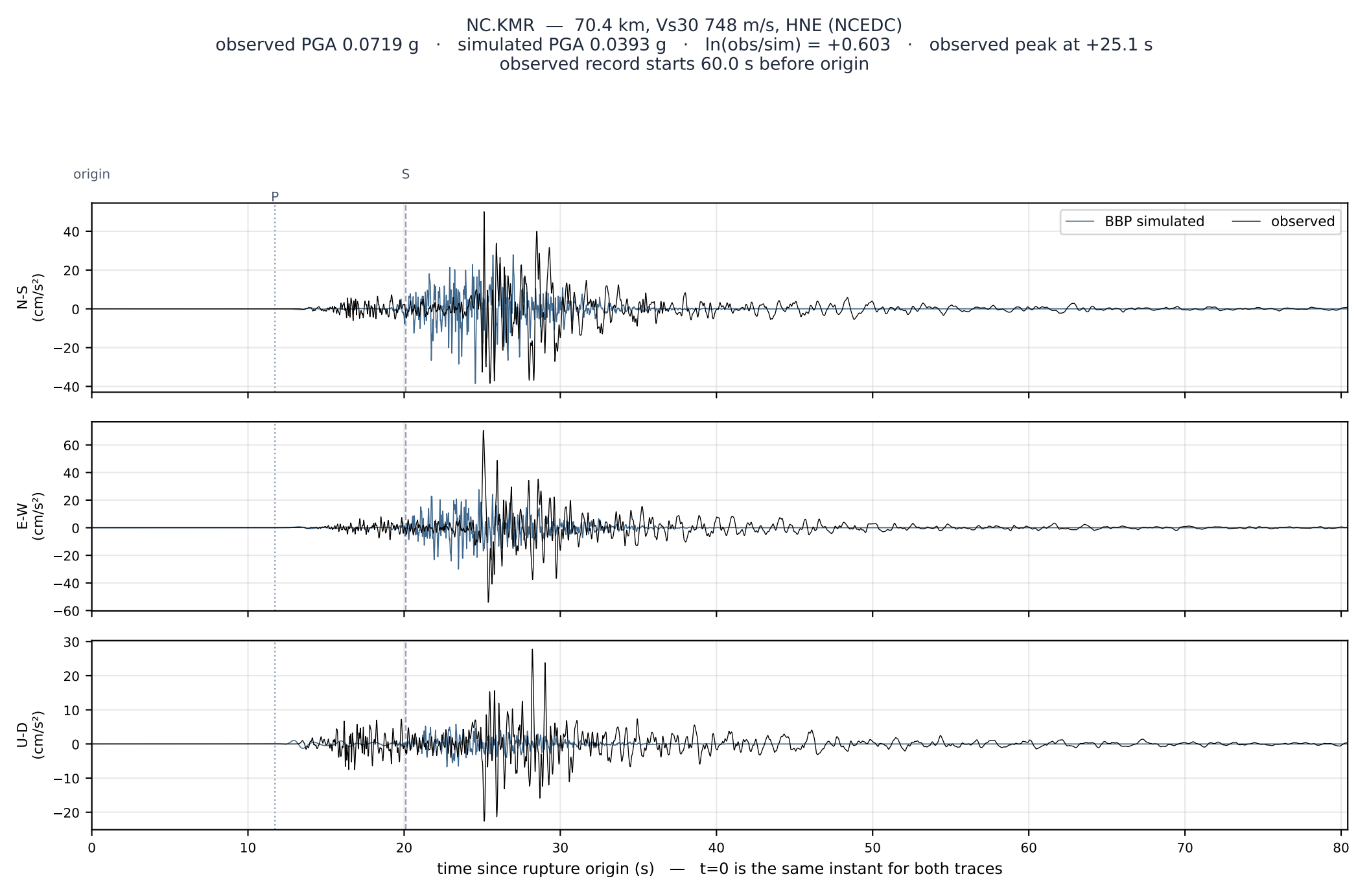

CE.89688 — 62.1 km, Vs30 493 m/s, HNE (NCEDC)
observed PGA 0.0511 g · simulated PGA 0.0630 g · ln(obs/sim) = -0.209 · observed peak at +19.9 s
observed record starts 16.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

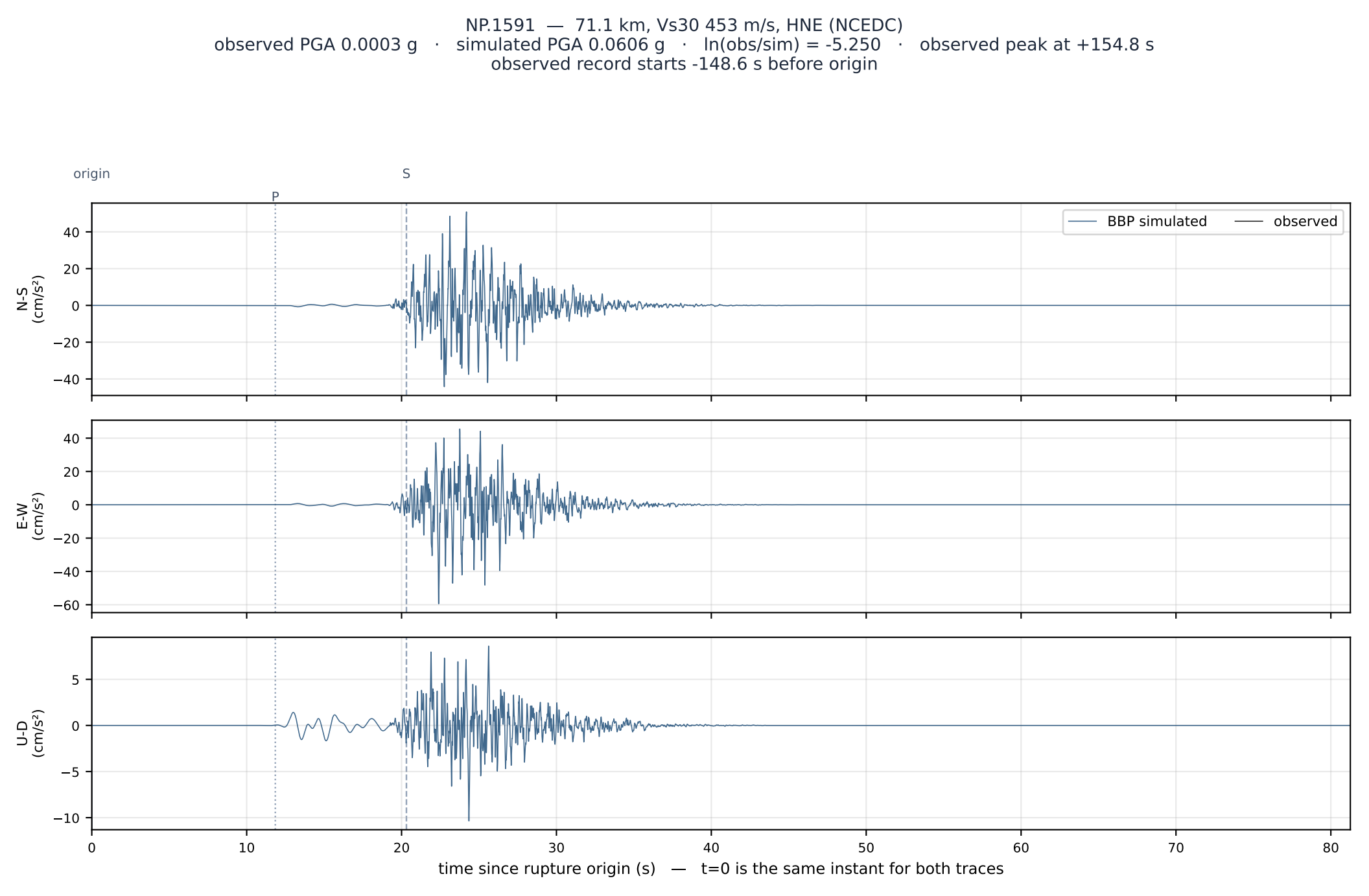

NC.KTD — 63.1 km, Vs30 701 m/s, HNE (NCEDC)
observed PGA 0.0188 g · simulated PGA 0.0449 g · ln(obs/sim) = -0.871 · observed peak at +23.1 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

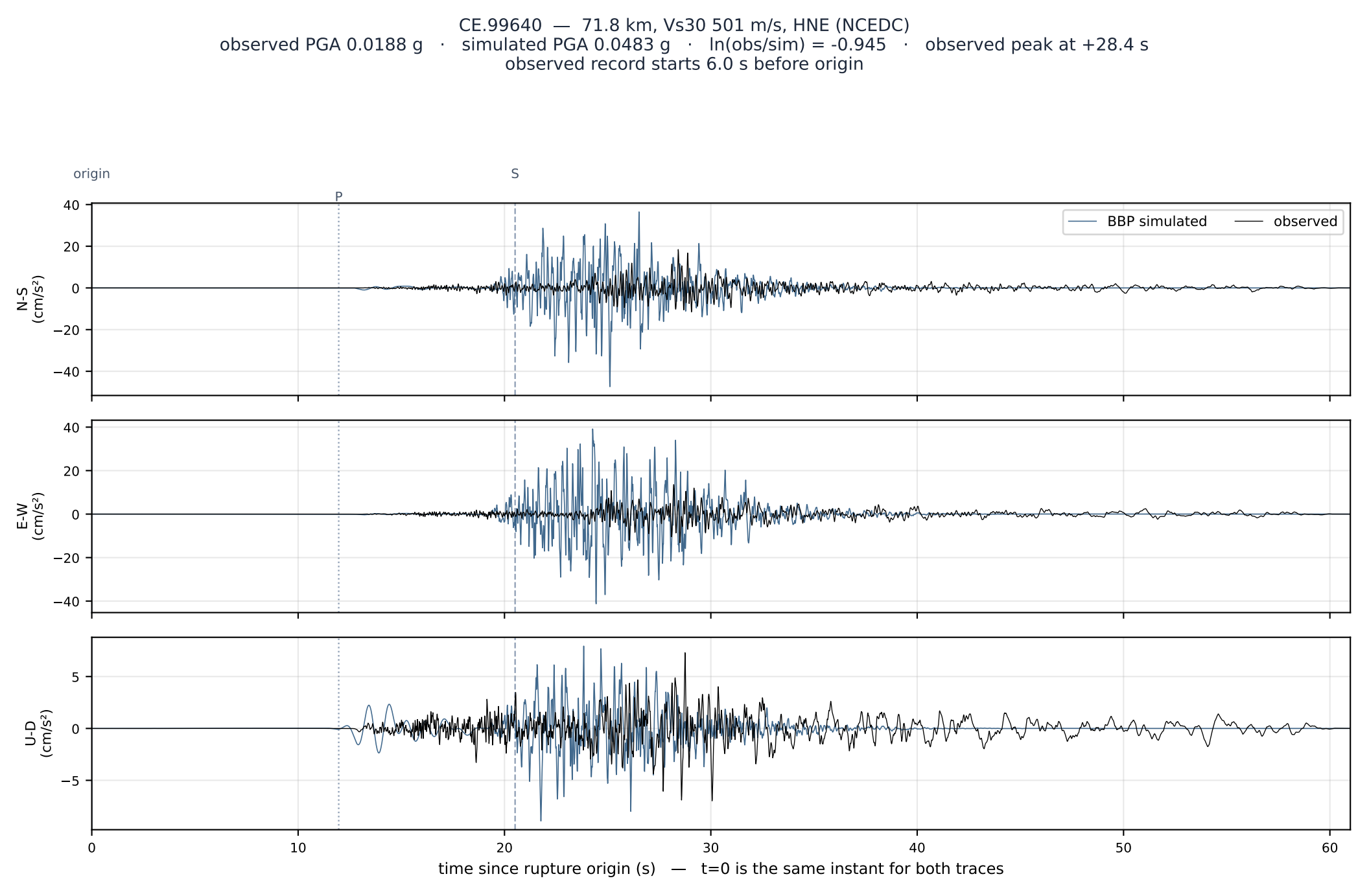

BK.BRIC — 64.0 km, Vs30 493 m/s, HNE (NCEDC)
observed PGA 0.0743 g · simulated PGA 0.0600 g · ln(obs/sim) = +0.214 · observed peak at +26.3 s
observed record starts 60.0 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

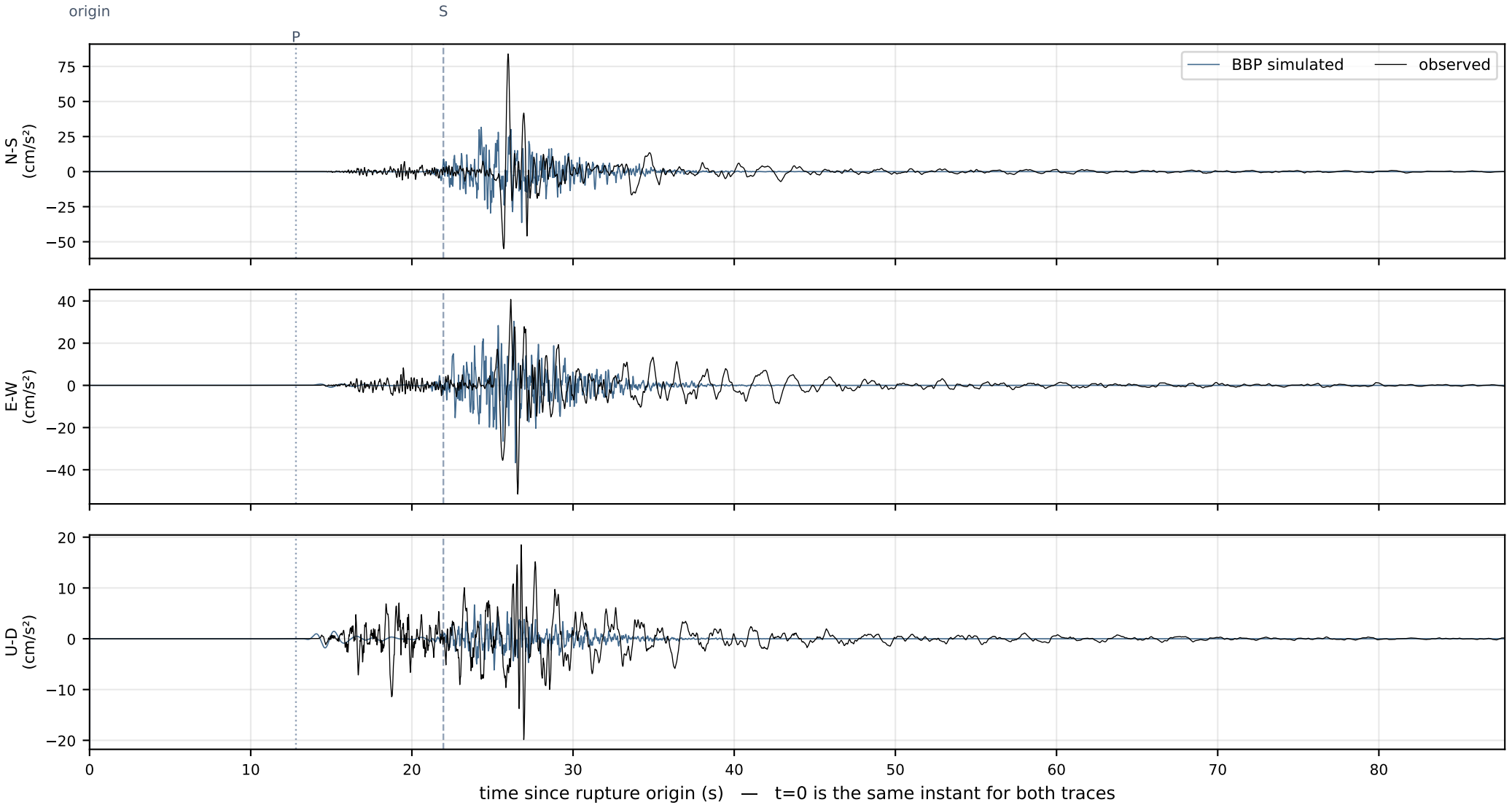

BK.DMOR — 64.1 km, Vs30 743 m/s, HNE (NCEDC)
observed PGA 0.2086 g · simulated PGA 0.0458 g · ln(obs/sim) = +1.517 · observed peak at +21.1 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

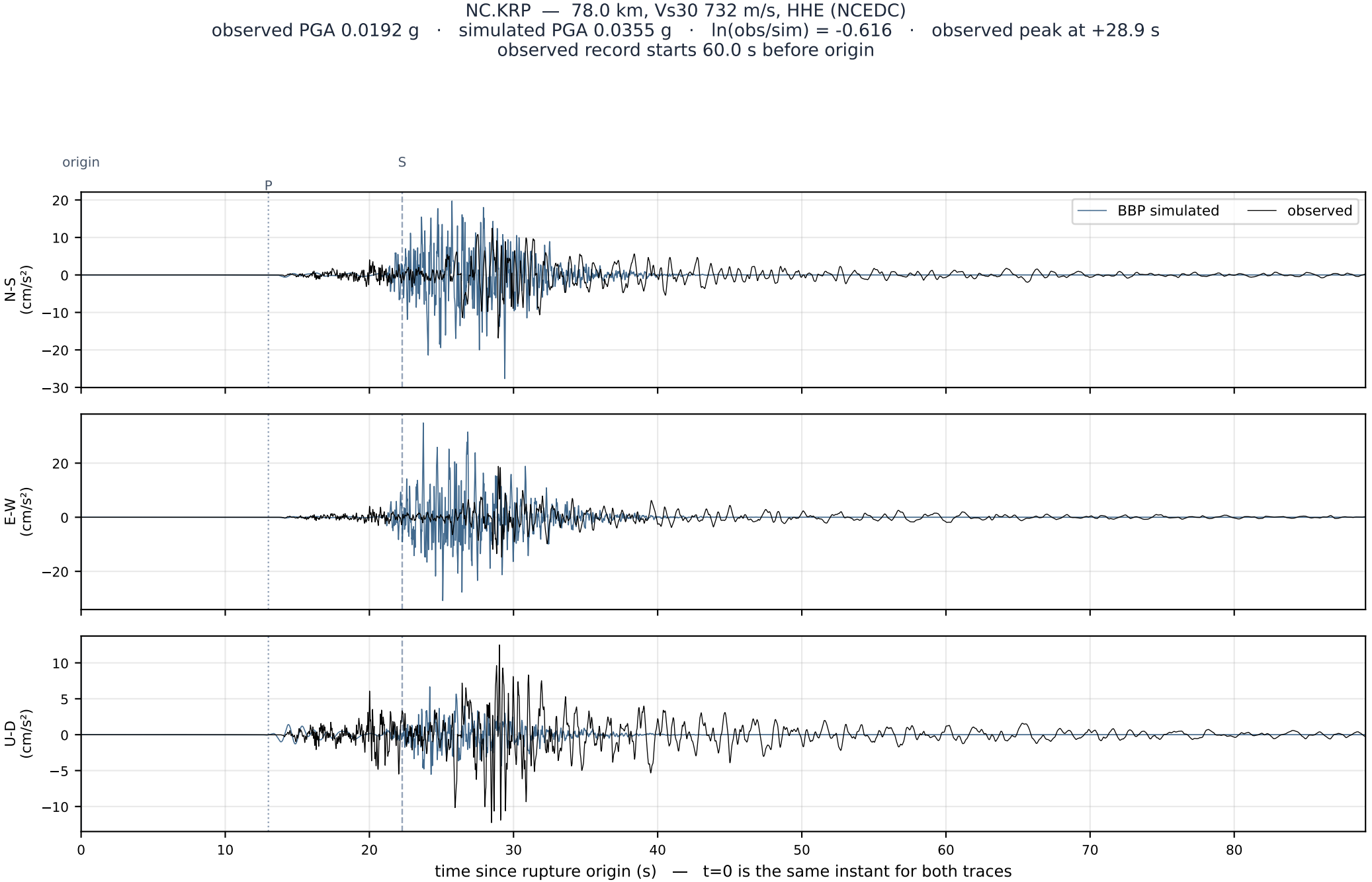

NC.KHMB — 70.0 km, Vs30 628 m/s, HNE (NCEDC)
observed PGA 0.1248 g · simulated PGA 0.0452 g · ln(obs/sim) = +1.016 · observed peak at +24.5 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

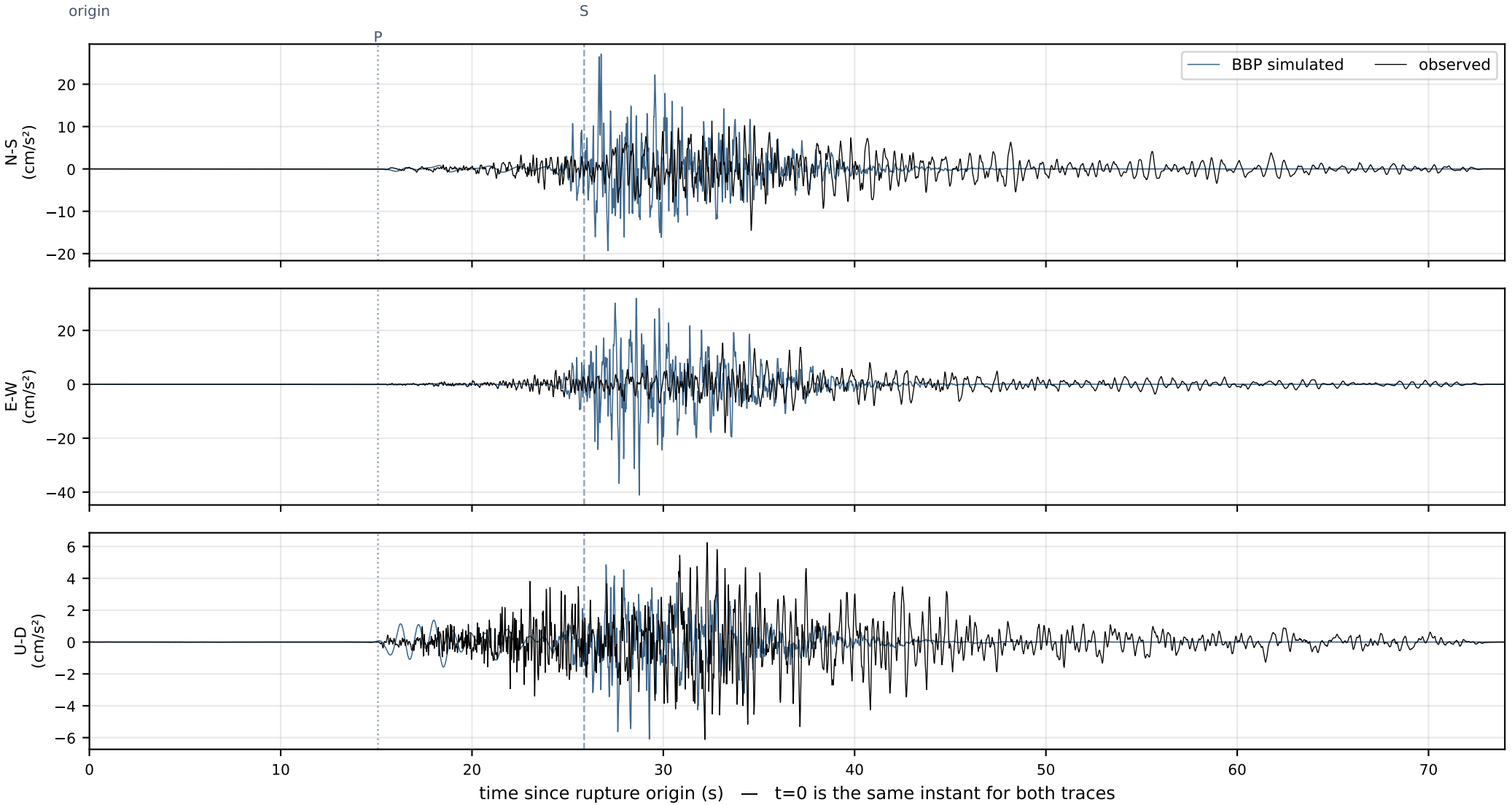

NC.KMR — 70.4 km, Vs30 748 m/s, HNE (NCEDC)
observed PGA 0.0719 g · simulated PGA 0.0393 g · ln(obs/sim) = +0.603 · observed peak at +25.1 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces


NP.1591 — 71.1 km, Vs30 453 m/s, HNE (NCEDC)
observed PGA 0.0003 g · simulated PGA 0.0606 g · ln(obs/sim) = -5.250 · observed peak at +154.8 s
observed record starts -148.6 s before origin
origin
S
P
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces


CE.99640 — 71.8 km, Vs30 501 m/s, HNE (NCEDC)
observed PGA 0.0188 g · simulated PGA 0.0483 g · ln(obs/sim) = -0.945 · observed peak at +28.4 s
observed record starts 6.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces


NC.KCSB — 76.8 km, Vs30 749 m/s, HNE (NCEDC)
observed PGA 0.0856 g · simulated PGA 0.0374 g · ln(obs/sim) = +0.828 · observed peak at +26.0 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces


NC.KRP — 78.0 km, Vs30 732 m/s, HHE (NCEDC)
observed PGA 0.0192 g · simulated PGA 0.0355 g · ln(obs/sim) = -0.616 · observed peak at +28.9 s
observed record starts 60.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces


CE.99700 — 90.5 km, Vs30 524 m/s, HNE (NCEDC)
observed PGA 0.0183 g · simulated PGA 0.0419 g · ln(obs/sim) = -0.828 · observed peak at +33.2 s
observed record starts 3.0 s before origin
origin
P
S
BBP simulated
observed
N-S (cm/s²)
E-W (cm/s²)
U-D (cm/s²)
time since rupture origin (s) — t=0 is the same instant for both traces

Animation input — displacement

the time series the Blender scenes render, per station

WHAT THESE PAGES SHOW

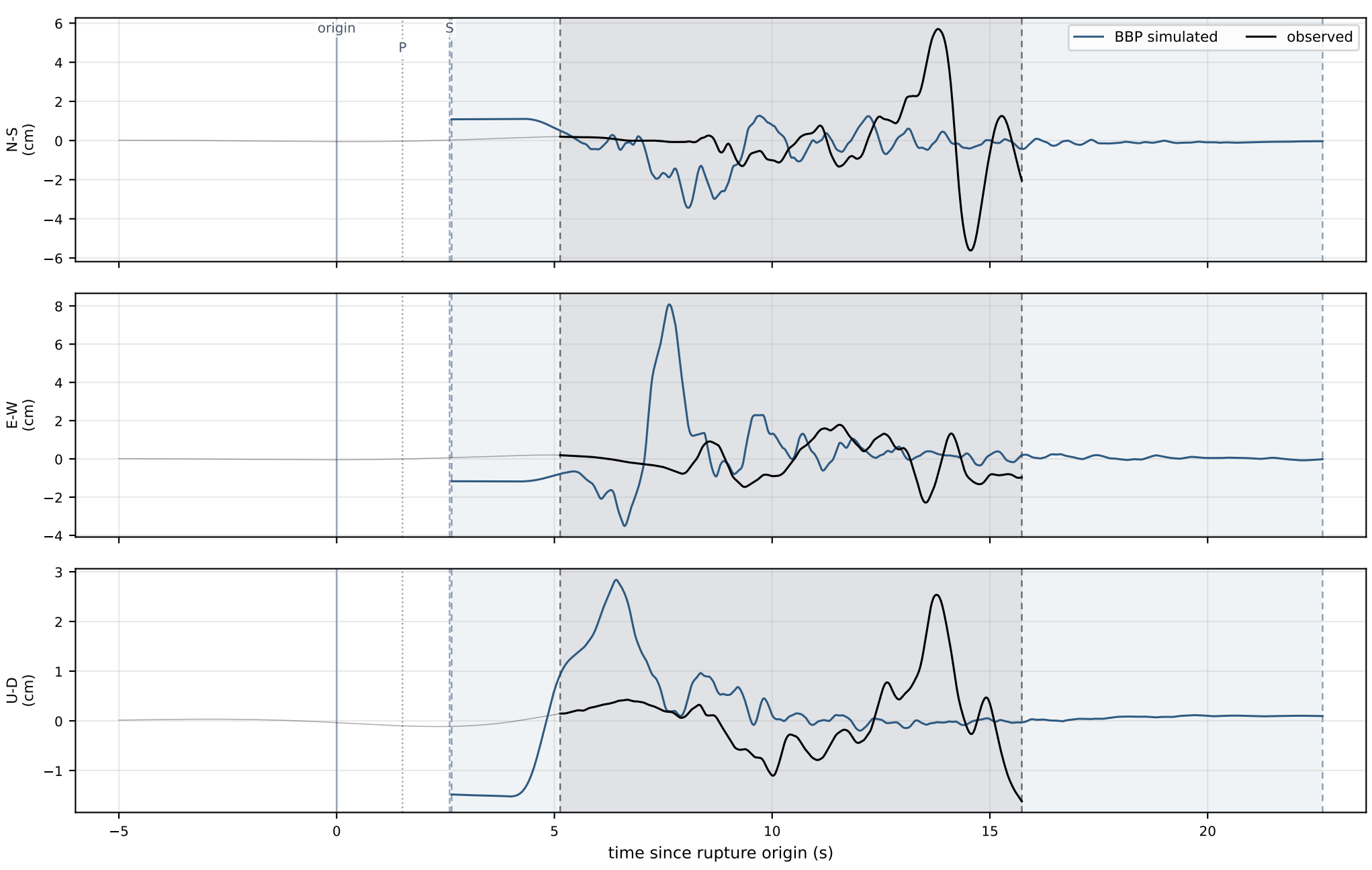
	The displacement time series handed to the Blender scene for each station: the array in the .npy file passed as --displacement-file. Everything earlier in this report concerns acceleration and response spectra, which is what goodness of fit is defined on. This is the quantity that becomes movement on 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.

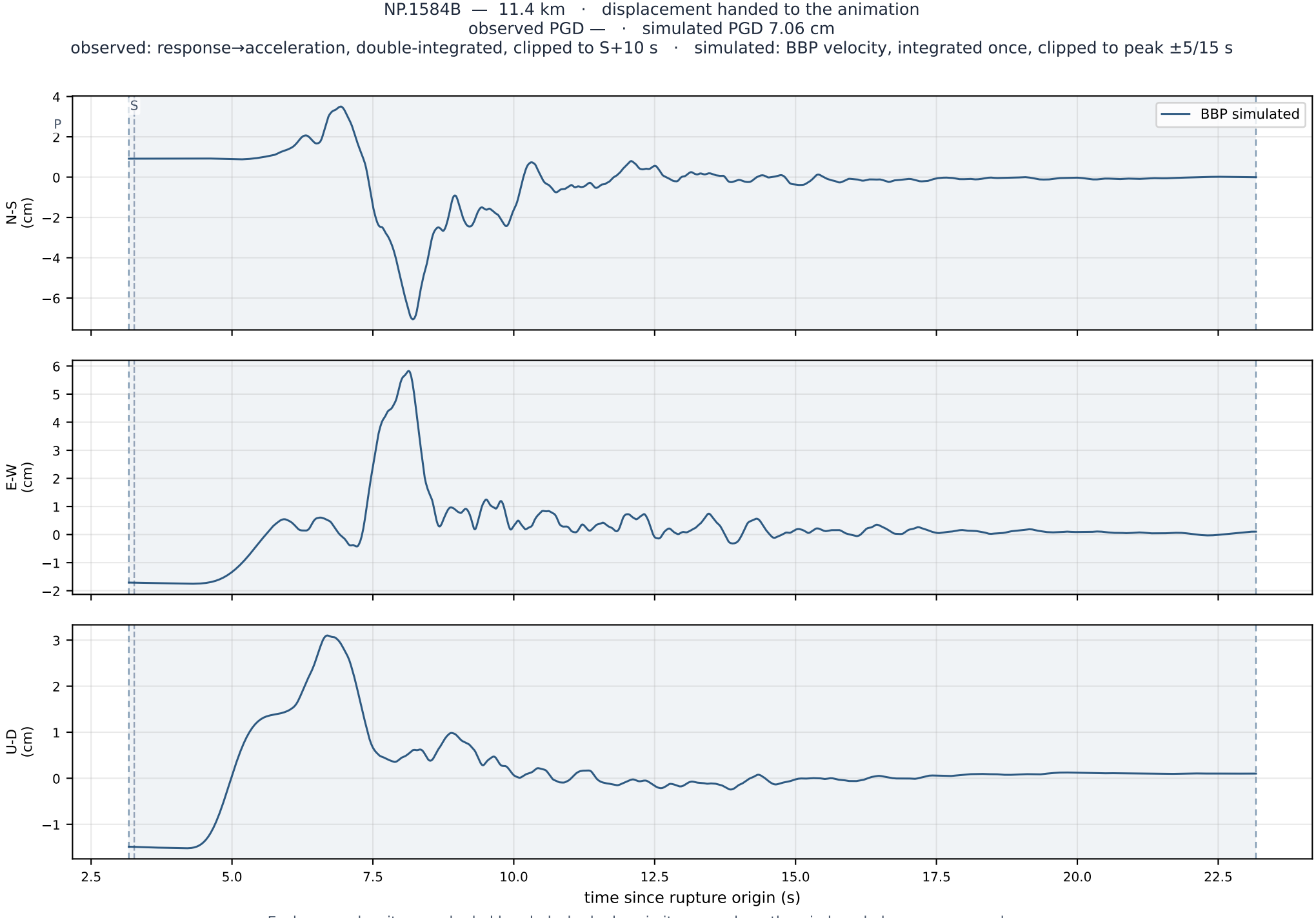
HOW TO READ A DISAGREEMENT

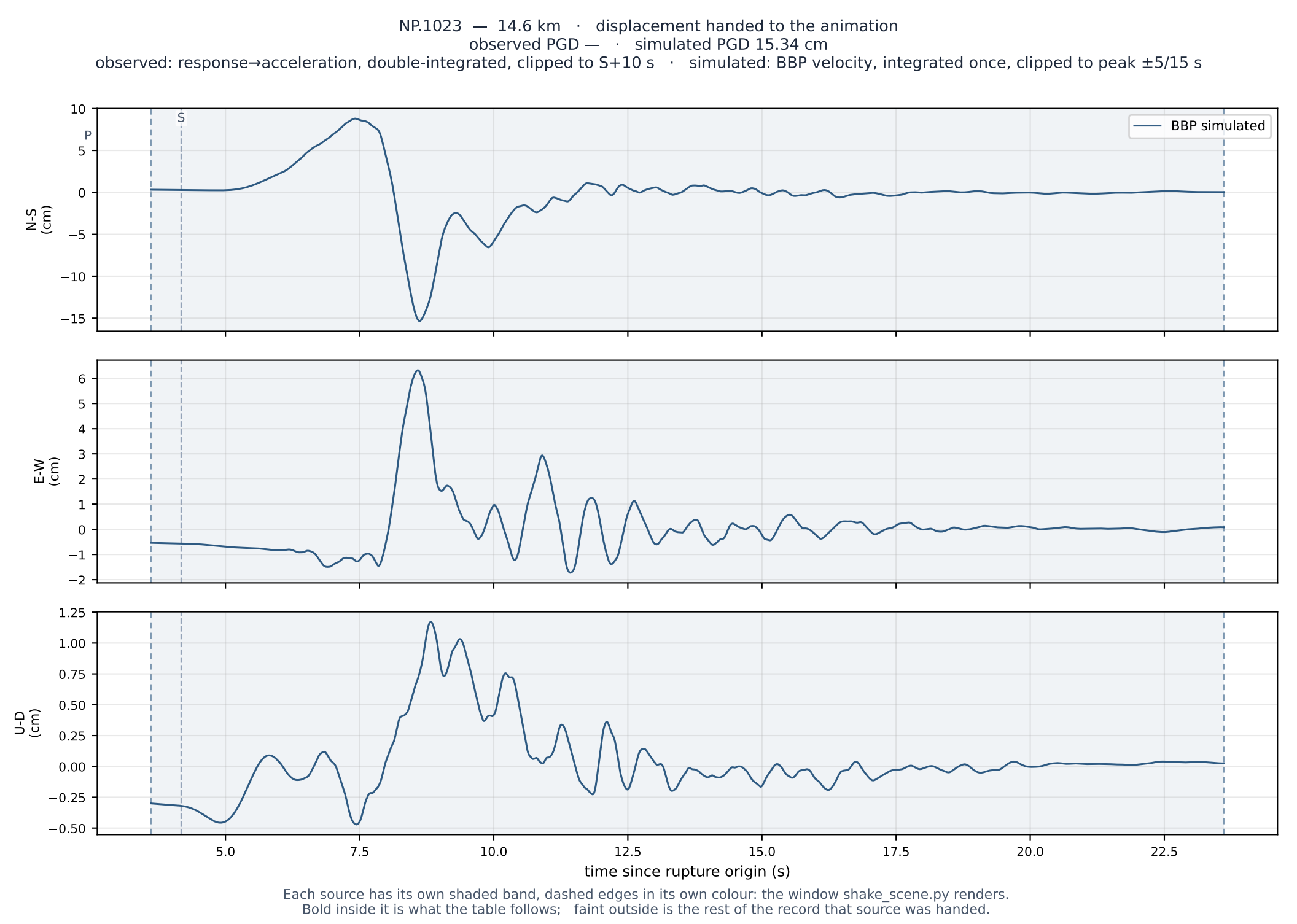
not a residual	The two traces come from different code over different windows, so a difference here is part processing and part physics and this page cannot separate them. The acceleration overlays and the spectra are where the model is judged.
what it does show	Whether the animation was driven by a 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.

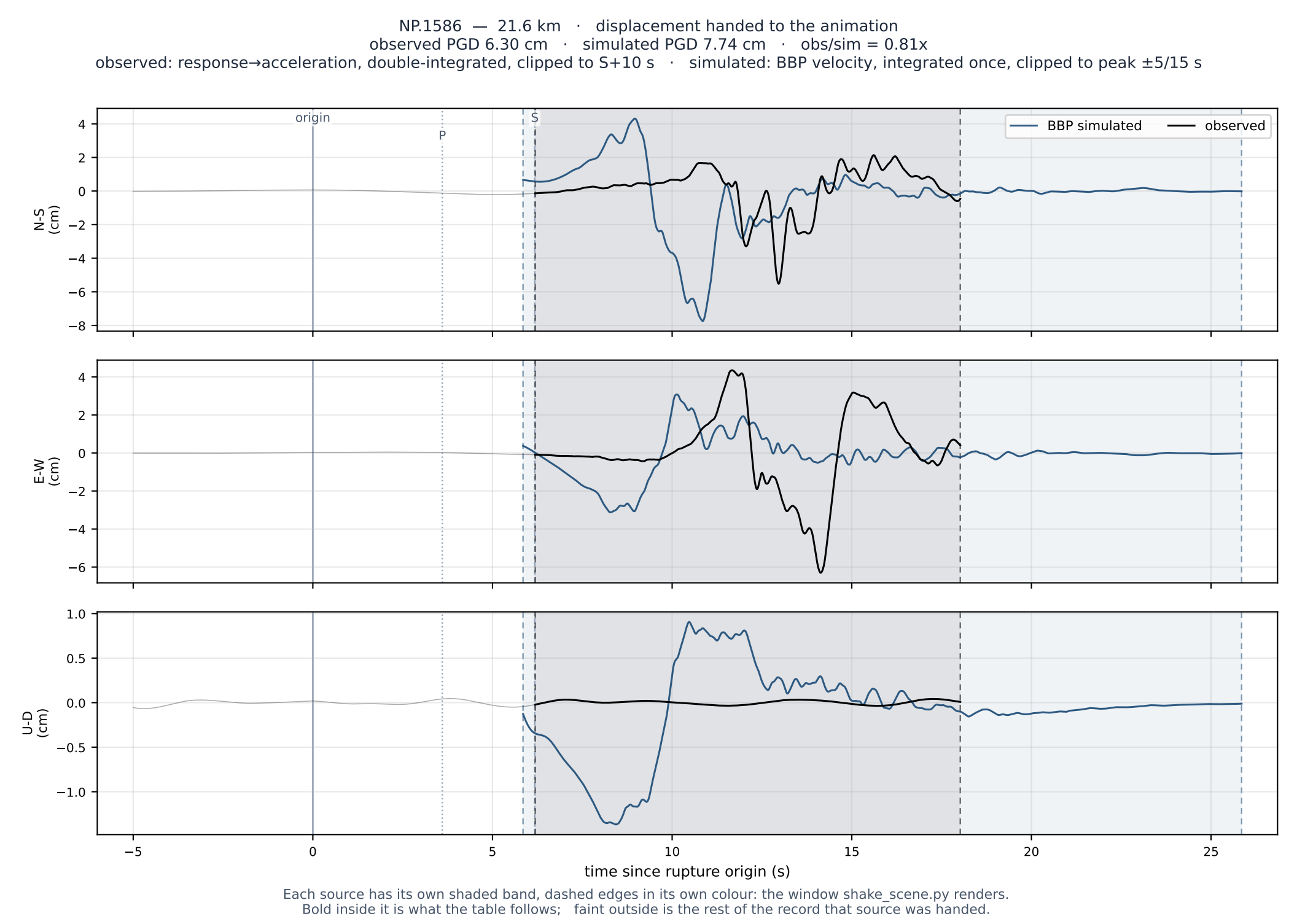
COVERAGE

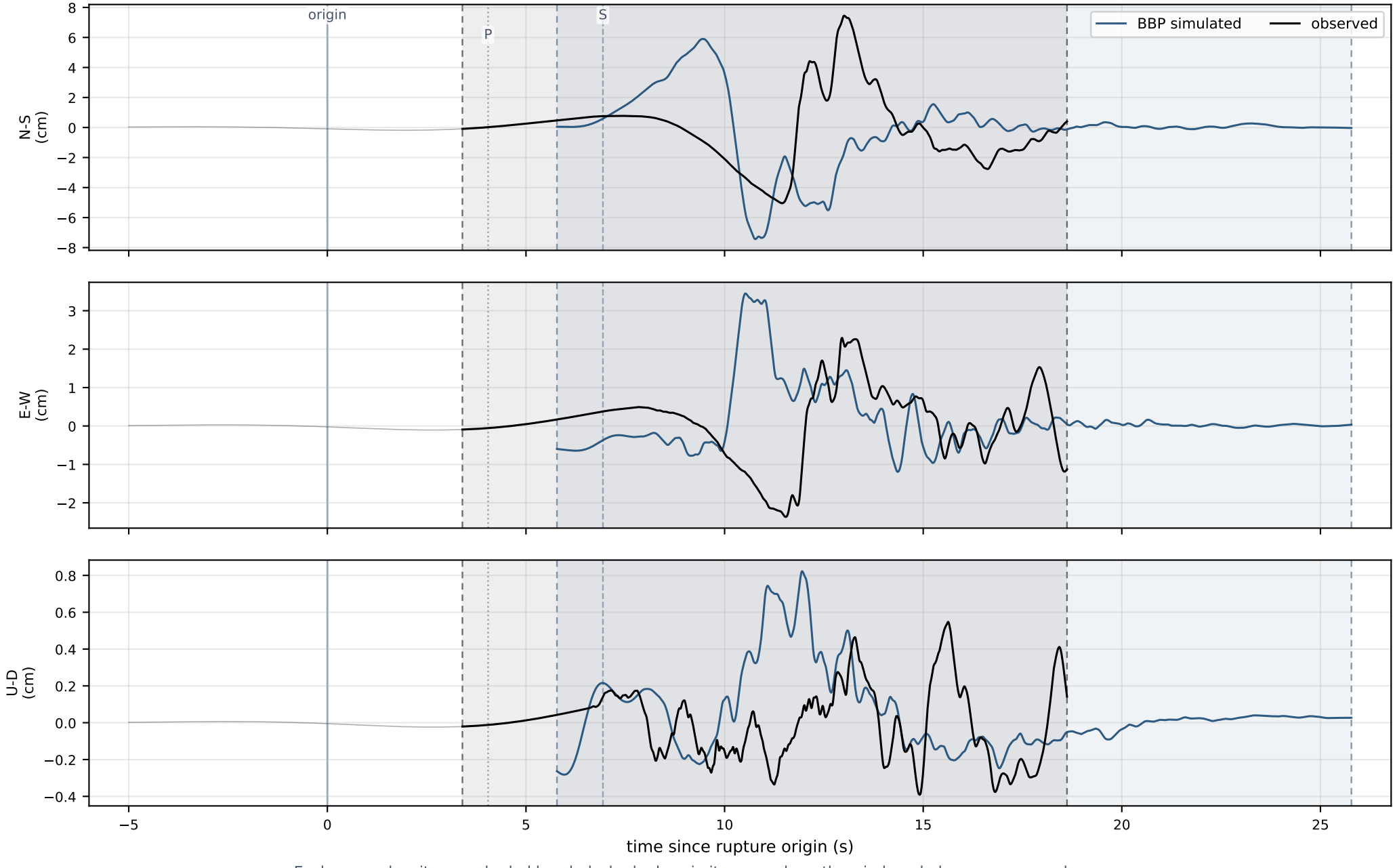
both records	27 station(s)
observed only	0 station(s)
simulated only	4 station(s)
PGD ratio	geometric mean observed/simulated = 1.28x
simulated source	BBP simulated

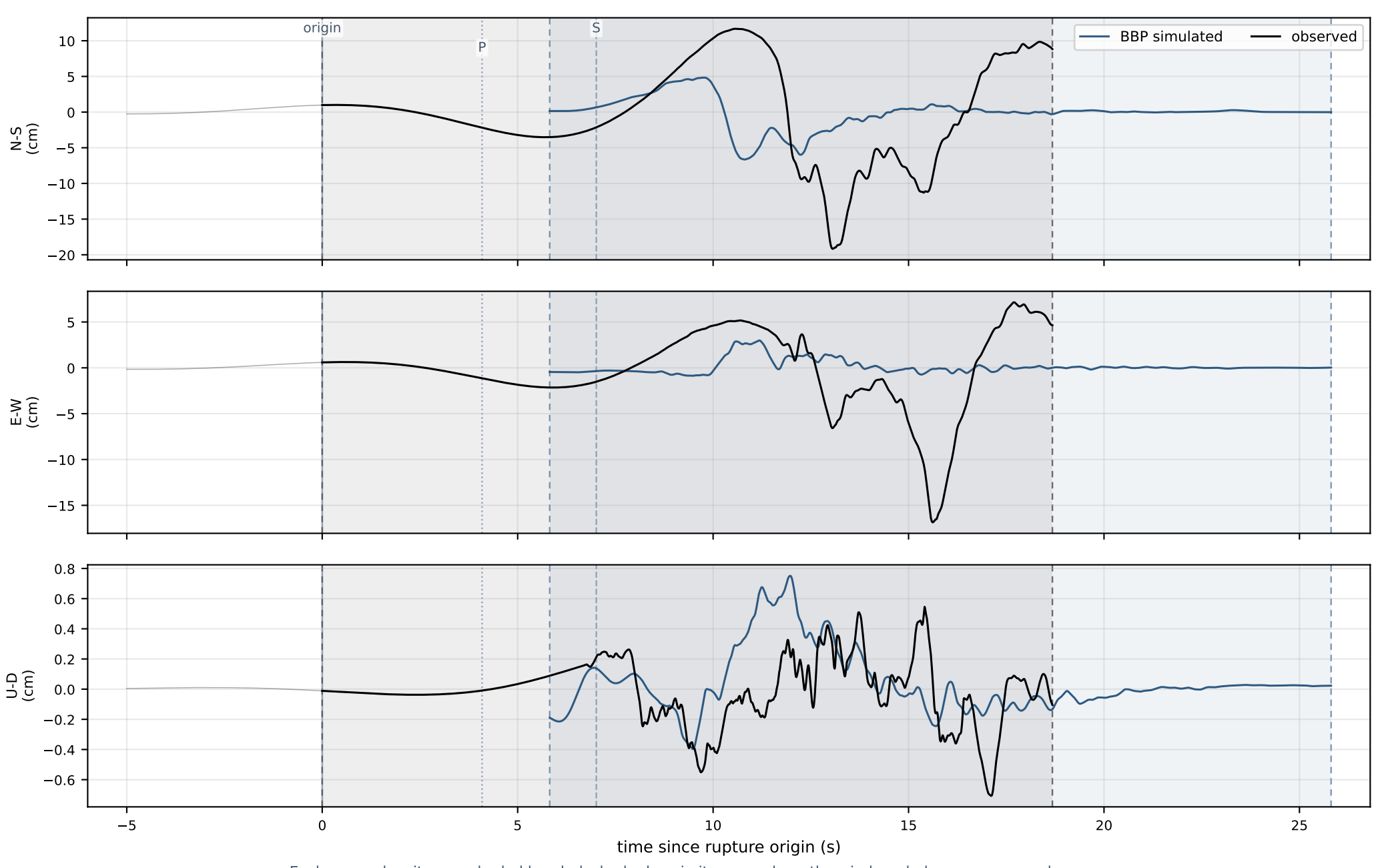

NC.KCT — 9.1 km · displacement handed to the animation
observed PGD 5.70 cm · simulated PGD 8.08 cm · obs/sim = 0.71x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

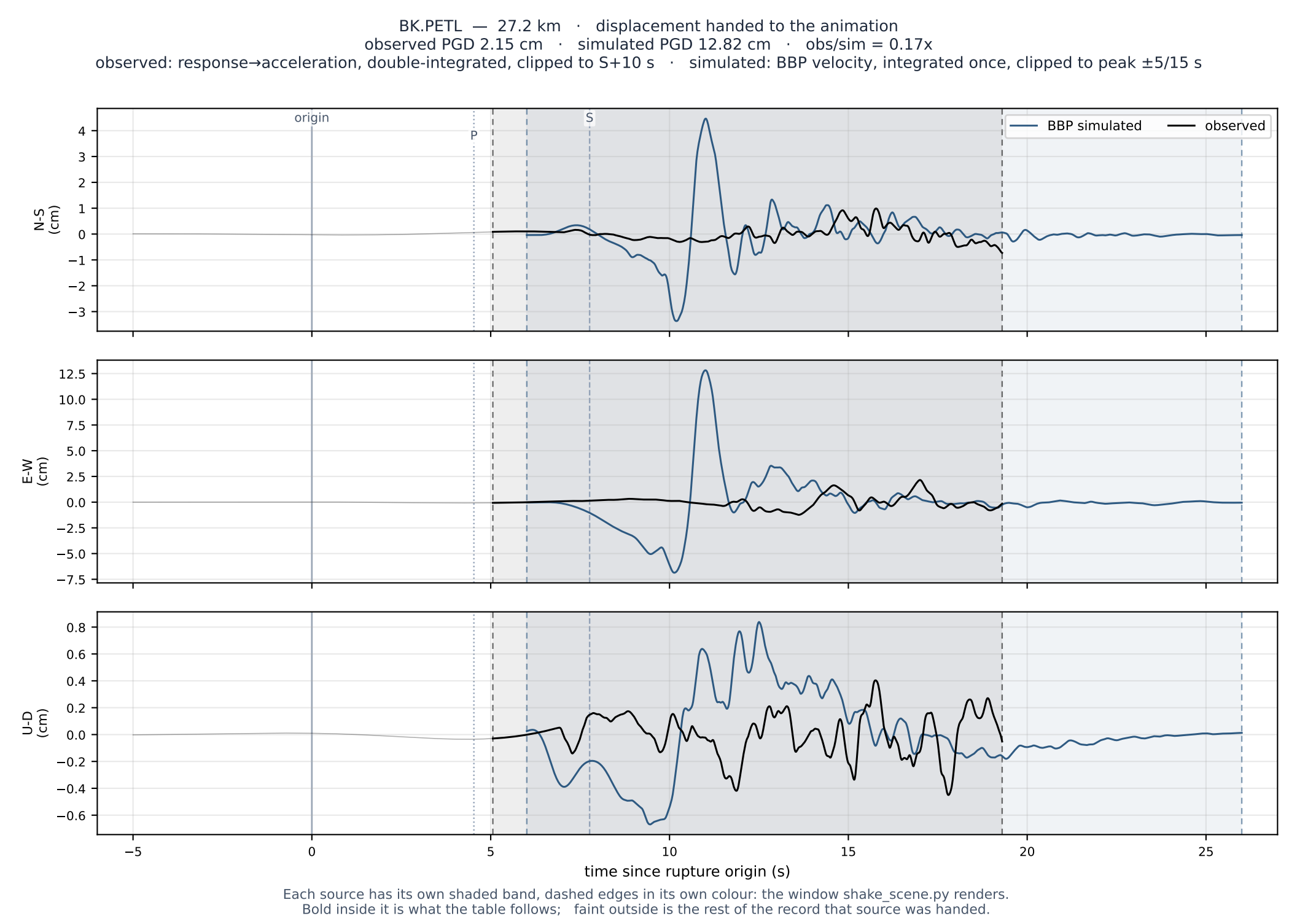

NP.1584B — 11.4 km · displacement handed to the animation
observed PGD — · simulated PGD 7.06 cm
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
BBP simulated
S
P
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

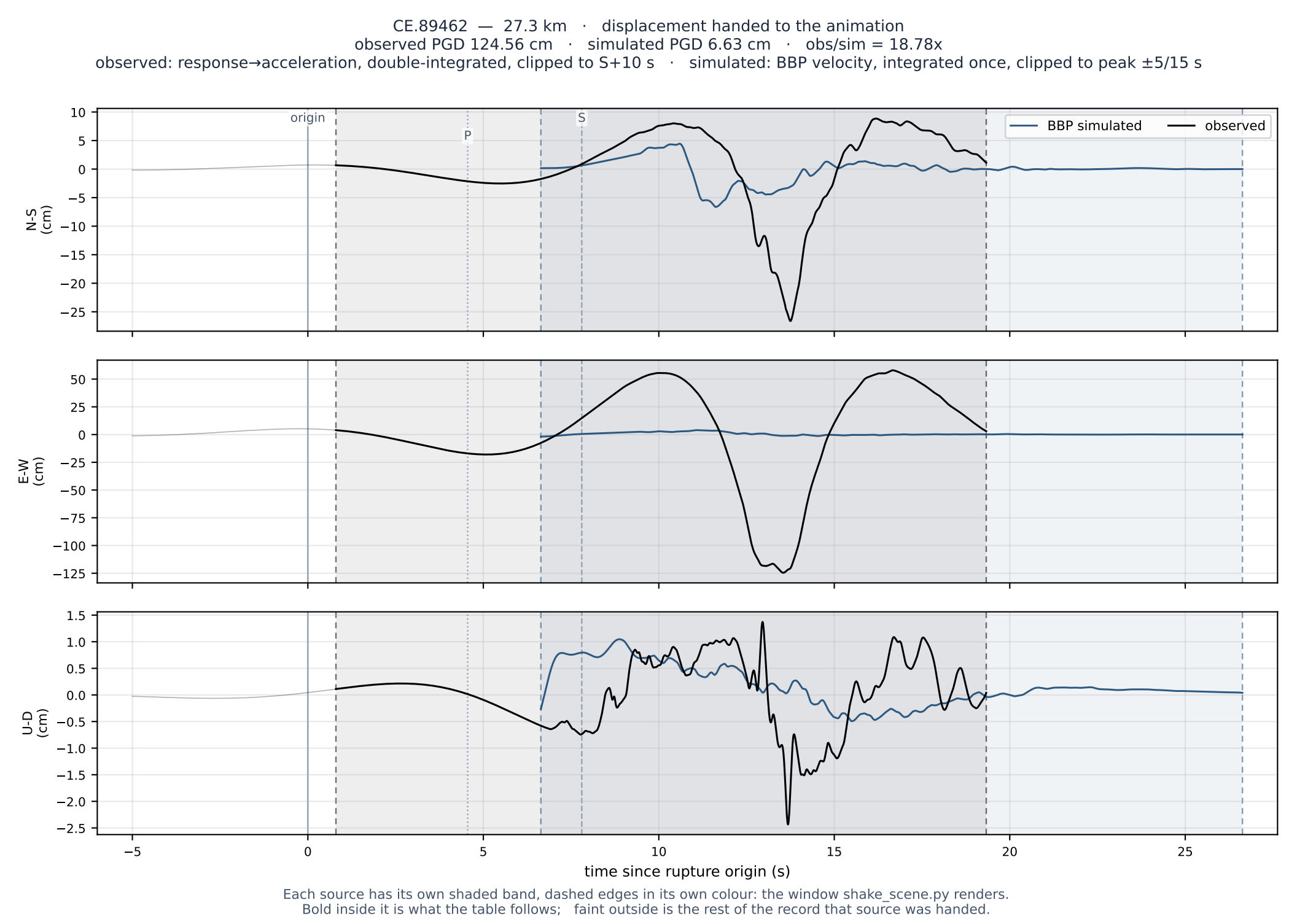

NP.1023 — 14.6 km · displacement handed to the animation
observed PGD — · simulated PGD 15.34 cm
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
BBP simulated
S
P
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

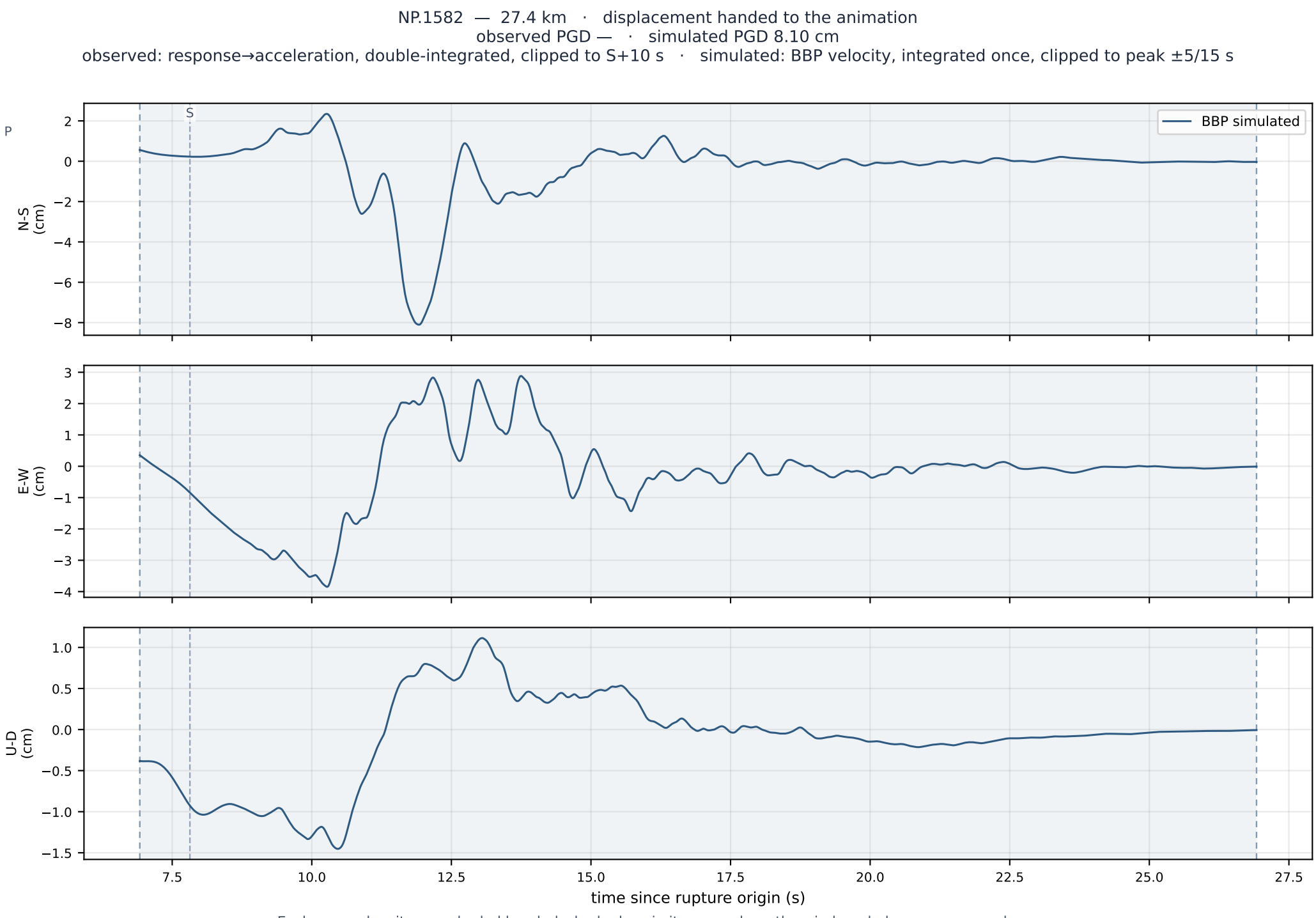

NP.1586 — 21.6 km · displacement handed to the animation
observed PGD 6.30 cm · simulated PGD 7.74 cm · obs/sim = 0.81x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

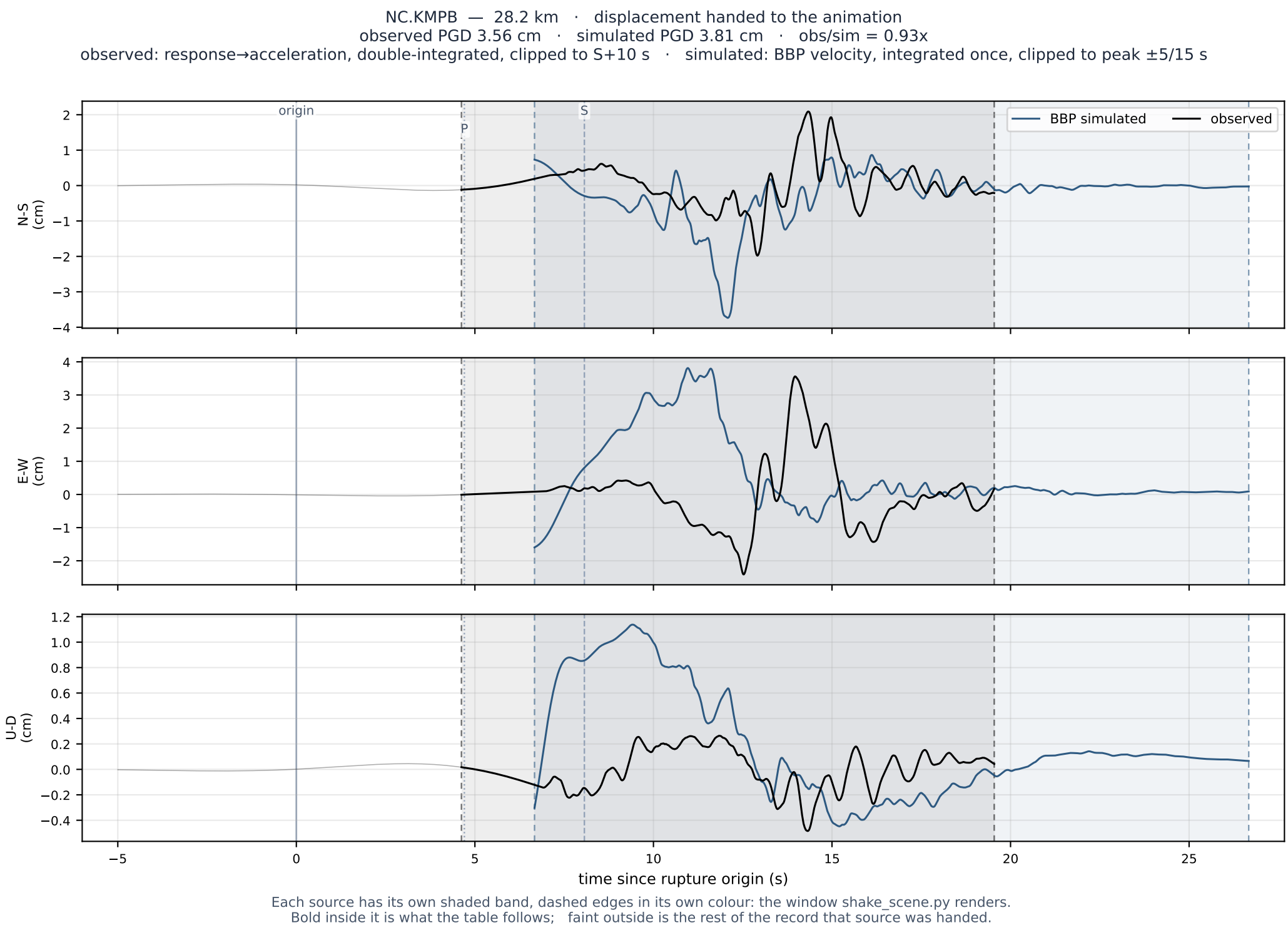

CE.89486 — 24.3 km · displacement handed to the animation
observed PGD 7.45 cm · simulated PGD 7.44 cm · obs/sim = 1.00x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

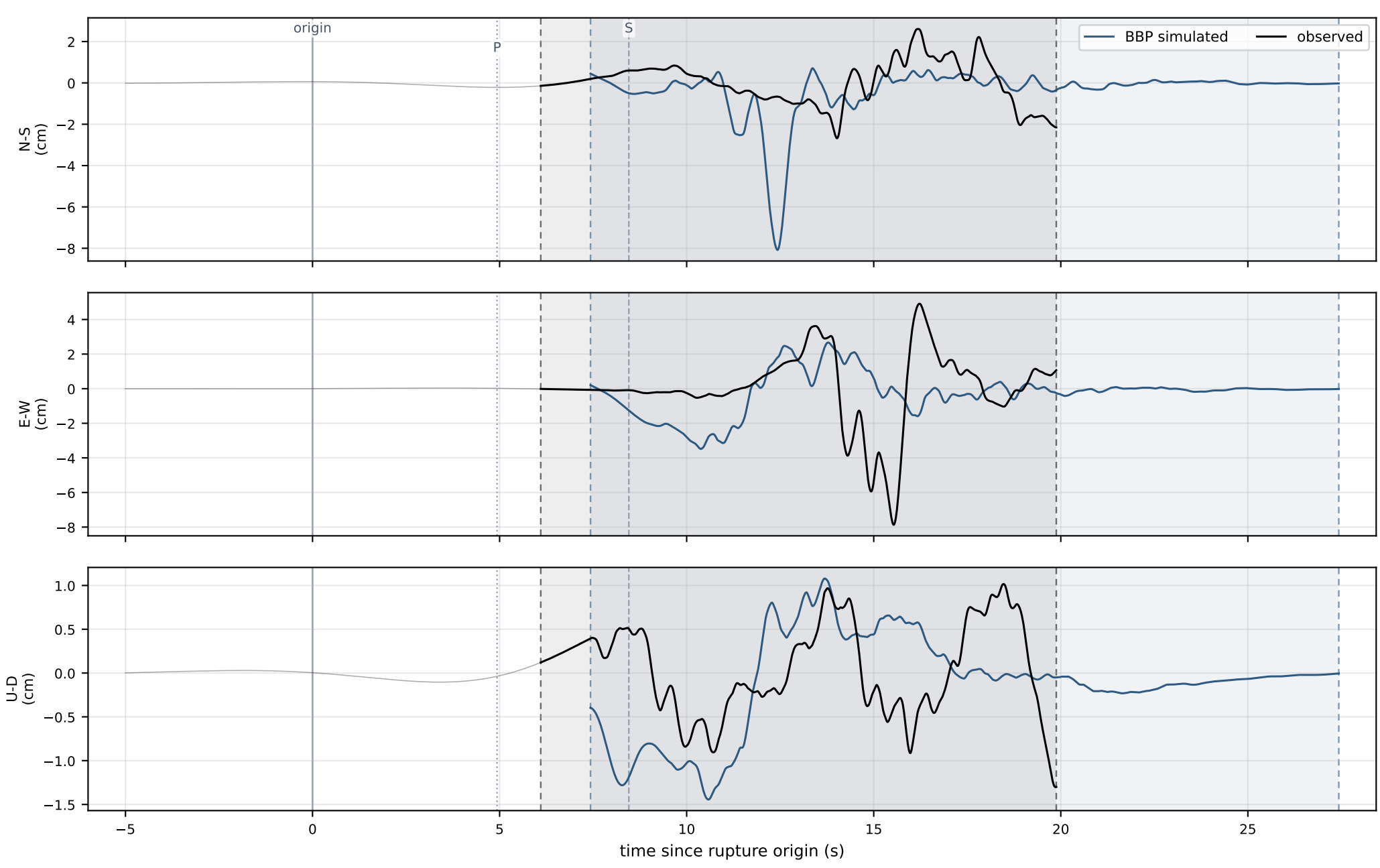

CE.89255 — 24.5 km · displacement handed to the animation
observed PGD 19.17 cm · simulated PGD 6.65 cm · obs/sim = 2.88x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

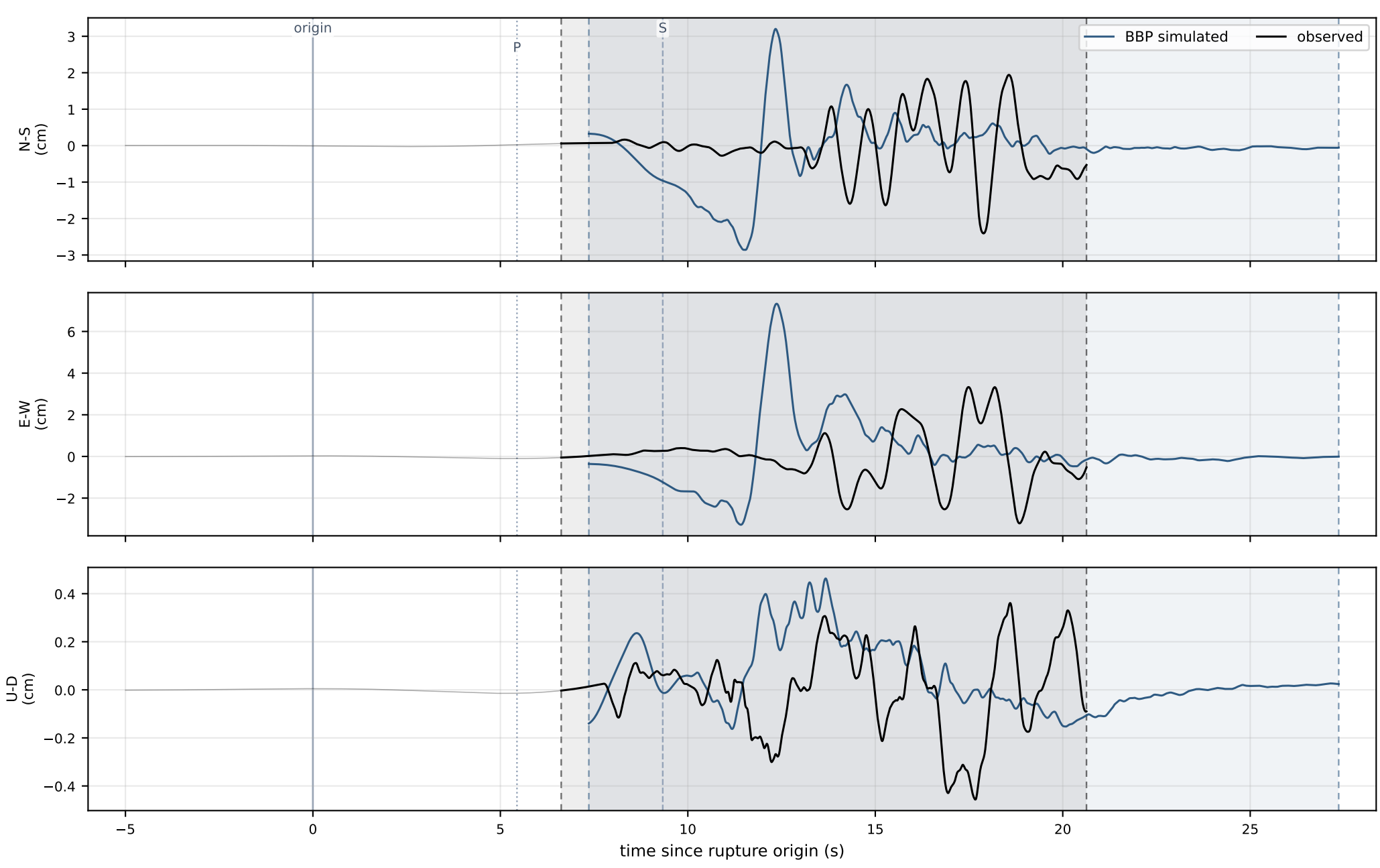

BK.PETL — 27.2 km · displacement handed to the animation
observed PGD 2.15 cm · simulated PGD 12.82 cm · obs/sim = 0.17x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

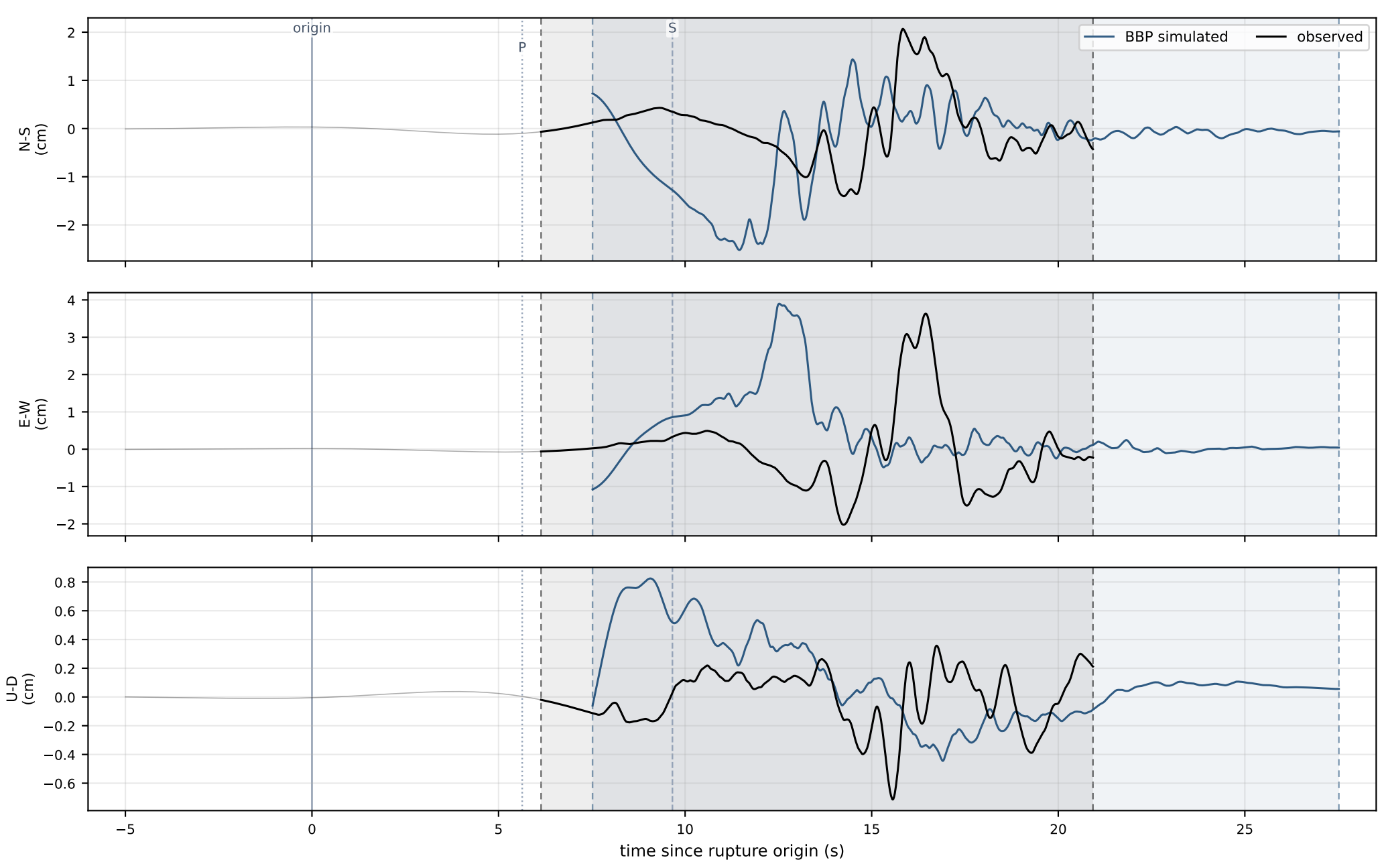

CE.89462 — 27.3 km · displacement handed to the animation
observed PGD 124.56 cm · simulated PGD 6.63 cm · obs/sim = 18.78x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

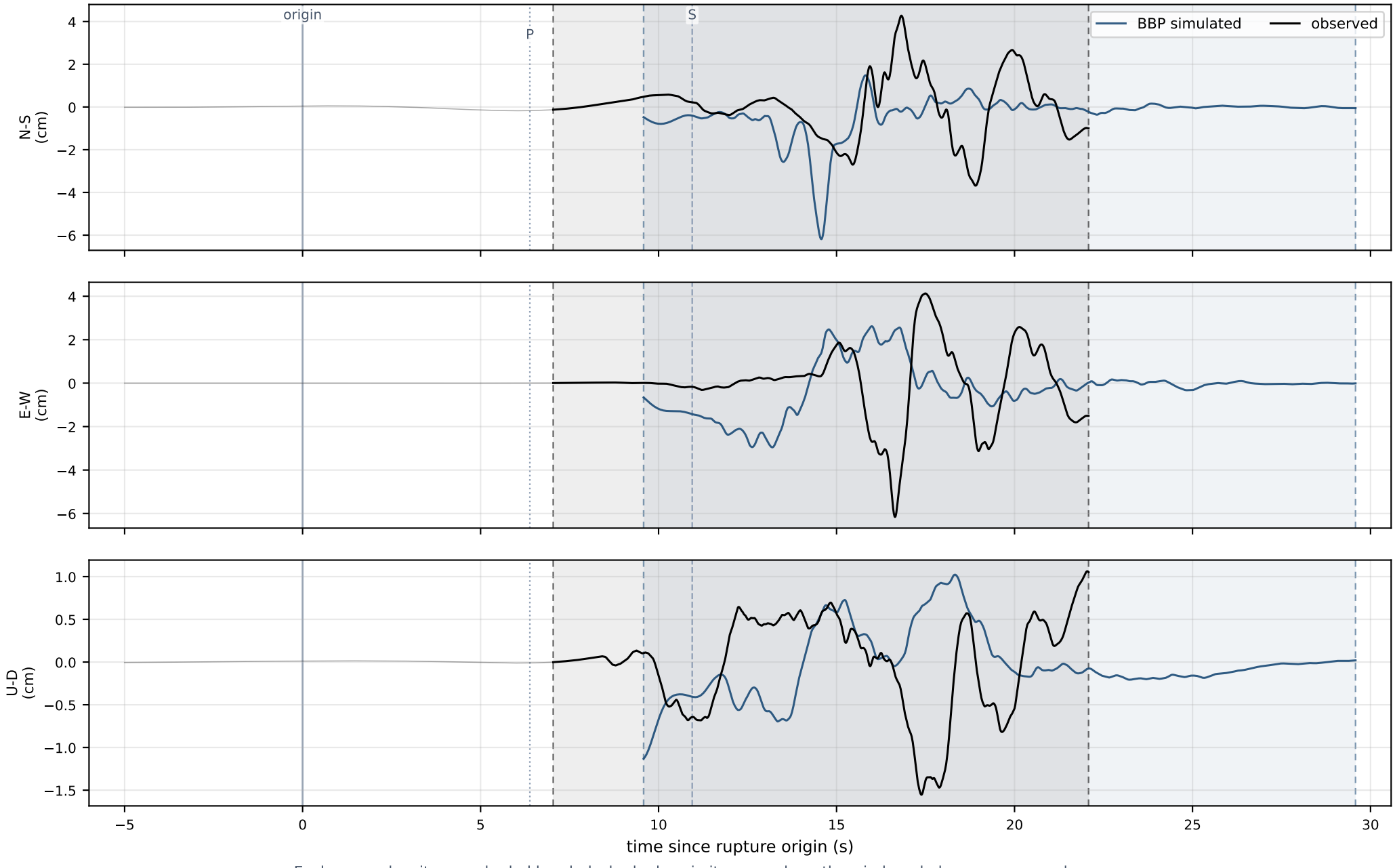

NP.1582 — 27.4 km · displacement handed to the animation
observed PGD — · simulated PGD 8.10 cm
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
P
S
BBP simulated
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

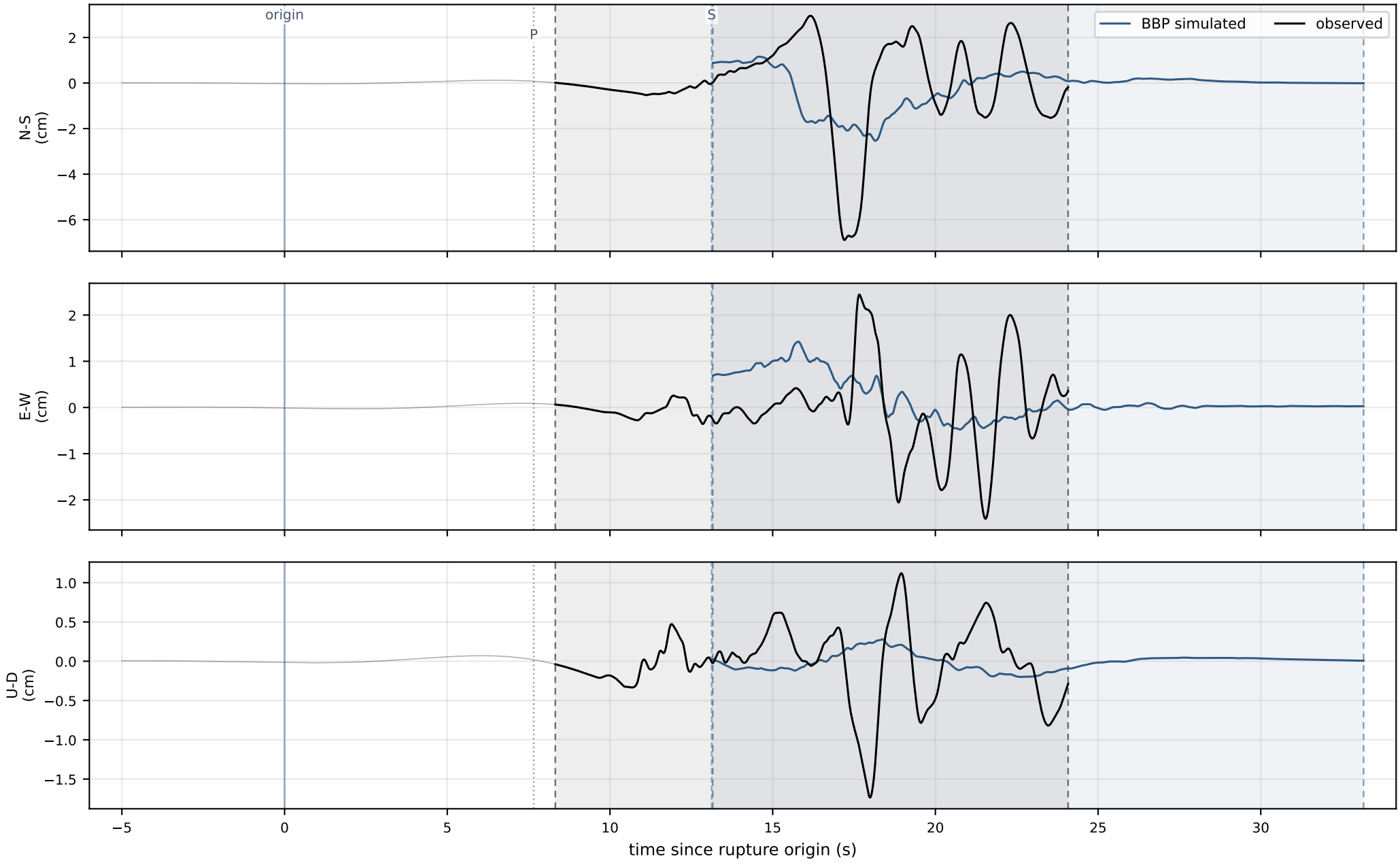

NC.KMPB — 28.2 km · displacement handed to the animation
observed PGD 3.56 cm · simulated PGD 3.81 cm · obs/sim = 0.93x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

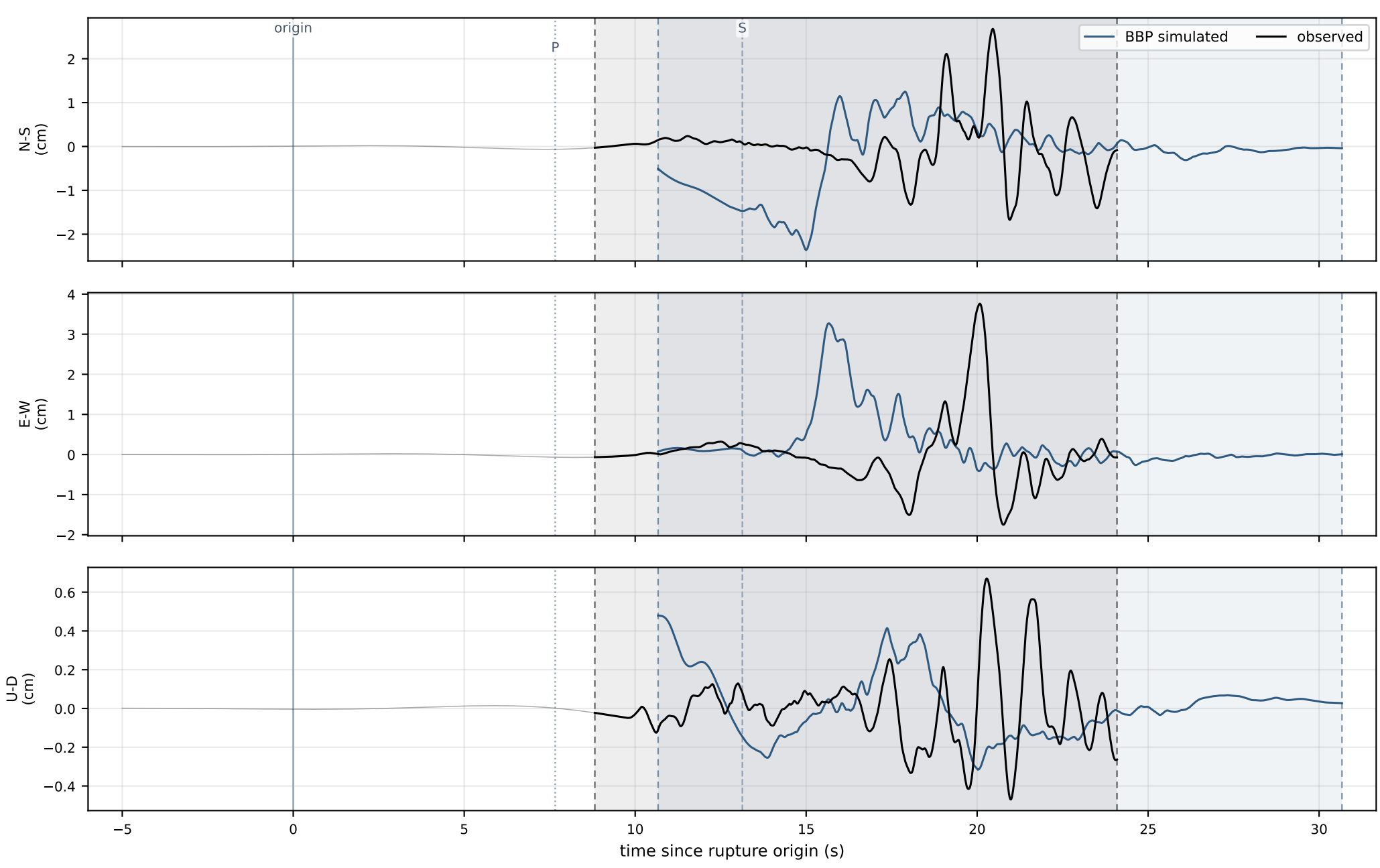

NP.1581 — 29.6 km · displacement handed to the animation
observed PGD 7.87 cm · simulated PGD 8.08 cm · obs/sim = 0.97x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

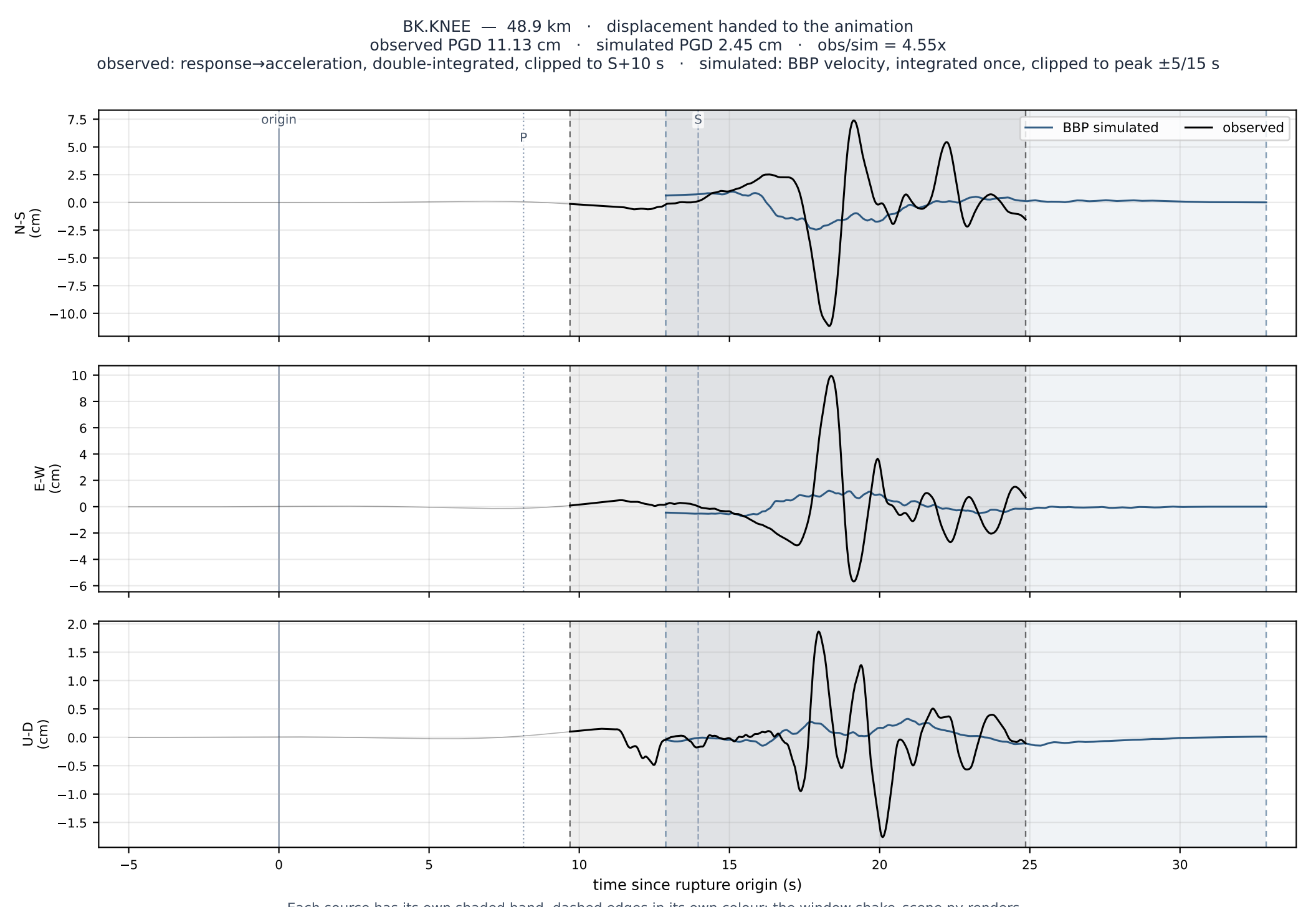

NC.KCO — 32.7 km · displacement handed to the animation
observed PGD 3.33 cm · simulated PGD 7.33 cm · obs/sim = 0.45x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

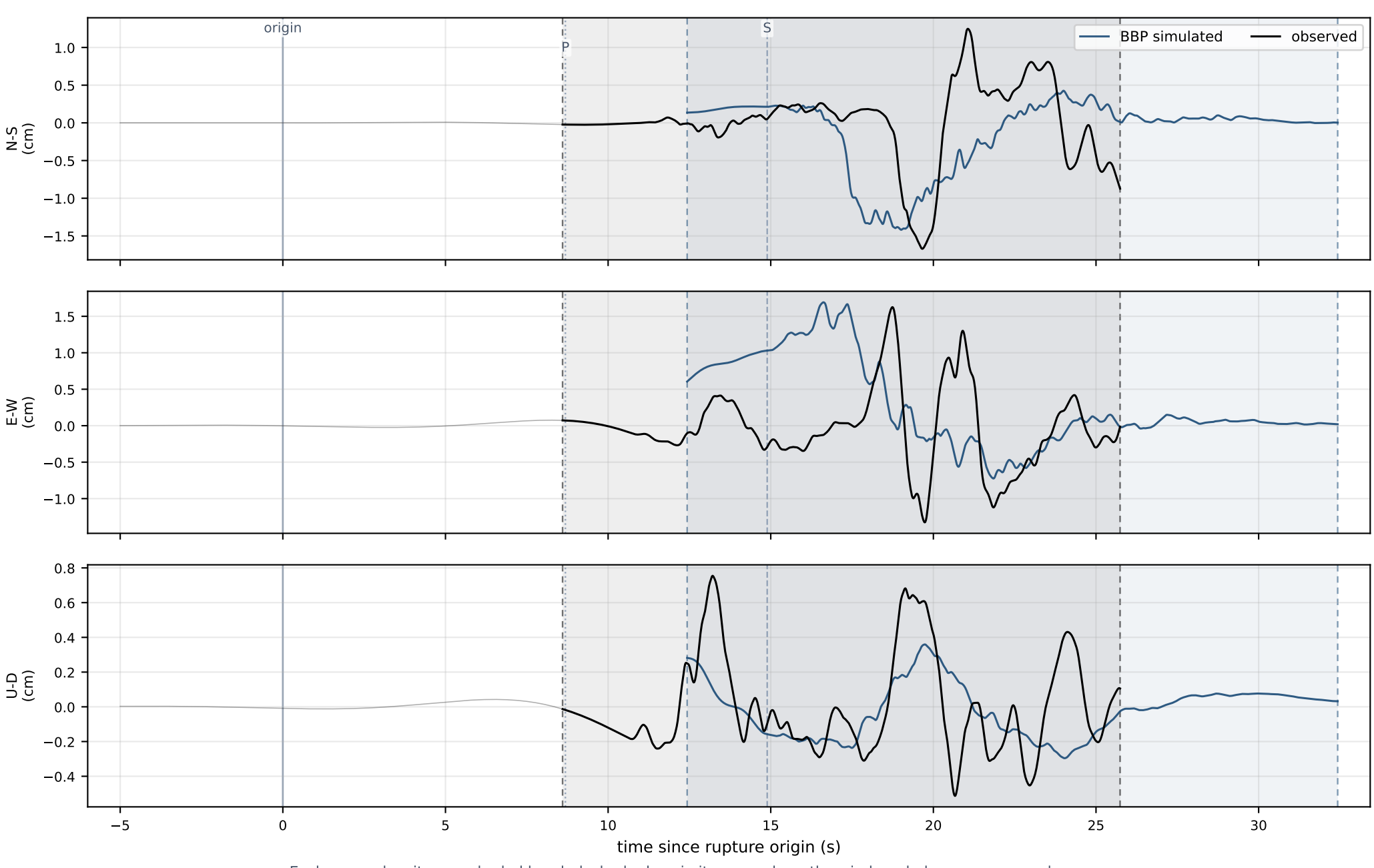

BK.RBOW — 33.8 km · displacement handed to the animation
observed PGD 3.63 cm · simulated PGD 3.90 cm · obs/sim = 0.93x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

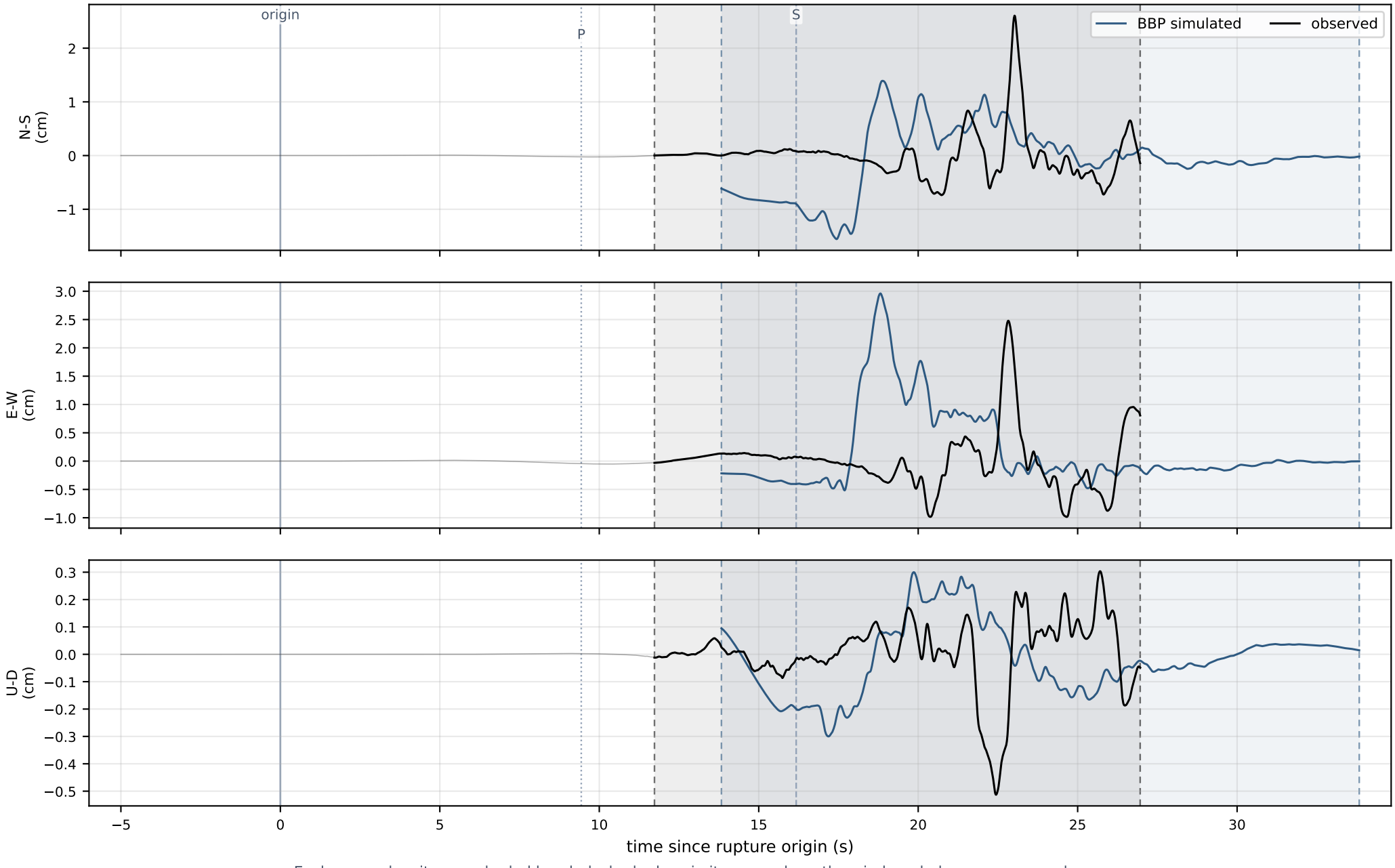

CE.89641 — 38.3 km · displacement handed to the animation
observed PGD 6.16 cm · simulated PGD 6.19 cm · obs/sim = 1.00x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

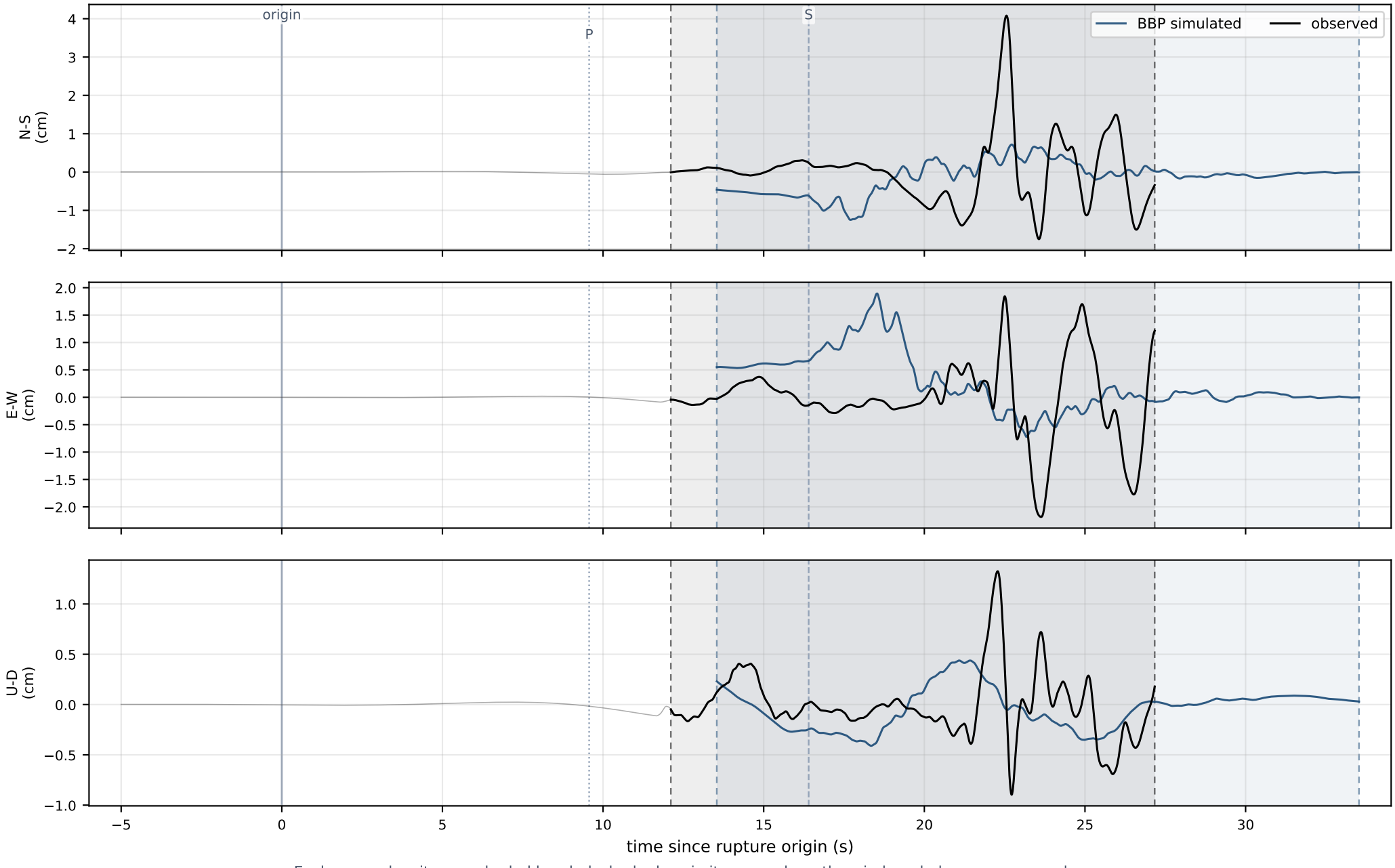

BK.BJES — 45.9 km · displacement handed to the animation
observed PGD 6.89 cm · simulated PGD 2.53 cm · obs/sim = 2.72x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.KPR — 46.0 km · displacement handed to the animation
observed PGD 3.76 cm · simulated PGD 3.27 cm · obs/sim = 1.15x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

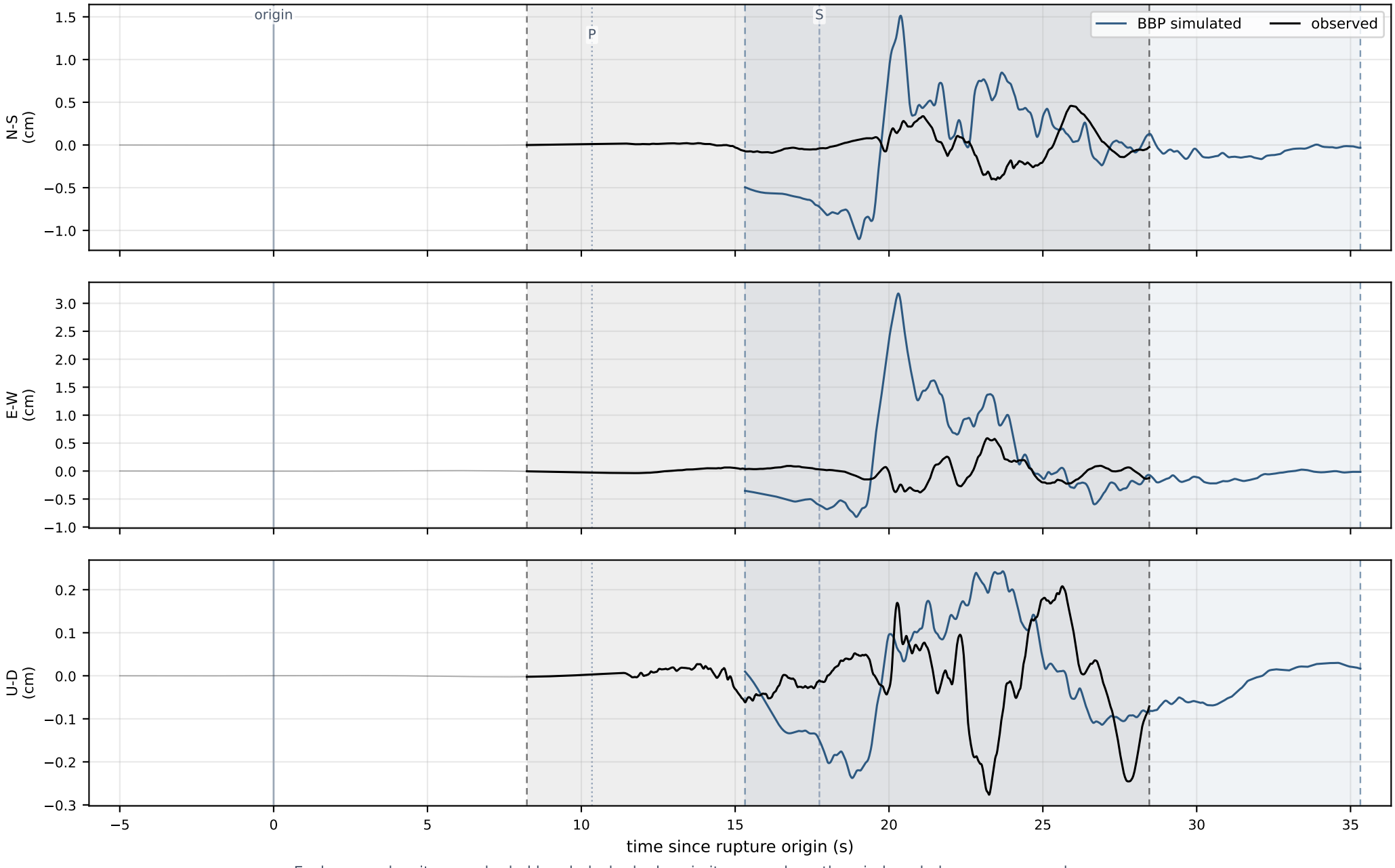

BK.KNEE — 48.9 km · displacement handed to the animation
observed PGD 11.13 cm · simulated PGD 2.45 cm · obs/sim = 4.55x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

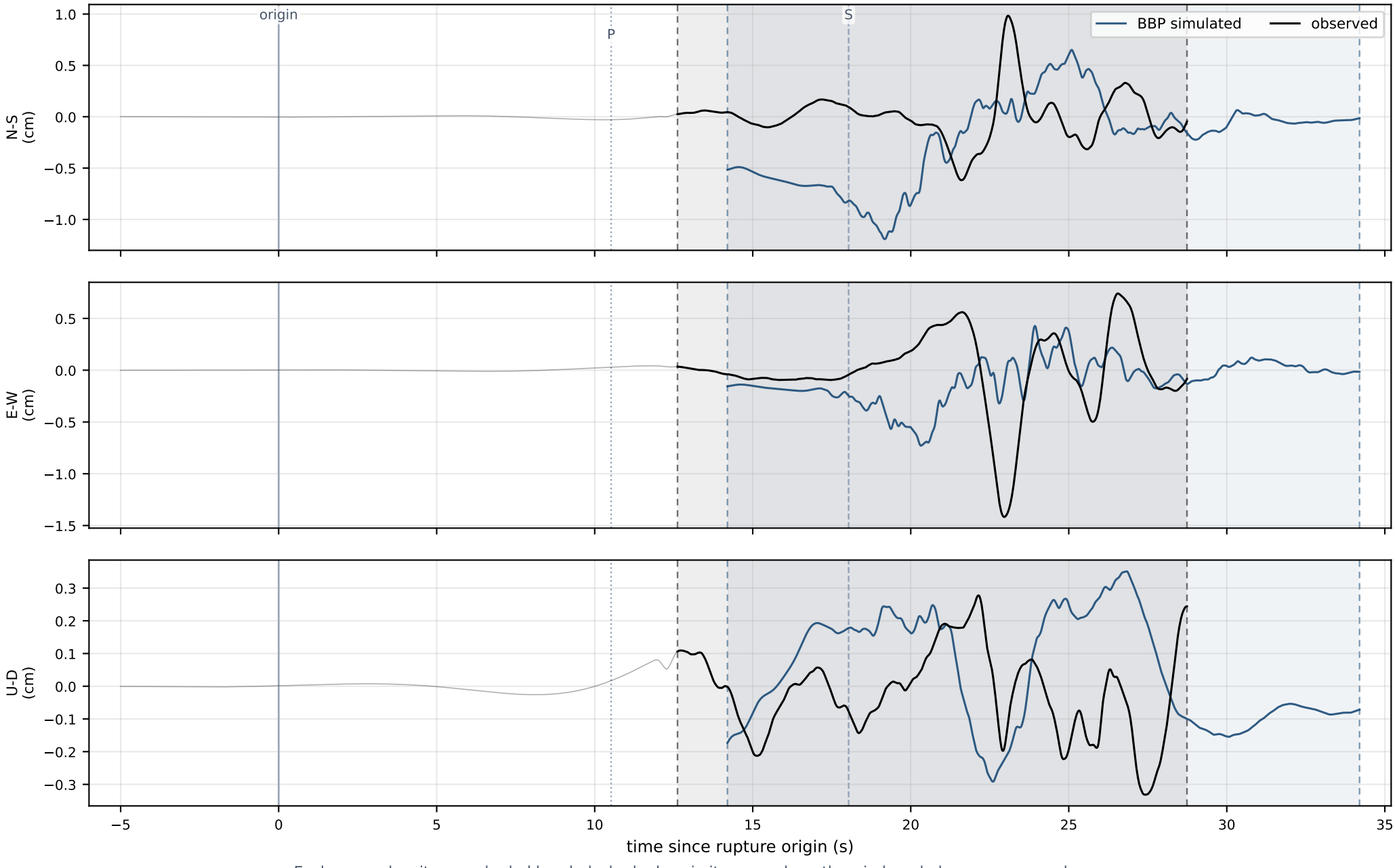

NC.KCR — 52.1 km · displacement handed to the animation
observed PGD 1.67 cm · simulated PGD 1.69 cm · obs/sim = 0.99x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

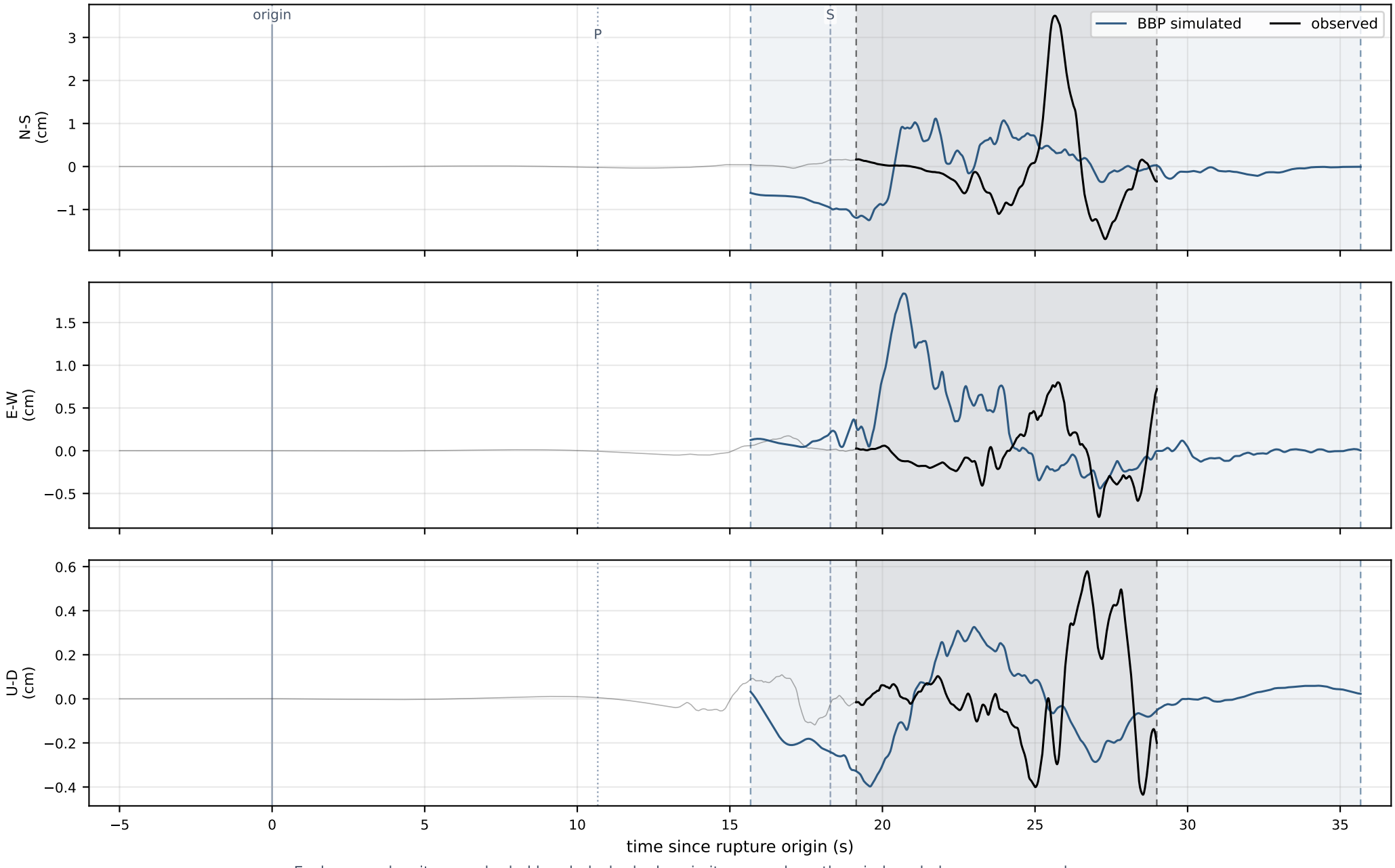

BK.PRDS — 56.6 km · displacement handed to the animation
observed PGD 2.61 cm · simulated PGD 2.96 cm · obs/sim = 0.88x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

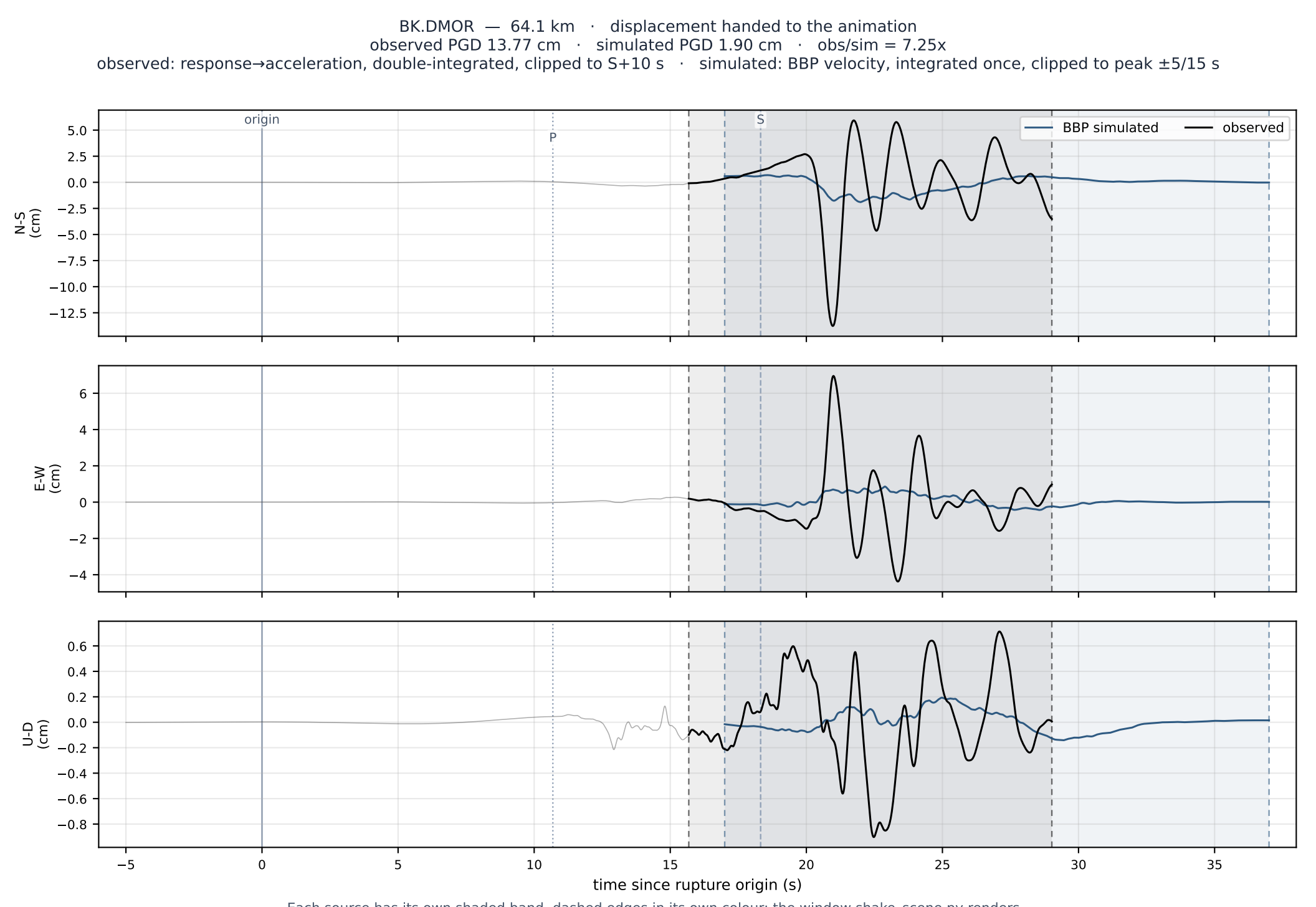


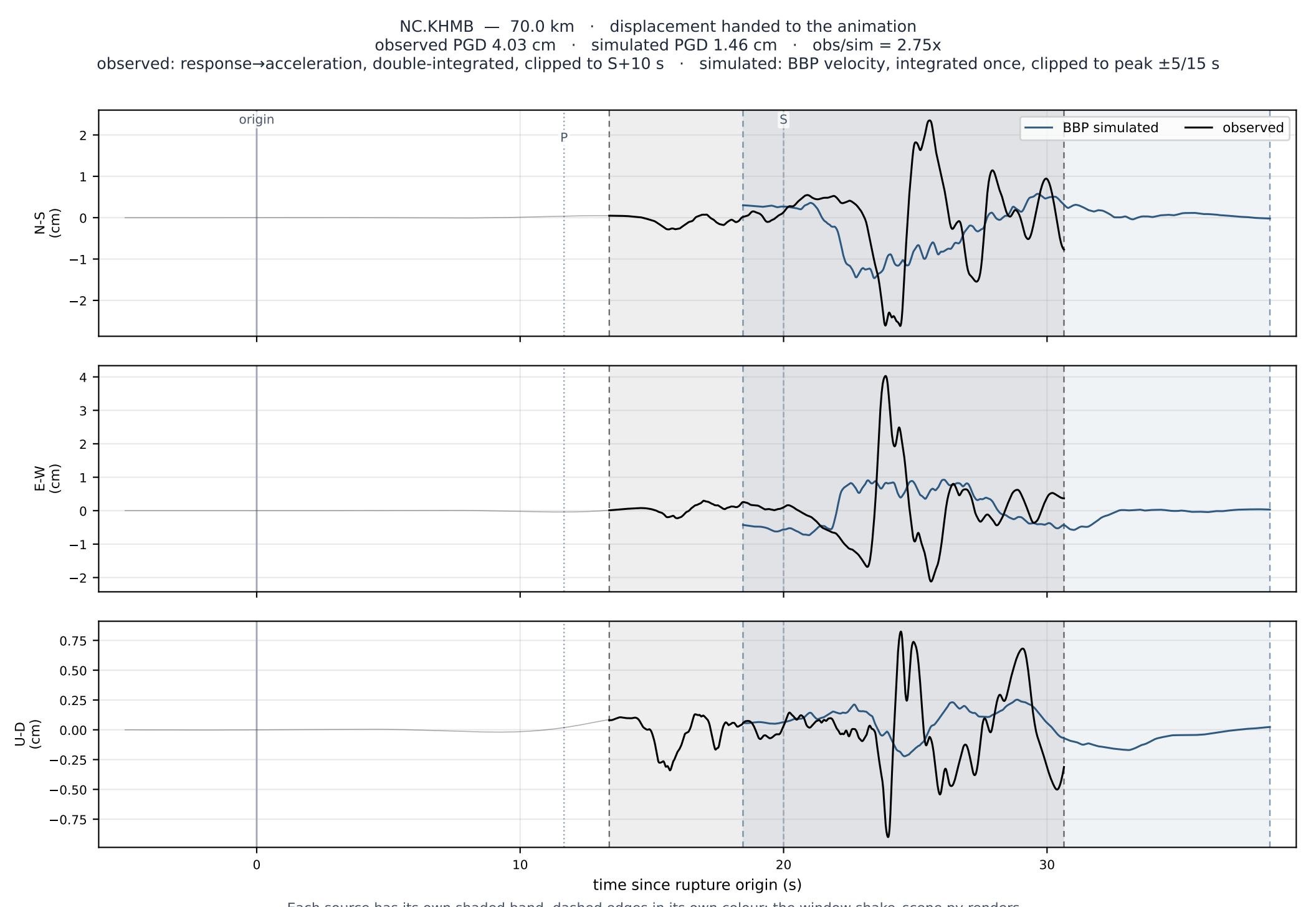
Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
Bold inside it is what the table follows; faint outside is the rest of the record that source was handed.

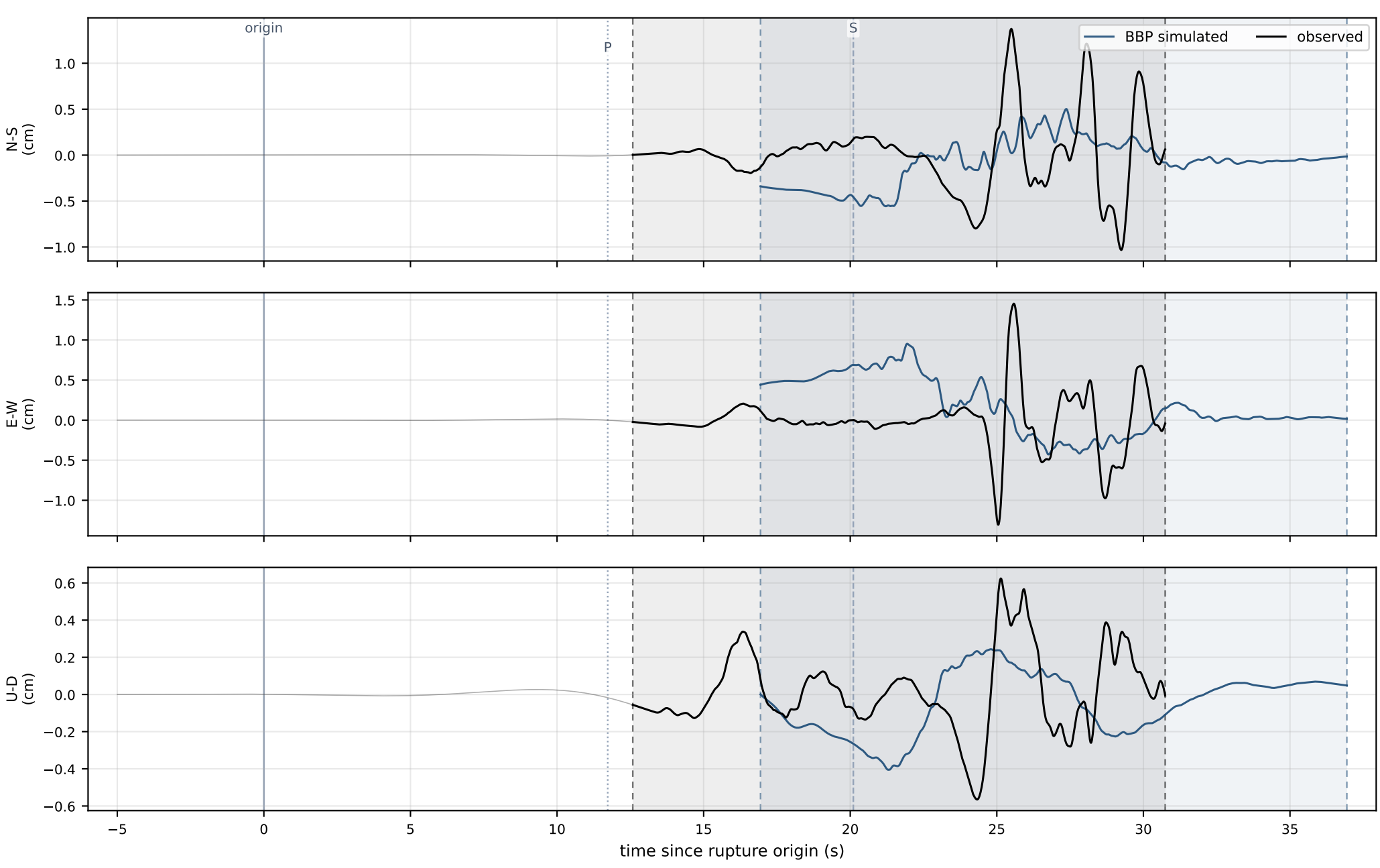

CE.89688 — 62.1 km · displacement handed to the animation
observed PGD 0.59 cm · simulated PGD 3.18 cm · obs/sim = 0.18x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

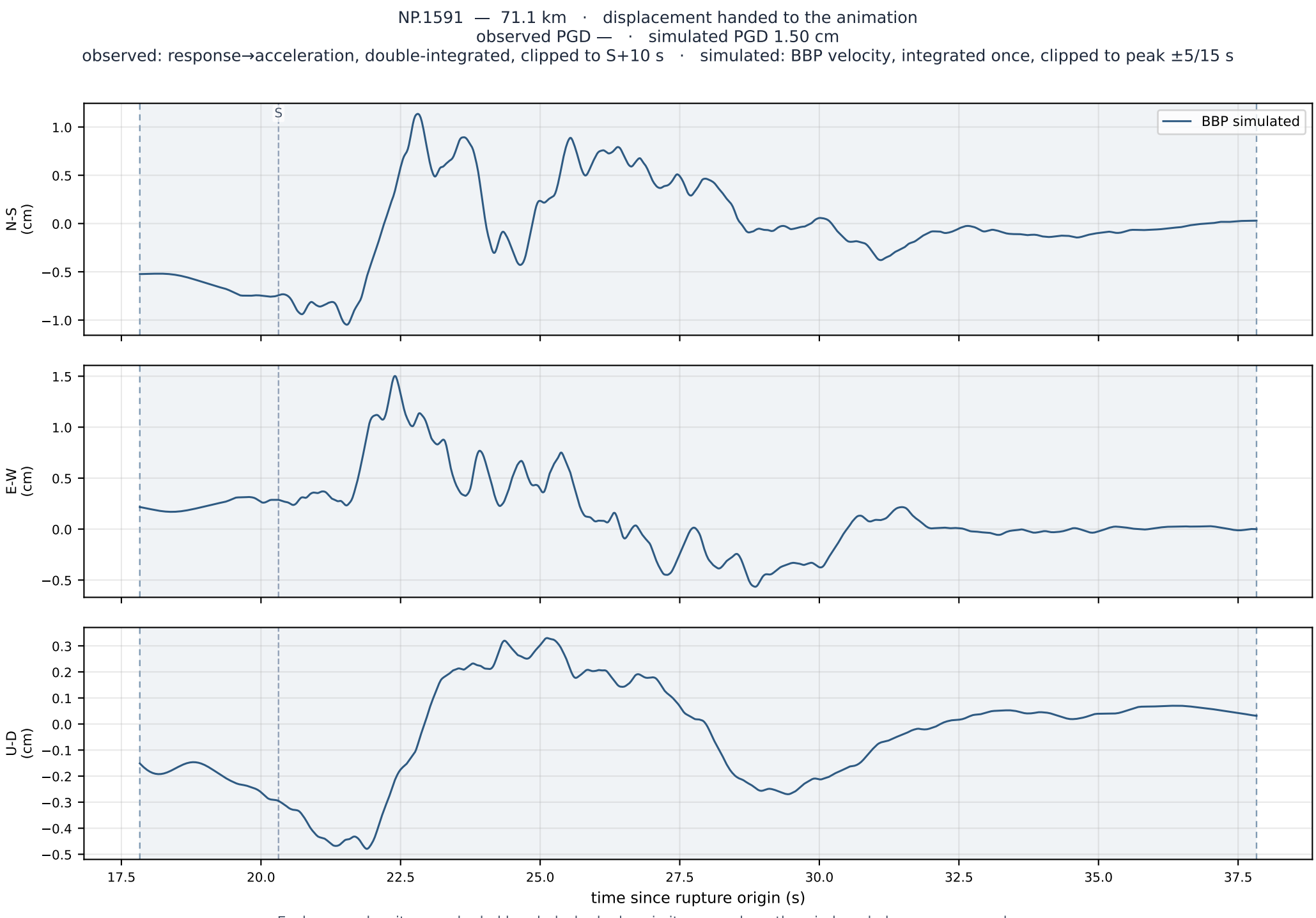

NC.KTD — 63.1 km · displacement handed to the animation
observed PGD 1.42 cm · simulated PGD 1.19 cm · obs/sim = 1.19x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

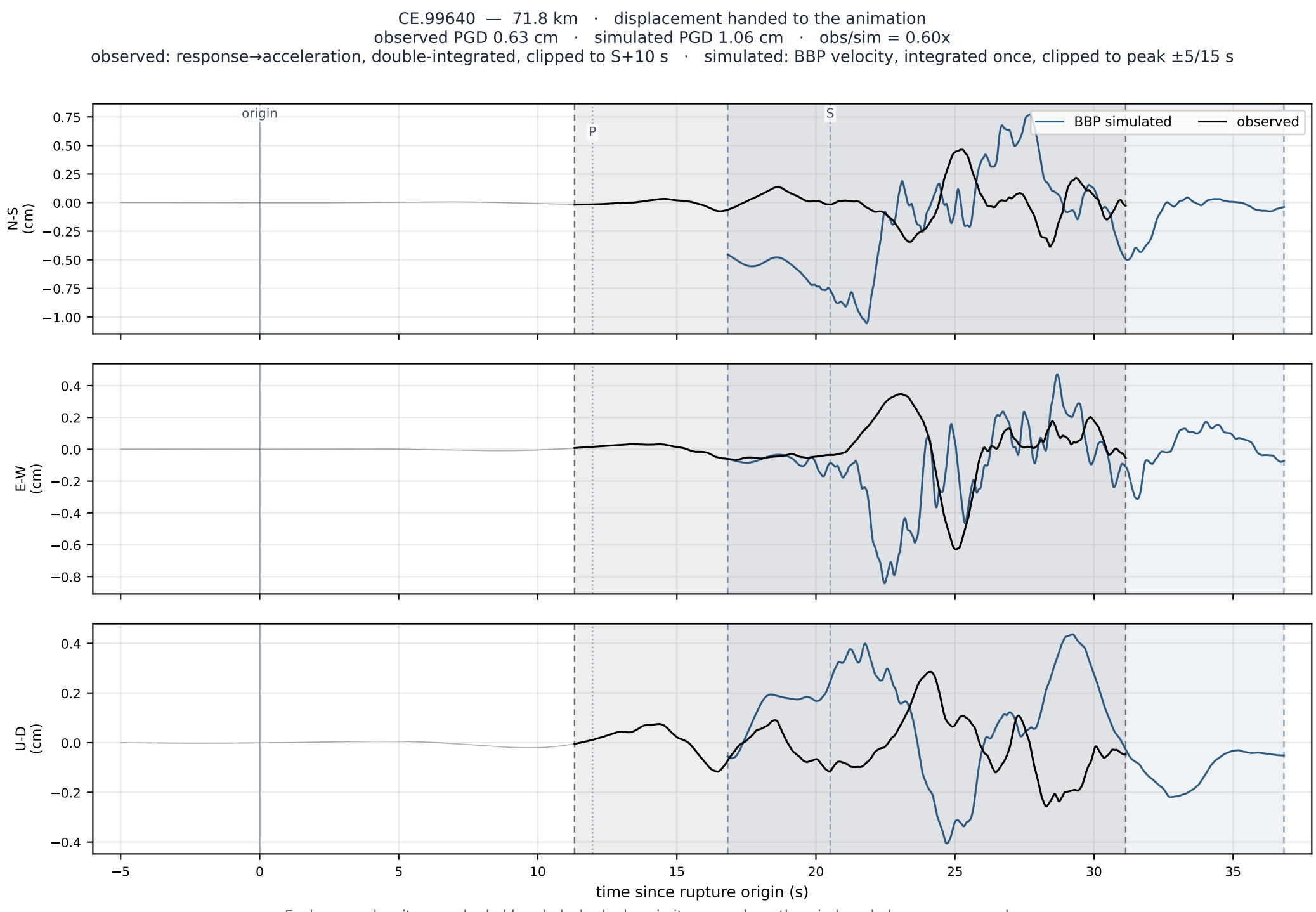

BK.BRIC — 64.0 km · displacement handed to the animation
observed PGD 3.51 cm · simulated PGD 1.84 cm · obs/sim = 1.91x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

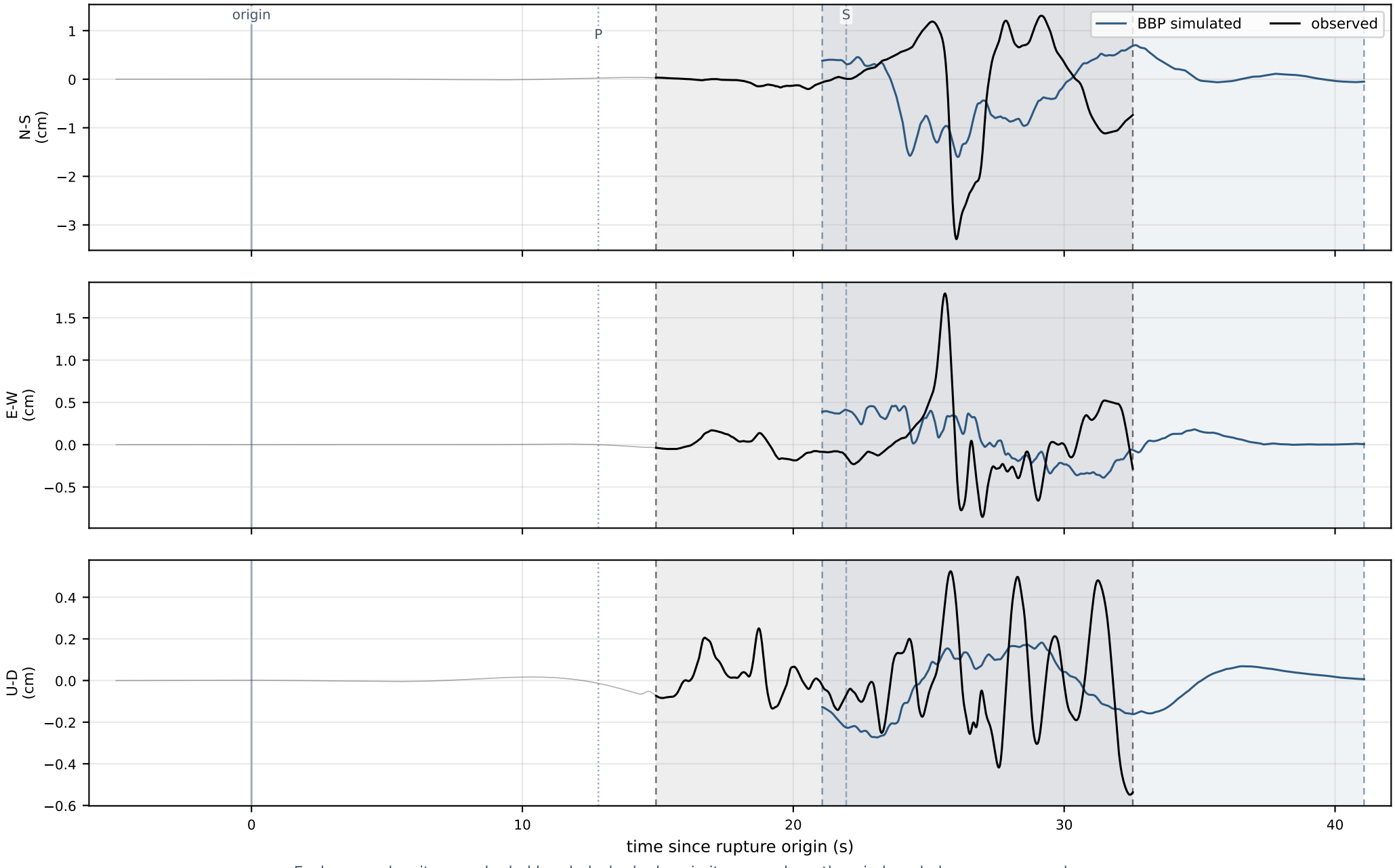

BK.DMOR — 64.1 km · displacement handed to the animation
observed PGD 13.77 cm · simulated PGD 1.90 cm · obs/sim = 7.25x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

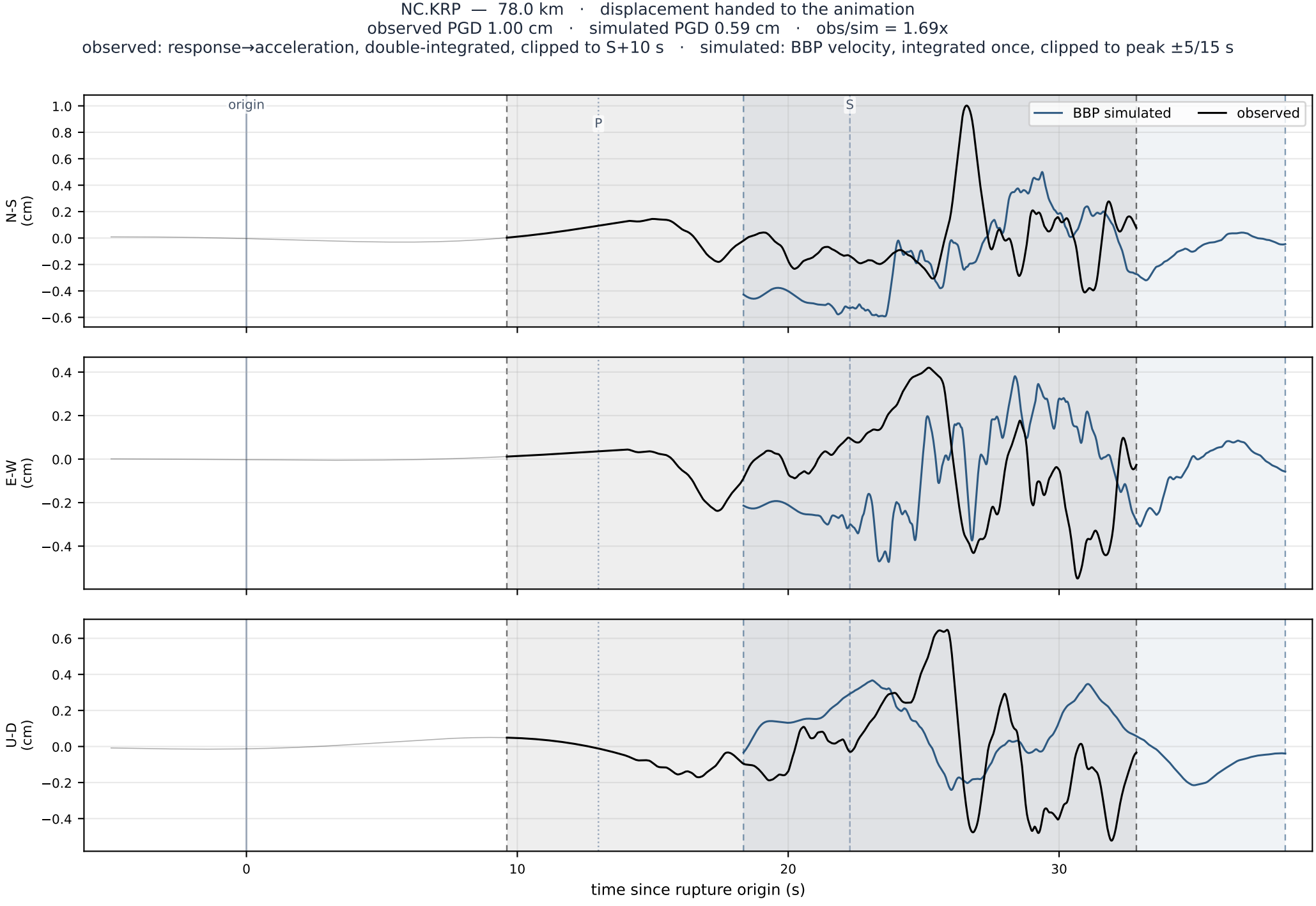

NC.KHMB — 70.0 km · displacement handed to the animation
observed PGD 4.03 cm · simulated PGD 1.46 cm · obs/sim = 2.75x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.

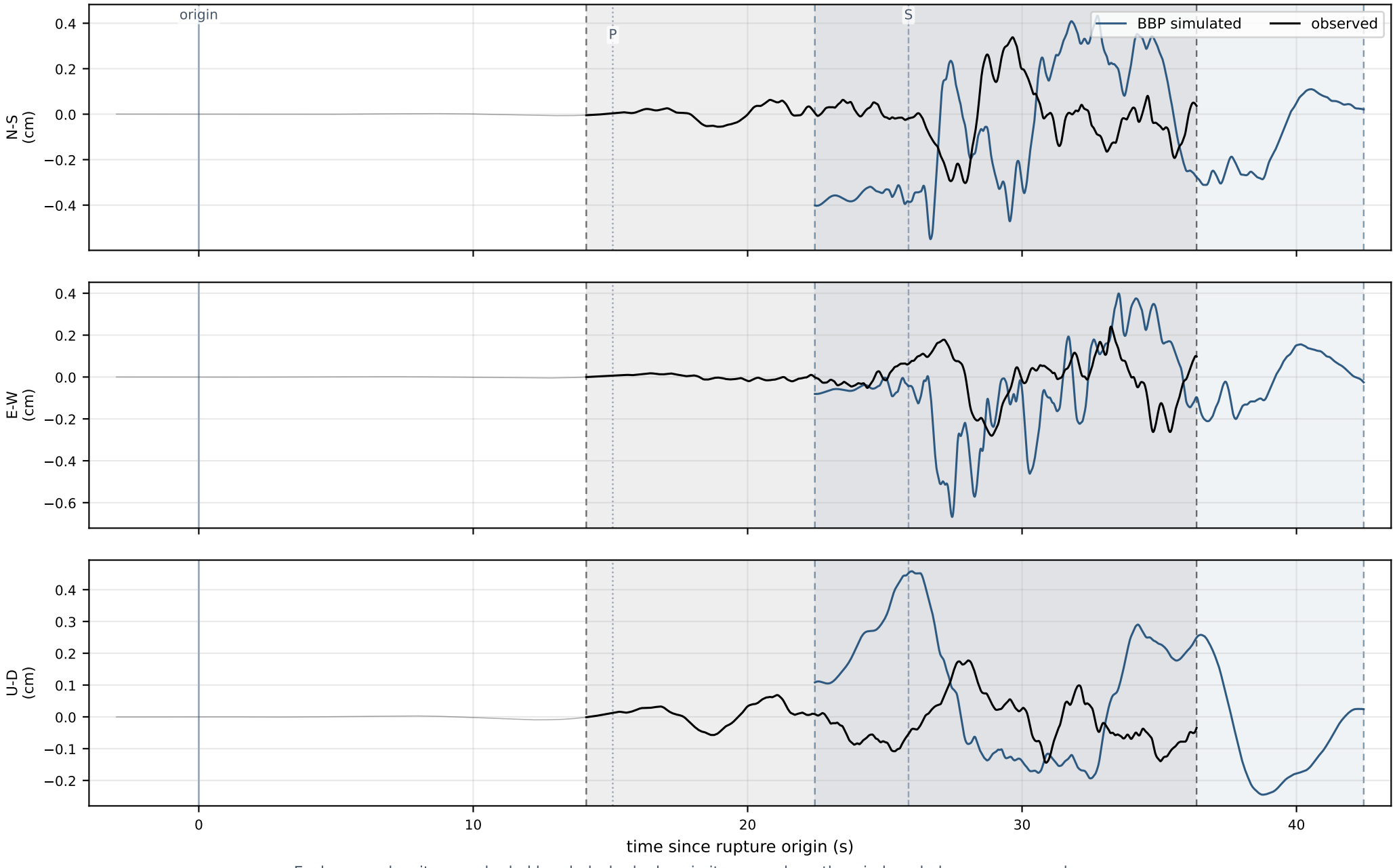

NC.KMR — 70.4 km · displacement handed to the animation
observed PGD 1.45 cm · simulated PGD 0.95 cm · obs/sim = 1.52x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.1591 — 71.1 km · displacement handed to the animation
observed PGD — · simulated PGD 1.50 cm
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
S
BBP simulated
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.99640 — 71.8 km · displacement handed to the animation
observed PGD 0.63 cm · simulated PGD 1.06 cm · obs/sim = 0.60x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.KCSB — 76.8 km · displacement handed to the animation
observed PGD 3.29 cm · simulated PGD 1.60 cm · obs/sim = 2.06x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.KRP — 78.0 km · displacement handed to the animation
observed PGD 1.00 cm · simulated PGD 0.59 cm · obs/sim = 1.69x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (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.99700 — 90.5 km · displacement handed to the animation
observed PGD 0.34 cm · simulated PGD 0.67 cm · obs/sim = 0.51x
observed: response→acceleration, double-integrated, clipped to S+10 s · simulated: BBP velocity, integrated once, clipped to peak ±5/15 s
origin
P
S
BBP simulated
observed
N-S (cm)
E-W (cm)
U-D (cm)
time since rupture origin (s)
Each source has its own shaded band, dashed edges in its own colour: the window shake_scene.py renders.
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