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# APPENDIX TO

# LOCAL MAGNITUDE SCALE AND 1-D VELOCITY MODEL FOR CENTRAL NORTHERN INDIA

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## Appendix Tables

| Sr. No. | Station Code | Latitude (°N) | Longitude (°E) | Elevation (m) | P-wave Correction(s) | S-wave Correction(s) |
|---|---|---|---|---|---|---|
| 1 | AGRA | 27.1390 | 78.0007 | 161 | −1.65 | 1.33 |
| 2 | AJM | 26.4242 | 74.6292 | 492 | −0.94 | −1.62 |
| 3 | ALBD | 25.3090 | 81.8083 | 91 | −0.95 | 0.00 |
| 4 | ASR | 28.7535 | 77.7700 | 212 | 0.32 | −1.72 |
| 5 | BIS | 28.5692 | 77.4367 | 202 | −0.10 | −1.17 |
| 6 | JOSM | 30.5560 | 79.5580 | 1881 | −0.16 | −1.42 |
| 7 | KALG | 29.5060 | 78.7540 | 1812 | −0.36 | −1.83 |
| 8 | KALP | 31.5460 | 78.2600 | 2721 | −0.89 | −1.55 |
| 9 | LGT | 29.3990 | 80.0878 | 1672 | 0.51 | −0.51 |
| 10 | RTUL | 28.8322 | 77.3418 | 218 | 0.04 | −1.65 |
| 11 | SUN | 31.5390 | 76.9090 | 922 | −1.62 | −0.01 |
| 12 | UGON | 28.3100 | 77.9100 | 191 | 0.22 | −0.13 |
| 13 | AKL | 20.7017 | 77.0145 | 302 | −1.17 | 0.00 |
| 14 | ALBI | 25.3090 | 81.8083 | 91 | 0.45 | 0.00 |
| 15 | ALCI | 34.2138 | 77.1843 | 3132 | 1.09 | 0.00 |
| 16 | ASOR | 28.7535 | 77.7700 | 211 | 0.33 | −1.23 |
| 17 | AYAN | 28.4760 | 77.1225 | 272 | −0.25 | −1.16 |
| 18 | BHGR | 28.6875 | 76.9388 | 211 | −0.21 | −1.14 |
| 19 | BHK | 31.3947 | 76.9388 | 362 | 1.31 | 0.26 |
| 20 | BISR | 28.5692 | 77.4367 | 201 | 0.17 | −1.09 |
| 21 | BKNR | 28.2000 | 73.2780 | 232 | −0.15 | 0.05 |

| Sr. No. | Station Code | Latitude (°N) | Longitude (°E) | Elevation (m) | P-wave Correction(s) | S-wave Correction(s) |
|---|---|---|---|---|---|---|
| 22 | BNDA | 25.4820 | 80.3310 | 131 | 1.89 | 0.00 |
| 23 | BOKR | 23.7937 | 85.8858 | 202 | 1.51 | 0.00 |
| 24 | BRCH | 27.5652 | 81.6038 | 101 | 0.47 | 0.00 |
| 25 | CGRH | 30.7330 | 76.7790 | 332 | −0.32 | −1.51 |
| 26 | CKA | 30.7187 | 77.8658 | 1991 | −0.48 | −1.46 |
| 27 | DBN | 29.7167 | 77.7312 | 212 | −0.93 | 0.00 |
| 28 | DDI | 30.3222 | 78.0553 | 641 | 0.01 | −1.28 |
| 29 | DHRM | 32.2475 | 76.3065 | 1872 | 0.37 | −0.76 |
| 30 | DLH | 32.5367 | 75.9333 | 501 | 0.69 | 1.79 |
| 31 | FRKB | 27.3970 | 79.5730 | 132 | 0.36 | −0.16 |
| 32 | GKD | 30.6213 | 79.0028 | 761 | 0.21 | −1.81 |
| 33 | GNR | 29.1340 | 77.0180 | 232 | −0.01 | −1.57 |
| 34 | GTU | 30.5300 | 78.7400 | 971 | 0.30 | −1.66 |
| 35 | GUNA | 24.6490 | 77.3320 | 502 | −0.50 | −1.68 |
| 36 | HNLY | 32.7783 | 78.9728 | 4321 | 1.79 | 0.25 |
| 37 | JASL | 26.9212 | 70.9018 | 262 | 0.15 | 0.00 |
| 38 | JBP | 23.1200 | 79.8700 | 141 | −1.46 | −1.67 |
| 39 | JHJR | 28.6170 | 76.6870 | 212 | 0.08 | −1.21 |
| 40 | JHNI | 25.4552 | 78.6132 | 241 | −0.66 | −1.56 |
| 41 | JMIU | 28.5690 | 77.2920 | 212 | −0.11 | −1.82 |
| 42 | JMU | 32.7810 | 74.8308 | 381 | 0.68 | −2.13 |
| 43 | JOSI | 30.5560 | 79.5580 | 1992 | 0.48 | −0.88 |
| 44 | JWL | 31.8700 | 76.3783 | 101 | 0.34 | −0.74 |
| 45 | JYP | 33.1083 | 74.8500 | 750 | 0.37 | −0.68 |
| 46 | KHE | 28.0710 | 75.8037 | 371 | −0.80 | −1.56 |
| 47 | KHET | 28.0710 | 75.8037 | 372 | −0.68 | −1.63 |
| 48 | KHI | 31.1017 | 77.5813 | 2261 | −0.07 | −1.03 |
| 49 | KKR | 29.9568 | 76.8190 | 252 | 0.38 | −1.42 |
| 50 | KLP | 31.5460 | 78.2600 | 2672 | 0.91 | −0.12 |
| 51 | KUDL | 28.1398 | 76.4868 | 281 | −0.49 | −1.05 |
| 52 | LDR | 28.5830 | 77.2170 | 202 | −0.18 | −1.94 |
| 53 | LGTI | 29.3927 | 80.0860 | 1652 | 0.03 | −1.57 |
| 54 | LKN | 26.7660 | 80.8830 | 101 | 0.00 | −0.48 |
| 55 | MERT | 28.9710 | 77.7343 | 212 | 0.04 | −1.22 |
| 56 | NDI | 28.6843 | 77.2095 | 231 | −0.60 | −1.37 |
| 57 | NGP | 21.1698 | 79.0508 | 362 | −0.27 | 0.00 |
| 58 | NHN | 30.5268 | 77.2712 | 611 | 0.07 | −1.26 |
| 59 | NPL | 28.6370 | 77.1690 | 222 | −0.25 | −1.32 |
| 60 | NRDN | 22.7190 | 77.1670 | 282 | 1.08 | 0.00 |

| Sr. No. | Station Code | Latitude (°N) | Longitude (°E) | Elevation (m) | P-wave Correction(s) | S-wave Correction(s) |
|---|---|---|---|---|---|---|
| 61 | NRLA | 28.8530 | 77.0910 | 202 | −0.19 | −1.90 |
| 62 | NURP | 32.2667 | 75.8967 | 401 | 1.11 | 1.56 |
| 63 | PAWL | 28.1480 | 77.3320 | 182 | 0.19 | −1.34 |
| 64 | PONG | 31.9533 | 75.9500 | 501 | 0.55 | 0.16 |
| 65 | PTH | 29.5855 | 80.2040 | 1602 | 0.28 | −1.14 |
| 66 | REW | 24.5650 | 81.3350 | 281 | −1.39 | 0.00 |
| 67 | RMBN | 33.2312 | 75.2455 | 307 | −0.29 | 0.00 |
| 68 | RTK | 29.0330 | 76.4140 | 231 | −0.43 | −1.31 |
| 69 | SDNR | 31.5390 | 76.9090 | 922 | 0.17 | −1.13 |
| 70 | SMLA | 31.1277 | 77.1742 | 2131 | −0.21 | −1.70 |
| 71 | SONA | 28.2450 | 77.0628 | 222 | −0.22 | −1.15 |
| 72 | SRGN | 29.9220 | 73.8860 | 181 | 0.43 | −1.70 |
| 73 | THN | 32.4408 | 75.8045 | 622 | 0.95 | 0.38 |
| 74 | TKRD | 29.1910 | 78.8610 | 211 | −0.11 | −1.23 |
| 75 | TLWR | 31.9560 | 75.9550 | 472 | −0.77 | 0.22 |
| 76 | TPN | 30.4963 | 79.6113 | 2111 | 0.33 | −1.14 |
| 77 | TSSA | 32.8000 | 76.1670 | 1782 | 0.78 | −0.16 |
| 78 | UDPR | 24.5800 | 73.7130 | 581 | −0.78 | −1.02 |
| 79 | UJWA | 28.5620 | 76.9150 | 202 | −0.29 | −1.92 |
| 80 | UNCH | 28.3100 | 77.9100 | 191 | −0.58 | −1.04 |
| 81 | UTK | 30.7300 | 78.4460 | 1152 | −0.44 | −1.15 |
| 82 | VLK | 27.4417 | 83.9232 | 121 | −0.08 | 0.00 |
| 83 | BHPL | 23.2412 | 77.4242 | 471 | −1.39 | −1.74 |
| 84 | ABI | 30.1520 | 79.2083 | 1591 | 0.02 | −1.85 |

**Table S1.** The P and S wave station corrections.

| Sr. No. | Station Code | Latitude (°N) | Longitude (°E) | Elevation (m) | Magnitude station Correction(s) |
|---|---|---|---|---|---|
| 1 | SONA | 28.2450 | 77.0628 | 222 | 0.33 |
| 2 | KHE | 28.0710 | 75.8037 | 371 | 0.53 |
| 3 | SDNR | 31.5390 | 76.9090 | 922 | −0.65 |
| 4 | BHPL | 23.2412 | 77.4242 | 471 | −0.07 |
| 5 | AJM | 26.4242 | 74.6292 | 492 | 0.49 |
| 6 | JOSI | 30.5560 | 79.5580 | 1992 | −0.23 |
| 7 | AGRA | 27.1390 | 78.0007 | 161 | 0.03 |
| 8 | KALP | 31.5460 | 78.2600 | 272 | −0.03 |
| 9 | KLP | 31.5460 | 78.2600 | 267 | 0.04 |
| 10 | KALG | 29.5060 | 78.7540 | 181 | 0.19 |
| 11 | SMLA | 31.1277 | 77.1742 | 213 | −0.07 |
| 12 | NDI | 28.6843 | 77.2095 | 231 | 0.15 |
| 13 | KUDL | 28.1398 | 76.4868 | 281 | 0.49 |
| 14 | NGP | 21.1698 | 79.0508 | 362 | 0.05 |
| 15 | DDI | 30.3222 | 78.0553 | 641 | −0.35 |
| 16 | DHRM | 32.2475 | 76.3065 | 1872 | 0.09 |
| 17 | JBP | 23.1200 | 79.8700 | 141 | 0.1 |
| 18 | ABI | 30.1520 | 79.2083 | 159 | −0.06 |
| 19 | GKD | 30.6213 | 79.0028 | 761 | −0.37 |
| 20 | GTU | 30.5300 | 78.7400 | 971 | −0.54 |
| 21 | DBN | 29.7167 | 77.7312 | 212 | −0.15 |
| 22 | BHK | 31.3947 | 76.9388 | 362 | 0.1 |
| 23 | LGTI | 29.3927 | 80.0860 | 165 | 0.39 |
| 24 | THN | 32.4408 | 75.8045 | 622 | 0.1 |
| 25 | NPL | 28.6370 | 77.1690 | 222 | −0.1 |
| 26 | KKR | 29.9568 | 76.8190 | 252 | −0.11 |
| 27 | UNCH | 28.3100 | 77.9100 | 191 | −0.59 |
| 28 | PTH | 29.5855 | 80.2040 | 160 | 0.16 |
| 29 | ALCI | 34.2138 | 77.1843 | 313 | 0.06 |
| 30 | TLWR | 31.9560 | 75.9550 | 472 | 0.26 |
| 31 | JMU | 32.7810 | 74.8308 | 381 | 0.03 |
| 32 | SRIN | 34.0302 | 74.4816 | 1580 | −0.33 |
| 33 | NRDN | 22.7192 | 77.1672 | 291 | −0.05 |
| 34 | HNLY | 32.7783 | 78.9728 | 4321 | 0.06 |
| 35 | TSSA | 32.8000 | 76.1670 | 1782 | 0.1 |
| 36 | LDR | 28.5830 | 77.2170 | 202 | −0.18 |
| 37 | AYAN | 28.4760 | 77.1225 | 272 | 0.36 |
| 38 | NRLA | 28.8530 | 77.0910 | 202 | −0.04 |
| 39 | JHJR | 28.6170 | 76.6870 | 212 | −0.01 |
| 40 | UTK | 30.7300 | 78.4460 | 1152 | −0.18 |

**Table S2.** Local Magnitude station corrections.

| Sr. No. | With old Velocity Model | | | With New Velocity Model | | |
|---|---|---|---|---|---|---|
| | RMS (s) | ERH (km) | ERZ (km) | RMS (s) | ERH (km) | ERZ (km) |
| 1 | 0.56 | 4.60 | 5.10 | 0.52 | 4.20 | 4.50 |
| 2 | 0.83 | 16.60 | 22.20 | 0.82 | 16.30 | 19.30 |
| 3 | 0.83 | 5.40 | 0.00 | 0.79 | 5.00 | 0.00 |
| 4 | 0.70 | 7.00 | 8.50 | 0.70 | 7.00 | 6.90 |
| 5 | 0.88 | 12.20 | 8.90 | 0.76 | 10.20 | 6.70 |
| 6 | 0.94 | 10.80 | 13.00 | 0.95 | 11.10 | 12.60 |
| 7 | 1.00 | 8.10 | 6.20 | 0.94 | 7.80 | 6.40 |
| 8 | 0.94 | 4.70 | 4.10 | 0.97 | 4.90 | 3.80 |
| 9 | 0.88 | 5.60 | 5.20 | 0.84 | 5.20 | 4.30 |
| 10 | 0.48 | 3.30 | 3.70 | 0.53 | 3.60 | 3.80 |
| 11 | 0.57 | 5.40 | 5.30 | 0.64 | 6.00 | 5.40 |
| 12 | 1.31 | 9.50 | 0.00 | 1.25 | 8.90 | 0.00 |
| 13 | 0.49 | 4.60 | 4.80 | 0.51 | 4.70 | 3.50 |
| 14 | 0.45 | 3.70 | 5.00 | 0.45 | 3.80 | 5.30 |
| 15 | 1.43 | 6.50 | 0.00 | 1.38 | 6.10 | 0.00 |
| 16 | 1.55 | 10.40 | 0.00 | 1.52 | 10.00 | 0.00 |
| 17 | 0.97 | 5.20 | 0.00 | 0.94 | 5.00 | 0.00 |
| 18 | 2.72 | 21.10 | 0.00 | 2.68 | 20.90 | 0.00 |
| 19 | 1.12 | 7.40 | 0.00 | 1.06 | 6.80 | 0.00 |
| 20 | 1.46 | 9.60 | 0.00 | 1.22 | 8.20 | 0.00 |
| 21 | 0.73 | 8.80 | 8.40 | 0.66 | 8.10 | 9.40 |
| 22 | 0.80 | 7.20 | 9.90 | 0.82 | 7.50 | 9.20 |
| 23 | 0.41 | 6.60 | 9.60 | 0.36 | 5.30 | 7.70 |
| 24 | 1.14 | 12.90 | 0.00 | 1.09 | 12.50 | 0.00 |
| 25 | 0.87 | 14.00 | 0.00 | 0.88 | 13.90 | 0.00 |
| 26 | 1.11 | 7.60 | 0.00 | 1.02 | 6.80 | 0.00 |
| 27 | 1.01 | 7.40 | 0.00 | 1.10 | 7.30 | 0.00 |
| 28 | 0.76 | 5.30 | 0.00 | 0.69 | 5.00 | 0.00 |
| 29 | 0.62 | 6.90 | 0.00 | 0.61 | 6.80 | 0.00 |
| 30 | 1.70 | 11.30 | 0.00 | 1.69 | 11.10 | 0.00 |
| 31 | 1.31 | 5.70 | 0.00 | 1.23 | 5.10 | 0.00 |
| 32 | 0.81 | 7.30 | 0.00 | 0.77 | 6.60 | 0.00 |
| 33 | 0.94 | 9.20 | 9.60 | 0.90 | 8.70 | 8.20 |
| 34 | 0.66 | 4.40 | 5.80 | 0.22 | 4.20 | 4.30 |
| 35 | 1.17 | 8.00 | 0.00 | 1.08 | 7.30 | 0.00 |
| 36 | 2.32 | 13.80 | 0.00 | 2.24 | 14.40 | 0.00 |
| 37 | 1.42 | 9.10 | 0.00 | 1.44 | 9.20 | 0.00 |
| 38 | 1.19 | 8.70 | 0.00 | 1.20 | 8.70 | 0.00 |
| 39 | 1.70 | 8.70 | 0.00 | 1.77 | 8.80 | 0.00 |
| 40 | 1.25 | 14.50 | 20.70 | 1.24 | 14.30 | 19.50 |
| 41 | 0.80 | 9.90 | 15.10 | 0.76 | 9.60 | 14.70 |
| 42 | 0.73 | 6.90 | 0.00 | 0.69 | 6.30 | 0.00 |
| 43 | 1.07 | 12.10 | 12.50 | 1.07 | 11.90 | 10.40 |
| 44 | 0.67 | 7.50 | 0.00 | 0.62 | 7.70 | 0.00 |
| 45 | 0.87 | 6.80 | 10.30 | 0.83 | 6.00 | 9.60 |
| 46 | 0.96 | 7.80 | 0.00 | 0.91 | 7.20 | 0.00 |
| Average | 1.02 | 8.48 | 4.22 | 0.99 | 8.17 | 3.82 |

**Table S3.** Comparison of average Root Mean Square (RMS) errors in travel time residuals, Horizontal (ERH), and Vertical (ERZ) Errors between the old IG11 model and the new model with new dataset.