Table . PS error (estimate – ground truth) obtained using parameter map mean, signal mean, parameter map median, and signal median per region of interest as we progressively induced spatiotemporal imaging considerations. We report median error and interquartile range. AWGN: additive white Gaussian noise.

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| **Spatiotemporal consideration** | **Method** | **PS error [x10-4 min-1]** |
| **Normal-appearing white matter** | **White matter hyperintensity** | **Stroke lesion** | **Cortical grey matter** | **Deep grey matter** |
| **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** |
| k-space sampling | Parameter mean | 0.52(0.48, 0.60) | 0.22(0.21, 0.25) | 0.04(0.01, 0.08) | 0.07(-0.02, 0.14) | -0.78(-0.92, -0.61) | -0.04(-0.18, 0.32) | 1.45(1.4, 1.49) | 0.69(0.63, 0.75) | 0.11(0.07, 0.21) | 0.08(0.06, 0.14) |
| Signal mean | 0.48(0.44, 0.54) | 0.22(0.20, 0.25) | 0.01(-0.02, 0.05) | 0.06(-0.03, 0.13) | -0.80(-0.94, -0.64) | -0.05(-0.19, 0.32) | 1.29(1.25, 1.33) | 0.63(0.56, 0.68) | 0.06(0.02, 0.15) | 0.06(0.04, 0.12) |
| Parameter median | 0.30(0.27, 0.33) | 0.15(0.14, 0.16) | -0.02(-0.11, 0.01) | 0.05(-0.02, 0.12) | -0.69(-0.84, -0.53) | -0.10(-0.26, 0.14) | 0.05(0.01, 0.10) | 0.05(0.00, 0.09) | -0.17(-0.20, -0.13) | 0.08(0.05, 0.11) |
| Signal median | 0.14(0.10, 0.17) | 0.19(0.18, 0.21) | 0.10(-0.06, 0.19) | 0.05(-0.13, 0.26) | -0.46(-0.66, -0.28) | -0.12(-0.35, 0.15) | 1.57(1.54, 1.66) | 0.77(0.72, 0.85) | 0.16(0.08, 0.24) | 0.19(0.14, 0.37) |
| Gross motionk-space sampling | Parameter mean | -0.92(-1.36, -0.51) | -0.34(-0.45, -0.24) | 0.75(0.45, 1.18) | 0.35(0.09, 0.6) | -0.65(-0.86, -0.34) | 0.25(-0.05, 0.62) | 2.13(1.86, 2.41) | 0.96(0.85, 1.06) | 0.53(0.40, 0.76) | 0.34(0.23, 0.58) |
| Signal mean | -1.00(-1.48, -0.58) | -0.38(-0.50, -0.28) | 0.65(0.39, 1.03) | 0.30(0.07, 0.56) | -0.68(-0.88, -0.37) | 0.23(-0.06, 0.61) | 1.77(1.58, 2) | 0.70(0.64, 0.81) | 0.44(0.32, 0.64) | 0.27(0.17, 0.52) |
| Parameter median | -0.69(-1.03, -0.43) | -0.25(-0.32, -0.17) | 0.72(0.38, 1.09) | 0.46(0.21, 0.8) | -0.55(-0.81, -0.27) | 0.15(-0.15, 0.45) | 1.04(0.74, 1.28) | 0.41(0.28, 0.53) | 0.41(0.24, 0.72) | 0.38(0.26, 0.58) |
| Signal median | -1.24(-1.72, -0.85) | -0.36(-0.50, -0.24) | 0.92(0.51, 1.37) | 0.49(0.05, 0.78) | -0.30(-0.64, 0.01) | 0.07(-0.21, 0.45) | 1.95(1.8, 2.11) | 0.80(0.72, 0.88) | 0.78(0.49, 1.02) | 0.49(0.32, 0.78) |
| Gross motionk-space samplingMotion artefacts | Parameter mean | -0.98(-1.51, -0.53) | -0.39(-0.51, -0.28) | 0.78(0.50, 1.25) | 0.35(0.12, 0.64) | -0.65(-0.87, -0.31) | 0.26(-0.05, 0.66) | 2.20(1.9, 2.47) | 1.00(0.87, 1.11) | 0.56(0.43, 0.77) | 0.34(0.23, 0.59) |
| Signal mean | -1.08(-1.59, -0.63) | -0.42(-0.54, -0.32) | 0.69(0.42, 1.1) | 0.31(0.1, 0.56) | -0.68(-0.89, -0.36) | 0.25(-0.06, 0.63) | 1.82(1.61, 2.06) | 0.74(0.65, 0.84) | 0.47(0.34, 0.66) | 0.28(0.17, 0.52) |
| Parameter median | -0.75(-1.11, -0.46) | -0.27(-0.36, -0.19) | 0.76(0.45, 1.16) | 0.48(0.24, 0.83) | -0.58(-0.82, -0.26) | 0.16(-0.14, 0.48) | 1.10(0.79, 1.37) | 0.45(0.30, 0.57) | 0.48(0.26, 0.74) | 0.39(0.26, 0.6) |
| Signal median | -1.36(-1.84, -0.9) | -0.38(-0.51, -0.25) | 0.96(0.58, 1.44) | 0.46(0.07, 0.77) | -0.31(-0.64, 0.01) | 0.08(-0.25, 0.49) | 1.98(1.82, 2.14) | 0.82(0.73, 0.90) | 0.78(0.55, 1.07) | 0.50(0.32, 0.80) |
| Gross motionk-space samplingMotion artefactsAWGN | Parameter mean | -0.96(-1.48, -0.54) | -0.35(-0.48, -0.24) | 0.82(0.55, 1.28) | 0.39(0.09, 0.67) | -0.65(-0.93, -0.25) | 0.29(-0.16, 0.65) | 2.22(1.94, 2.49) | 1.02(0.90, 1.13) | 0.58(0.45, 0.81) | 0.37(0.26, 0.63) |
| Signal mean | -1.10(-1.61, -0.65) | -0.43(-0.55, -0.32) | 0.71(0.47, 1.08) | 0.33(0.03, 0.59) | -0.69(-0.98, -0.31) | 0.25(-0.19, 0.6) | 1.82(1.61, 2.05) | 0.74(0.65, 0.84) | 0.47(0.34, 0.64) | 0.28(0.18, 0.54) |
| Parameter median | -0.88(-1.25, -0.56) | -0.35(-0.45, -0.26) | 0.70(0.47, 1.16) | 0.45(0.14, 0.76) | -0.63(-0.96, -0.25) | 0.20(-0.19, 0.64) | 1.16(0.87, 1.4) | 0.49(0.35, 0.60) | 0.43(0.25, 0.71) | 0.37(0.25, 0.64) |
| Signal median | -1.21(-1.65, -0.78) | -0.42(-0.54, -0.30) | 0.89(0.60, 1.44) | 0.45(0.02, 0.75) | -0.37(-0.72, 0.02) | 0.21(-0.23, 0.62) | 1.98(1.83, 2.14) | 0.83(0.74, 0.91) | 0.73(0.53, 1.04) | 0.47(0.31, 0.78) |

Table . Relative PS error obtained using parameter map mean, signal mean, parameter map median, and signal median per region of interest as we progressively induced spatiotemporal imaging considerations. We report median error and interquartile range. AWGN: additive white Gaussian noise.

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| **Spatiotemporal consideration** | **Method** | **Relative PS error (%)** |
| **Normal-appearing white matter** | **White matter hyperintensity** | **Stroke lesion** | **Cortical grey matter** | **Deep grey matter** |
| **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** | **Raw** | **Erosion** |
| k-space sampling | Parameter mean | 18.93(17.43, 21.89) | 8.15(7.66, 9.24) | 1.01(0.27, 2.01) | 1.81(-0.51, 3.50) | -10.75(-12.69, -8.46) | -0.50(-2.53, 4.44) | 37.57(36.38, 38.83) | 17.93(16.27, 19.39) | 2.72(1.72, 5.38) | 1.98(1.46, 3.7) |
| Signal mean | 17.45(15.91, 19.78) | 7.97(7.45, 9.02) | 0.34(-0.43, 1.32) | 1.65(-0.83, 3.28) | -11.01(-12.91, -8.77) | -0.63(-2.56, 4.40) | 33.54(32.38, 34.66) | 16.24(14.43, 17.62) | 1.29(0.41, 3.81) | 1.56(1.06, 3.11) |
| Parameter median | 11.01(9.75, 12.05) | 5.52(5.05, 5.91) | -0.59(-2.70, 0.25) | 1.24(-0.65, 3.26) | -9.50(-11.55, -7.27) | -1.31(-3.58, 1.93) | 1.27(0.17, 2.61) | 1.20(-0.14, 2.31) | -4.47(-5.12, -3.26) | 2.02(1.22, 2.78) |
| Signal median | 5.24(3.49, 6.32) | 6.98(6.36, 7.63) | 2.57(-1.50, 4.92) | 1.23(-3.26, 6.61) | -6.29(-9.17, -3.89) | -1.62(-4.89, 2.05) | 40.71(39.87, 43.04) | 20.04(18.67, 22.07) | 4.06(2.17, 6.32) | 4.94(3.65, 9.58) |
| Gross motionk-space sampling | Parameter mean | -33.61(-49.94, -18.42) | -12.47(-16.55, -8.76) | 19.03(11.38, 30.11) | 8.77(2.18, 15.37) | -8.97(-11.85, -4.74) | 3.42(-0.67, 8.58) | 55.19(47.99, 62.61) | 24.84(22.05, 27.43) | 13.85(10.43, 19.78) | 8.81(5.88, 15.06) |
| Signal mean | -36.54(-53.69, -21.19) | -13.81(-18.42, -10.29) | 16.26(9.66, 26.35) | 7.56(1.54, 14.27) | -9.29(-12.14, -5.10) | 3.14(-0.78, 8.46) | 46.00(40.79, 51.98) | 18.19(16.73, 21.05) | 11.43(8.29, 16.73) | 7.19(4.42, 13.52) |
| Parameter median | -24.99(-37.6, -15.75) | -9.06(-11.89, -6.30) | 18.12(9.81, 27.7) | 11.70(5.10, 20.55) | -7.66(-11.15, -3.72) | 2.02(-2.03, 6.22) | 27.01(19.18, 33.23) | 10.65(7.34, 13.67) | 10.75(6.18, 18.59) | 9.77(6.66, 15.12) |
| Signal median | -44.97(-63.78, -30.81) | -13.19(-18.39, -8.45) | 23.46(12.83, 34.91) | 12.43(1.01, 19.92) | -4.12(-8.83, 0.18) | 0.97(-2.89, 6.15) | 50.59(46.54, 54.65) | 20.85(18.68, 22.97) | 20.19(12.81, 26.55) | 12.91(8.28, 20.15) |
| Gross motionk-space samplingMotion artefacts | Parameter mean | -35.70(-55.09, -19.36) | -14.27(-18.59, -10.14) | 19.73(12.79, 32.08) | 8.98(3.04, 16.24) | -8.78(-12.02, -4.26) | 3.62(-0.67, 9.08) | 57.19(49.17, 64.09) | 25.82(22.29, 28.91) | 14.45(11.10, 20.14) | 8.94(6.01, 15.27) |
| Signal mean | -39.21(-58, -22.53) | -15.30(-19.67, -11.5) | 17.26(10.58, 28.26) | 7.88(2.07, 14.31) | -9.12(-12.37, -4.96) | 3.51(-0.78, 8.70) | 47.16(41.57, 53.42) | 19.12(16.97, 21.8) | 12.12(8.89, 17.29) | 7.24(4.41, 13.47) |
| Parameter median | -27.21(-40.71, -16.64) | -9.86(-13.20, -6.97) | 19.39(11.43, 29.64) | 12.09(6.05, 21.33) | -8.02(-11.33, -3.63) | 2.14(-2.00, 6.62) | 28.49(20.22, 35.58) | 11.65(7.89, 14.92) | 12.52(6.72, 19.2) | 10.23(6.65, 15.66) |
| Signal median | -49.47(-67.13, -32.89) | -14.00(-18.71, -9.02) | 24.51(14.85, 36.72) | 11.69(1.68, 19.71) | -4.21(-8.90, 0.08) | 1.10(-3.36, 6.81) | 51.54(47.32, 55.67) | 21.33(18.97, 23.4) | 20.26(14.50, 27.92) | 13.03(8.36, 20.87) |
| Gross motionk-space samplingMotion artefactsAWGN | Parameter mean | -35.01(-54.05, -18.92) | -12.86(-17.59, -8.65) | 20.72(13.82, 32.68) | 10.06(1.89, 17.22) | -8.96(-12.88, -3.32) | 3.94(-2.2, 9.64) | 57.72(50.25, 64.66) | 26.47(23.34, 29.45) | 14.95(11.58, 21.04) | 9.57(6.73, 16.32) |
| Signal mean | -39.91(-58.7, -23.58) | -15.65(-20.15, -11.74) | 17.88(11.72, 27.74) | 8.31(0.41, 15.02) | -9.53(-13.49, -4.17) | 3.50(-2.68, 8.49) | 47.20(41.70, 53.27) | 19.09(16.85, 21.71) | 12.11(8.72, 16.99) | 7.39(4.70, 13.87) |
| Parameter median | -32.05(-45.44, -20.32) | -12.79(-16.33, -9.32) | 17.88(11.82, 29.76) | 11.31(3.63, 19.55) | -8.70(-13.26, -3.34) | 2.78(-2.57, 8.80) | 30.18(22.5, 36.41) | 12.69(9.14, 15.54) | 11.21(6.56, 18.47) | 9.68(6.50, 16.56) |
| Signal median | -43.87(-61.39, -28.46) | -15.27(-19.63, -10.93) | 22.48(15.44, 36.83) | 11.44(0.38, 19.22) | -5.11(-9.99, 0.24) | 2.92(-3.15, 8.54) | 51.46(47.46, 55.58) | 21.47(19.32, 23.58) | 18.86(13.78, 26.93) | 12.34(8.01, 20.17) |