**Supplementary File**

Table S1. Correlation matrix of seasonal land surface temperatures and explanatory variables at the grid level (N=34,135)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LST spring | LST summer | LST autumn | LST winter | NDVI spring | NDVI summer | NDVI autumn | NDVI winter | Albedo spring | Albedo summer | Albedo autumn | Albedo winter | Residential % | Commercial % | Industrial % | Cultural & Recreational % | Transport % | Public % | Other uses % | Entropy index | Building density | Old buildings % | Ave. BCR | Ave. FAR | Ave. TFA | Ave. BH | GIUF | GIWB |
| LST spring | 1 | .475\*\* | .661\*\* | .772\*\* | .263\*\* | .157\*\* | .249\*\* | .355\*\* | .491\*\* | .414\*\* | .517\*\* | .505\*\* | -.063\*\* | .032\*\* | .086\*\* | .062\*\* | -.243\*\* | .029\*\* | .182\*\* | -.280\*\* | .102\*\* | .089\*\* | -.038\*\* | -.187\*\* | -.229\*\* | -.387\*\* | -.073\*\* | -0.009 |
| LST summer | .475\*\* | 1 | .598\*\* | .311\*\* | -.238\*\* | -.596\*\* | -.349\*\* | -.217\*\* | -.085\*\* | -.106\*\* | -.045\*\* | -.095\*\* | .299\*\* | .368\*\* | .114\*\* | .018\*\* | .082\*\* | .049\*\* | -.556\*\* | .202\*\* | .481\*\* | .285\*\* | .471\*\* | .236\*\* | -.141\*\* | -.083\*\* | -.139\*\* | -.152\*\* |
| LST autumn | .661\*\* | .598\*\* | 1 | .740\*\* | .095\*\* | -.089\*\* | .135\*\* | .185\*\* | .167\*\* | .137\*\* | .231\*\* | .248\*\* | .044\*\* | .138\*\* | .113\*\* | .025\*\* | -.026\*\* | 0.0102 | -.120\*\* | -.103\*\* | .162\*\* | .102\*\* | .112\*\* | -0.002 | -.143\*\* | -.208\*\* | -.097\*\* | .056\*\* |
| LST winter | .772\*\* | .311\*\* | .740\*\* | 1 | .247\*\* | .163\*\* | .316\*\* | .384\*\* | .435\*\* | .366\*\* | .526\*\* | .523\*\* | -.141\*\* | -.032\*\* | .053\*\* | .049\*\* | -.106\*\* | .022\*\* | .191\*\* | -.270\*\* | -.059\*\* | -.018\*\* | -.139\*\* | -.186\*\* | -.163\*\* | -.303\*\* | -.147\*\* | .174\*\* |
| NDVI spring | .263\*\* | -.238\*\* | .095\*\* | .247\*\* | 1 | .702\*\* | .826\*\* | .918\*\* | .414\*\* | .417\*\* | .431\*\* | .414\*\* | -.124\*\* | -.279\*\* | .028\*\* | .141\*\* | -.385\*\* | .125\*\* | .484\*\* | -.141\*\* | -.171\*\* | -.065\*\* | -.301\*\* | -.337\*\* | -.096\*\* | -.299\*\* | .190\*\* | .090\*\* |
| NDVI summer | .157\*\* | -.596\*\* | -.089\*\* | .163\*\* | .702\*\* | 1 | .823\*\* | .699\*\* | .298\*\* | .335\*\* | .340\*\* | .319\*\* | -.331\*\* | -.420\*\* | -.036\*\* | .036\*\* | -.296\*\* | -.024\*\* | .746\*\* | -.336\*\* | -.428\*\* | -.187\*\* | -.519\*\* | -.411\*\* | -.020\*\* | -.193\*\* | .061\*\* | .157\*\* |
| NDVI autumn | .249\*\* | -.349\*\* | .135\*\* | .316\*\* | .826\*\* | .823\*\* | 1 | .868\*\* | .342\*\* | .364\*\* | .449\*\* | .389\*\* | -.272\*\* | -.337\*\* | -0.007 | .087\*\* | -.275\*\* | .044\*\* | .598\*\* | -.239\*\* | -.320\*\* | -.099\*\* | -.401\*\* | -.358\*\* | -.071\*\* | -.266\*\* | .063\*\* | .185\*\* |
| NDVI winter | .355\*\* | -.217\*\* | .185\*\* | .384\*\* | .918\*\* | .699\*\* | .868\*\* | 1 | .444\*\* | .430\*\* | .511\*\* | .498\*\* | -.170\*\* | -.273\*\* | .020\*\* | .122\*\* | -.347\*\* | .093\*\* | .504\*\* | -.203\*\* | -.197\*\* | -.088\*\* | -.316\*\* | -.332\*\* | -.106\*\* | -.308\*\* | .102\*\* | .108\*\* |
| Albedo spring | .491\*\* | -.085\*\* | .167\*\* | .435\*\* | .414\*\* | .298\*\* | .342\*\* | .444\*\* | 1 | .906\*\* | .829\*\* | .904\*\* | -.267\*\* | -.158\*\* | .047\*\* | .095\*\* | -.229\*\* | .140\*\* | .419\*\* | -.309\*\* | -.196\*\* | -.105\*\* | -.311\*\* | -.324\*\* | -.124\*\* | -.353\*\* | -.030\*\* | .061\*\* |
| Albedo summer | .414\*\* | -.106\*\* | .137\*\* | .366\*\* | .417\*\* | .335\*\* | .364\*\* | .430\*\* | .906\*\* | 1 | .799\*\* | .817\*\* | -.319\*\* | -.152\*\* | .058\*\* | .088\*\* | -.171\*\* | .171\*\* | .406\*\* | -.271\*\* | -.235\*\* | -.081\*\* | -.319\*\* | -.318\*\* | -.097\*\* | -.331\*\* | -0.01 | .090\*\* |
| Albedo autumn | .517\*\* | -.045\*\* | .231\*\* | .526\*\* | .431\*\* | .340\*\* | .449\*\* | .511\*\* | .829\*\* | .799\*\* | 1 | .843\*\* | -.277\*\* | -.148\*\* | .046\*\* | .076\*\* | -.168\*\* | .112\*\* | .388\*\* | -.335\*\* | -.202\*\* | -.097\*\* | -.303\*\* | -.305\*\* | -.116\*\* | -.336\*\* | -.020\*\* | .094\*\* |
| Albedo winter | .505\*\* | -.095\*\* | .248\*\* | .523\*\* | .414\*\* | .319\*\* | .389\*\* | .498\*\* | .904\*\* | .817\*\* | .843\*\* | 1 | -.252\*\* | -.162\*\* | .036\*\* | .096\*\* | -.229\*\* | .117\*\* | .416\*\* | -.328\*\* | -.201\*\* | -.123\*\* | -.315\*\* | -.314\*\* | -.116\*\* | -.333\*\* | -0.009 | .082\*\* |
| Residential % | -.063\*\* | .299\*\* | .044\*\* | -.141\*\* | -.124\*\* | -.331\*\* | -.272\*\* | -.170\*\* | -.267\*\* | -.319\*\* | -.277\*\* | -.252\*\* | 1 | -.096\*\* | -.067\*\* | -.119\*\* | -.346\*\* | -.123\*\* | -.444\*\* | .230\*\* | .767\*\* | .139\*\* | .519\*\* | .179\*\* | -.125\*\* | -.012\* | .118\*\* | -.154\*\* |
| Commercial % | .032\*\* | .368\*\* | .138\*\* | -.032\*\* | -.279\*\* | -.420\*\* | -.337\*\* | -.273\*\* | -.158\*\* | -.152\*\* | -.148\*\* | -.162\*\* | -.096\*\* | 1 | .019\*\* | -.142\*\* | .043\*\* | -.134\*\* | -.478\*\* | .158\*\* | .255\*\* | .228\*\* | .429\*\* | .445\*\* | .068\*\* | .123\*\* | -.144\*\* | -.107\*\* |
| Industrial % | .086\*\* | .114\*\* | .113\*\* | .053\*\* | .028\*\* | -.036\*\* | -0.007 | .020\*\* | .047\*\* | .058\*\* | .046\*\* | .036\*\* | -.067\*\* | .019\*\* | 1 | -.017\*\* | 0.0071 | -.027\*\* | -.055\*\* | .040\*\* | -.031\*\* | .085\*\* | .023\*\* | .011\* | 0.0062 | -0.003 | -.039\*\* | .025\*\* |
| Cultural &  Recreational % | .062\*\* | .018\*\* | .025\*\* | .049\*\* | .141\*\* | .036\*\* | .087\*\* | .122\*\* | .095\*\* | .088\*\* | .076\*\* | .096\*\* | -.119\*\* | -.142\*\* | -.017\*\* | 1 | -.077\*\* | .074\*\* | -0.001 | .129\*\* | -.136\*\* | -.080\*\* | -.140\*\* | -.112\*\* | 0.0007 | -.013\* | .027\*\* | .023\*\* |
| Transport % | -.243\*\* | .082\*\* | -.026\*\* | -.106\*\* | -.385\*\* | -.296\*\* | -.275\*\* | -.347\*\* | -.229\*\* | -.171\*\* | -.168\*\* | -.229\*\* | -.346\*\* | .043\*\* | 0.0071 | -.077\*\* | 1 | -.086\*\* | -.440\*\* | .078\*\* | -.337\*\* | -.052\*\* | -.080\*\* | .113\*\* | .130\*\* | .180\*\* | -.078\*\* | .086\*\* |
| Public % | .029\*\* | .049\*\* | 0.0102 | .022\*\* | .125\*\* | -.024\*\* | .044\*\* | .093\*\* | .140\*\* | .171\*\* | .112\*\* | .117\*\* | -.123\*\* | -.134\*\* | -.027\*\* | .074\*\* | -.086\*\* | 1 | -.056\*\* | .263\*\* | -.085\*\* | -.033\*\* | -.028\*\* | -.048\*\* | -.022\*\* | -.045\*\* | .048\*\* | -0.009 |
| Other uses % | .182\*\* | -.556\*\* | -.120\*\* | .191\*\* | .484\*\* | .746\*\* | .598\*\* | .504\*\* | .419\*\* | .406\*\* | .388\*\* | .416\*\* | -.444\*\* | -.478\*\* | -.055\*\* | -0.001 | -.440\*\* | -.056\*\* | 1 | -.451\*\* | -.478\*\* | -.194\*\* | -.589\*\* | -.458\*\* | -.027\*\* | -.180\*\* | .030\*\* | .123\*\* |
| Entropy index | -.280\*\* | .202\*\* | -.103\*\* | -.270\*\* | -.141\*\* | -.336\*\* | -.239\*\* | -.203\*\* | -.309\*\* | -.271\*\* | -.335\*\* | -.328\*\* | .230\*\* | .158\*\* | .040\*\* | .129\*\* | .078\*\* | .263\*\* | -.451\*\* | 1 | .213\*\* | .145\*\* | .389\*\* | .233\*\* | 0.0026 | .209\*\* | .058\*\* | -.066\*\* |
| Building density | .102\*\* | .481\*\* | .162\*\* | -.059\*\* | -.171\*\* | -.428\*\* | -.320\*\* | -.197\*\* | -.196\*\* | -.235\*\* | -.202\*\* | -.201\*\* | .767\*\* | .255\*\* | -.031\*\* | -.136\*\* | -.337\*\* | -.085\*\* | -.478\*\* | .213\*\* | 1 | .306\*\* | .665\*\* | .278\*\* | -.183\*\* | -.073\*\* | 0.0088 | -.161\*\* |
| Old buildings % | .089\*\* | .285\*\* | .102\*\* | -.018\*\* | -.065\*\* | -.187\*\* | -.099\*\* | -.088\*\* | -.105\*\* | -.081\*\* | -.097\*\* | -.123\*\* | .139\*\* | .228\*\* | .085\*\* | -.080\*\* | -.052\*\* | -.033\*\* | -.194\*\* | .145\*\* | .306\*\* | 1 | .305\*\* | .152\*\* | -.065\*\* | -.074\*\* | -.034\*\* | -.055\*\* |
| Ave. building coverage ratio (BCR) | -.038\*\* | .471\*\* | .112\*\* | -.139\*\* | -.301\*\* | -.519\*\* | -.401\*\* | -.316\*\* | -.311\*\* | -.319\*\* | -.303\*\* | -.315\*\* | .519\*\* | .429\*\* | .023\*\* | -.140\*\* | -.080\*\* | -.028\*\* | -.589\*\* | .389\*\* | .665\*\* | .305\*\* | 1 | .724\*\* | -.061\*\* | .150\*\* | -0.007 | -.178\*\* |
| Ave. floor area ratio (FAR) | -.187\*\* | .236\*\* | -0.002 | -.186\*\* | -.337\*\* | -.411\*\* | -.358\*\* | -.332\*\* | -.324\*\* | -.318\*\* | -.305\*\* | -.314\*\* | .179\*\* | .445\*\* | .011\* | -.112\*\* | .113\*\* | -.048\*\* | -.458\*\* | .233\*\* | .278\*\* | .152\*\* | .724\*\* | 1 | .266\*\* | .452\*\* | -.072\*\* | -.128\*\* |
| Ave. total floor area (TFA) | -.229\*\* | -.141\*\* | -.143\*\* | -.163\*\* | -.096\*\* | -.020\*\* | -.071\*\* | -.106\*\* | -.124\*\* | -.097\*\* | -.116\*\* | -.116\*\* | -.125\*\* | .068\*\* | 0.0062 | 0.0007 | .130\*\* | -.022\*\* | -.027\*\* | 0.0026 | -.183\*\* | -.065\*\* | -.061\*\* | .266\*\* | 1 | .565\*\* | -.045\*\* | 0.0038 |
| Ave. building height (BH) | -.387\*\* | -.083\*\* | -.208\*\* | -.303\*\* | -.299\*\* | -.193\*\* | -.266\*\* | -.308\*\* | -.353\*\* | -.331\*\* | -.336\*\* | -.333\*\* | -.012\* | .123\*\* | -0.003 | -.013\* | .180\*\* | -.045\*\* | -.180\*\* | .209\*\* | -.073\*\* | -.074\*\* | .150\*\* | .452\*\* | .565\*\* | 1 | -.030\*\* | -.058\*\* |
| Gravity index for urban forests (GIUF) | -.073\*\* | -.139\*\* | -.097\*\* | -.147\*\* | .190\*\* | .061\*\* | .063\*\* | .102\*\* | -.030\*\* | -0.01 | -.020\*\* | -0.009 | .118\*\* | -.144\*\* | -.039\*\* | .027\*\* | -.078\*\* | .048\*\* | .030\*\* | .058\*\* | 0.0088 | -.034\*\* | -0.007 | -.072\*\* | -.045\*\* | -.030\*\* | 1 | -.149\*\* |
| Gravity index for water bodies (GIWB) | -0.009 | -.152\*\* | .056\*\* | .174\*\* | .090\*\* | .157\*\* | .185\*\* | .108\*\* | .061\*\* | .090\*\* | .094\*\* | .082\*\* | -.154\*\* | -.107\*\* | .025\*\* | .023\*\* | .086\*\* | -0.009 | .123\*\* | -.066\*\* | -.161\*\* | -.055\*\* | -.178\*\* | -.128\*\* | 0.0038 | -.058\*\* | -.149\*\* | 1 |

Table S2. Correlation matrix of seasonal land surface temperatures and explanatory variables at the block level (N=4,553)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LST spring | LST summer | LST autumn | LST winter | NDVI spring | NDVI summer | NDVI autumn | NDVI winter | Albedo spring | Albedo summer | Albedo autumn | Albedo winter | Residential % | Commercial % | Industrial % | Cultural & Recreational % | Transport % | Public % | Other uses % | Entropy index | Building density | Old buildings % | Ave. BCR | Ave. FAR | Ave. TFA | Ave. BH | GIUF | GIWB |
| LST spring | 1 | .699\*\* | .704\*\* | .709\*\* | .211\*\* | -.091\*\* | .129\*\* | .267\*\* | .503\*\* | .429\*\* | .509\*\* | .494\*\* | .212\*\* | .138\*\* | .123\*\* | 0.0095 | -.354\*\* | .101\*\* | -.098\*\* | .111\*\* | .447\*\* | .384\*\* | .213\*\* | -.256\*\* | -.216\*\* | -.430\*\* | -.043\*\* | -0.004 |
| LST summer | .699\*\* | 1 | .663\*\* | .499\*\* | -.225\*\* | -.593\*\* | -.365\*\* | -.206\*\* | .131\*\* | .053\*\* | .117\*\* | .087\*\* | .368\*\* | .409\*\* | .131\*\* | -.127\*\* | -.137\*\* | 0.0177 | -.582\*\* | .119\*\* | .616\*\* | .361\*\* | .436\*\* | -.036\* | -.201\*\* | -.313\*\* | -.403\*\* | -0.014 |
| LST autumn | .704\*\* | .663\*\* | 1 | .807\*\* | .060\*\* | -.213\*\* | .047\*\* | .145\*\* | .202\*\* | .132\*\* | .361\*\* | .332\*\* | .195\*\* | .272\*\* | .161\*\* | -.058\*\* | -.163\*\* | -0.01 | -.289\*\* | .061\*\* | .349\*\* | .222\*\* | .240\*\* | -.077\*\* | -.154\*\* | -.279\*\* | -.149\*\* | 0.0216 |
| LST winter | .709\*\* | .499\*\* | .807\*\* | 1 | .072\*\* | -.137\*\* | .097\*\* | .200\*\* | .383\*\* | .286\*\* | .502\*\* | .508\*\* | .097\*\* | .154\*\* | .093\*\* | 0.0057 | -.127\*\* | 0.0066 | -.133\*\* | .048\*\* | .205\*\* | .154\*\* | .101\*\* | -.140\*\* | -.140\*\* | -.276\*\* | -.164\*\* | .144\*\* |
| NDVI spring | .211\*\* | -.225\*\* | .060\*\* | .072\*\* | 1 | .758\*\* | .858\*\* | .946\*\* | .396\*\* | .431\*\* | .459\*\* | .413\*\* | 0.0223 | -.414\*\* | .056\*\* | .202\*\* | -.398\*\* | .244\*\* | .487\*\* | .159\*\* | -.092\*\* | 0.0231 | -.206\*\* | -.384\*\* | -.111\*\* | -.289\*\* | .500\*\* | -.065\*\* |
| NDVI summer | -.091\*\* | -.593\*\* | -.213\*\* | -.137\*\* | .758\*\* | 1 | .886\*\* | .734\*\* | .140\*\* | .250\*\* | .222\*\* | .169\*\* | -.271\*\* | -.552\*\* | -0.015 | .243\*\* | -.186\*\* | .138\*\* | .762\*\* | .065\*\* | -.454\*\* | -.124\*\* | -.418\*\* | -.279\*\* | 0.0253 | -0.002 | .521\*\* | -0.016 |
| NDVI autumn | .129\*\* | -.365\*\* | .047\*\* | .097\*\* | .858\*\* | .886\*\* | 1 | .889\*\* | .300\*\* | .370\*\* | .466\*\* | .365\*\* | -.151\*\* | -.453\*\* | 0.0205 | .230\*\* | -.282\*\* | .195\*\* | .622\*\* | .125\*\* | -.279\*\* | -1E-03 | -.290\*\* | -.310\*\* | -.042\*\* | -.151\*\* | .480\*\* | -0.003 |
| NDVI winter | .267\*\* | -.206\*\* | .145\*\* | .200\*\* | .946\*\* | .734\*\* | .889\*\* | 1 | .446\*\* | .461\*\* | .553\*\* | .524\*\* | -0.011 | -.385\*\* | .047\*\* | .203\*\* | -.378\*\* | .228\*\* | .490\*\* | .131\*\* | -.104\*\* | .039\*\* | -.202\*\* | -.350\*\* | -.091\*\* | -.266\*\* | .449\*\* | -.047\*\* |
| Albedo spring | .503\*\* | .131\*\* | .202\*\* | .383\*\* | .396\*\* | .140\*\* | .300\*\* | .446\*\* | 1 | .917\*\* | .794\*\* | .883\*\* | -.049\*\* | -.150\*\* | .111\*\* | .124\*\* | -.242\*\* | .298\*\* | .244\*\* | .113\*\* | .058\*\* | .184\*\* | -.112\*\* | -.302\*\* | -.083\*\* | -.316\*\* | .045\*\* | 0.0067 |
| Albedo summer | .429\*\* | .053\*\* | .132\*\* | .286\*\* | .431\*\* | .250\*\* | .370\*\* | .461\*\* | .917\*\* | 1 | .759\*\* | .791\*\* | -.171\*\* | -.169\*\* | .121\*\* | .144\*\* | -.172\*\* | .331\*\* | .322\*\* | .126\*\* | -.047\*\* | .209\*\* | -.161\*\* | -.275\*\* | -.049\*\* | -.252\*\* | .100\*\* | 0.0188 |
| Albedo autumn | .509\*\* | .117\*\* | .361\*\* | .502\*\* | .459\*\* | .222\*\* | .466\*\* | .553\*\* | .794\*\* | .759\*\* | 1 | .833\*\* | -.053\*\* | -.120\*\* | .114\*\* | .097\*\* | -.257\*\* | .248\*\* | .251\*\* | .090\*\* | .057\*\* | .190\*\* | -.086\*\* | -.278\*\* | -.078\*\* | -.295\*\* | .116\*\* | -0.005 |
| Albedo winter | .494\*\* | .087\*\* | .332\*\* | .508\*\* | .413\*\* | .169\*\* | .365\*\* | .524\*\* | .883\*\* | .791\*\* | .833\*\* | 1 | -.034\* | -.132\*\* | .088\*\* | .130\*\* | -.271\*\* | .254\*\* | .248\*\* | .092\*\* | .038\* | .137\*\* | -.111\*\* | -.274\*\* | -.074\*\* | -.286\*\* | .100\*\* | -0.013 |
| Residential % | .212\*\* | .368\*\* | .195\*\* | .097\*\* | 0.0223 | -.271\*\* | -.151\*\* | -0.011 | -.049\*\* | -.171\*\* | -.053\*\* | -.034\* | 1 | -.217\*\* | -.101\*\* | -.203\*\* | -.527\*\* | -.138\*\* | -.417\*\* | .088\*\* | .736\*\* | 0.0289 | .333\*\* | -.244\*\* | -.223\*\* | -.387\*\* | -0.004 | -.044\*\* |
| Commercial % | .138\*\* | .409\*\* | .272\*\* | .154\*\* | -.414\*\* | -.552\*\* | -.453\*\* | -.385\*\* | -.150\*\* | -.169\*\* | -.120\*\* | -.132\*\* | -.217\*\* | 1 | .039\*\* | -.263\*\* | .149\*\* | -.223\*\* | -.544\*\* | -.144\*\* | .184\*\* | .187\*\* | .359\*\* | .387\*\* | 0.0127 | .049\*\* | -.292\*\* | -.051\*\* |
| Industrial % | .123\*\* | .131\*\* | .161\*\* | .093\*\* | .056\*\* | -0.015 | 0.0205 | .047\*\* | .111\*\* | .121\*\* | .114\*\* | .088\*\* | -.101\*\* | .039\*\* | 1 | -0.019 | 0.0271 | -0.017 | -.039\*\* | .063\*\* | -.062\*\* | .109\*\* | 0.0004 | -0.01 | -0.002 | -0.009 | -.029\* | .057\*\* |
| Cultural &  Recreational % | 0.0095 | -.127\*\* | -.058\*\* | 0.0057 | .202\*\* | .243\*\* | .230\*\* | .203\*\* | .124\*\* | .144\*\* | .097\*\* | .130\*\* | -.203\*\* | -.263\*\* | -0.019 | 1 | 0.0088 | .312\*\* | .199\*\* | .344\*\* | -.260\*\* | -.117\*\* | -.219\*\* | -.126\*\* | 0.0276 | .058\*\* | .056\*\* | .033\* |
| Transport % | -.354\*\* | -.137\*\* | -.163\*\* | -.127\*\* | -.398\*\* | -.186\*\* | -.282\*\* | -.378\*\* | -.242\*\* | -.172\*\* | -.257\*\* | -.271\*\* | -.527\*\* | .149\*\* | 0.0271 | 0.0088 | 1 | -.075\*\* | -.288\*\* | -.133\*\* | -.518\*\* | -.161\*\* | -.201\*\* | .334\*\* | .231\*\* | .423\*\* | -.269\*\* | .129\*\* |
| Public % | .101\*\* | 0.0177 | -0.01 | 0.0066 | .244\*\* | .138\*\* | .195\*\* | .228\*\* | .298\*\* | .331\*\* | .248\*\* | .254\*\* | -.138\*\* | -.223\*\* | -0.017 | .312\*\* | -.075\*\* | 1 | .097\*\* | .436\*\* | -.128\*\* | -0.004 | -.071\*\* | -.113\*\* | -.039\*\* | -.075\*\* | .032\* | -0.024 |
| Other uses % | -.098\*\* | -.582\*\* | -.289\*\* | -.133\*\* | .487\*\* | .762\*\* | .622\*\* | .490\*\* | .244\*\* | .322\*\* | .251\*\* | .248\*\* | -.417\*\* | -.544\*\* | -.039\*\* | .199\*\* | -.288\*\* | .097\*\* | 1 | -.037\* | -.446\*\* | -.045\*\* | -.417\*\* | -.236\*\* | .056\*\* | .063\*\* | .406\*\* | -0.017 |
| Entropy index | .111\*\* | .119\*\* | .061\*\* | .048\*\* | .159\*\* | .065\*\* | .125\*\* | .131\*\* | .113\*\* | .126\*\* | .090\*\* | .092\*\* | .088\*\* | -.144\*\* | .063\*\* | .344\*\* | -.133\*\* | .436\*\* | -.037\* | 1 | -0.011 | -0.01 | .112\*\* | -.211\*\* | -.144\*\* | -.169\*\* | -6E-04 | .034\* |
| Building density | .447\*\* | .616\*\* | .349\*\* | .205\*\* | -.092\*\* | -.454\*\* | -.279\*\* | -.104\*\* | .058\*\* | -.047\*\* | .057\*\* | .038\* | .736\*\* | .184\*\* | -.062\*\* | -.260\*\* | -.518\*\* | -.128\*\* | -.446\*\* | -0.011 | 1 | .272\*\* | .507\*\* | -.161\*\* | -.264\*\* | -.441\*\* | -.126\*\* | -.046\*\* |
| Old buildings % | .384\*\* | .361\*\* | .222\*\* | .154\*\* | 0.0231 | -.124\*\* | -1E-03 | .039\*\* | .184\*\* | .209\*\* | .190\*\* | .137\*\* | 0.0289 | .187\*\* | .109\*\* | -.117\*\* | -.161\*\* | -0.004 | -.045\*\* | -0.01 | .272\*\* | 1 | .217\*\* | -0.018 | -.136\*\* | -.201\*\* | -.073\*\* | 0.0272 |
| Ave. building coverage ratio (BCR) | .213\*\* | .436\*\* | .240\*\* | .101\*\* | -.206\*\* | -.418\*\* | -.290\*\* | -.202\*\* | -.112\*\* | -.161\*\* | -.086\*\* | -.111\*\* | .333\*\* | .359\*\* | 0.0004 | -.219\*\* | -.201\*\* | -.071\*\* | -.417\*\* | .112\*\* | .507\*\* | .217\*\* | 1 | .381\*\* | -.148\*\* | -.143\*\* | -.115\*\* | -.044\*\* |
| Ave. floor area ratio (FAR) | -.256\*\* | -.036\* | -.077\*\* | -.140\*\* | -.384\*\* | -.279\*\* | -.310\*\* | -.350\*\* | -.302\*\* | -.275\*\* | -.278\*\* | -.274\*\* | -.244\*\* | .387\*\* | -0.01 | -.126\*\* | .334\*\* | -.113\*\* | -.236\*\* | -.211\*\* | -.161\*\* | -0.018 | .381\*\* | 1 | .366\*\* | .589\*\* | -.168\*\* | -.036\* |
| Ave. total floor area (TFA) | -.216\*\* | -.201\*\* | -.154\*\* | -.140\*\* | -.111\*\* | 0.0253 | -.042\*\* | -.091\*\* | -.083\*\* | -.049\*\* | -.078\*\* | -.074\*\* | -.223\*\* | 0.0127 | -0.002 | 0.0276 | .231\*\* | -.039\*\* | .056\*\* | -.144\*\* | -.264\*\* | -.136\*\* | -.148\*\* | .366\*\* | 1 | .645\*\* | -.056\*\* | .044\*\* |
| Ave. building height (BH) | -.430\*\* | -.313\*\* | -.279\*\* | -.276\*\* | -.289\*\* | -0.002 | -.151\*\* | -.266\*\* | -.316\*\* | -.252\*\* | -.295\*\* | -.286\*\* | -.387\*\* | .049\*\* | -0.009 | .058\*\* | .423\*\* | -.075\*\* | .063\*\* | -.169\*\* | -.441\*\* | -.201\*\* | -.143\*\* | .589\*\* | .645\*\* | 1 | -.095\*\* | 0.0281 |
| Gravity index for urban forests (GIUF) | -.043\*\* | -.403\*\* | -.149\*\* | -.164\*\* | .500\*\* | .521\*\* | .480\*\* | .449\*\* | .045\*\* | .100\*\* | .116\*\* | .100\*\* | -0.004 | -.292\*\* | -.029\* | .056\*\* | -.269\*\* | .032\* | .406\*\* | -6E-04 | -.126\*\* | -.073\*\* | -.115\*\* | -.168\*\* | -.056\*\* | -.095\*\* | 1 | -.159\*\* |
| Gravity index for water bodies (GIWB) | -0.004 | -0.014 | 0.0216 | .144\*\* | -.065\*\* | -0.016 | -0.003 | -.047\*\* | 0.0067 | 0.0188 | -0.005 | -0.013 | -.044\*\* | -.051\*\* | .057\*\* | .033\* | .129\*\* | -0.024 | -0.017 | .034\* | -.046\*\* | 0.0272 | -.044\*\* | -.036\* | .044\*\* | 0.0281 | -.159\*\* | 1 |

Table S3. Ordinary least squared (OLS) estimation results at the grid level (N=34,135).

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 16.798\*\*\* | 38.879\*\*\* | 9.6405\*\*\* | -5.9484\*\*\* |
| NDVI | | 3.5504\*\*\* | -9.4115\*\*\* | 7.8410\*\*\* | 11.920\*\*\* |
| Albedo | | 0.3676\*\*\* | 0.0957\*\*\* | 0.1427\*\*\* | 0.3277\*\*\* |
| Land use  type proportion | Residential | -0.0093\*\*\* | 0.0104\*\*\* | 0.0099\*\*\* | 0.0027\*\*\* |
| Commercial | 0.0076\*\*\* | 0.0267\*\*\* | 0.0181\*\*\* | 0.0072\*\*\* |
| Industrial | 0.0390\*\*\* | 0.0851\*\*\* | 0.0480\*\*\* | 0.0135\*\*\* |
| Cultural & Recreational | 0.0229\*\*\* | 0.0505\*\*\* | 0.0215\*\*\* | 0.0086\*\*\* |
| Transport | -0.0023\*\*\* | 0.0190\*\*\* | 0.0130\*\*\* | 0.0066\*\*\* |
| Public | 0.0064\*\*\* | 0.0341\*\*\* | 0.0164\*\*\* | 0.0044\*\*\* |
| Land use diversity | Entropy Index | -2.2208\*\*\* | -1.1902\*\*\* | -1.2131\*\*\* | -1.0388\*\*\* |
| Building  2-D form | Count of buildings | 0.0182\*\*\* | 0.0257\*\*\* | 0.0079\*\*\* | 0.0020\*\*\* |
| % of old buildings (+35 years) | 0.0036\*\*\* | 0.0080\*\*\* | 0.0010\*\*\* | 0.0006\*\*\* |
| Average building coverage ratio | 0.0113\*\*\* | 0.0182\*\*\* | 0.0056\*\*\* | 0.0039\*\*\* |
| Building  3-D form | Average floor area ratio | -0.0016\*\*\* | -0.0026\*\*\* | -0.0006\*\*\* | -0.0004\*\*\* |
| Average total floor area | -6.8e-06\*\*\* | -5.4e-06\*\*\* | -4.7e-06\*\*\* | -6.3e-06\*\*\* |
| Average building height | -0.0122\*\*\* | -0.0124\*\*\* | -0.0038\*\*\* | -0.0036\*\*\* |
| Natural area | Gravity index for urban forests | -0.0038\*\*\* | -0.0098\*\*\* | -0.0030\*\*\* | -0.0055\*\*\* |
| Gravity index for water bodies | -0.0014\*\*\* | -0.0040\*\*\* | 0.0011\*\*\* | 0.0033\*\*\* |
| Adj. R2 | | 0.390 | 0.523 | 0.214 | 0.374 |
| Std. Err. | | 1.28 | 1.63 | 0.97 | 0.88 |
| AIC | | 113,997 | 130,453 | 94,906 | 88,010 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S4. Ordinary least squared (OLS) estimation results at the block level (N=4,553)

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 12.866\*\*\* | 33.767\*\*\* | 7.1954\*\*\* | -7.1915\*\*\* |
| NDVI | | 4.6396\*\*\* | -4.5857\*\*\* | 9.1271\*\*\* | 7.2993\*\*\* |
| Albedo | | 0.5183\*\*\* | 0.1791\*\*\* | 0.3535\*\*\* | 0.5699\*\*\* |
| Land use  type proportion | Residential | -0.0012 | 0.0217\*\*\* | 0.0139\*\*\* | 0.0073\*\*\* |
| Commercial | 0.0157\*\*\* | 0.0397\*\*\* | 0.0253\*\*\* | 0.0145\*\*\* |
| Industrial | 0.0427\*\*\* | 0.1208\*\*\* | 0.0593\*\*\* | 0.0147\*\*\* |
| Cultural & Recreational | 0.0454\*\*\* | 0.0678\*\*\* | 0.0280\*\*\* | 0.0182\*\*\* |
| Transport | -0.0002 | 0.0207\*\*\* | 0.0106\*\*\* | 0.0064\*\*\* |
| Public | 0.0001 | 0.0447\*\*\* | 0.0022 | -0.0151\*\*\* |
| Land use diversity | Entropy Index | 0.0954 | 0.6955\*\*\* | -0.0445 | -0.0096 |
| Building  2-D form | Building Density (/1km2) | 0.0233\*\*\* | 0.0354\*\*\* | 0.0071\*\*\* | 0.0004 |
| % of old buildings (+35 years) | 0.0101\*\*\* | 0.0145\*\*\* | 0.0013\*\* | 0.0001 |
| Average building coverage ratio | 0.0057\*\*\* | 0.0115\*\*\* | 0.0031\*\*\* | 0.0026\*\*\* |
| Building  3-D form | Average floor area ratio | -0.0011\*\*\* | -0.0019\*\*\* | -0.0002\* | -0.0003\* |
| Average total floor area | 0.0000 | -0.0000 | -1.8e-06\* | -2.4e-06\*\*\* |
| Average building height | -0.0051\*\*\* | -0.0034\*\* | -0.0009 | -0.0028\*\*\* |
| Natural area | Gravity index for urban forests | -0.0008\*\* | -0.0084\*\*\* | -0.0025\*\*\* | -0.0031\*\*\* |
| Gravity index for water bodies | 0.0007 | -0.0057\*\*\* | 0.0010 | 0.0084\*\*\* |
| Adj. R2 | | 0.515 | 0.662 | 0.388 | 0.406 |
| Std. Err. | | 0.82 | 1.06 | 0.63 | 0.60 |
| AIC | | 11,102 | 13,437 | 8,720 | 8,321 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S3. Spatial error model (SEM) estimation results at the grid level (N=34,135)

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 18.227\*\*\* | 36.997\*\*\* | 11.076\*\*\* | -4.6217\*\*\* |
| NDVI | | 3.4328\*\*\* | -3.5413\*\*\* | 3.7212\*\*\* | 8.6236\*\*\* |
| Albedo | | 0.1231\*\*\* | 0.0539\*\*\* | 0.1292\*\*\* | 0.1611\*\*\* |
| Land use  type proportion | Residential | 0.0011\*\*\* | 0.0096\*\*\* | 0.0056\*\*\* | 0.0024\*\*\* |
| Commercial | 0.0065\*\*\* | 0.0156\*\*\* | 0.0065\*\*\* | 0.0030\*\*\* |
| Industrial | 0.0181\*\*\* | 0.0319\*\*\* | 0.0145\*\*\* | 0.0065\*\*\* |
| Cultural & Recreational | 0.0182\*\*\* | 0.0274\*\*\* | 0.0103\*\*\* | 0.0068\*\*\* |
| Transport | 0.0039\*\*\* | 0.0104\*\*\* | 0.0071\*\*\* | 0.0060\*\*\* |
| Public | 0.0082\*\*\* | 0.0184\*\*\* | 0.0065\*\*\* | 0.0026\*\*\* |
| Land use diversity | Entropy Index | -0.4549\*\*\* | -0.1702\*\*\* | -0.2019\*\*\* | -0.2297\*\*\* |
| Building  2-D form | Count of buildings | 0.0078\*\*\* | 0.0104\*\*\* | 0.0053\*\*\* | 0.0040\*\*\* |
| % of old buildings (+35 years) | 0.0017\*\*\* | 0.0032\*\*\* | 0.0008\*\*\* | 0.0006\*\*\* |
| Average building coverage ratio | 0.0031\*\*\* | 0.0048\*\*\* | 0.0011\*\*\* | 0.0006\*\*\* |
| Building  3-D form | Average floor area ratio | -0.0004\*\*\* | -0.0005\*\*\* | -0.0001\*\*\* | -2.8e-05 |
| Average total floor area | -9.6e-07\*\*\* | -1.6e-06\*\*\* | -1.8e-06\*\*\* | -1.7e-06\*\*\* |
| Average building height | -0.0036\*\*\* | -0.0047\*\*\* | -0.0007\*\*\* | -0.0007\*\*\* |
| Natural area | Gravity index for urban forests | -0.0037\*\*\* | -0.0222\*\*\* | -0.0046\*\*\* | -0.0077\*\*\* |
| Gravity index for water bodies | -0.0001 | -0.0016\*\*\* | 0.0002\*\* | 0.0008\*\*\* |
| Lambda (λ) | | 0.954\*\*\* | 0.957\*\*\* | 0.947\*\*\* | 0.933\*\*\* |
| Adj. R2 | | 0.883 | 0.917 | 0.848 | 0.832 |
| Std. Err. | | 0.53 | 0.65 | 0.40 | 0.43 |
| AIC | | 62,718 | 76,800 | 43,868 | 47,812 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S4. Spatial error model (SEM) estimation results at the block level (N=4,553)

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 14.345\*\*\* | 36.455\*\*\* | 8.4268\*\*\* | -7.304\*\*\* |
| NDVI | | 3.2705\*\*\* | -6.3639\*\*\* | 6.4654\*\*\* | 9.7872\*\*\* |
| Albedo | | 0.4422\*\*\* | 0.1191\*\*\* | 0.3121\*\*\* | 0.4547\*\*\* |
| Land use  type proportion | Residential | 0.0018 | 0.0161\*\*\* | 0.0099\*\*\* | 0.0060\*\*\* |
| Commercial | 0.0112\*\*\* | 0.0272\*\*\* | 0.0146\*\*\* | 0.0080\*\*\* |
| Industrial | 0.0424\*\*\* | 0.0935\*\*\* | 0.0370\*\*\* | 0.0167\*\*\* |
| Cultural & Recreational | 0.0445\*\*\* | 0.0649\*\*\* | 0.0242\*\*\* | 0.0203\*\*\* |
| Transport | 0.0057\*\*\* | 0.0203\*\*\* | 0.0117\*\*\* | 0.0119\*\*\* |
| Public | 0.0061\*\* | 0.0396\*\*\* | 0.0072\*\*\* | -0.0039\* |
| Land use diversity | Entropy Index | -0.4582\*\*\* | 0.0874 | -0.2372\*\*\* | -0.1712\*\* |
| Building  2-D form | Building Density (/1km2) | 0.0190\*\*\* | 0.0288\*\*\* | 0.0113\*\*\* | 0.0089\*\*\* |
| % of old buildings (+35 years) | 0.0036\*\*\* | 0.0064\*\*\* | 0.0012\*\*\* | 0.0004 |
| Average building coverage ratio | 0.0053\*\*\* | 0.0044\*\*\* | 0.0022\*\*\* | 0.0017\*\* |
| Building  3-D form | Average floor area ratio | -0.0008\*\*\* | -0.0009\*\*\* | -0.0002 | 3.1.E-05 |
| Average total floor area | 3.4e-06\*\*\* | 2.9e-06\*\*\* | -8.6e-07 | -1.4e-06\*\* |
| Average building height | -0.0085\*\*\* | -0.0117\*\*\* | -0.0025\*\*\* | -0.0028\*\*\* |
| Natural  area | Gravity index for urban forests | -0.0007\*\* | -0.0064\*\*\* | -0.0018\*\*\* | -0.0021\*\*\* |
| Gravity index for water bodies | 0.0028\* | -0.0041\*\* | 0.0037\*\*\* | 0.0100\*\*\* |
| Lambda (λ) | | 0.752\*\*\* | 0.746\*\*\* | 0.747\*\*\* | 0.782\*\*\* |
| Adj. R2 | | 0.741 | 0.829 | 0.693 | 0.660 |
| Std. Err. | | 0.59 | 0.75 | 0.46 | 0.45 |
| AIC | | 8,983 | 11,062 | 6,303 | 6,555 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S5. Spatial lag model (SLM) estimation results at the grid level (N=34,135).

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 6.7784\*\*\* | 22.427\*\*\* | 2.7371\*\*\* | -2.4445\*\*\* |
| NDVI | | 3.1671\*\*\* | -5.9977\*\*\* | 4.9167\*\*\* | 6.8601\*\*\* |
| Albedo | | 0.2038\*\*\* | 0.0688\*\*\* | 0.0976\*\*\* | 0.1299\*\*\* |
| Land use  type proportion | Residential | -0.0050\*\*\* | 0.0058\*\*\* | 0.0049\*\*\* | 0.0024\*\*\* |
| Commercial | 0.0060\*\*\* | 0.0184\*\*\* | 0.0095\*\*\* | 0.0034\*\*\* |
| Industrial | 0.0239\*\*\* | 0.0569\*\*\* | 0.0239\*\*\* | 0.0042\*\*\* |
| Cultural & Recreational | 0.0182\*\*\* | 0.0372\*\*\* | 0.0127\*\*\* | 0.0061\*\*\* |
| Transport | -0.0002 | 0.0120\*\*\* | 0.0075\*\*\* | 0.0052\*\*\* |
| Public | 0.0053\*\*\* | 0.0234\*\*\* | 0.0084\*\*\* | 0.0021\*\*\* |
| Land use diversity | Entropy Index | -1.2344\*\*\* | -0.9964\*\*\* | -0.6235\*\*\* | -0.1865\*\*\* |
| Building  2-D form | Count of buildings | 0.0107\*\*\* | 0.0171\*\*\* | 0.0053\*\*\* | 0.0022\*\*\* |
| % of old buildings (+35 years) | 0.0023\*\*\* | 0.0053\*\*\* | 0.0008\*\*\* | 0.0007\*\*\* |
| Average building coverage ratio | 0.0065\*\*\* | 0.0108\*\*\* | 0.0025\*\*\* | 0.0014\*\*\* |
| Building  3-D form | Average floor area ratio | -0.0009\*\*\* | -0.0017\*\*\* | -0.0003\*\*\* | -0.0001\*\*\* |
| Average total floor area | -3.9e-06\*\*\* | -3.5e-06\*\*\* | -3.2e-06\*\*\* | -3.0e-06\*\*\* |
| Average building height | -0.0065\*\*\* | -0.0092\*\*\* | -0.0010\*\*\* | 0.0009\*\*\* |
| Natural  area | Gravity index for urban forests | 0.0011\*\*\* | -0.0020\*\*\* | 0.0009\*\*\* | -0.0018\*\*\* |
| Gravity index for water bodies | -0.0003\*\* | -0.0023\*\*\* | 0.0007\*\*\* | 0.0009\*\*\* |
| Rho (ρ) | | 0.543\*\*\* | 0.425\*\*\* | 0.615\*\*\* | 0.865\*\*\* |
| Adj. R2 | | 0.689 | 0.715 | 0.633 | 0.831 |
| Std. Err. | | 0.92 | 1.26 | 0.66 | 0.46 |
| AIC | | 92,781 | 113,980 | 71,369 | 49,461 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S6. Spatial lag model (SLM) estimation results at the block level (N=4,553)

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 11.339\*\*\* | 31.463\*\*\* | 5.8661\*\*\* | -5.3522\*\*\* |
| NDVI | | 4.4035\*\*\* | -4.3325\*\*\* | 8.4625\*\*\* | 7.3708\*\*\* |
| Albedo | | 0.4976\*\*\* | 0.1784\*\*\* | 0.3383\*\*\* | 0.4536\*\*\* |
| Land use  type proportion | Residential | -0.0011 | 0.0214\*\*\* | 0.0128\*\*\* | 0.0062\*\*\* |
| Commercial | 0.0150\*\*\* | 0.0385\*\*\* | 0.0230\*\*\* | 0.0113\*\*\* |
| Industrial | 0.0404\*\*\* | 0.1165\*\*\* | 0.0534\*\*\* | 0.0114\*\*\* |
| Cultural & Recreational | 0.0456\*\*\* | 0.0671\*\*\* | 0.0275\*\*\* | 0.0230\*\*\* |
| Transport | 0.0004 | 0.0213\*\*\* | 0.0104\*\*\* | 0.0075\*\*\* |
| Public | 0.0001 | 0.0427\*\*\* | 0.0016 | -0.0084\*\*\* |
| Land use diversity | Entropy Index | 0.0041 | 0.6087\*\*\* | -0.1053 | -0.1026 |
| Building  2-D form | Building Density (/1km2) | 0.0217\*\*\* | 0.0341\*\*\* | 0.0068\*\*\* | 0.0022\*\* |
| % of old buildings (+35 years) | 0.0092\*\*\* | 0.0136\*\*\* | 0.0011\*\* | 0.000 |
| Average building coverage ratio | 0.0057\*\*\* | 0.0111\*\*\* | 0.0031\*\*\* | 0.0009 |
| Building  3-D form | Average floor area ratio | -0.0010\*\*\* | -0.0019\*\*\* | -0.0002\* | 0.000 |
| Average total floor area | 2.1e-06\* | 4.7e-07 | -1.2e-06 | -1.7e-06\*\* |
| Average building height | -0.0057\*\*\* | -0.0040\*\* | -0.0012 | -0.0030\*\*\* |
| Natural  area | Gravity index for urban forests | -0.0003 | -0.0075\*\*\* | -0.0019\*\*\* | -0.0025\*\*\* |
| Gravity index for water bodies | 0.0010 | -0.0053\*\*\* | 0.0012\* | 0.0050\*\*\* |
| Rho (ρ) | | 0.093\*\*\* | 0.062\*\*\* | 0.130\*\*\* | 0.485\*\*\* |
| Adj. R2 | | 0.543 | 0.677 | 0.438 | 0.581 |
| Std. Err. | | 0.79 | 1.03 | 0.60 | 0.51 |
| AIC | | 10,935 | 13,316 | 8,441 | 7,093 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S7. General spatial model (GSM) estimation results at the grid level (N=34,135).

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 2.0475\*\*\* | 11.759\*\*\* | 1.4901\*\*\* | -3.4028\*\*\* |
| NDVI | | 3.5077\*\*\* | -3.6698\*\*\* | 4.0788\*\*\* | 9.1573\*\*\* |
| Albedo | | 0.1341\*\*\* | 0.0573\*\*\* | 0.1316\*\*\* | 0.1714\*\*\* |
| Land use  type proportion | Residential | 0.0005 | 0.0093\*\*\* | 0.0060\*\*\* | 0.0028\*\*\* |
| Commercial | 0.0065\*\*\* | 0.0153\*\*\* | 0.0071\*\*\* | 0.0036\*\*\* |
| Industrial | 0.0186\*\*\* | 0.0340\*\*\* | 0.0159\*\*\* | 0.0067\*\*\* |
| Cultural & Recreational | 0.0193\*\*\* | 0.0303\*\*\* | 0.0115\*\*\* | 0.0076\*\*\* |
| Transport | 0.0031\*\*\* | 0.0101\*\*\* | 0.0073\*\*\* | 0.0062\*\*\* |
| Public | 0.0071\*\*\* | 0.0184\*\*\* | 0.0064\*\*\* | 0.0020\*\*\* |
| Land use diversity | Entropy Index | -0.5538\*\*\* | -0.2345\*\*\* | -0.2339\*\*\* | -0.2575\*\*\* |
| Building  2-D form | Count of buildings | 0.0072\*\*\* | 0.0100\*\*\* | 0.0050\*\*\* | 0.0035\*\*\* |
| % of old buildings (+35 years) | 0.0017\*\*\* | 0.0032\*\*\* | 0.0009\*\*\* | 0.0006\*\*\* |
| Average building coverage ratio | 0.0034\*\*\* | 0.0051\*\*\* | 0.0013\*\*\* | 0.0008\*\*\* |
| Building  3-D form | Average floor area ratio | -0.0004\*\*\* | -0.0006\*\*\* | -0.0001\*\*\* | -0.0001 |
| Average total floor area | -1.0e-06\*\* | -1.0e-06\*\* | -2.0e-06\*\*\* | -2.0e-06\*\*\* |
| Average building height | -0.0039\*\*\* | -0.0052\*\*\* | -0.0005\*\* | -0.0003 |
| Natural  area | Gravity index for urban forests | -0.0018\*\*\* | -0.0113\*\*\* | -0.0022\*\*\* | -0.0030\*\*\* |
| Gravity index for water bodies | -0.0002\*\* | -0.0018\*\*\* | 0.0001\* | 0.0009\*\*\* |
| Rho (ρ) | | 0.777\*\*\* | 0.685\*\*\* | 0.701\*\*\* | 0.702\*\*\* |
| Lambda (λ) | | 0.647\*\*\* | 0.769\*\*\* | 0.748\*\*\* | 0.662\*\*\* |
| Adj. R2 | | 0.892 | 0.923 | 0.857 | 0.841 |
| Std. Err. | | 0.54 | 0.66 | 0.41 | 0.44 |
| AIC | | 37,325 | 51,139 | 19,431 | 23,078 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |

Table S8. General spatial model (GSM) estimation results at the block level (N=4,553)

| Variable | | Spring  LST | Summer LST | Autumn LST | Winter  LST |
| --- | --- | --- | --- | --- | --- |
| Constant | | 6.6525\*\*\* | 21.347\*\*\* | 4.0591\*\*\* | -6.499\*\*\* |
| NDVI | | 2.9606\*\*\* | -5.3722\*\*\* | 6.8056\*\*\* | 9.1059\*\*\* |
| Albedo | | 0.4429\*\*\* | 0.1354\*\*\* | 0.3110\*\*\* | 0.4796\*\*\* |
| Land use  type proportion | Residential | 0.0006\*\*\* | 0.0179\*\*\* | 0.0104\*\*\* | 0.0061\*\*\* |
| Commercial | 0.0123\*\*\* | 0.0291\*\*\* | 0.0160\*\*\* | 0.0095\*\*\* |
| Industrial | 0.0420\*\*\* | 0.0972\*\*\* | 0.0394\*\*\* | 0.0160\*\*\* |
| Cultural & Recreational | 0.0463\*\*\* | 0.0651\*\*\* | 0.0226\*\*\* | 0.0192\*\*\* |
| Transport | 0.0029\*\*\* | 0.0212\*\*\* | 0.0114\*\*\* | 0.0097\*\*\* |
| Public | 0.0052\* | 0.0407\*\*\* | 0.0066\*\*\* | -0.0071\*\*\* |
| Land use diversity | Entropy Index | -0.4084\*\*\* | 0.1690 | -0.1940\*\* | -0.1257 |
| Building  2-D form | Building Density (/1km2) | 0.0169\*\*\* | 0.0268\*\*\* | 0.0094\*\*\* | 0.0060\*\*\* |
| % of old buildings (+35 years) | 0.0046\*\*\* | 0.0074\*\*\* | 0.0009\*\* | 0.0003 |
| Average building coverage ratio | 0.0044\*\*\* | 0.0044\*\*\* | 0.0019\*\*\* | 0.0010 |
| Building  3-D form | Average floor area ratio | -0.0007\*\*\* | -0.0010\*\*\* | -0.0002 | 1.0e-05 |
| Average total floor area | 4.0e-06\*\*\* | 4.0e-06\*\*\* | 0.000 | -1.0e-06 |
| Average building height | -0.0083\*\*\* | -0.0108\*\*\* | -0.0023\*\*\* | -0.0029\*\*\* |
| Natural  area | Gravity index for urban forests | -0.0005\* | -0.0059\*\*\* | -0.0016\*\*\* | -0.0021\*\*\* |
| Gravity index for water bodies | 0.0013 | -0.0044\*\*\* | 0.0025\*\*\* | 0.0075\*\*\* |
| Rho (ρ) | | 0.388\*\*\* | 0.381\*\*\* | 0.323\*\*\* | 0.259\*\*\* |
| Lambda (λ) | | 0.407\*\*\* | 0.439\*\*\* | 0.539\*\*\* | 0.494\*\*\* |
| Adj. R2 | | 0.731 | 0.826 | 0.691 | 0.638 |
| Std. Err. | | 0.61 | 0.75 | 0.45 | 0.47 |
| AIC | | 5,655 | 7,664 | 2,962 | 3,312 |
| \*\*\*: p-value <0.01, \*\*: p-value<0.05, \*: p-value<0.1 | | | | | |