**Table S4a. Tree height statistics for the four tree priors and two clock models combinations of Omicron’s BA.1 sub-lineage**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tree Height  (Summary Statistic) | strict\_constpop | strict\_expopop | strict\_baysky | strict\_extbaysky | rcln\_constpop | rcln\_expopop | rcln\_baysky | rcln\_extbaysky |
| mean | 0.3785 | 0.5146 | 0.797 | 0.7841 | 0.4201 | 1.4767 | 1.6195 | 1.2767 |
| stderr of mean | 1.07E-03 | 0.0297 | 0.1036 | 0.0672 | 3.30E-03 | 0.5896 | 0.1848 | 0.1961 |
| stdev | 0.0578 | 0.2936 | 3.6887 | 2.4421 | 0.0963 | 3.4091 | 5.0846 | 6.601 |
| variance | 3.35E-03 | 0.0862 | 13.6063 | 5.9638 | 9.28E-03 | 11.6221 | 25.8533 | 43.5737 |
| median | 0.3715 | 0.4217 | 0.461 | 0.4636 | 0.4021 | 0.6723 | 0.7344 | 0.4892 |
| mode | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| geometric mean | 0.3743 | 0.4655 | 0.5448 | 0.5439 | 0.4105 | 0.8025 | 0.866 | 0.6133 |
| 95% HPD Interval | [0.2758, 0.4943] | [0.2365, 1.1182] | [0.2313, 1.6447] | [0.2264, 1.6875] | [0.2681, 0.6107] | [0.2114, 4.13] | [0.1986, 4.5816] | [0.195, 3.0942] |
| auto-correlation time (ACT) | 31025.27 | 9.24E+05 | 71002.23 | 68195.55 | 1.05E+05 | 2.69E+06 | 1.19E+05 | 79444.32 |
| effective sample size (ESS) | 2900.894 | 97.4153 | 1267.58 | 1319.749 | 853.6177 | 33.4318 | 756.6193 | 1132.882 |

**Table S4b. Clock rate statistics for the four tree priors and two clock models combinations of Omicron’s BA.1 sub-lineage**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Clock rate  (Summary Statistic) | strict\_constpop | strict\_expopop | strict\_baysky | strict\_extbaysky | rcln\_constpop | rcln\_expopop | rcln\_baysky | rcln\_extbaysky |
| mean | 1.44E-03 | 8.50E-04 | 8.65E-04 | 8.72E-04 | 1.55E-03 | 4.20E-04 | 5.41E-04 | 8.03E-04 |
| stderr of mean | 4.97E-06 | 3.60E-05 | 2.96E-05 | 2.95E-05 | 1.11E-05 | 2.70E-05 | 4.40E-05 | 4.18E-05 |
| stdev | 2.17E-04 | 3.88E-04 | 4.17E-04 | 3.95E-04 | 2.92E-04 | 2.73E-04 | 4.15E-04 | 4.58E-04 |
| variance | 4.71E-08 | 1.51E-07 | 1.74E-07 | 1.56E-07 | 8.54E-08 | 7.45E-08 | 1.72E-07 | 2.09E-07 |
| median | 1.44E-03 | 8.39E-04 | 8.84E-04 | 8.92E-04 | 1.52E-03 | 3.72E-04 | 4.39E-04 | 7.80E-04 |
| mode | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| geometric mean | 1.43E-03 | 7.42E-04 | 7.24E-04 | 7.41E-04 | 1.52E-03 | 3.19E-04 | 3.82E-04 | 6.17E-04 |
| 95% HPD Interval | [1.0214E-3, 1.8697E-3] | [1.3571E-4, 1.5385E-3] | [9.1338E-5, 1.586E-3] | [9.3829E-5, 1.5625E-3] | [9.9915E-4, 2.13E-3] | [6.1752E-6, 9.2324E-4] | [1.6754E-6, 1.4072E-3] | [1.5313E-6, 1.5826E-3] |
| auto-correlation time (ACT) | 47266.14 | 7.75E+05 | 4.53E+05 | 5.04E+05 | 1.30E+05 | 8.82E+05 | 1.01E+06 | 7.52E+05 |
| effective sample size (ESS) | 1904.133 | 116.1955 | 198.5462 | 178.4601 | 693.2781 | 102.0579 | 89.0793 | 119.6824 |

**Table S4c. Tree height statistics for the four tree priors and two clock models combinations of Omicron’s BA.2 sub-lineage**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tree Height  (Summary Statistic) | strict\_constpop | strict\_expopop | strict\_baysky | strict\_extbaysky | rcln\_constpop | rcln\_expopop | rcln\_baysky | rcln\_extbaysky |
| mean | 0.251 | 1.6815 | 3.0339 | 5.5056 | 0.2527 | 0.9229 | 4.0885 | 23.1817 |
| stderr of mean | 1.04E-03 | 0.4086 | 0.4105 | 2.0292 | 1.35E-03 | 0.1133 | 1.587 | 13.9612 |
| stdev | 0.0473 | 2.0952 | 17.4212 | 108.2619 | 0.0487 | 0.6587 | 53.574 | 619.6183 |
| variance | 2.24E-03 | 4.39 | 303.497 | 11720.64 | 2.37E-03 | 0.4338 | 2870.169 | 3.84E+05 |
| median | 0.2432 | 0.7633 | 0.9399 | 1.1497 | 0.2446 | 0.745 | 0.9077 | 1.2517 |
| mode | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| geometric mean | 0.2469 | 1.0069 | 1.165 | 1.4182 | 0.2485 | 0.776 | 1.1162 | 1.654 |
| 95% HPD Interval | [0.1735, 0.3462] | [0.2353, 6.6529] | [0.1744, 7.8034] | [0.1834, 9.9067] | [0.1724, 0.3492] | [0.2345, 2.0267] | [0.1541, 7.2364] | [0.1685, 16.6044] |
| auto-correlation time (ACT) | 43163.32 | 3.42E+06 | 49980.18 | 31619.41 | 68969.36 | 2.66E+06 | 78976.81 | 45692.72 |
| effective sample size (ESS) | 2085.127 | 26.2906 | 1800.734 | 2846.385 | 1304.942 | 33.8241 | 1139.588 | 1969.701 |

**Table S4d. Clock rate statistics for the four tree priors and two clock models combinations of Omicron’s BA.2 sub-lineage**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Clock rate  (Summary Statistic) | strict\_constpop | strict\_expopop | strict\_baysky | strict\_extbaysky | rcln\_constpop | rcln\_expopop | rcln\_baysky | rcln\_extbaysky |
| mean | 1.10E-03 | 8.85E-05 | 1.14E-04 | 9.67E-05 | 1.10E-03 | 9.58E-05 | 1.16E-04 | 9.34E-05 |
| stderr of mean | 6.41E-06 | 1.05E-05 | 3.10E-06 | 1.37E-06 | 8.62E-06 | 7.59E-06 | 2.66E-06 | 1.87E-06 |
| stdev | 2.45E-04 | 6.27E-05 | 8.61E-05 | 7.25E-05 | 2.50E-04 | 5.28E-05 | 8.42E-05 | 7.29E-05 |
| variance | 5.99E-08 | 3.93E-09 | 7.41E-09 | 5.25E-09 | 6.26E-08 | 2.79E-09 | 7.10E-09 | 5.32E-09 |
| median | 1.07E-03 | 8.09E-05 | 9.85E-05 | 8.26E-05 | 1.08E-03 | 8.49E-05 | 1.03E-04 | 7.88E-05 |
| mode | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| geometric mean | 1.07E-03 | 6.23E-05 | 7.92E-05 | 6.64E-05 | 1.07E-03 | 8.11E-05 | 8.26E-05 | 5.93E-05 |
| 95% HPD Interval | [6.4442E-4, 1.5862E-3] | [4.1855E-6, 2.0656E-4] | [8.6959E-8, 2.5982E-4] | [8.8487E-9, 2.2906E-4] | [6.3575E-4, 1.5991E-3] | [1.073E-5, 1.9392E-4] | [2.0722E-8, 2.6045E-4] | [1.4609E-9, 2.2732E-4] |
| auto-correlation time (ACT) | 61770.57 | 2.53E+06 | 1.17E+05 | 32094.56 | 1.07E+05 | 1.86E+06 | 89842.29 | 59451.61 |
| effective sample size (ESS) | 1457.021 | 35.6289 | 771.458 | 2804.244 | 843.8335 | 48.3673 | 1001.767 | 1513.853 |