**Supplementary Table 1.** Comparison of models used to validate and calibrate remotely sensed wildfire severity with ground based composite burn index (CBI) severity sorted in descending order by the value from a 5-fold cross validation. A total of 56 models were tested representing all possible combinations of 7 different measures of wildfire severity (RBR, dNBR, dNBR2, RdNBR, RdNBR2, dNDVI, and RdNDVI), 4 different time windows in which Landsat imagery was acquired and summarized with a median reducer on a pixel-by-pixel basis (16 days, 32 days, 48 days, and 64 days), and two different interpolation methods (bilinear and bicubic). The three parameters (, , and ) from the nonlinear model fit described in Eq. are reported. For each model, the value of the remotely sensed wildfire severity measurement corresponding to the lower bounds of 3 commonly used categories of severity are reported (‘low’ corresponds to a CBI value of 0.1, ‘mod’ corresponds to a CBI value of 1.25, and ‘high’ corresponds to a CBI value of 2.25)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank |  |  | Interpolation |  | β0 | β1 | β2 | low | mod | high |
| 1 | RBR | 48 | bicubic | 0.820 | 0.014 | 0.028 | 1.001 | 0.045 | 0.113 | 0.282 |
| 2 | RdNBR | 32 | bilinear | 0.813 | -0.483 | 3.061 | 0.857 | 2.852 | 8.450 | 20.559 |
| 3 | RdNDVI | 48 | bilinear | 0.809 | -2.144 | 3.273 | 0.609 | 1.335 | 4.867 | 10.753 |
| 4 | RBR | 32 | bilinear | 0.807 | 0.014 | 0.029 | 0.985 | 0.046 | 0.113 | 0.280 |
| 5 | RdNDVI | 64 | bicubic | 0.805 | -2.524 | 3.570 | 0.590 | 1.263 | 4.936 | 10.929 |
| 6 | RBR | 64 | bicubic | 0.805 | 0.016 | 0.027 | 1.010 | 0.046 | 0.113 | 0.283 |
| 7 | RdNDVI | 32 | bicubic | 0.803 | -2.737 | 3.308 | 0.619 | 0.782 | 4.436 | 10.586 |
| 8 | RBR | 64 | bilinear | 0.802 | 0.017 | 0.027 | 1.003 | 0.047 | 0.113 | 0.279 |
| 9 | RdNDVI | 32 | bilinear | 0.801 | -2.531 | 3.176 | 0.624 | 0.849 | 4.393 | 10.387 |
| 10 | RdNDVI | 48 | bicubic | 0.797 | -2.623 | 3.624 | 0.587 | 1.220 | 4.922 | 10.943 |
| 11 | RdNDVI | 64 | bilinear | 0.796 | -2.140 | 3.287 | 0.607 | 1.353 | 4.876 | 10.728 |
| 12 | RdNBR | 64 | bilinear | 0.792 | -0.420 | 3.031 | 0.862 | 2.884 | 8.483 | 20.663 |
| 13 | RBR | 48 | bilinear | 0.791 | 0.017 | 0.027 | 1.006 | 0.047 | 0.112 | 0.277 |
| 14 | RBR | 32 | bicubic | 0.790 | 0.013 | 0.029 | 0.994 | 0.045 | 0.114 | 0.284 |
| 15 | RdNBR | 48 | bicubic | 0.785 | -0.858 | 3.219 | 0.852 | 2.647 | 8.476 | 21.021 |
| 16 | RBR | 16 | bilinear | 0.781 | 0.021 | 0.026 | 1.016 | 0.050 | 0.114 | 0.278 |
| 17 | RdNBR | 32 | bicubic | 0.776 | -0.954 | 3.340 | 0.841 | 2.679 | 8.602 | 21.199 |
| 18 | dNDVI | 32 | bicubic | 0.776 | -0.058 | 0.073 | 0.650 | 0.020 | 0.106 | 0.257 |
| 19 | dNBR | 48 | bicubic | 0.775 | 0.030 | 0.035 | 1.069 | 0.068 | 0.161 | 0.413 |
| 20 | RdNBR | 16 | bilinear | 0.774 | 0.279 | 2.518 | 0.909 | 3.037 | 8.119 | 19.727 |
| 21 | dNDVI | 32 | bilinear | 0.772 | -0.053 | 0.070 | 0.656 | 0.022 | 0.105 | 0.252 |
| 22 | dNDVI | 48 | bicubic | 0.772 | -0.055 | 0.081 | 0.613 | 0.031 | 0.119 | 0.267 |
| 23 | dNBR | 32 | bilinear | 0.770 | 0.029 | 0.036 | 1.048 | 0.069 | 0.163 | 0.410 |
| 24 | RdNBR2 | 64 | bicubic | 0.766 | 2.102 | 0.416 | 1.240 | 2.572 | 4.059 | 8.861 |
| 25 | dNBR | 32 | bicubic | 0.764 | 0.028 | 0.036 | 1.057 | 0.068 | 0.163 | 0.417 |
| 26 | dNDVI | 48 | bilinear | 0.762 | -0.044 | 0.073 | 0.637 | 0.034 | 0.118 | 0.262 |
| 27 | RBR | 16 | bicubic | 0.761 | 0.021 | 0.026 | 1.028 | 0.049 | 0.114 | 0.281 |
| 28 | dNBR | 16 | bilinear | 0.760 | 0.033 | 0.036 | 1.048 | 0.073 | 0.167 | 0.417 |
| 29 | RdNBR2 | 32 | bilinear | 0.759 | 1.435 | 0.625 | 1.100 | 2.132 | 3.906 | 8.861 |
| 30 | RdNBR | 16 | bicubic | 0.758 | 0.370 | 2.446 | 0.926 | 3.053 | 8.149 | 19.999 |
| 31 | RdNBR2 | 32 | bicubic | 0.754 | 1.426 | 0.601 | 1.125 | 2.098 | 3.876 | 8.975 |
| 32 | dNBR | 64 | bicubic | 0.753 | 0.033 | 0.033 | 1.086 | 0.070 | 0.161 | 0.413 |
| 33 | dNBR | 64 | bilinear | 0.751 | 0.035 | 0.033 | 1.080 | 0.071 | 0.161 | 0.406 |
| 34 | RdNBR2 | 48 | bicubic | 0.751 | 1.835 | 0.460 | 1.209 | 2.354 | 3.919 | 8.818 |
| 35 | dNBR | 48 | bilinear | 0.748 | 0.035 | 0.033 | 1.076 | 0.071 | 0.161 | 0.405 |
| 36 | RdNDVI | 16 | bilinear | 0.747 | -0.983 | 2.503 | 0.678 | 1.695 | 4.856 | 10.515 |
| 37 | dNDVI | 64 | bicubic | 0.746 | -0.055 | 0.082 | 0.609 | 0.032 | 0.120 | 0.266 |
| 38 | dNDVI | 64 | bilinear | 0.741 | -0.046 | 0.075 | 0.627 | 0.034 | 0.118 | 0.261 |
| 39 | RdNBR2 | 48 | bilinear | 0.737 | 1.802 | 0.497 | 1.174 | 2.361 | 3.956 | 8.766 |
| 40 | RdNBR | 64 | bicubic | 0.737 | -1.448 | 3.651 | 0.819 | 2.515 | 8.717 | 21.611 |
| 41 | RdNBR2 | 64 | bilinear | 0.735 | 2.027 | 0.451 | 1.204 | 2.536 | 4.060 | 8.801 |
| 42 | dNBR | 16 | bicubic | 0.729 | 0.032 | 0.036 | 1.058 | 0.072 | 0.168 | 0.423 |
| 43 | dNBR2 | 32 | bilinear | 0.727 | 0.026 | 0.009 | 1.149 | 0.035 | 0.062 | 0.140 |
| 44 | dNDVI | 16 | bicubic | 0.726 | -0.030 | 0.065 | 0.674 | 0.040 | 0.121 | 0.267 |
| 45 | RdNDVI | 16 | bicubic | 0.725 | -1.248 | 2.681 | 0.665 | 1.618 | 4.908 | 10.721 |
| 46 | dNBR2 | 32 | bicubic | 0.715 | 0.025 | 0.008 | 1.177 | 0.035 | 0.061 | 0.142 |
| 47 | dNBR2 | 64 | bilinear | 0.714 | 0.036 | 0.006 | 1.283 | 0.043 | 0.064 | 0.137 |
| 48 | dNDVI | 16 | bilinear | 0.707 | -0.023 | 0.060 | 0.689 | 0.042 | 0.120 | 0.261 |
| 49 | dNBR2 | 48 | bilinear | 0.686 | 0.033 | 0.006 | 1.248 | 0.040 | 0.063 | 0.137 |
| 50 | RdNBR2 | 16 | bilinear | 0.682 | 1.928 | 0.465 | 1.189 | 2.452 | 3.983 | 8.676 |
| 51 | dNBR2 | 16 | bilinear | 0.662 | 0.030 | 0.009 | 1.138 | 0.040 | 0.066 | 0.143 |
| 52 | RdNBR2 | 16 | bicubic | 0.654 | 1.871 | 0.467 | 1.198 | 2.398 | 3.960 | 8.792 |
| 53 | dNBR2 | 16 | bicubic | 0.635 | 0.029 | 0.009 | 1.156 | 0.039 | 0.066 | 0.145 |
| 54 | RdNBR | 48 | bilinear | 0.630 | -3.445 | 5.132 | 0.724 | 2.072 | 9.235 | 22.700 |
| 55 | dNBR2 | 48 | bicubic | 0.000 | 0.033 | 0.006 | 1.284 | 0.040 | 0.062 | 0.138 |
| 56 | dNBR2 | 64 | bicubic | 0.000 | 0.037 | 0.005 | 1.313 | 0.043 | 0.064 | 0.139 |