Table: WRF modeled variation in the meteorological fields over the 20 Indian cities in 2015

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| **Mixing Heights (m)** | | | | | | | | | | | | | |
|  | **City name** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| 1 | Agra | 202 ± 71 | 245 ± 55 | 403 ± 120 | 760 ± 159 | 1073 ± 162 | 1080 ± 141 | 766 ± 150 | 533 ± 104 | 552 ± 107 | 393 ± 87 | 248 ± 128 | 165 ± 57 |
| 2 | Amritsar | 136 ± 53 | 156 ± 67 | 208 ± 73 | 509 ± 129 | 806 ± 173 | 862 ± 157 | 708 ± 140 | 488 ± 41 | 372 ± 88 | 283 ± 69 | 168 ± 65 | 123 ± 40 |
| 3 | Bengaluru | 360 ± 38 | 461 ± 74 | 536 ± 90 | 592 ± 109 | 519 ± 132 | 512 ± 80 | 622 ± 71 | 480 ± 68 | 393 ± 53 | 345 ± 59 | 326 ± 72 | 326 ± 71 |
| 4 | Bhopal | 269 ± 68 | 410 ± 98 | 513 ± 142 | 731 ± 141 | 1083 ± 103 | 884 ± 204 | 665 ± 126 | 382 ± 61 | 367 ± 72 | 481 ± 60 | 346 ± 100 | 229 ± 87 |
| 5 | Bhubaneswar | 295 ± 63 | 384 ± 84 | 510 ± 71 | 459 ± 133 | 495 ± 83 | 564 ± 64 | 486 ± 96 | 454 ± 71 | 392 ± 73 | 318 ± 67 | 268 ± 46 | 260 ± 69 |
| 6 | Chandigarh | 186 ± 84 | 215 ± 72 | 272 ± 89 | 600 ± 176 | 917 ± 232 | 828 ± 136 | 598 ± 106 | 391 ± 50 | 265 ± 56 | 255 ± 70 | 201 ± 78 | 146 ± 57 |
| 7 | Chennai | 464 ± 146 | 369 ± 70 | 349 ± 67 | 417 ± 93 | 365 ± 104 | 392 ± 117 | 364 ± 47 | 332 ± 54 | 356 ± 84 | 390 ± 98 | 405 ± 103 | 445 ± 108 |
| 8 | Coimbatore | 347 ± 51 | 382 ± 51 | 371 ± 63 | 445 ± 65 | 392 ± 72 | 438 ± 56 | 450 ± 26 | 371 ± 40 | 351 ± 66 | 310 ± 46 | 275 ± 61 | 315 ± 76 |
| 9 | Dehradun | 191 ± 71 | 269 ± 103 | 285 ± 90 | 590 ± 174 | 880 ± 225 | 724 ± 148 | 376 ± 100 | 283 ± 47 | 308 ± 40 | 238 ± 60 | 189 ± 80 | 151 ± 68 |
| 10 | Indore | 302 ± 83 | 480 ± 114 | 598 ± 106 | 735 ± 132 | 1070 ± 127 | 790 ± 178 | 667 ± 93 | 435 ± 59 | 421 ± 86 | 493 ± 61 | 352 ± 91 | 259 ± 85 |
| 11 | Jaipur | 265 ± 61 | 404 ± 119 | 562 ± 134 | 856 ± 153 | 1179 ± 141 | 1034 ± 147 | 780 ± 133 | 566 ± 96 | 638 ± 123 | 606 ± 99 | 383 ± 132 | 256 ± 71 |
| 12 | Kanpur | 199 ± 58 | 271 ± 78 | 375 ± 121 | 758 ± 164 | 1084 ± 133 | 1047 ± 150 | 702 ± 168 | 520 ± 85 | 518 ± 106 | 409 ± 64 | 269 ± 131 | 191 ± 53 |
| 13 | Kochi | 277 ± 26 | 308 ± 36 | 341 ± 28 | 353 ± 42 | 303 ± 42 | 351 ± 54 | 361 ± 50 | 347 ± 48 | 335 ± 62 | 310 ± 56 | 264 ± 65 | 236 ± 28 |
| 14 | Ludhiana | 152 ± 78 | 171 ± 69 | 240 ± 98 | 570 ± 155 | 844 ± 179 | 859 ± 161 | 673 ± 134 | 435 ± 44 | 310 ± 83 | 287 ± 73 | 202 ± 79 | 136 ± 53 |
| 15 | Nagpur | 333 ± 62 | 447 ± 94 | 566 ± 141 | 710 ± 181 | 1010 ± 162 | 775 ± 176 | 598 ± 114 | 383 ± 70 | 401 ± 103 | 355 ± 75 | 306 ± 97 | 232 ± 81 |
| 16 | Patna | 206 ± 45 | 256 ± 40 | 402 ± 107 | 644 ± 97 | 758 ± 111 | 881 ± 114 | 651 ± 160 | 463 ± 100 | 442 ± 58 | 298 ± 49 | 219 ± 59 | 210 ± 39 |
| 17 | Pune | 357 ± 73 | 515 ± 89 | 608 ± 155 | 647 ± 134 | 741 ± 216 | 480 ± 112 | 437 ± 30 | 426 ± 31 | 434 ± 64 | 389 ± 62 | 323 ± 70 | 284 ± 62 |
| 18 | Raipur | 303 ± 62 | 423 ± 102 | 556 ± 132 | 689 ± 195 | 1021 ± 170 | 869 ± 168 | 609 ± 145 | 438 ± 80 | 428 ± 95 | 349 ± 82 | 293 ± 90 | 258 ± 79 |
| 19 | Ranchi | 292 ± 91 | 411 ± 103 | 551 ± 151 | 689 ± 252 | 1039 ± 164 | 838 ± 178 | 500 ± 96 | 416 ± 71 | 383 ± 80 | 314 ± 59 | 265 ± 67 | 232 ± 73 |
| 20 | Varanasi | 208 ± 42 | 249 ± 46 | 445 ± 108 | 748 ± 162 | 1016 ± 141 | 1071 ± 107 | 612 ± 145 | 441 ± 65 | 461 ± 74 | 370 ± 69 | 272 ± 100 | 203 ± 53 |
| **Wind Speeds (m/s)** | | | | | | | | | | | | | |
|  | **City name** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| 1 | Agra | 2.8 ± 0.9 | 3.1 ± 0.6 | 3.4 ± 1.0 | 3.3 ± 0.9 | 3.8 ± 1.2 | 4.5 ± 1.3 | 4.3 ± 1.7 | 3.6 ± 1.4 | 3.2 ± 0.9 | 2.5 ± 0.6 | 2.6 ± 0.7 | 2.7 ± 0.8 |
| 2 | Amritsar | 2.5 ± 0.9 | 3.2 ± 1.1 | 3.3 ± 1.2 | 3.3 ± 1.0 | 3.5 ± 0.9 | 3.6 ± 1.0 | 3.2 ± 1.2 | 2.7 ± 0.8 | 2.6 ± 0.8 | 2.9 ± 0.7 | 2.9 ± 0.9 | 2.3 ± 0.7 |
| 3 | Bengaluru | 4.5 ± 1.0 | 5.1 ± 1.0 | 4.6 ± 1.1 | 4.2 ± 1.4 | 5.5 ± 1.7 | 8.1 ± 2.8 | 7.6 ± 1.0 | 5.5 ± 1.3 | 4.3 ± 2.1 | 3.9 ± 1.8 | 5.2 ± 1.6 | 5.0 ± 1.5 |
| 4 | Bhopal | 3.0 ± 0.8 | 3.1 ± 0.9 | 3.4 ± 0.7 | 3.6 ± 0.9 | 4.4 ± 1.4 | 4.9 ± 1.2 | 6.9 ± 1.7 | 4.9 ± 1.0 | 3.4 ± 1.0 | 2.8 ± 0.7 | 2.7 ± 0.4 | 3.0 ± 0.5 |
| 5 | Bhubaneswar | 3.4 ± 1.0 | 2.9 ± 0.6 | 3.1 ± 0.6 | 5.0 ± 1.4 | 5.9 ± 1.2 | 6.7 ± 2.3 | 6.3 ± 1.6 | 4.7 ± 1.7 | 3.8 ± 1.5 | 3.8 ± 2.0 | 3.0 ± 0.6 | 3.0 ± 0.8 |
| 6 | Chandigarh | 4.6 ± 1.6 | 4.9 ± 0.9 | 5.2 ± 1.5 | 4.9 ± 1.1 | 5.2 ± 0.8 | 4.9 ± 0.8 | 3.8 ± 0.9 | 3.5 ± 0.5 | 4.3 ± 0.5 | 4.5 ± 0.7 | 4.6 ± 0.7 | 4.3 ± 0.7 |
| 7 | Chennai | 5.3 ± 1.3 | 4.7 ± 1.3 | 4.1 ± 0.9 | 7.0 ± 2.8 | 6.8 ± 2.0 | 8.0 ± 2.4 | 5.8 ± 0.5 | 5.3 ± 1.1 | 6.1 ± 2.0 | 4.6 ± 2.0 | 6.0 ± 2.3 | 6.2 ± 1.9 |
| 8 | Coimbatore | 5.4 ± 1.3 | 5.6 ± 1.3 | 4.5 ± 1.0 | 4.3 ± 1.6 | 5.9 ± 2.2 | 9.7 ± 2.1 | 8.2 ± 1.0 | 5.9 ± 1.3 | 6.1 ± 2.7 | 5.1 ± 1.9 | 5.1 ± 1.8 | 6.3 ± 1.6 |
| 9 | Dehradun | 5.3 ± 1.2 | 5.8 ± 1.0 | 6.0 ± 1.1 | 6.0 ± 1.0 | 6.8 ± 0.9 | 5.9 ± 1.3 | 3.6 ± 1.0 | 3.6 ± 0.8 | 5.1 ± 0.6 | 4.7 ± 0.7 | 5.2 ± 0.3 | 5.1 ± 0.4 |
| 10 | Indore | 3.6 ± 0.8 | 3.4 ± 0.9 | 3.8 ± 0.8 | 3.9 ± 1.2 | 4.9 ± 1.6 | 6.1 ± 1.5 | 7.9 ± 1.4 | 5.5 ± 0.9 | 3.7 ± 1.2 | 3.0 ± 0.8 | 3.3 ± 0.5 | 3.6 ± 0.6 |
| 11 | Jaipur | 3.0 ± 0.9 | 3.7 ± 0.8 | 3.5 ± 0.8 | 3.7 ± 0.9 | 4.9 ± 1.0 | 4.8 ± 1.3 | 5.3 ± 1.3 | 4.3 ± 0.8 | 3.3 ± 0.9 | 3.0 ± 0.8 | 2.9 ± 0.5 | 3.2 ± 0.6 |
| 12 | Kanpur | 2.9 ± 0.8 | 3.2 ± 0.6 | 3.4 ± 0.9 | 3.5 ± 0.9 | 4.0 ± 1.0 | 4.7 ± 1.5 | 4.2 ± 2.1 | 3.5 ± 1.2 | 3.4 ± 1.2 | 2.5 ± 0.4 | 2.8 ± 0.8 | 2.7 ± 0.7 |
| 13 | Kochi | 2.0 ± 0.3 | 2.1 ± 0.4 | 2.4 ± 0.4 | 2.4 ± 0.4 | 2.6 ± 1.3 | 3.3 ± 0.8 | 3.1 ± 0.8 | 3.2 ± 0.5 | 3.6 ± 1.1 | 2.7 ± 0.8 | 2.6 ± 1.0 | 1.9 ± 0.4 |
| 14 | Ludhiana | 3.0 ± 1.5 | 3.3 ± 0.9 | 3.6 ± 1.5 | 3.4 ± 0.9 | 3.3 ± 0.8 | 3.5 ± 0.9 | 3.4 ± 1.1 | 2.9 ± 0.9 | 2.4 ± 0.7 | 2.9 ± 0.8 | 3.0 ± 0.8 | 2.8 ± 0.6 |
| 15 | Nagpur | 2.7 ± 0.5 | 2.6 ± 0.4 | 3.0 ± 0.5 | 3.5 ± 0.9 | 4.0 ± 1.6 | 4.8 ± 1.9 | 6.6 ± 1.4 | 4.6 ± 1.2 | 3.6 ± 1.2 | 2.6 ± 0.7 | 3.1 ± 0.5 | 2.7 ± 0.5 |
| 16 | Patna | 2.6 ± 1.0 | 2.6 ± 0.7 | 3.6 ± 0.9 | 3.8 ± 0.9 | 4.0 ± 0.4 | 5.4 ± 2.0 | 5.2 ± 3.0 | 3.3 ± 1.1 | 2.8 ± 1.0 | 2.2 ± 0.6 | 2.1 ± 0.4 | 2.1 ± 0.5 |
| 17 | Pune | 3.3 ± 0.7 | 3.2 ± 0.4 | 3.4 ± 0.4 | 4.4 ± 1.3 | 5.6 ± 1.1 | 7.5 ± 1.9 | 8.2 ± 1.1 | 6.3 ± 1.2 | 4.3 ± 1.6 | 3.2 ± 0.8 | 3.9 ± 1.0 | 3.6 ± 1.2 |
| 18 | Raipur | 2.4 ± 0.6 | 2.3 ± 0.5 | 2.6 ± 0.4 | 3.6 ± 1.0 | 3.7 ± 1.1 | 5.2 ± 1.8 | 6.0 ± 1.3 | 4.3 ± 2.0 | 3.4 ± 1.6 | 2.5 ± 0.9 | 2.7 ± 0.5 | 2.4 ± 0.5 |
| 19 | Ranchi | 3.2 ± 1.4 | 3.4 ± 1.1 | 4.0 ± 0.9 | 4.5 ± 1.3 | 5.1 ± 0.9 | 5.7 ± 1.8 | 5.5 ± 2.2 | 4.7 ± 1.5 | 3.7 ± 1.0 | 3.0 ± 1.0 | 3.1 ± 0.7 | 2.7 ± 0.9 |
| 20 | Varanasi | 2.7 ± 1.0 | 2.8 ± 0.7 | 3.3 ± 0.8 | 3.7 ± 1.0 | 3.7 ± 1.0 | 4.7 ± 2.1 | 4.3 ± 2.4 | 3.3 ± 1.2 | 3.2 ± 1.1 | 2.4 ± 0.4 | 2.7 ± 0.7 | 2.4 ± 0.7 |
| **Temperature (ºC)** | | | | | | | | | | | | | |
|  | **City name** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| 1 | Agra | 14.4 ± 1.4 | 18.5 ± 2.9 | 22.7 ± 3.9 | 31.2 ± 3.3 | 37.4 ± 2.2 | 39.0 ± 1.3 | 36.1 ± 2.5 | 33.5 ± 1.0 | 32.2 ± 0.8 | 27.9 ± 2.2 | 22.5 ± 2.7 | 15.6 ± 3.5 |
| 2 | Amritsar | 11.6 ± 1.8 | 14.3 ± 3.0 | 17.2 ± 4.2 | 26.7 ± 3.4 | 33.6 ± 2.7 | 37.1 ± 2.4 | 37.2 ± 2.1 | 33.7 ± 1.5 | 29.5 ± 1.0 | 25.2 ± 2.1 | 19.2 ± 1.9 | 13.2 ± 3.2 |
| 3 | Bengaluru | 19.3 ± 1.3 | 20.5 ± 1.5 | 23.9 ± 1.1 | 26.2 ± 1.4 | 27.0 ± 1.6 | 24.5 ± 1.4 | 24.8 ± 0.4 | 24.4 ± 0.6 | 24.1 ± 0.8 | 22.9 ± 0.8 | 21.5 ± 1.2 | 20.3 ± 1.4 |
| 4 | Bhopal | 16.4 ± 1.5 | 22.0 ± 2.3 | 24.4 ± 3.5 | 30.4 ± 2.7 | 36.1 ± 1.7 | 35.4 ± 2.2 | 29.9 ± 3.3 | 27.3 ± 1.0 | 27.4 ± 1.3 | 26.0 ± 2.1 | 22.6 ± 1.4 | 17.9 ± 2.9 |
| 5 | Bhubaneswar | 20.3 ± 1.9 | 22.6 ± 1.5 | 26.9 ± 1.1 | 29.5 ± 1.5 | 31.6 ± 1.4 | 31.7 ± 1.9 | 32.3 ± 1.7 | 30.9 ± 1.2 | 30.0 ± 1.2 | 26.7 ± 2.1 | 23.2 ± 1.5 | 21.3 ± 2.4 |
| 6 | Chandigarh | 13.7 ± 1.9 | 17.3 ± 3.1 | 19.4 ± 3.8 | 27.3 ± 3.6 | 33.8 ± 2.8 | 35.3 ± 1.6 | 33.8 ± 1.7 | 30.7 ± 1.0 | 28.4 ± 0.6 | 24.5 ± 1.8 | 20.2 ± 1.4 | 14.8 ± 3.2 |
| 7 | Chennai | 24.6 ± 0.6 | 25.0 ± 0.5 | 27.0 ± 0.7 | 29.0 ± 0.9 | 30.4 ± 1.2 | 30.6 ± 1.5 | 30.9 ± 0.6 | 30.1 ± 0.4 | 29.5 ± 0.5 | 28.6 ± 0.6 | 27.0 ± 0.7 | 26.2 ± 0.7 |
| 8 | Coimbatore | 20.7 ± 1.0 | 21.5 ± 0.9 | 24.2 ± 0.8 | 25.5 ± 1.0 | 26.1 ± 1.2 | 24.2 ± 1.1 | 24.2 ± 0.6 | 24.4 ± 0.5 | 24.1 ± 1.0 | 23.6 ± 0.9 | 22.6 ± 1.0 | 21.4 ± 1.0 |
| 9 | Dehradun | 10.1 ± 1.8 | 13.5 ± 2.9 | 15.3 ± 3.7 | 21.8 ± 3.4 | 27.8 ± 2.8 | 28.9 ± 1.5 | 26.9 ± 1.6 | 24.7 ± 1.0 | 23.6 ± 0.6 | 19.4 ± 1.6 | 16.1 ± 1.2 | 11.5 ± 3.2 |
| 10 | Indore | 17.7 ± 1.2 | 23.1 ± 1.9 | 25.4 ± 3.5 | 30.5 ± 2.7 | 35.6 ± 1.5 | 33.0 ± 2.1 | 28.1 ± 2.2 | 26.2 ± 0.8 | 27.5 ± 1.5 | 26.4 ± 1.9 | 23.1 ± 1.2 | 19.4 ± 2.5 |
| 11 | Jaipur | 14.9 ± 1.4 | 19.8 ± 3.0 | 23.2 ± 3.9 | 30.7 ± 3.3 | 35.9 ± 2.0 | 37.2 ± 1.5 | 34.4 ± 1.7 | 32.1 ± 1.8 | 30.9 ± 1.2 | 27.9 ± 2.4 | 22.3 ± 2.3 | 15.6 ± 3.6 |
| 12 | Kanpur | 15.5 ± 1.2 | 19.1 ± 2.8 | 23.3 ± 3.7 | 31.7 ± 3.1 | 38.0 ± 2.2 | 39.2 ± 1.6 | 35.0 ± 2.5 | 33.4 ± 0.6 | 32.0 ± 0.8 | 27.2 ± 2.1 | 23.1 ± 2.3 | 17.1 ± 3.5 |
| 13 | Kochi | 26.2 ± 1.1 | 26.9 ± 0.9 | 27.7 ± 0.6 | 27.7 ± 0.6 | 27.9 ± 0.4 | 27.2 ± 0.6 | 26.6 ± 0.4 | 26.5 ± 0.3 | 27.0 ± 0.3 | 27.2 ± 0.5 | 27.2 ± 0.7 | 27.6 ± 0.9 |
| 14 | Ludhiana | 11.9 ± 2.0 | 15.0 ± 3.1 | 18.0 ± 4.0 | 27.3 ± 3.5 | 34.0 ± 2.8 | 36.8 ± 2.0 | 36.0 ± 2.0 | 32.4 ± 1.3 | 28.5 ± 0.9 | 25.0 ± 1.9 | 19.6 ± 1.9 | 13.3 ± 3.3 |
| 15 | Nagpur | 19.5 ± 1.8 | 24.0 ± 1.9 | 27.4 ± 2.7 | 31.3 ± 2.8 | 37.4 ± 1.9 | 35.9 ± 3.1 | 30.9 ± 2.7 | 28.2 ± 1.1 | 28.5 ± 1.2 | 25.7 ± 1.6 | 23.1 ± 1.4 | 20.6 ± 2.5 |
| 16 | Patna | 17.2 ± 1.8 | 19.6 ± 3.0 | 24.6 ± 3.2 | 30.9 ± 2.3 | 36.0 ± 1.9 | 37.1 ± 1.4 | 33.9 ± 2.2 | 32.4 ± 1.2 | 31.6 ± 0.7 | 26.0 ± 1.9 | 22.4 ± 1.4 | 18.3 ± 2.9 |
| 17 | Pune | 19.6 ± 1.2 | 22.9 ± 1.2 | 25.5 ± 3.2 | 27.5 ± 1.8 | 30.2 ± 2.0 | 25.9 ± 1.7 | 23.7 ± 0.5 | 23.3 ± 0.3 | 25.3 ± 1.6 | 24.9 ± 1.1 | 23.1 ± 1.2 | 21.7 ± 1.9 |
| 18 | Raipur | 19.1 ± 1.9 | 23.4 ± 2.4 | 27.6 ± 2.5 | 31.4 ± 2.9 | 37.3 ± 2.2 | 36.0 ± 3.3 | 32.1 ± 2.7 | 29.5 ± 1.8 | 29.4 ± 0.9 | 25.5 ± 2.0 | 22.9 ± 1.5 | 20.6 ± 2.3 |
| 19 | Ranchi | 16.7 ± 1.8 | 20.7 ± 2.9 | 24.6 ± 2.9 | 28.9 ± 3.8 | 35.1 ± 2.3 | 33.5 ± 3.6 | 29.2 ± 2.1 | 27.8 ± 1.6 | 27.5 ± 1.1 | 23.5 ± 2.1 | 20.8 ± 1.1 | 17.5 ± 2.6 |
| 20 | Varanasi | 16.6 ± 1.8 | 19.9 ± 3.0 | 24.7 ± 3.4 | 32.1 ± 2.7 | 38.2 ± 2.0 | 39.6 ± 2.1 | 33.9 ± 2.6 | 32.4 ± 1.0 | 31.4 ± 0.8 | 26.3 ± 2.4 | 23.1 ± 1.8 | 18.1 ± 3.3 |

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| **Figure: Annual summary of meteorological fields for 20 Indian cities in 2015 – processed using WRF meteorological model and NCEP Reanalysis data** |
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