**Supplementary Materials:**

**Table S1: Selection of scheme and parameters of the Weather Research and Forecasting (WRF) Model**

|  |  |
| --- | --- |
| Item | Domain 1 |
| Location | 15°N，105°E |
| The number of grid points | 99\*84 |
| Distance ( km) between grid points | 30 |
| Layers | 32 |
| Map projection | Mercator |
| Microphysics scheme | WSM3 |
| Longwave radiation scheme | RRTM |
| Shortwave radiation scheme | Dudhia |
| Surface layer scheme | Monin-Obukhov |
| Land/water surface scheme | Noah |
| Planetary boundary layer scheme | YSU |
| Cumulus parameterization | Kain-Fritsch(new Eta) |
| Forecast time | 72 h |

**Table S2: Distribution of endpoints of forward trajectories from North and South central Vietnam in 2005-2013.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Region | Station | Period | No. of days | No. of trajectories | Mean hours | 95% CI |
| NCV | Hepu | 21 Mar - 10 Apr | 58 | 380 | 17.53 | 16.88, 18.19 |
|  |  | 11 - 30 Apr | 65 | 448 | 16.2 | 15.68, 16.72 |
|  |  | Subtotal | 123 | 828 | 16.81 | 16.40, 17.23 |
|  | Hai Hau | 21 Mar - 10 Apr | 87 | 909 | 8.15 | 7.77, 8.52 |
|  |  | 11 - 30 Apr | 93 | 882 | 8.44 | 7.99, 8.89 |
|  |  | Subtotal | 180 | 1791 | 8.29 | 8.00, 8.58 |
|  | Nam Dan | 21 Mar - 10 Apr | 82 | 748 | 5.55 | 5.25, 5.86 |
|  |  | 11 - 30 Apr | 94 | 842 | 5.79 | 5.45, 6.14 |
|  |  | Subtotal | 176 | 1590 | 5.68 | 5.45, 5.91 |
| SCV | Hepu | 1 - 20 Mar | 17 | 45 | 24.44 | 22.73, 26.15 |
|  |  | 21 Mar - 10 Apr | 32 | 96 | 24.21 | 23.02, 25.4 |
|  |  | 11 - 30 Apr | 38 | 107 | 24.89 | 23.66, 26.11 |
|  |  | Subtotal | 87 | 248 | 24.54 | 23.79, 25.3 |
|  | Hai Hau | 1 - 20 Mar | 35 | 129 | 22.78 | 21.57, 23.98 |
|  |  | 21 Mar - 10 Apr | 39 | 112 | 22.85 | 21.45, 24.25 |
|  |  | 11 - 30 Apr | 33 | 83 | 24.06 | 22.48, 25.64 |
|  |  | Subtotal | 107 | 324 | 23.13 | 22.34, 23.92 |
|  | Nam Dan | 1 - 20 Mar | 32 | 97 | 20.77 | 19.33, 22.22 |
|  |  | 21 Mar - 10 Apr | 31 | 52 | 20 | 18.38, 21.62 |
|  |  | 11 - 30 Apr | 21 | 57 | 23.81 | 22.04, 25.58 |
|  |  | Subtotal | 84 | 206 | 21.42 | 20.48, 22.36 |

Note: SCV - South part of central Vietnam; NCV - North part of central Vietnam

**Table S3: Distribution of endpoints of backward trajectories from Hepu in 2005-2013**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Periods | No. of Peak  Day | Region | No. of  peak days | No. of  trajectories | Mean hours | 95% CI |
| 1 - 20 Mar | 23 | Cambodia | 2 | 2 | 32.00 | - |
|  |  | Laos | 10 | 125 | 20.04 | 18.54, 21.54 |
|  |  | Myanmar | 4 | 9 | 23.00 | 17.96, 28.04 |
|  |  | SCV | 9 | 37 | 23.62 | 21.11, 26.13 |
|  |  | Thailand | 10 | 68 | 28.40 | 26.69, 30.10 |
|  |  | VOT | 2 | 2 | 29.50 | - |
| 21 Mar - 10 Apr | 46 | Cambodia | 4 | 5 | 32.60 | 28.62, 36.58 |
|  |  | Laos | 18 | 246 | 21.44 | 20.61, 22.28 |
|  |  | Myanmar | 4 | 4 | 29.75 | 20.71, 38.79 |
|  |  | NCV | 18 | 127 | 16.67 | 15.60, 17.74 |
|  |  | SCV | 15 | 75 | 23.39 | 22.17, 24.60 |
|  |  | SHN | 10 | 39 | 20.15 | 18.43, 21.88 |
|  |  | Thailand | 16 | 227 | 27.48 | 26.71, 28.24 |
|  |  | VOT | 5 | 6 | 26.67 | 21.80, 31.53 |
| 11 - 30 Apr | 65 | Cambodia | 6 | 19 | 30.95 | 29.54, 32.35 |
|  |  | Laos | 14 | 297 | 22.00 | 21.23, 22.77 |
|  |  | NCV | 13 | 164 | 17.22 | 16.17, 18.26 |
|  |  | NHN | 14 | 261 | 15.97 | 15.13, 16.82 |
|  |  | RRD | 11 | 39 | 11.13 | 9.09, 13.16 |
|  |  | SCV | 13 | 70 | 24.40 | 22.95, 25.85 |
|  |  | SHN | 11 | 42 | 19.57 | 17.35, 21.80 |
|  |  | Thailand | 13 | 211 | 28.71 | 27.87, 29.54 |
|  |  | VOT | 2 | 3 | 32.67 | - |

Note: SCV - Southern central Vietnam; NCV - Northern central Vietnam; SHN: Southern Hainan Island; NHN - Northern Hainan Island; VOT - Central Highland and Southeast Vietnam.