Supplementary file

From traditional extrapolation to neural networks: Time-depth relationship innovations in the subsurface characterization of Drava Basin, Pannonian Super Basin

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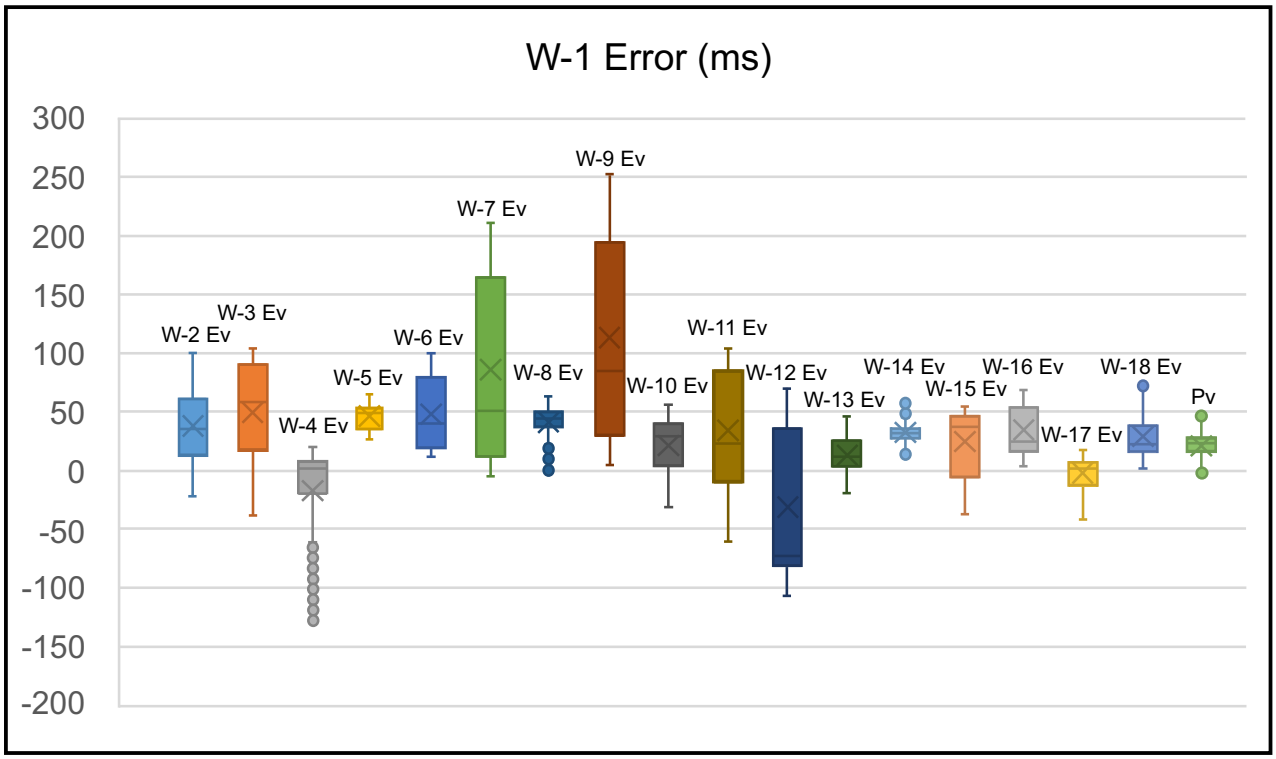
Appendix 1

Average absolute error in milliseconds calculated for results TWT obtained through both the extrapolation method (Ev) and ANN analysis (Pv). Wells used in the ANN training process are marked with green labels, while holdout wells are highlighted in yellow. Numbers in red indicate instances where the extrapolation method yielded better results, i.e., smaller errors than those produced by the ANN analysis. Pv% represents a percentage of wells for which prediction via ANN gave more successful results.

	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12	W-13	W-14	W-15	W-16	W-17	W-18
W-1 Ev		34.5	88.9	28.2	45.0	44.7	18.1	45.2	46.5	49.6	73.1	59.7	22.5	29.5	45.9	38.2	14.6	25.3
W-2 Ev	42.8		101.5	69.5	31.5	52.6	14.8	29.4	24.9	101.5	64.5	95.1	88.6	31.8	55.6	36.2	66.3	27.4
W-3 Ev	55.8	45.1		73.8	31.1	52.3	47.2	37.3	27.3	43.3	35.2	111.5	64.8	45.6	37.7	62.4	65.8	44.2
W-4 Ev	25.7	34.7	162.7		64.8	93.3	19.5	46.1	48.4	152.1	91.7	59.3	138.4	82.3	102.1	86.2	93.4	36.9
W-5 Ev	44.8	34.0	101.1	69.3		19.8	38.7	5.7	32.5	69.2	84.4	74.9	47.9	15.0	54.5	25.2	47.1	25.4
W-6 Ev	48.9	58.7	139.3	72.0	21.2		63.5	29.4	57.4	94.5	78.6	77.1	63.1	24.5	64.6	40.4	51.1	37.3
W-7 Ev	83.6	15.7	246.6	116.3	74.7	114.3		36.6	25.0	212.0	210.5	101.0	170.1	97.6	174.0	74.1	142.5	53.8
W-8 Ev	41.1	29.0	67.4	66.9	7.0	30.8	33.6		27.1	64.8	42.9	74.2	65.0	17.7	32.7	36.2	55.7	22.8
W-9 Ev	111.9	25.9	289.5	145.3	82.5	129.9	25.6	30.0		254.7	240.2	113.3	211.9	116.9	202.8	100.0	179.8	71.6
W-10 Ev	27.5	36.4	47.5	44.8	23.4	36.0	34.5	13.7	35.7		31.7	57.9	29.2	28.9	13.3	47.2	33.9	22.7
W-11 Ev	48.8	63.6	32.3	55.4	38.5	35.9	66.8	34.6	60.8	32.5		73.4	60.2	58.1	34.3	75.9	59.9	50.7
W-12 Ev	65.4	76.4	91.9	48.5	78.5	89.7	63.5	56.1	74.0	89.9	56.6		99.6	86.8	74.1	102.9	85.1	74.9
W-13 Ev	16.8	32.0	84.7	39.7	30.2	39.4	25.2	29.5	42.8	36.3	55.3	56.9		27.9	24.6	39.7	20.8	17.6
W-14 Ev	33.1	26.6	153.6	59.0	12.6	25.1	26.4	12.7	26.3	103.5	97.2	69.1	63.2		62.3	22.3	42.0	13.3
W-15 Ev	34.1	27.7	54.0	47.5	20.0	39.1	31.7	5.6	25.2	17.9	34.7	72.9	25.9	32.2		50.8	36.3	27.4
W-16 Ev	34.2	21.6	128.9	62.2	26.8	40.6	13.6	25.1	29.0	91.5	107.7	72.1	60.4	22.8	74.3		48.9	7.5
W-17 Ev	10.7	30.0	127.0	24.6	44.5	50.9	15.6	38.2	40.2	72.1	68.3	58.8	31.9	36.3	40.4	44.4		22.6
W-18 Ev	29.4	24.6	182.8	56.0	25.6	42.8	15.5	26.0	29.0	134.5	130.8	67.6	92.0	28.7	97.2	11.8	65.9	
Pv	19.9	29.9	15.0	35.4	24.8	31.4	30.4	16.4	20.3	34.7	28.9	51.9	24.3	10.8	15.5	26.8	26.1	20.1
Pv%	88.24	58.8	100.0	88.24	70.59	82.35	41.18	76.47	100	88.24	100	100	94.12	100	94.12	82.35	88.24	82.35

Appendix 2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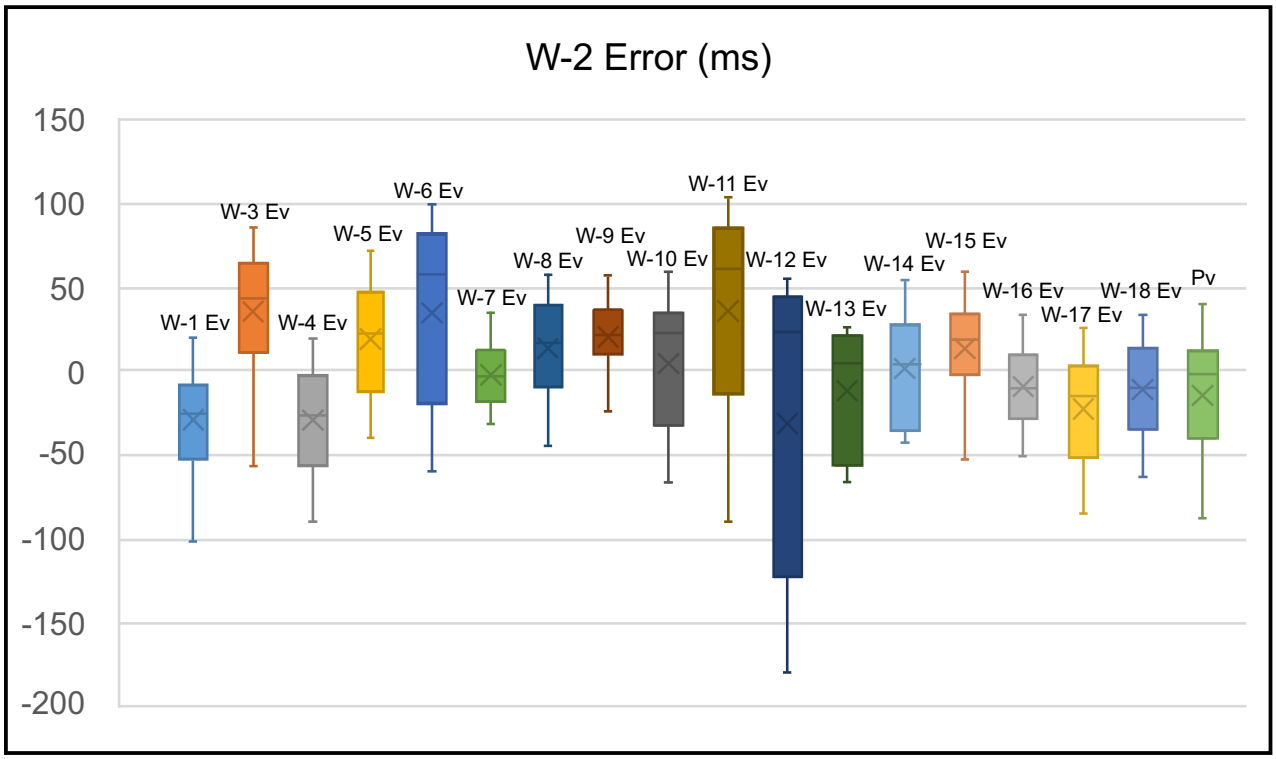
300
250
200
150
100
50
0
-50
-100
-150
-200
W-2 Ev
W-3 Ev
W-4 Ev
W-5 Ev
W-6 Ev
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-150
-200
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W-4 Ev
W-5 Ev
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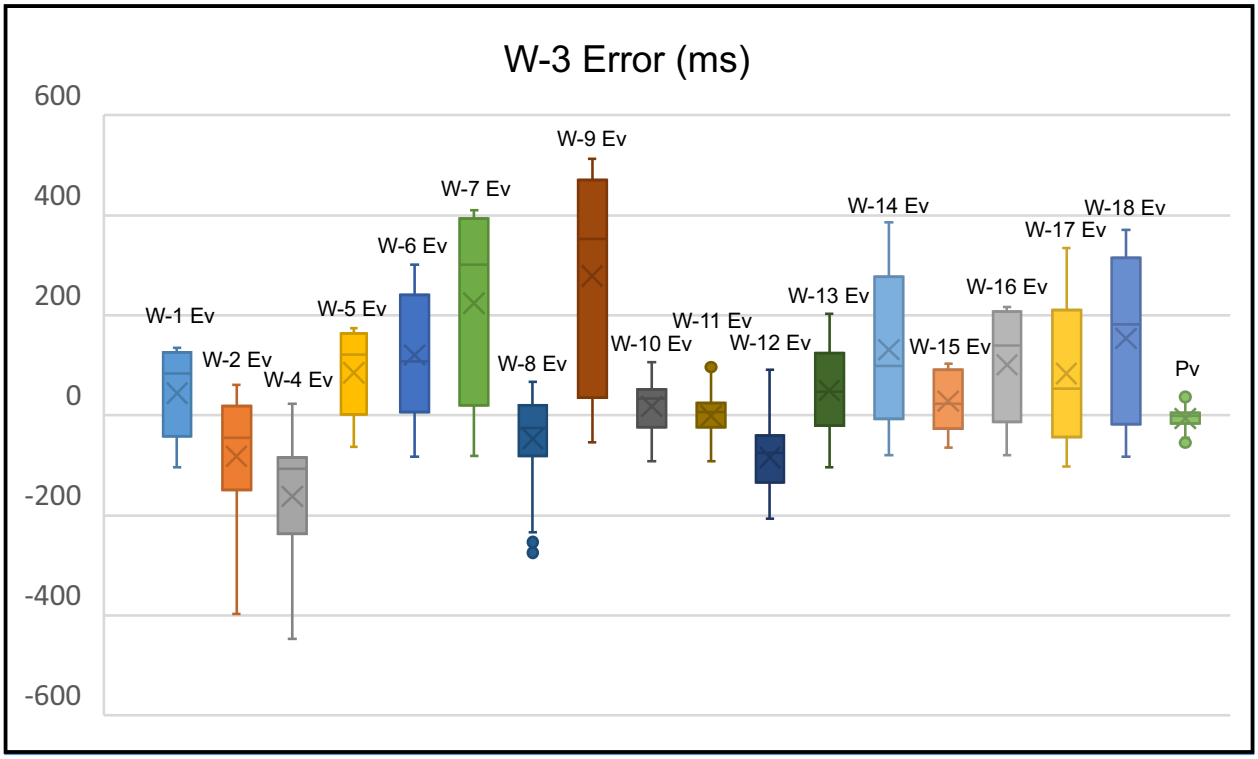
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-600
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W-2 Ev
W-4 Ev
W-5 Ev
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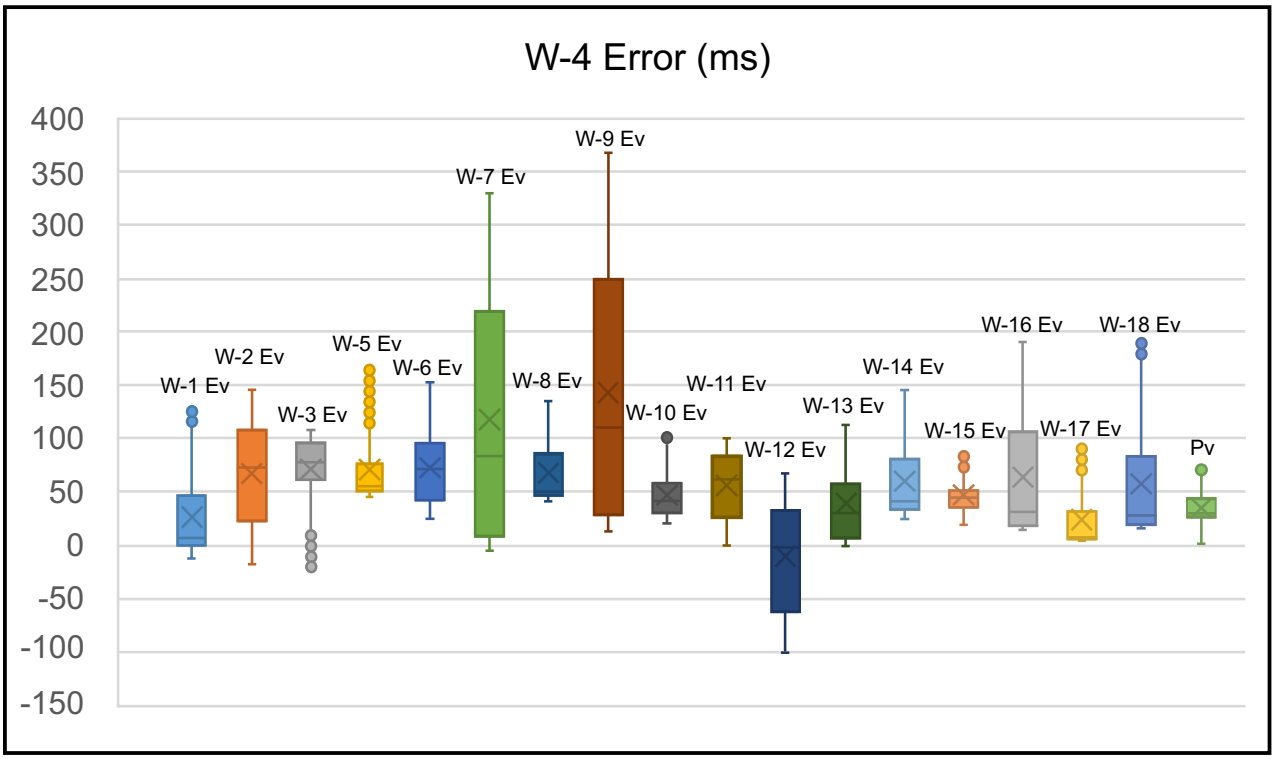
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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300
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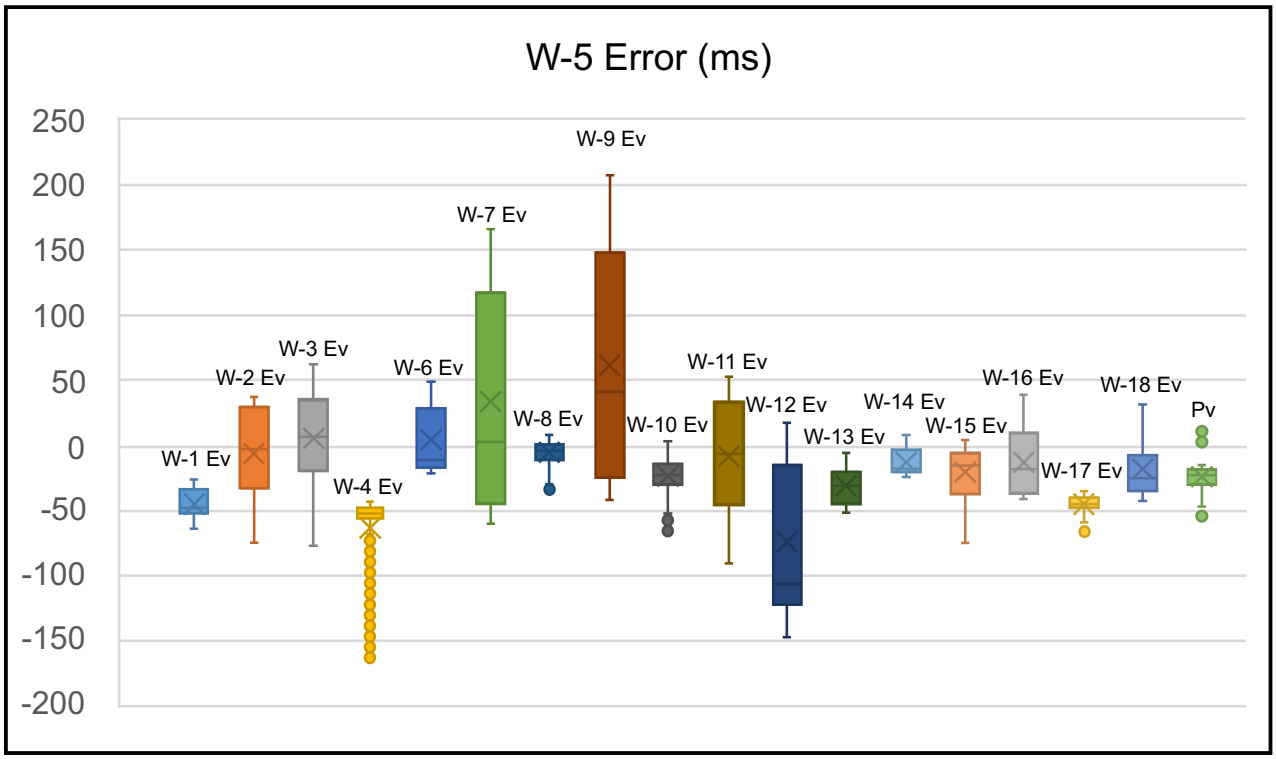
200
150
100
50
0
-50
-100
-150
W-1 Ev
W-2 Ev
W-3 Ev
W-5 Ev
W-6 Ev
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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0
-50
-100
-150
-200
W-1 Ev
W-2 Ev
W-3 Ev
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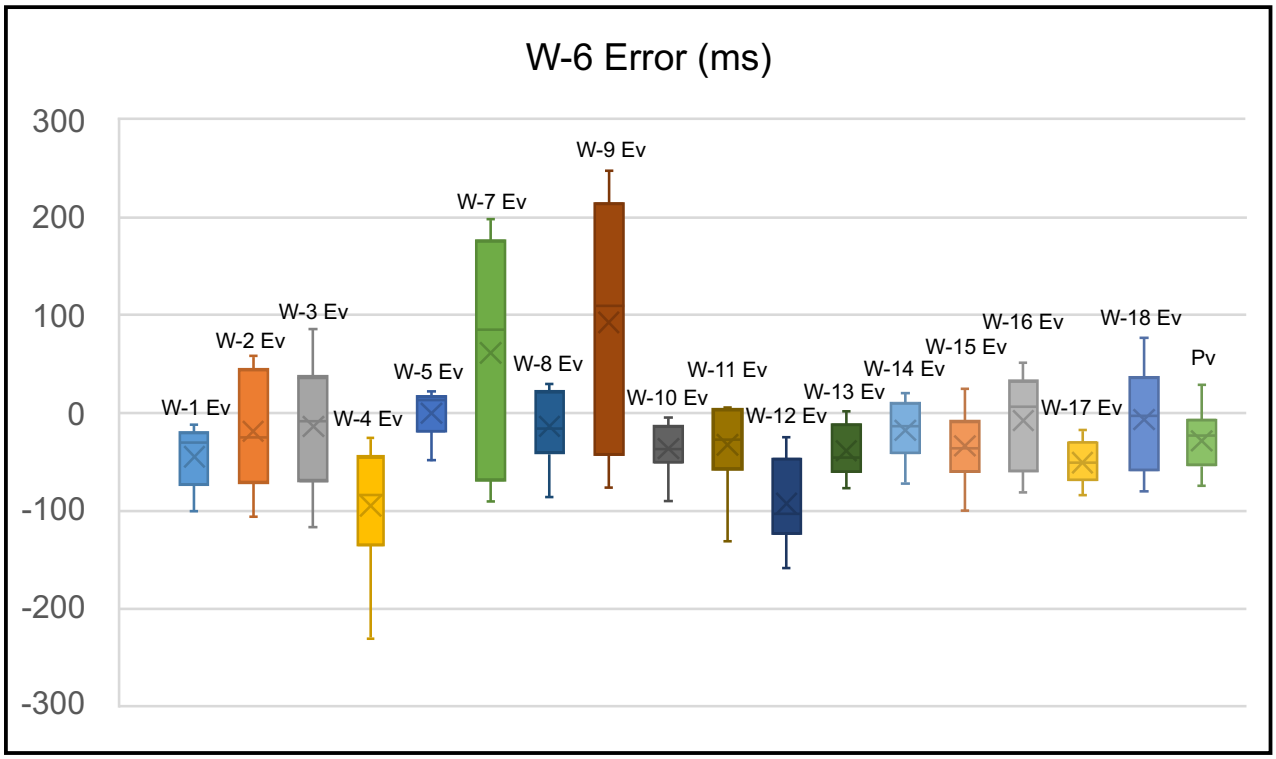
W-6 Ev
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-100
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-300
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W-2 Ev
W-3 Ev
W-4 Ev
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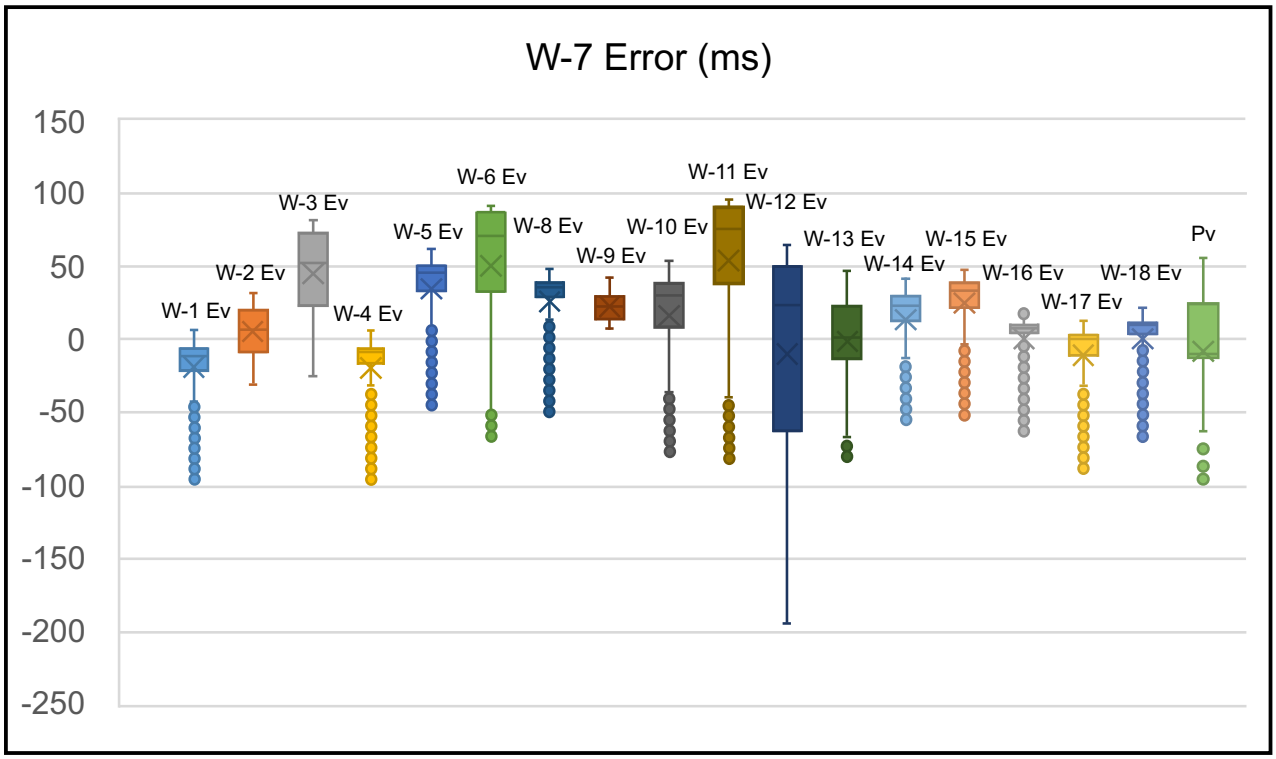
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-50
-100
-150
-200
-250
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W-2 Ev
W-3 Ev
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W-5 Ev
W-6 Ev
W-8 Ev
W-9 Ev
W-10 Ev
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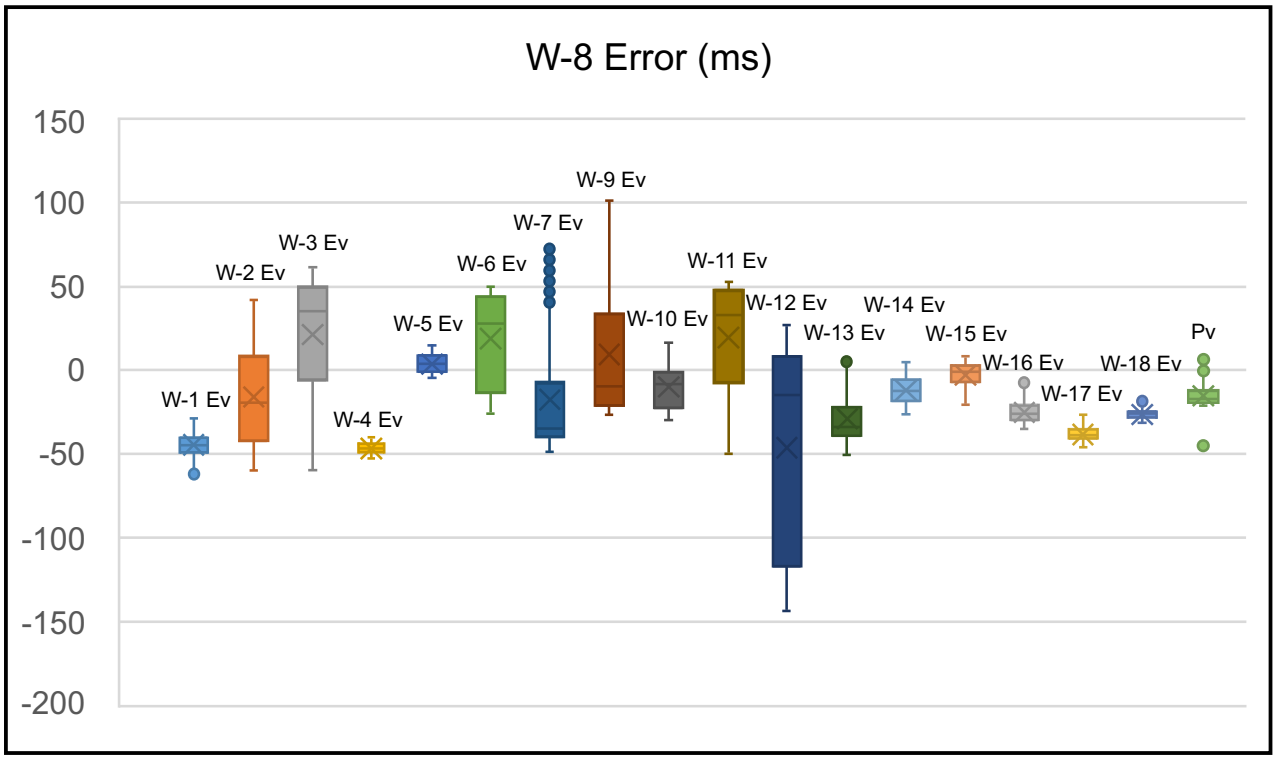
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-200
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W-2 Ev
W-3 Ev
W-4 Ev
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W-6 Ev
W-7 Ev
W-9 Ev
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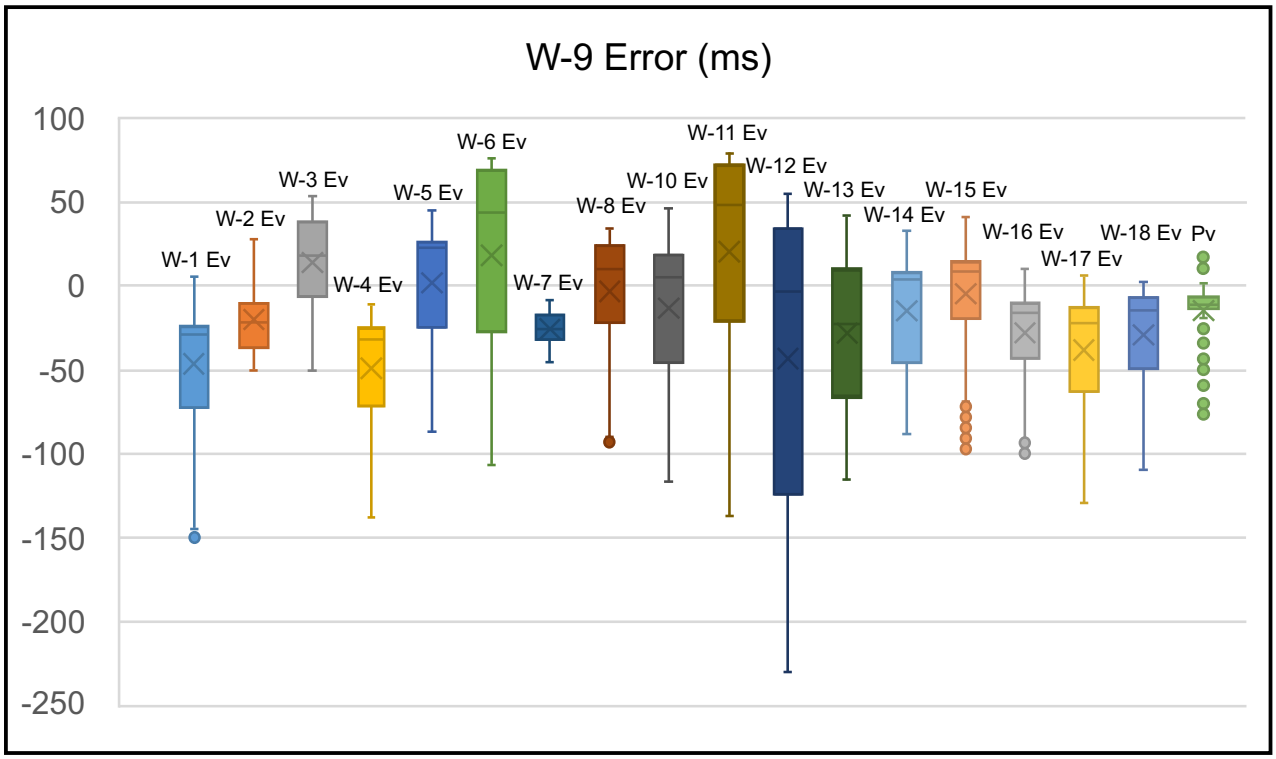
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-100
-150
-200
-250
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W-2 Ev
W-3 Ev
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W-6 Ev
W-7 Ev
W-8 Ev
W-10 Ev
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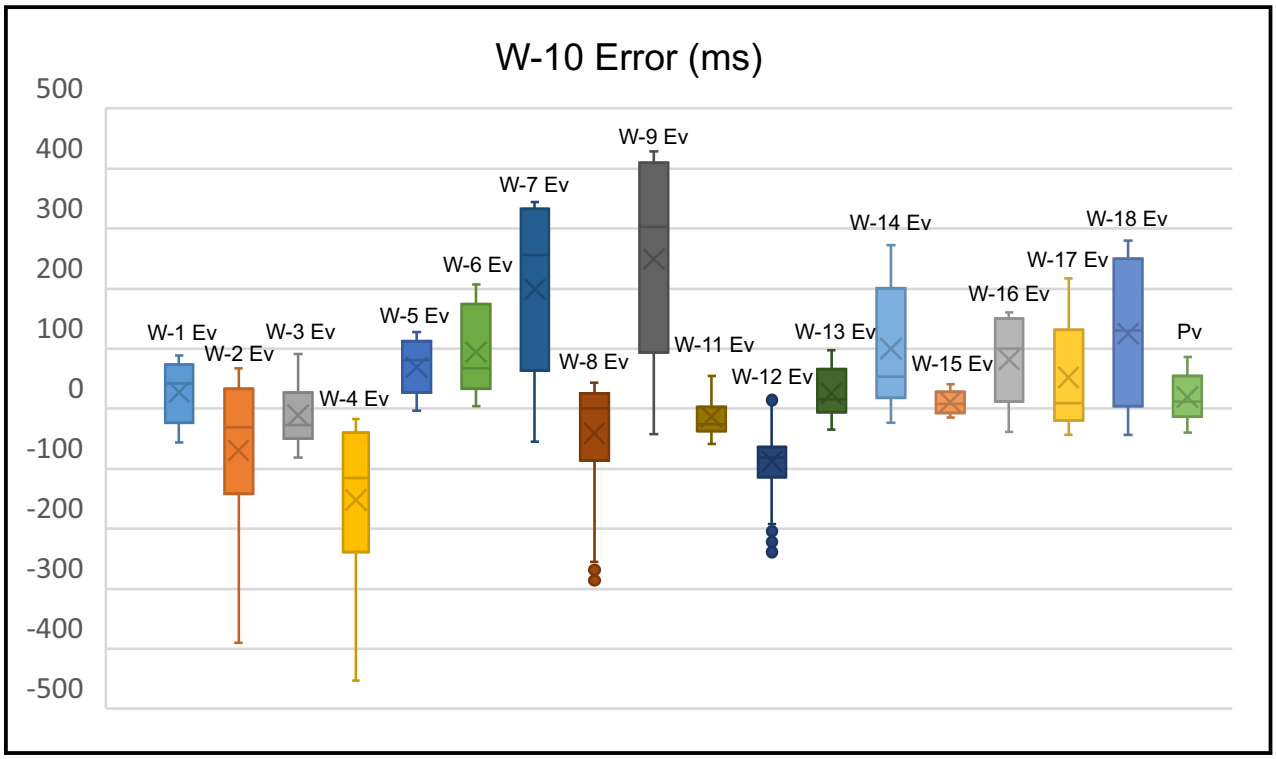
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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400
300
200
100
0
-100
-200
-300
-400
-500
W-1 Ev
W-2 Ev
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W-8 Ev
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W-15 Ev
W-16 Ev
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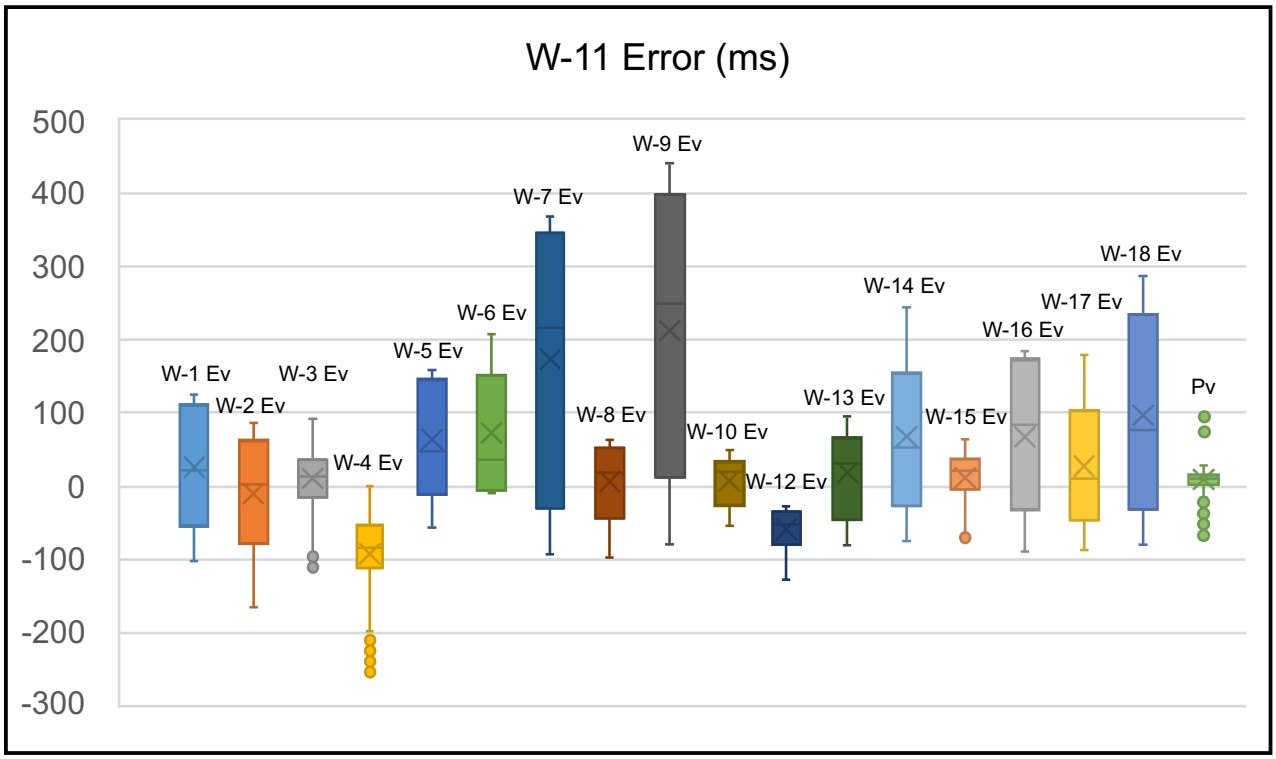
W-18 Ev
Pv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400
300
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-300
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W-2 Ev
W-3 Ev
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W-8 Ev
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W-14 Ev
W-15 Ev
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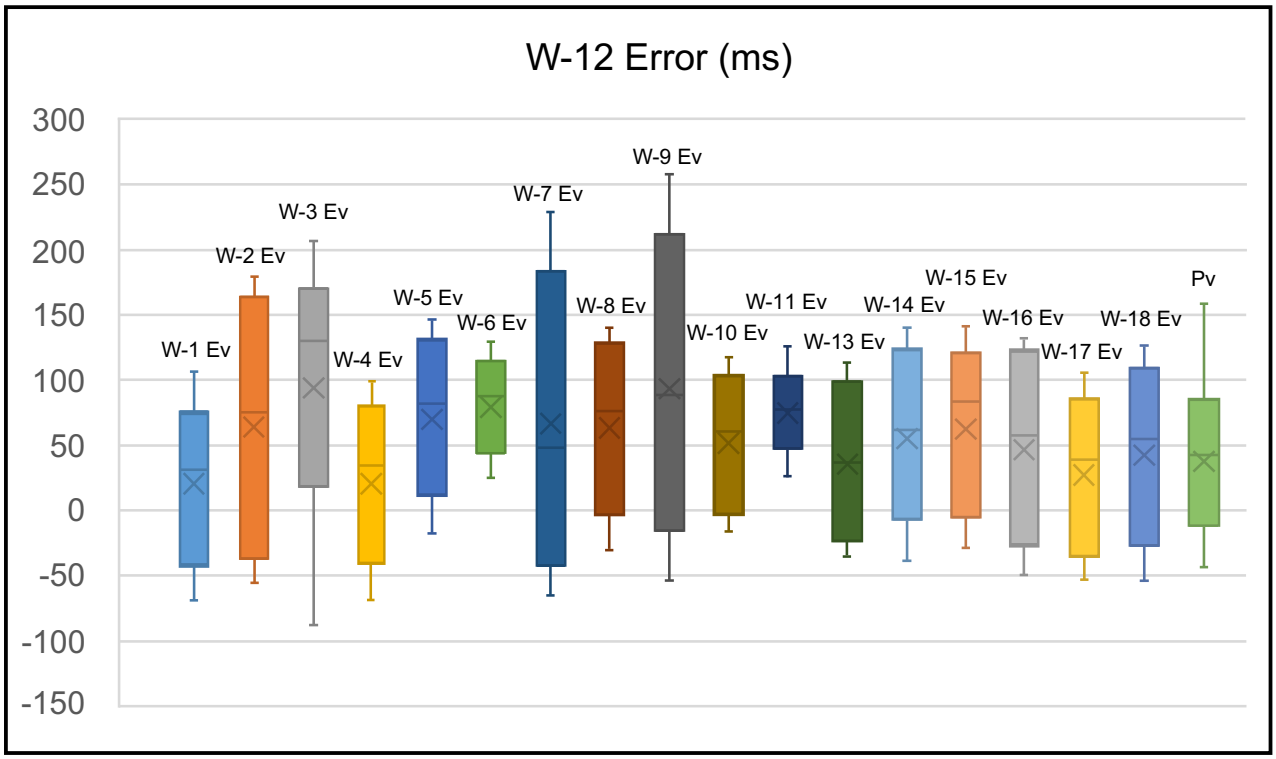
W-17 Ev
W-18 Ev
Pv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W-2 Ev
W-3 Ev
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W-8 Ev
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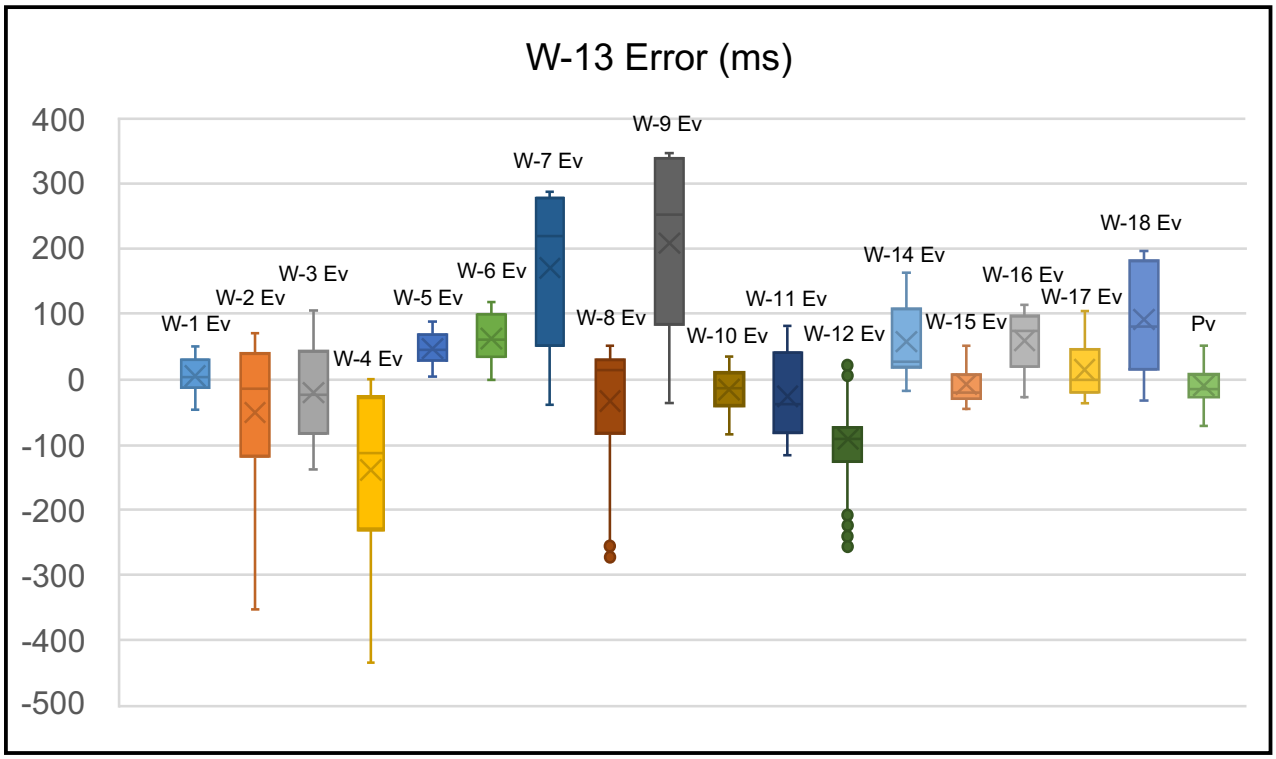
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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300
200
100
0
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-200
-300
-400
-500
W-1 Ev
W-2 Ev
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W-4 Ev
W-5 Ev
W-6 Ev
W-7 Ev
W-8 Ev
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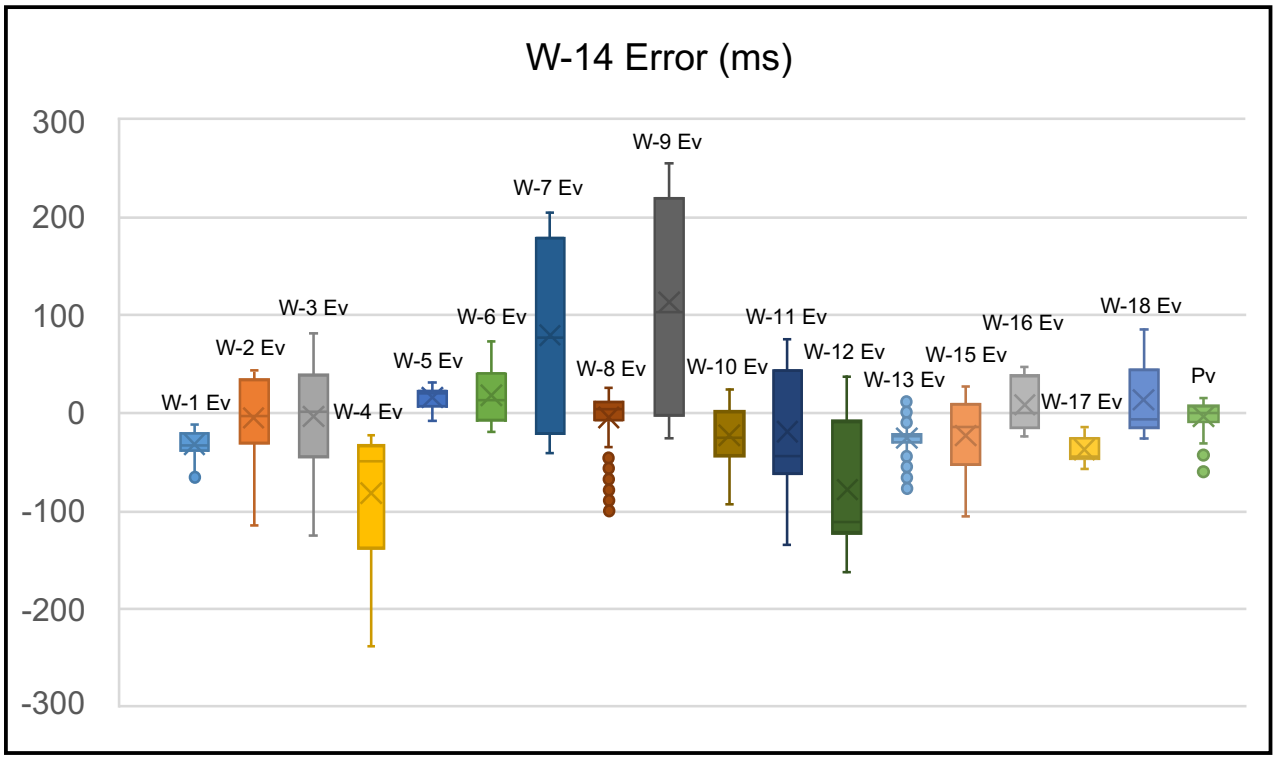
W-18 Ev
Pv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200
100
0
-100
-200
-300
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W-2 Ev
W-3 Ev
W-4 Ev
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W-7 Ev
W-8 Ev
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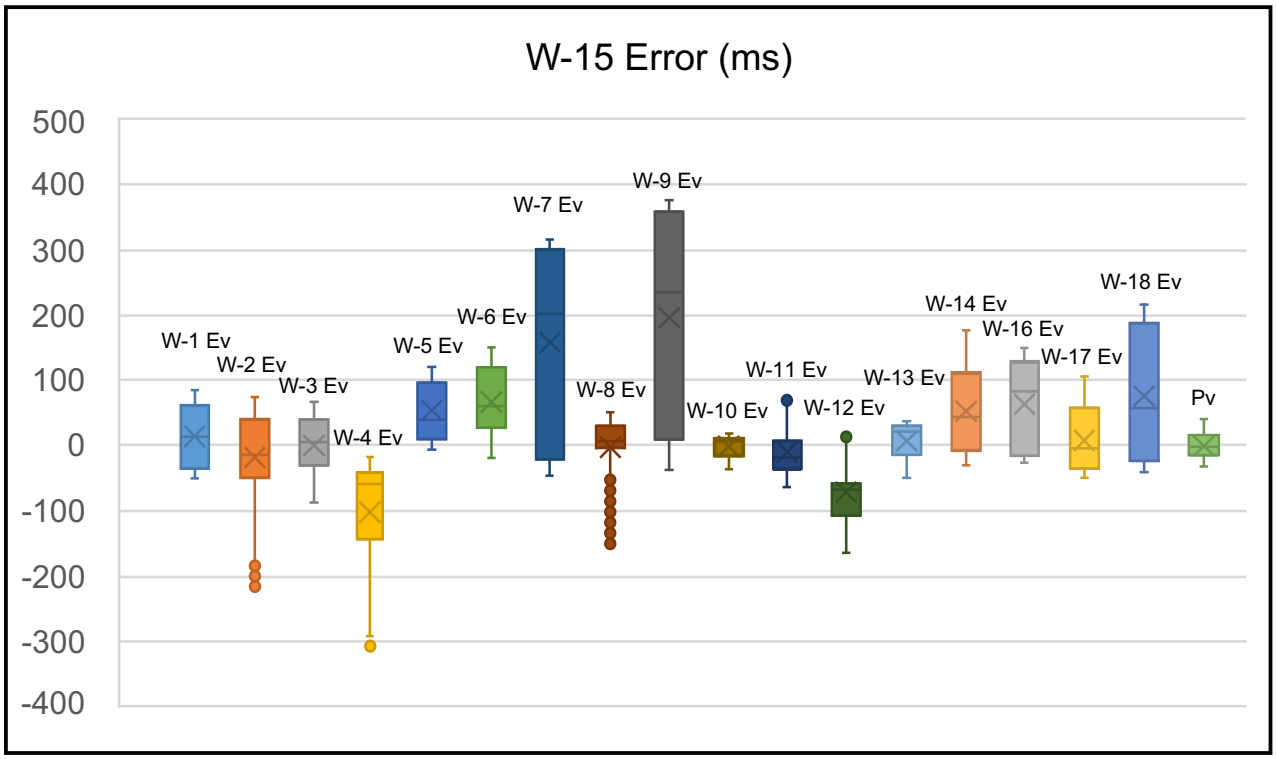
W-15 Ev
W-16 Ev
W-17 Ev
W-18 Ev
Pv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-300
-400
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W-3 Ev
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W-8 Ev
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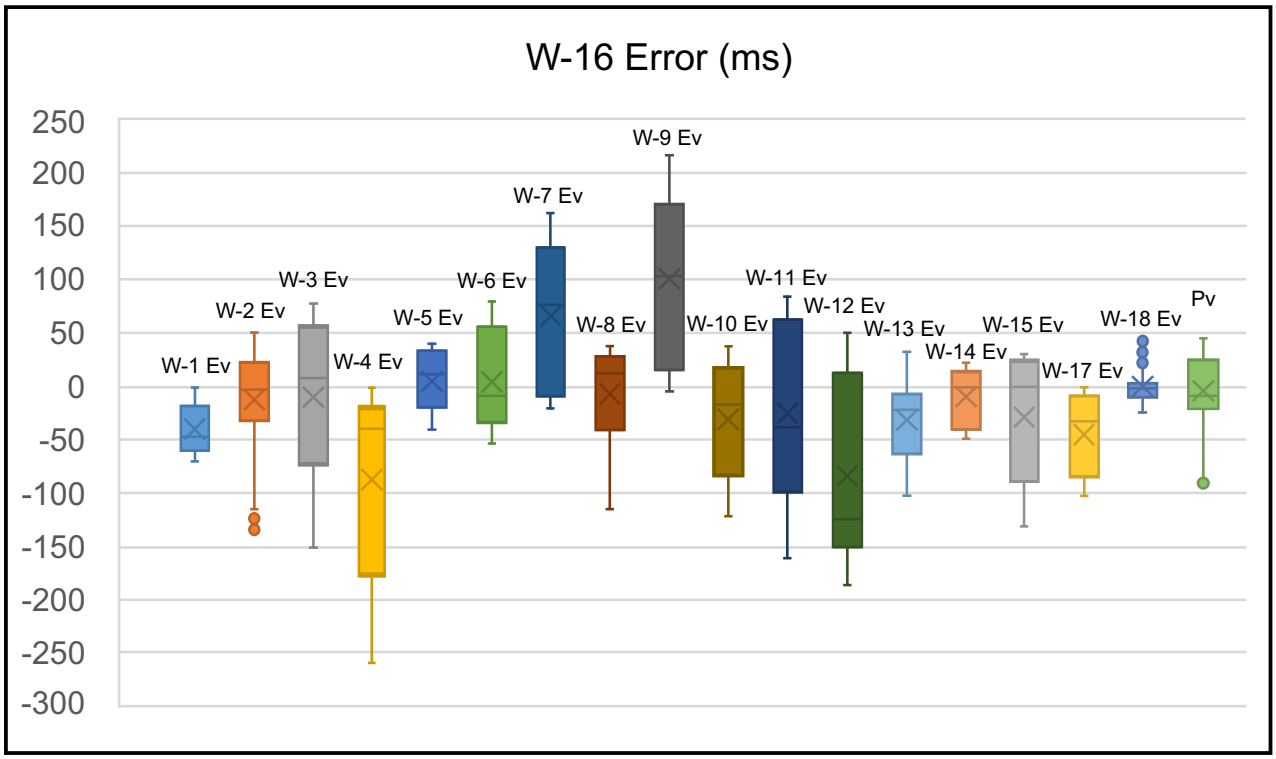
W-16 Ev
W-17 Ev
W-18 Ev
Pv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200
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-200
-250
-300
W-1 Ev
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W-3 Ev
W-4 Ev
W-5 Ev
W-6 Ev
W-7 Ev
W-8 Ev
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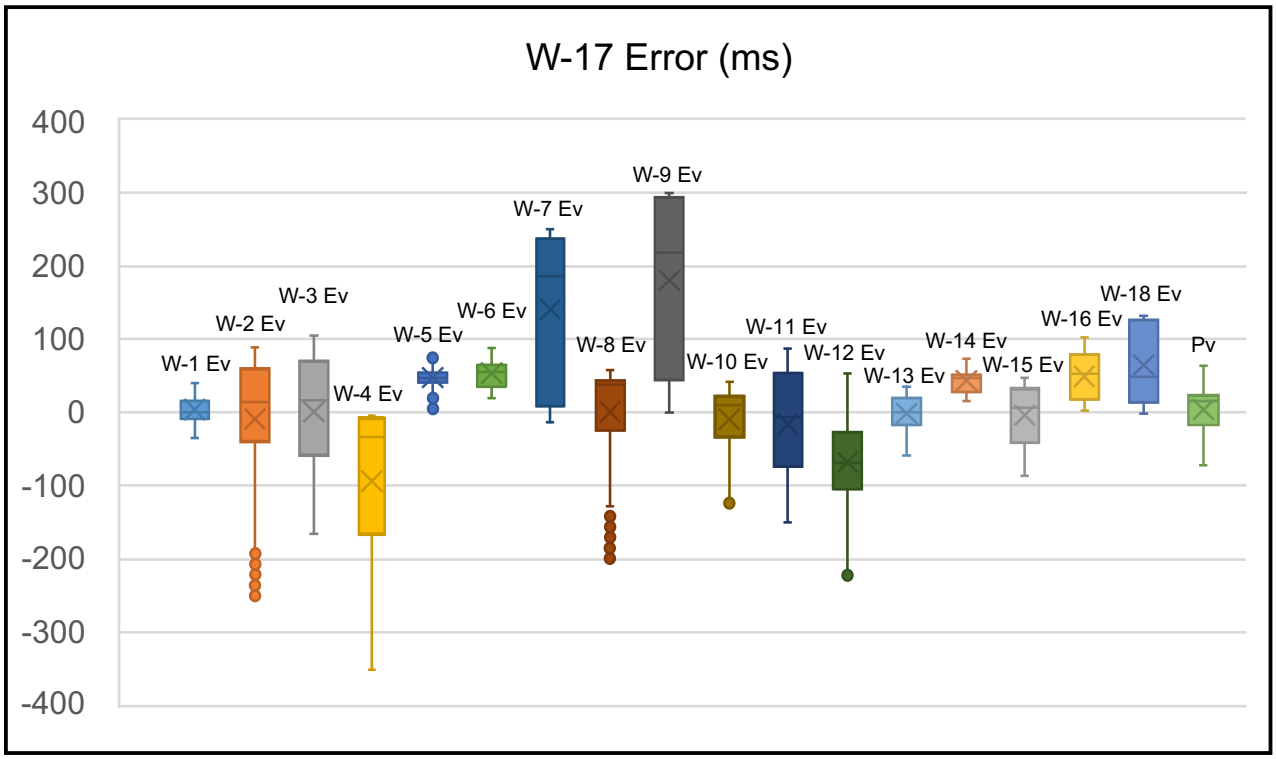
W-15 Ev
W-17 Ev
W-18 Ev
Pv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300
200
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-300
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W-1 Ev
W-2 Ev
W-3 Ev
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W-6 Ev
W-7 Ev
W-8 Ev
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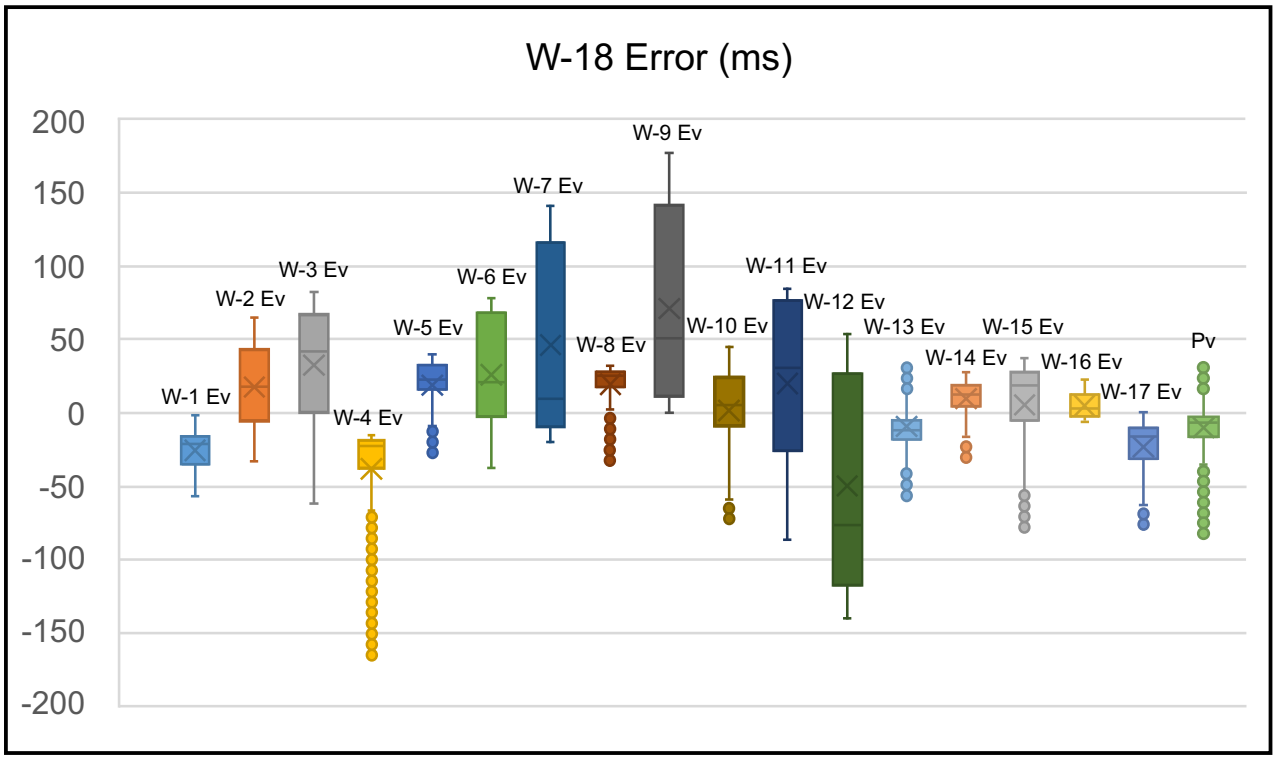
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-18 Ev
Pv


W-18 Error (ms)
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150
100
50
0
-50
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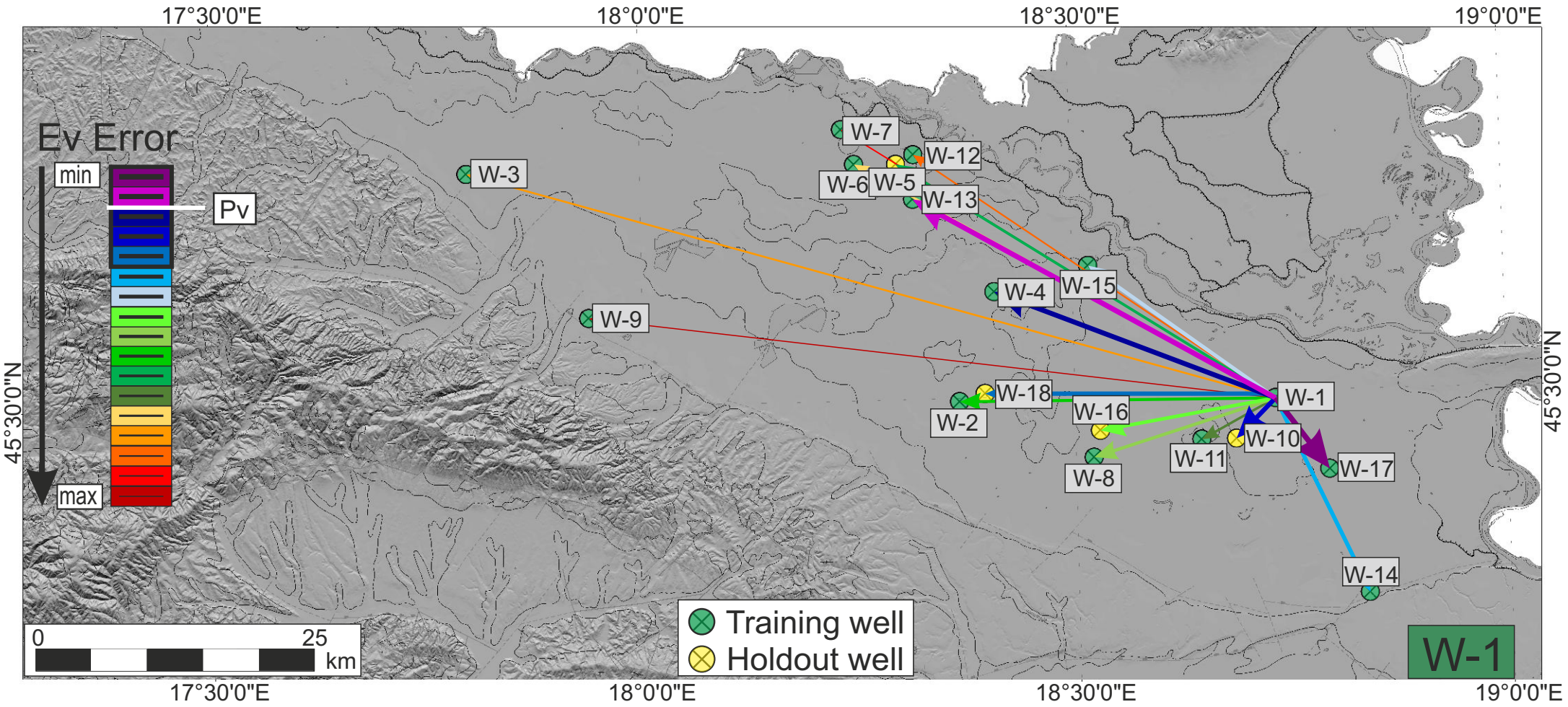
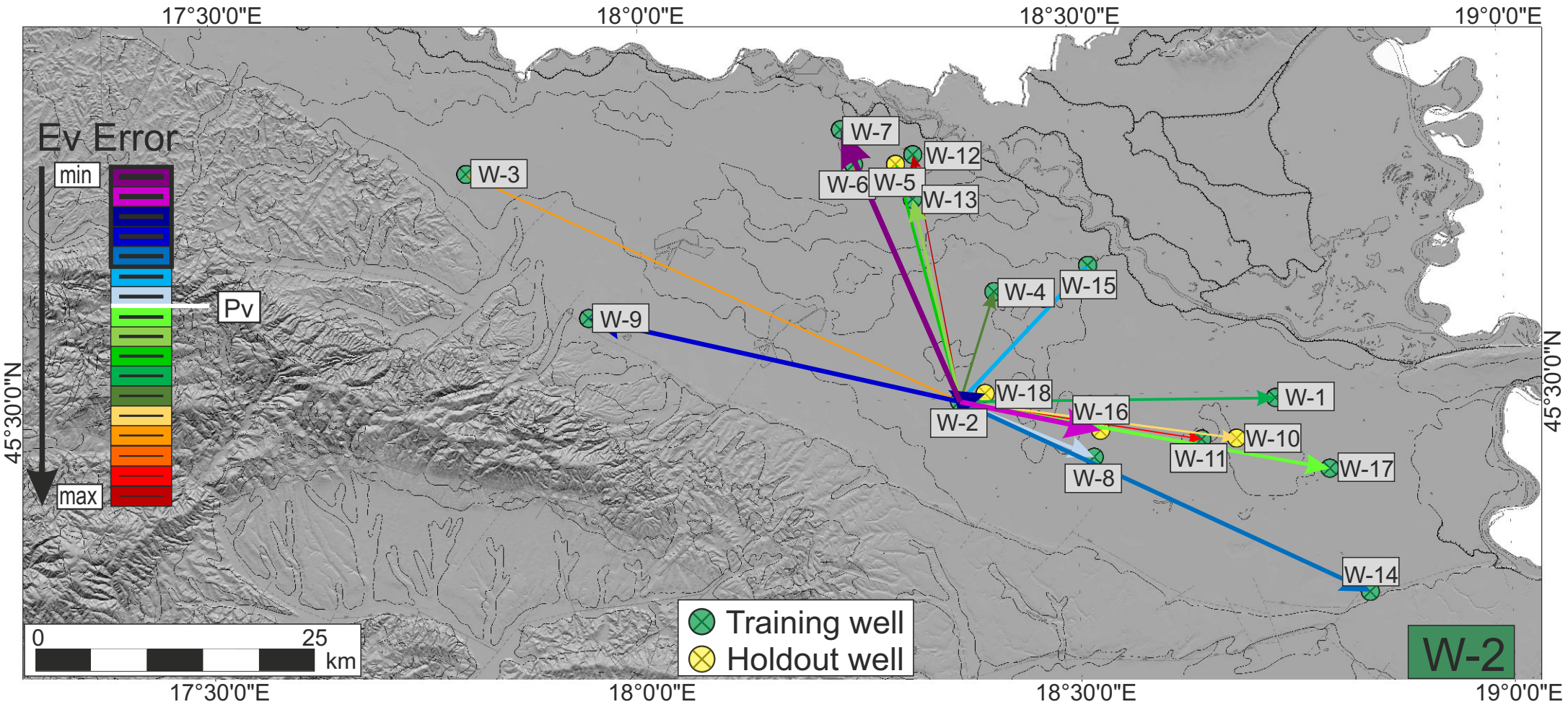
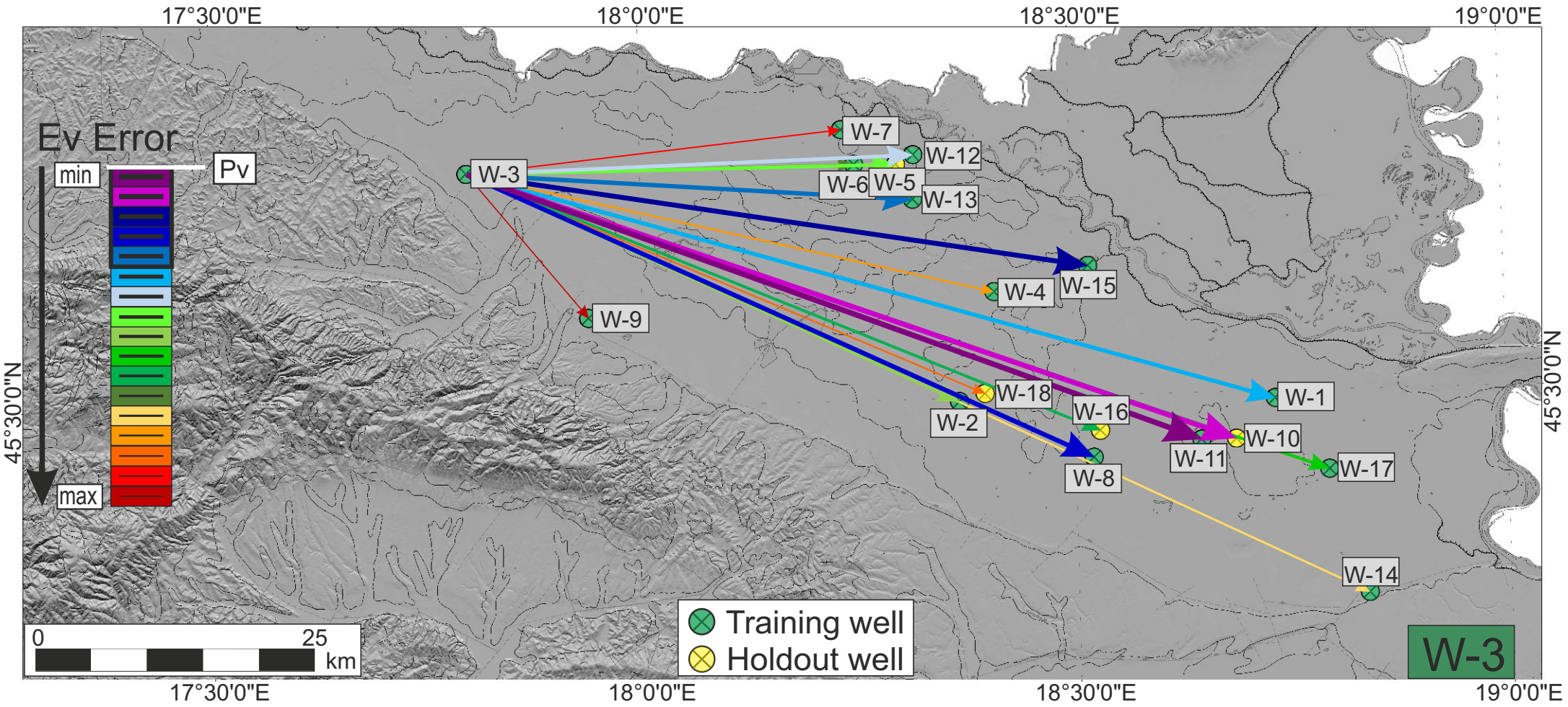
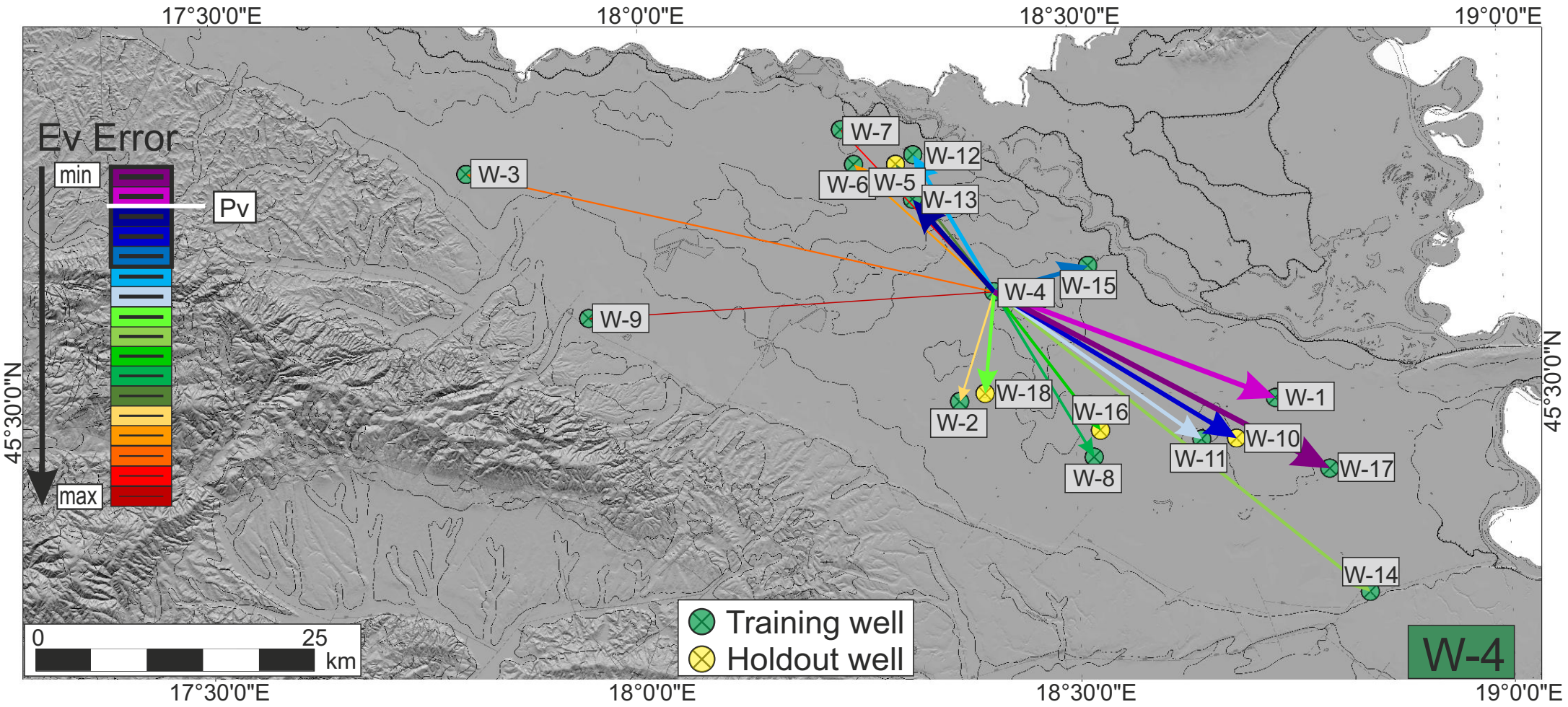
-150
-200
W-1 Ev
W-2 Ev
W-3 Ev
W-4 Ev
W-5 Ev
W-6 Ev
W-7 Ev
W-8 Ev
W-9 Ev
W-10 Ev
W-11 Ev
W-12 Ev
W-13 Ev
W-14 Ev
W-15 Ev
W-16 Ev
W-17 Ev
Pv

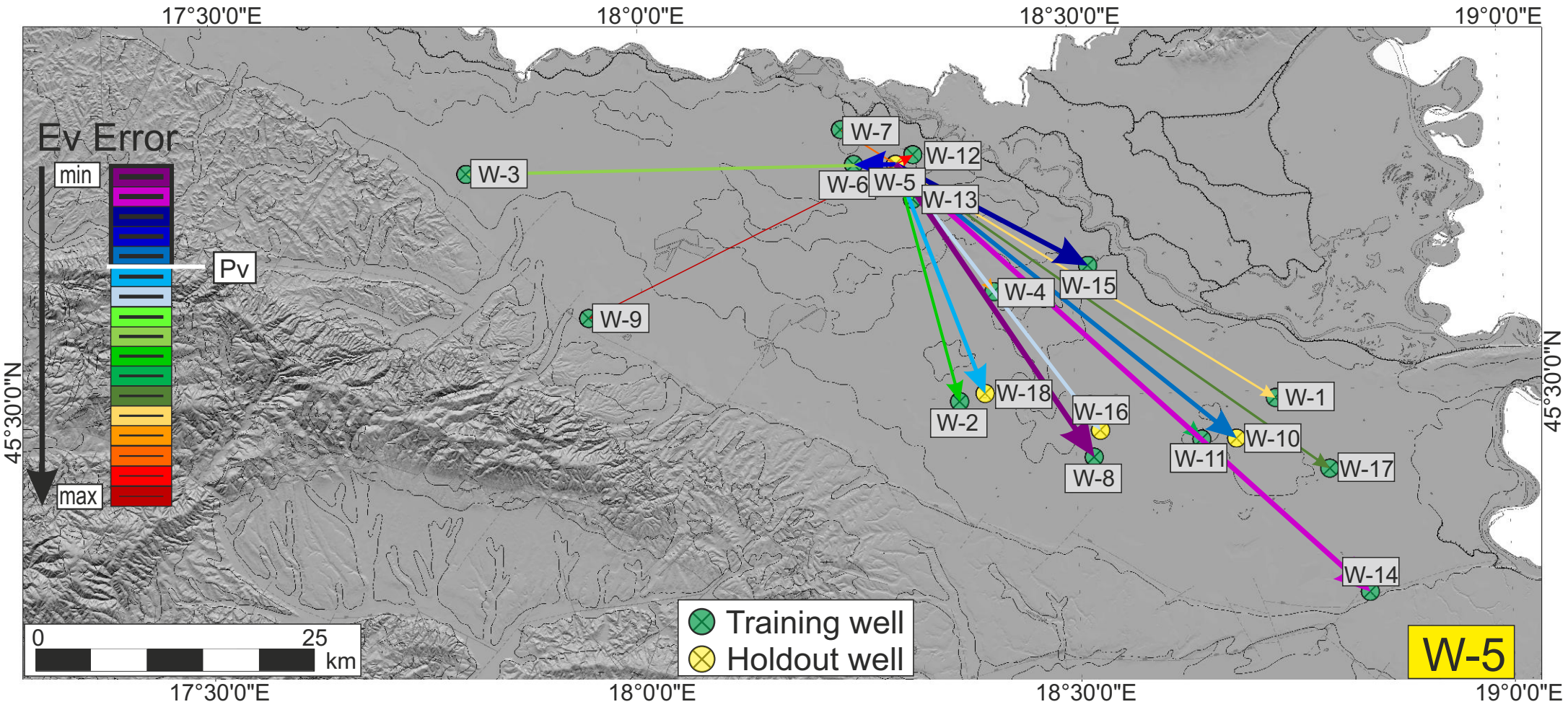
Appendix 3


17°30'0"E
18°0'0"E
18°30'0"E
19°0'0"E
45°30'0"N
Ev Error
min
max
Pv
W-3
W-7
W-12
W-6
W-5
W-13
W-4
W-15
W-9
W-18
W-1
W-2
W-16
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-1


17°30'0"E
18°0'0"E
18°30'0"E
19°0'0"E
45°30'0"N
Ev Error
min
max
Pv
W-3
W-7
W-12
W-6
W-5
W-13
W-9
W-4
W-15
W-18
W-2
W-16
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-2


17°30'0"E
18°0'0"E
18°30'0"E
19°0'0"E
45°30'0"N
Ev Error
min
Pv
max
W-3
W-7
W-12
W-6
W-5
W-13
W-15
W-4
W-9
W-18
W-16
W-2
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-3


17°30'0"E
18°0'0"E
18°30'0"E
19°0'0"E
45°30'0"N
Ev Error
min
max
Pv
W-3
W-9
W-7
W-6
W-5
W-12
W-13
W-4
W-15
W-2
W-18
W-16
W-8
W-11
W-10
W-1
W-17
W-14
0
25
km
Training well
Holdout well
W-4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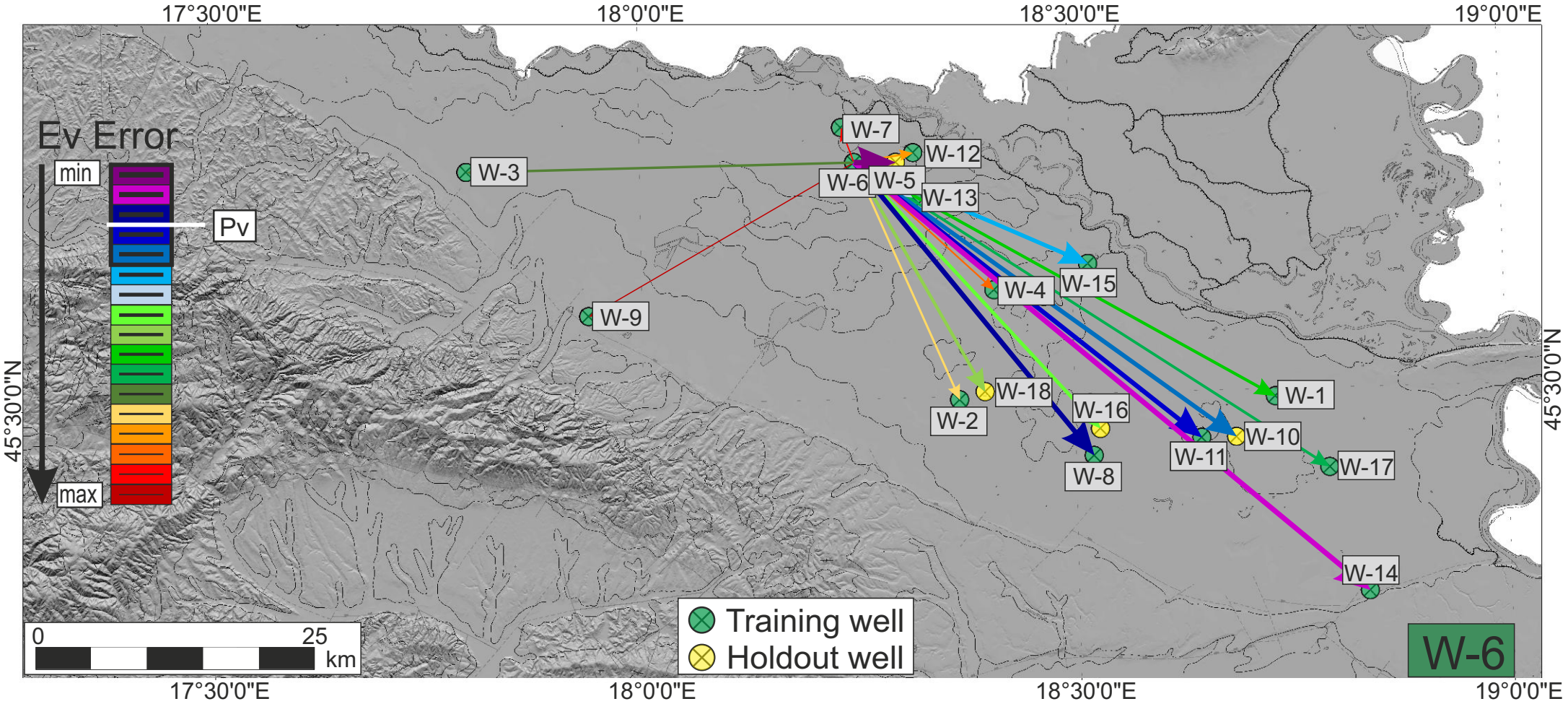
Ev Error
min
max
Pv
W-3
W-7
W-12
W-6
W-5
W-13
W-9
W-4
W-15
W-18
W-2
W-16
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-5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Ev Error
min
Pv
max
W-7
W-12
W-3
W-6
W-5
W-13
W-15
W-4
W-9
W-18
W-2
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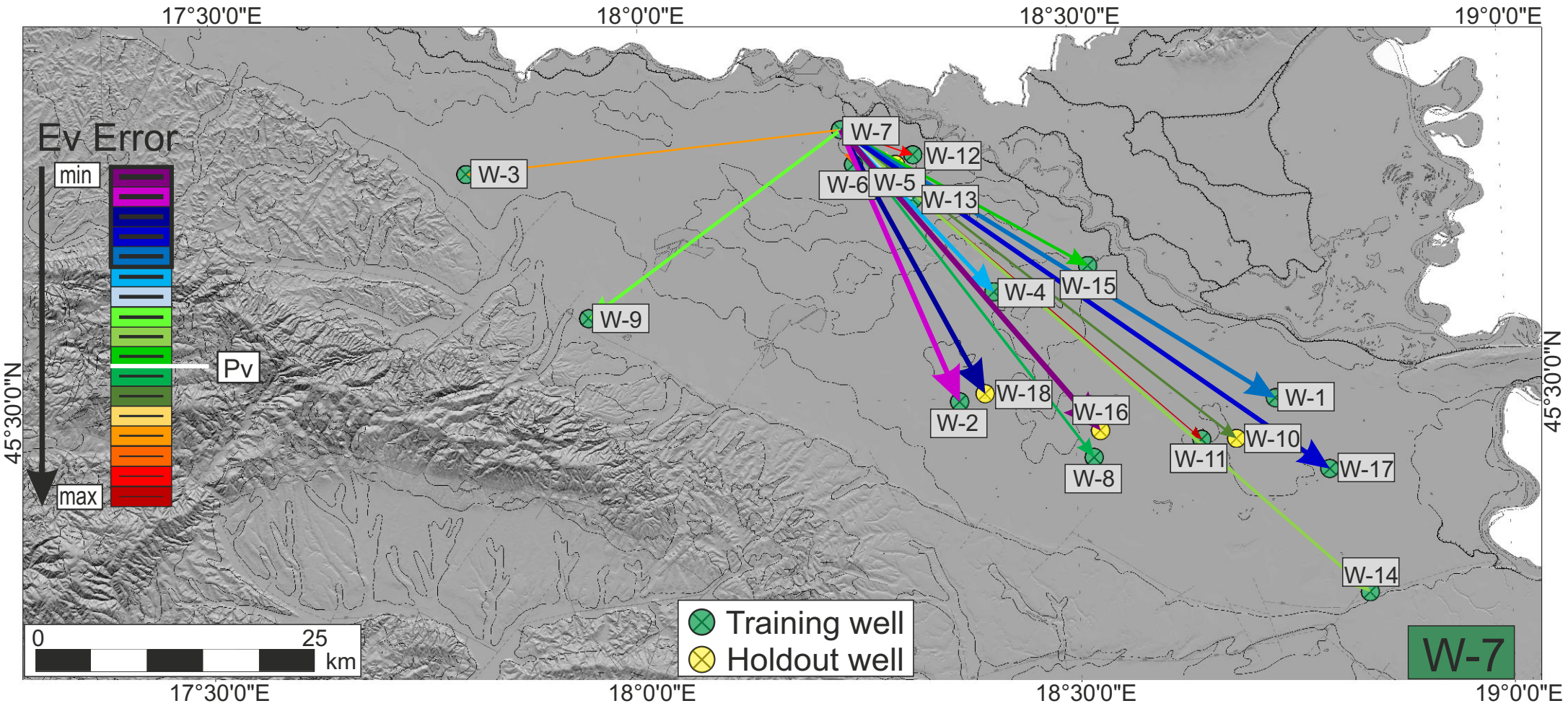
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-6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Ev Error
min
max
Pv
W-3
W-7
W-12
W-6
W-5
W-13
W-9
W-4
W-15
W-18
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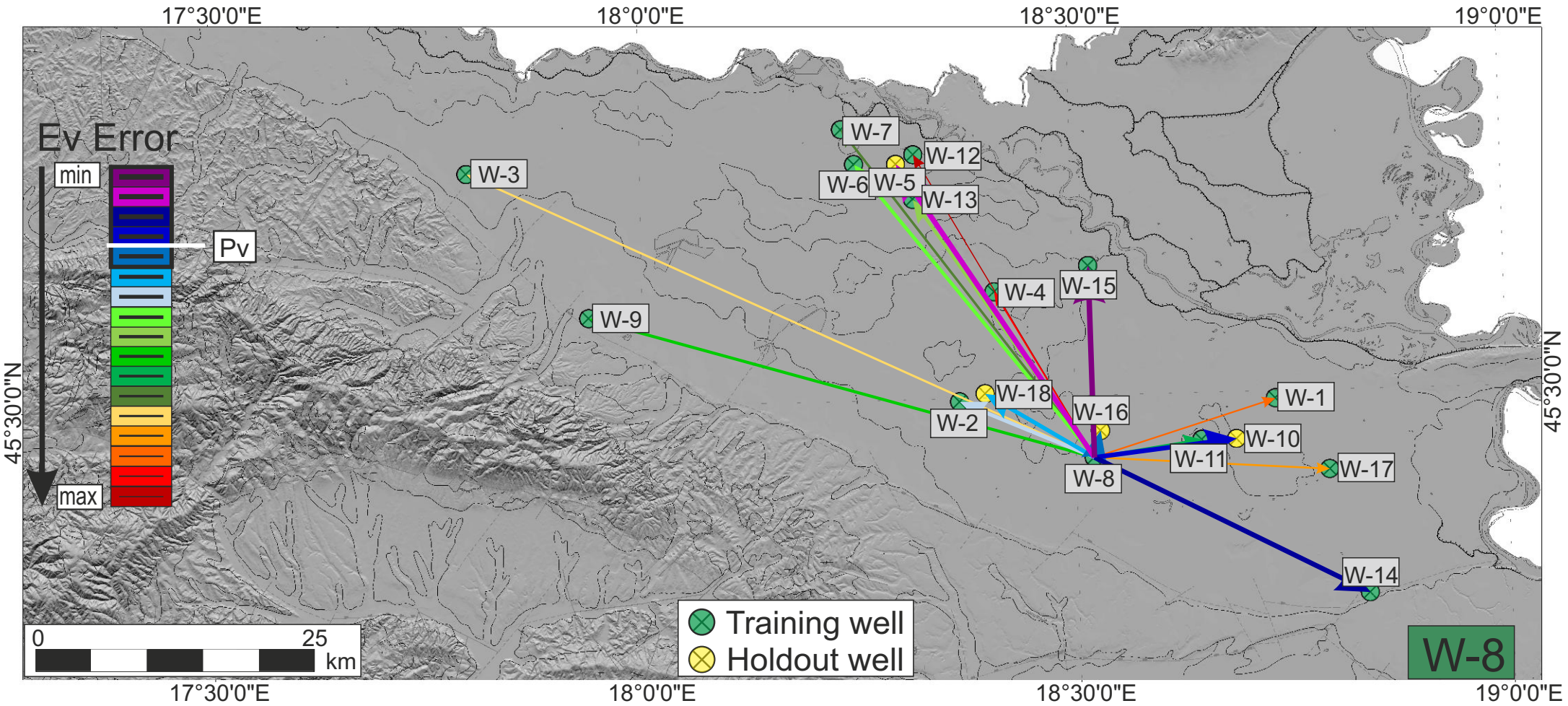
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-7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Pv
max
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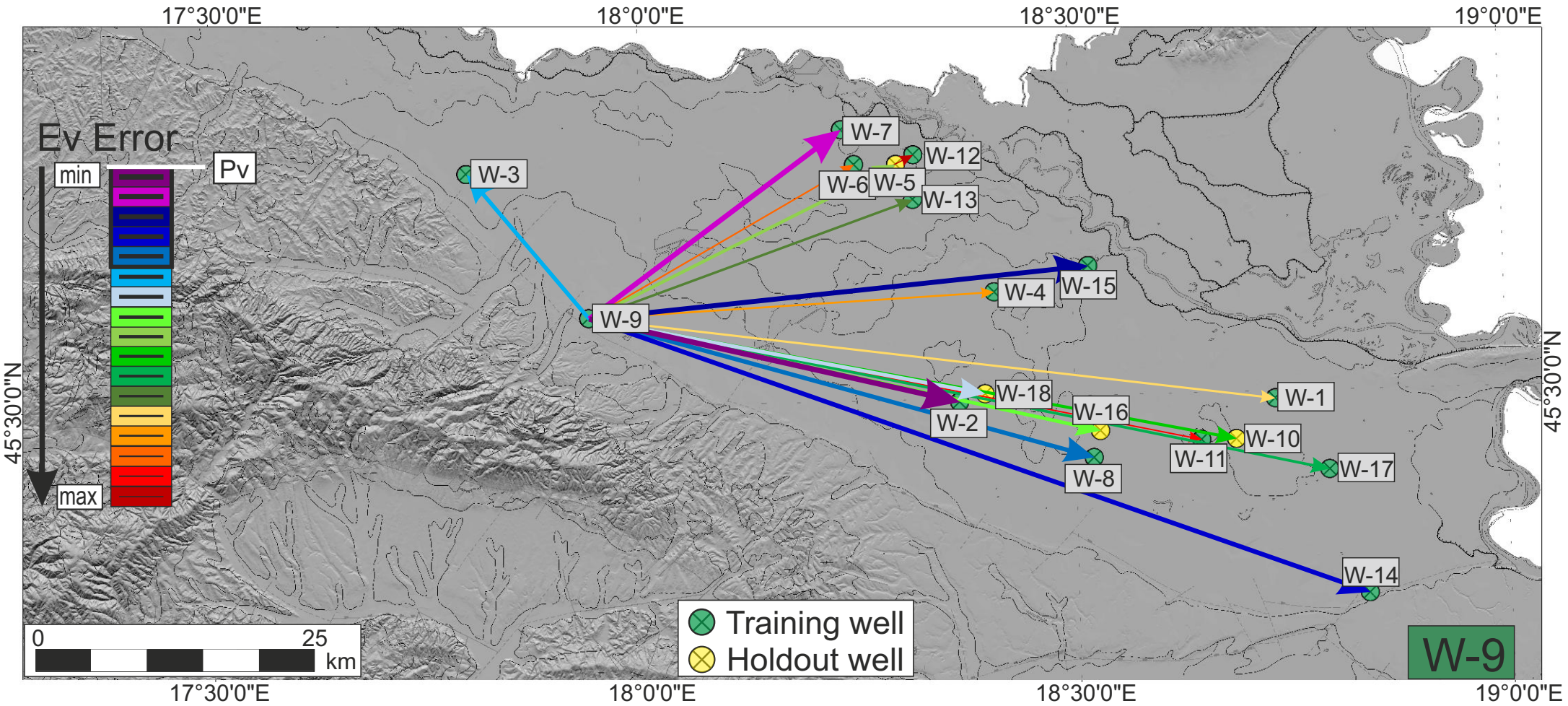
W-14
0
25
km
Training well
Holdout well
W-8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max
Pv
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W-12
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W-4
W-15
W-18
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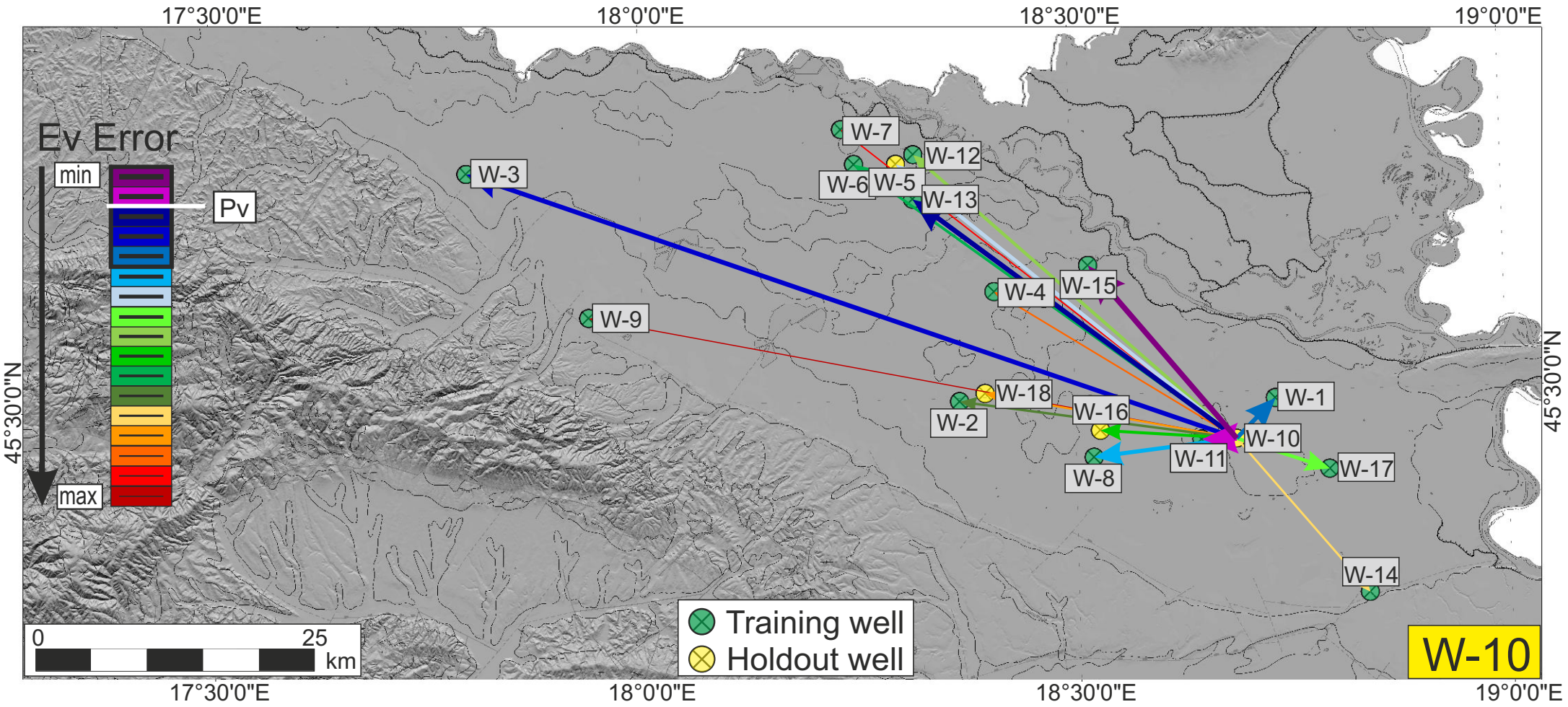
W-8
W-14
0
25
km
Training well
Holdout well
W-9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Ev Error
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Pv
max
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W-12
W-6
W-5
W-13
W-4
W-15
W-9
W-18
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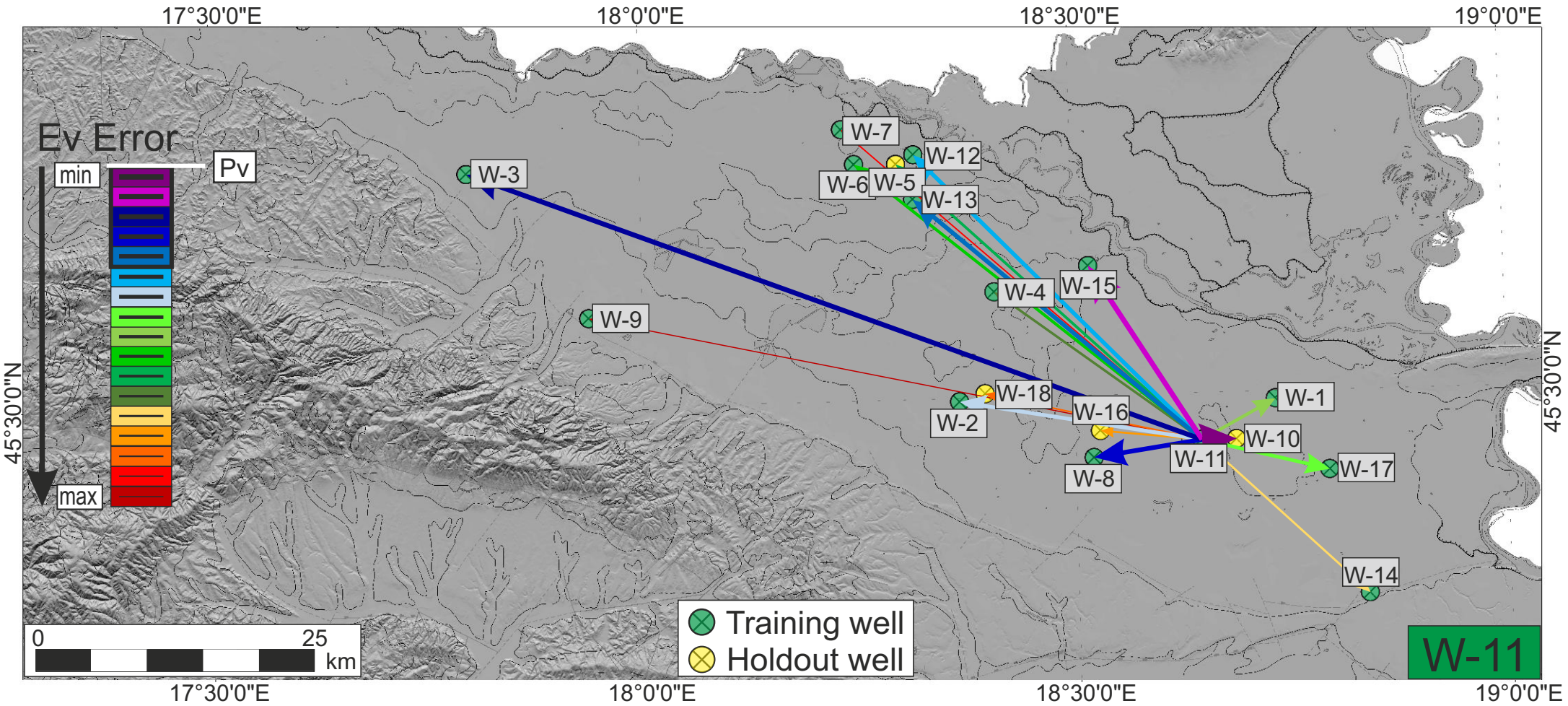
W-1
W-10
W-11
W-8
W-17
W-14
0
25
km
Training well
Holdout well
W-10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max
Pv
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W-9
W-18
W-2
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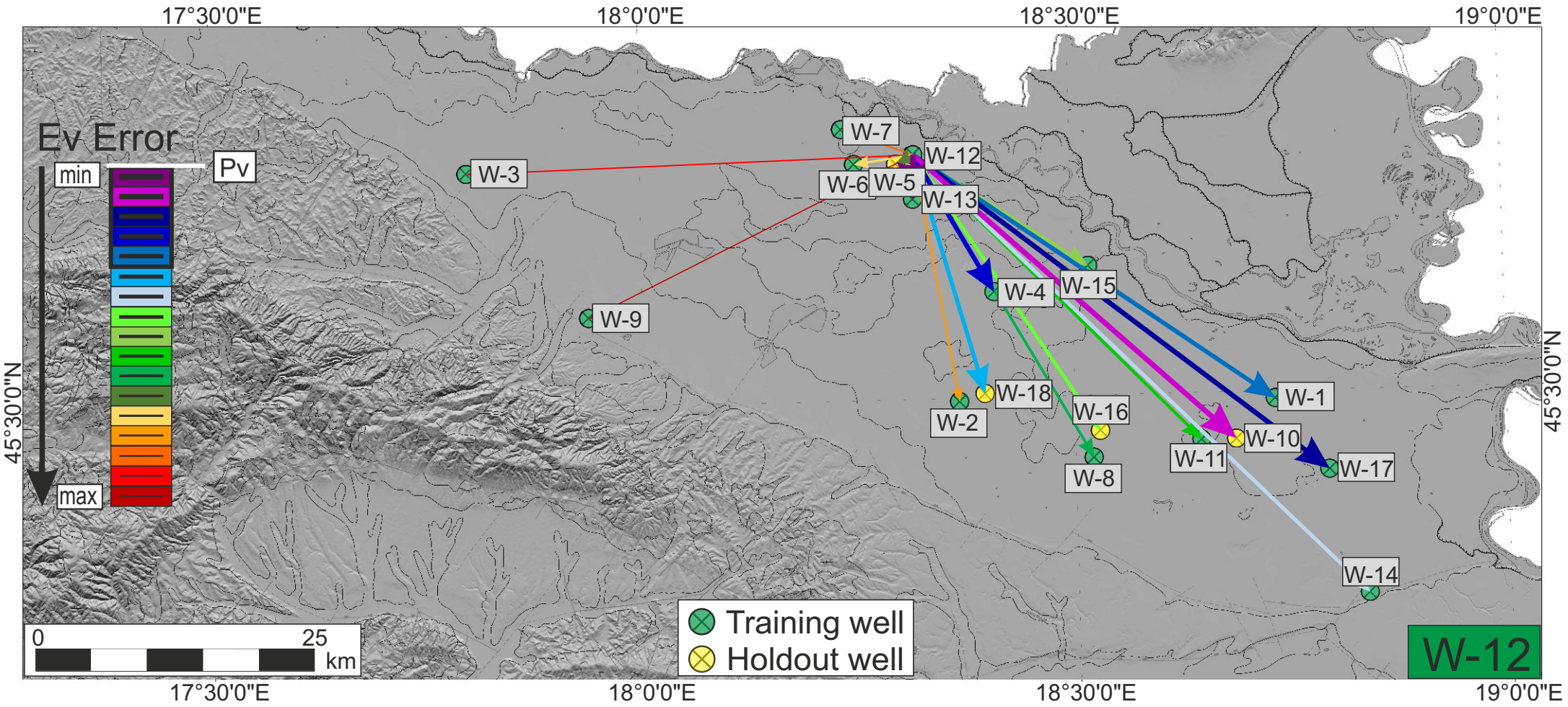
W-10
W-11
W-8
W-17
W-14
0
25
km
Training well
Holdout well
W-11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max
Pv
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W-13
W-4
W-15
W-18
W-2
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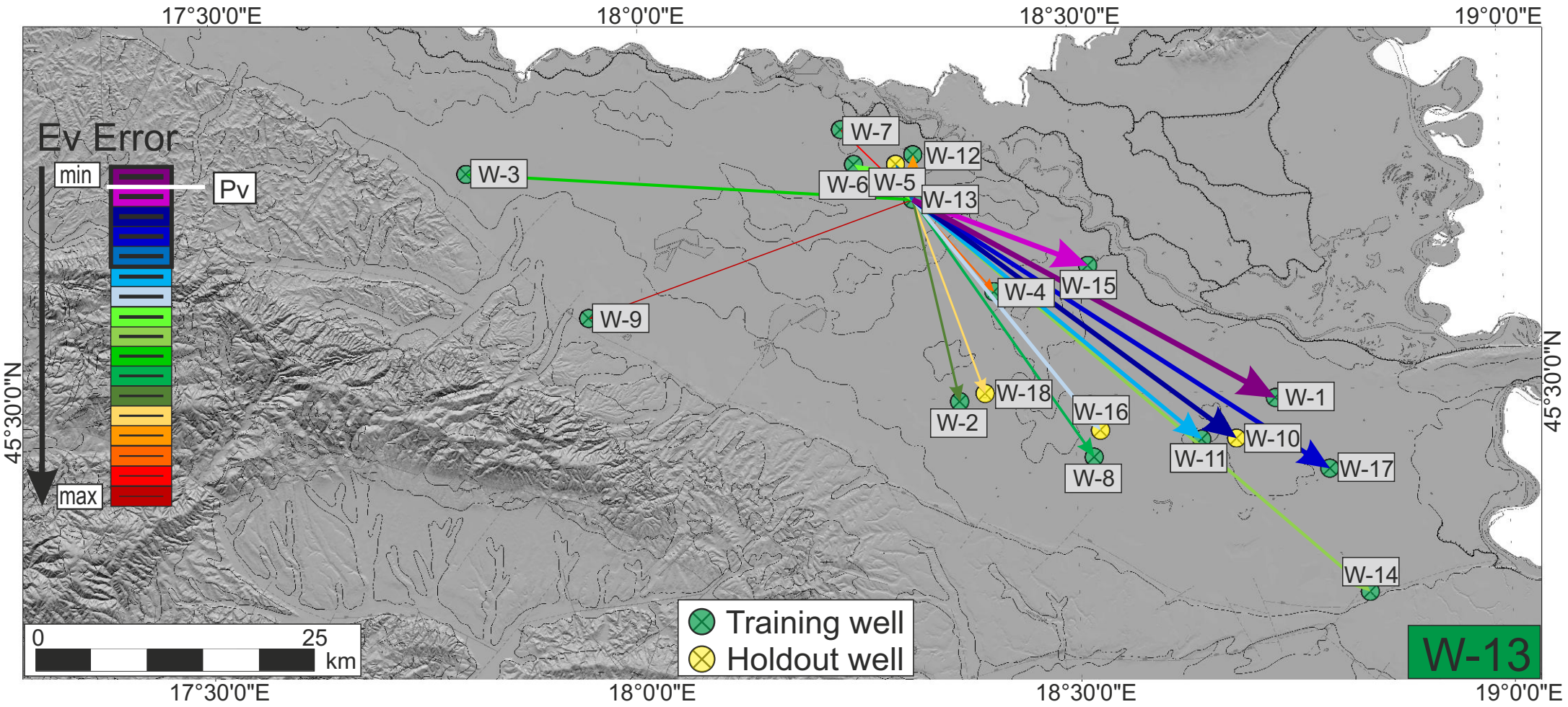
W-11
W-10
W-1
W-17
W-14
0
25
km
Training well
Holdout well
W-12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Ev Error
min
max
Pv
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W-13
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W-4
W-15
W-18
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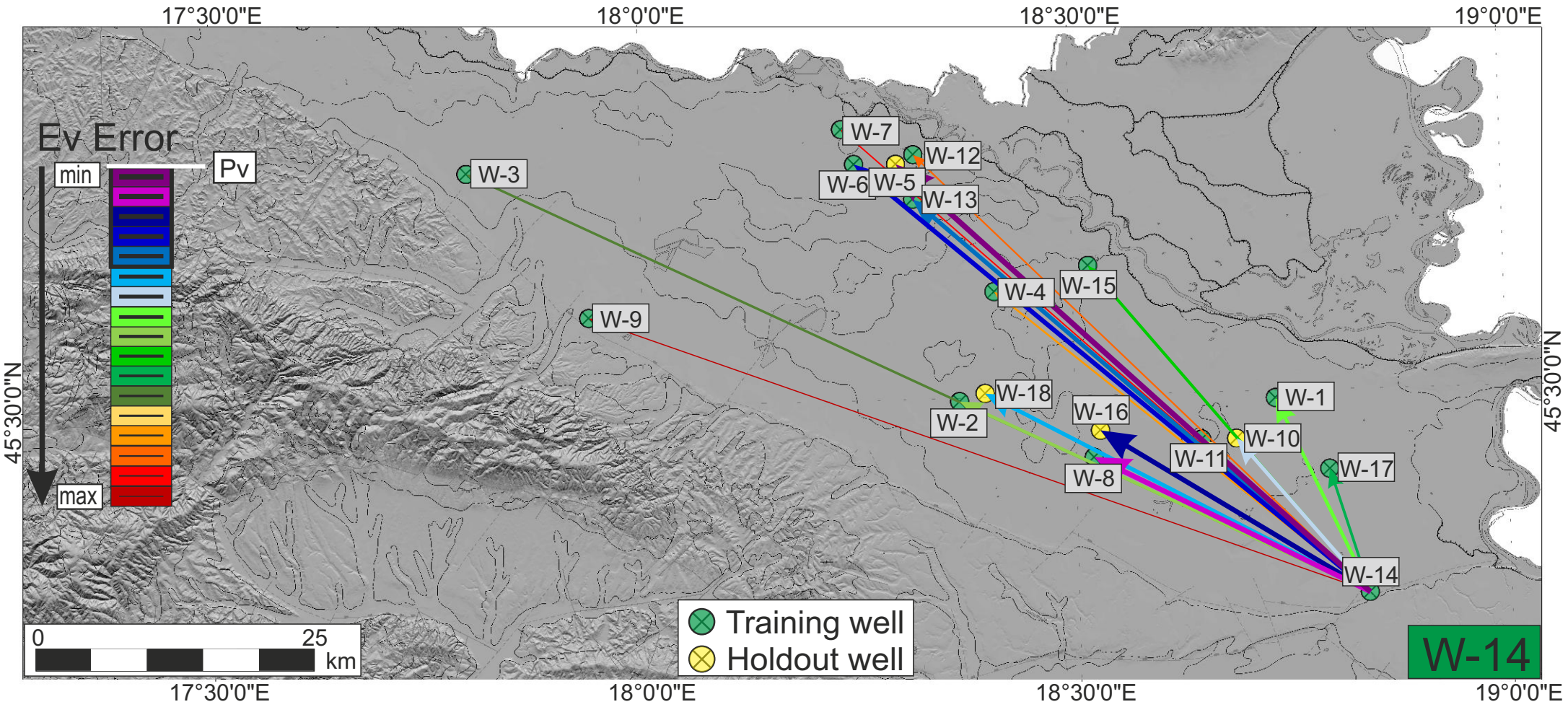
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-13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Ev Error
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max
Pv
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W-13
W-4
W-15
W-18
W-2
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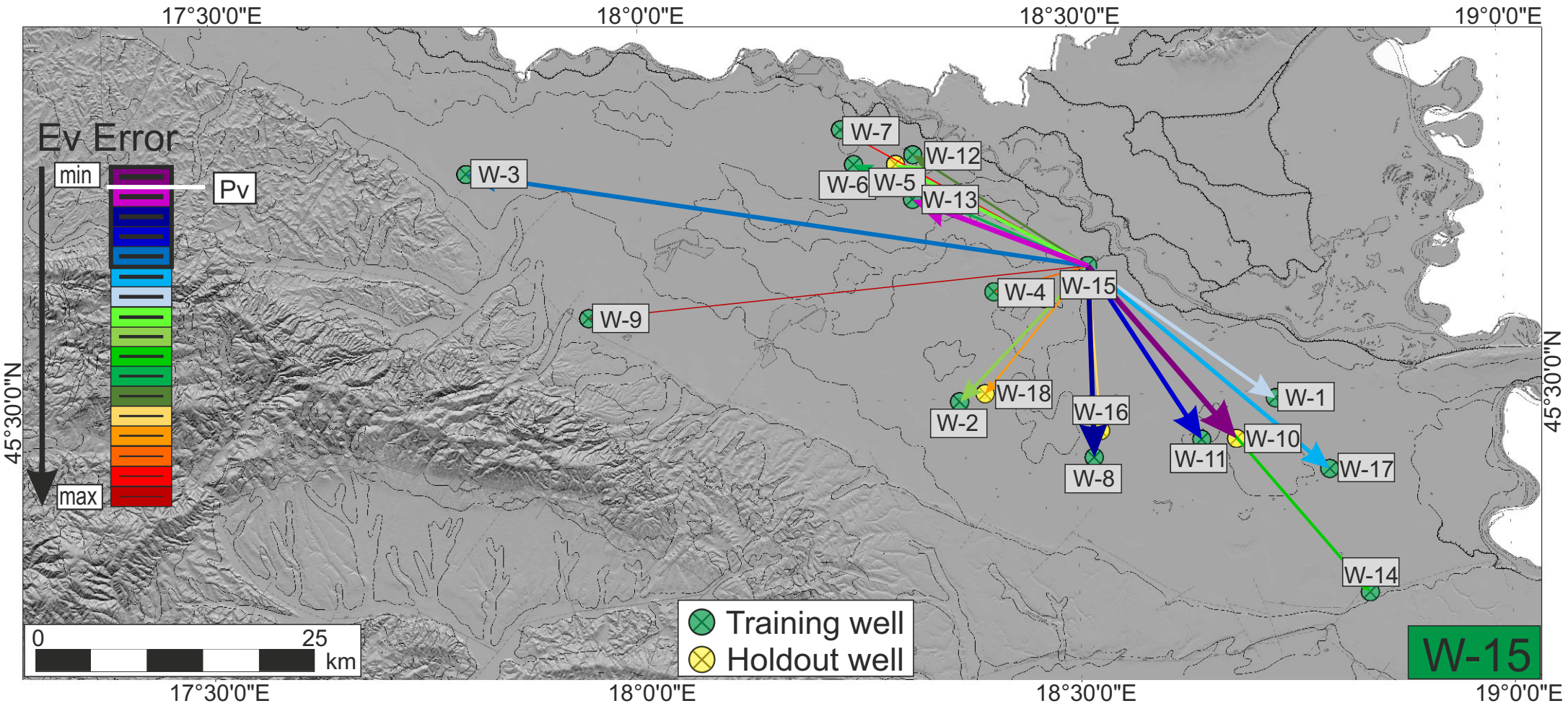
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-14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Ev Error
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max
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W-9
W-4
W-15
W-18
W-2
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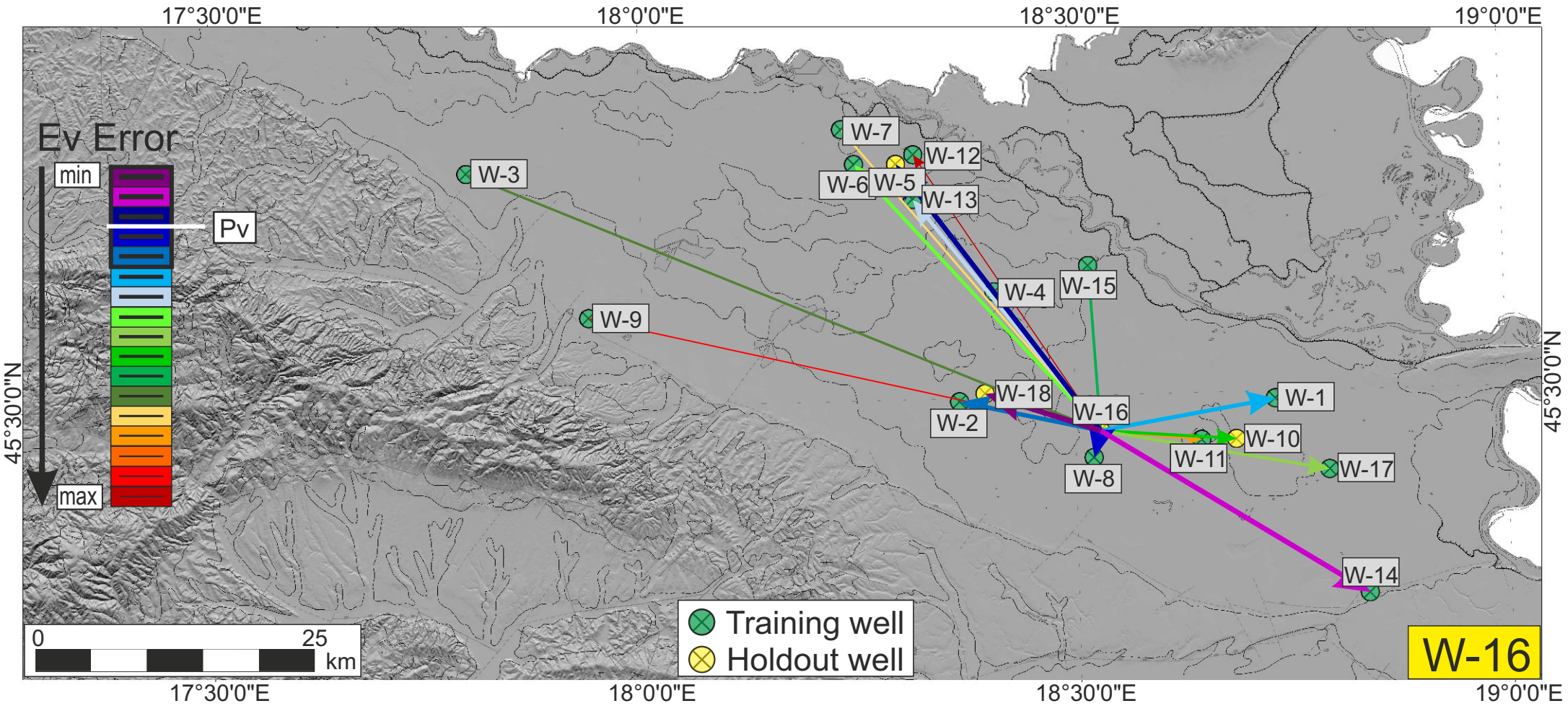
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-15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Ev Error
min
Pv
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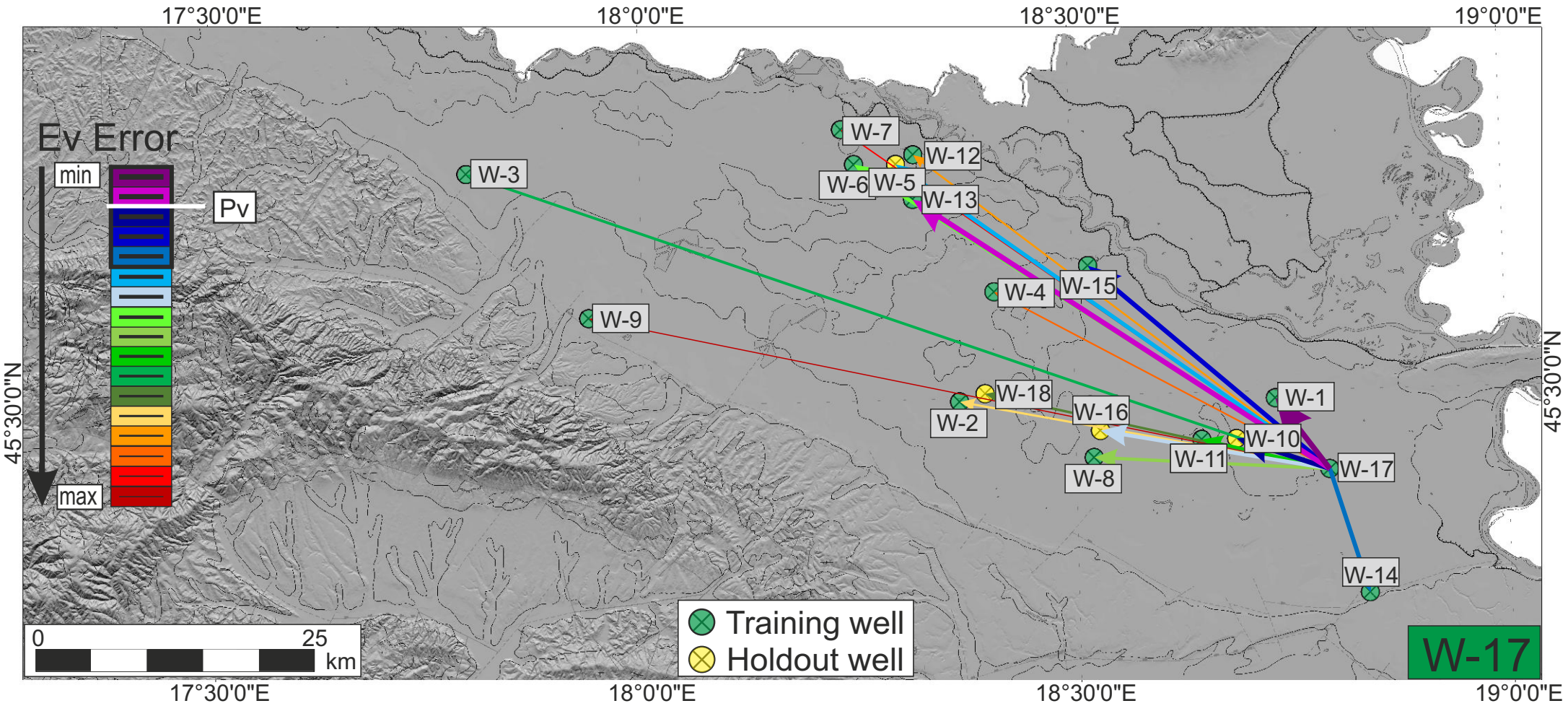
W-4
W-15
W-9
W-18
W-2
W-16
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-16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Ev Error
min
max
Pv
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W-9
W-18
W-2
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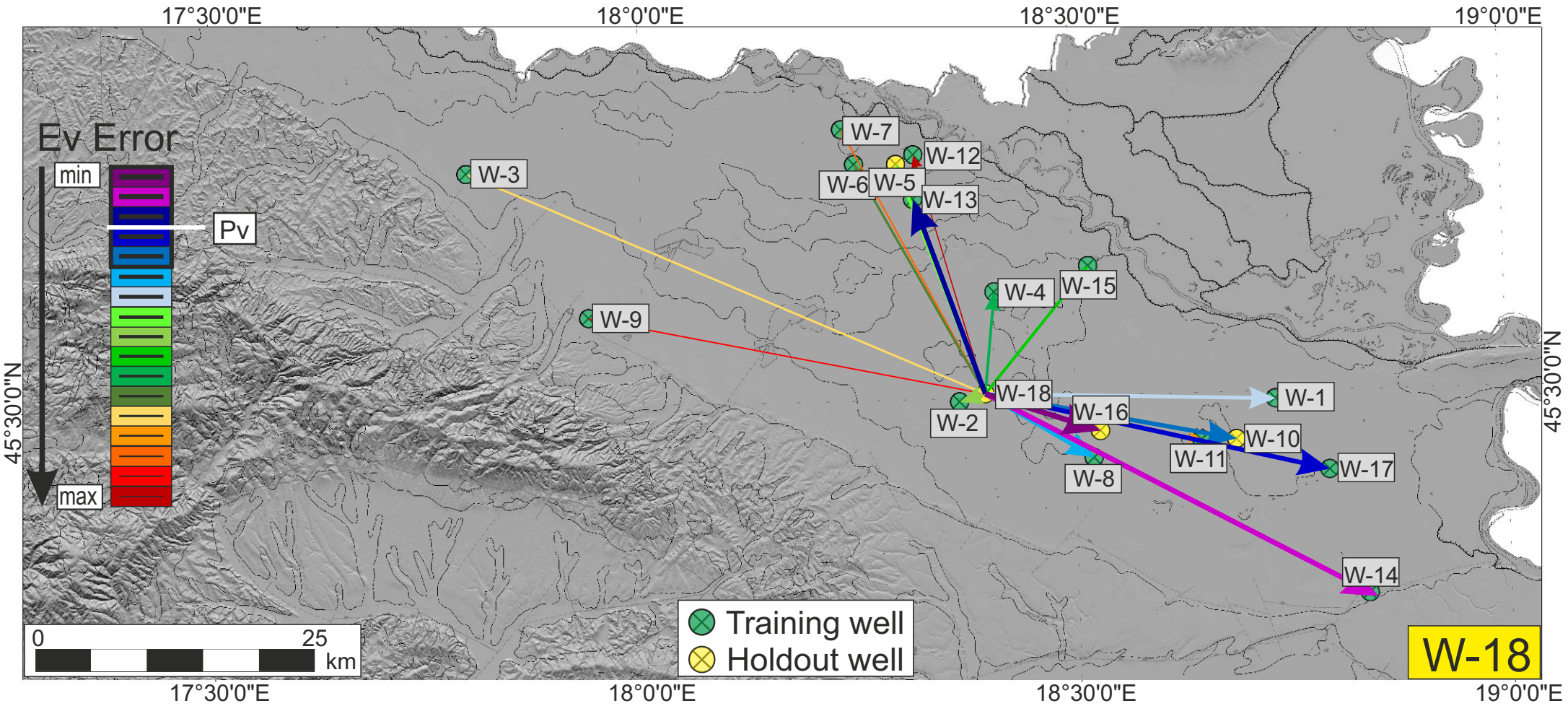
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-17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Ev Error
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Pv
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W-4
W-15
W-9
W-18
W-2
W-16
W-1
W-10
W-11
W-17
W-8
W-14
0
25
km
Training well
Holdout well
W-18