

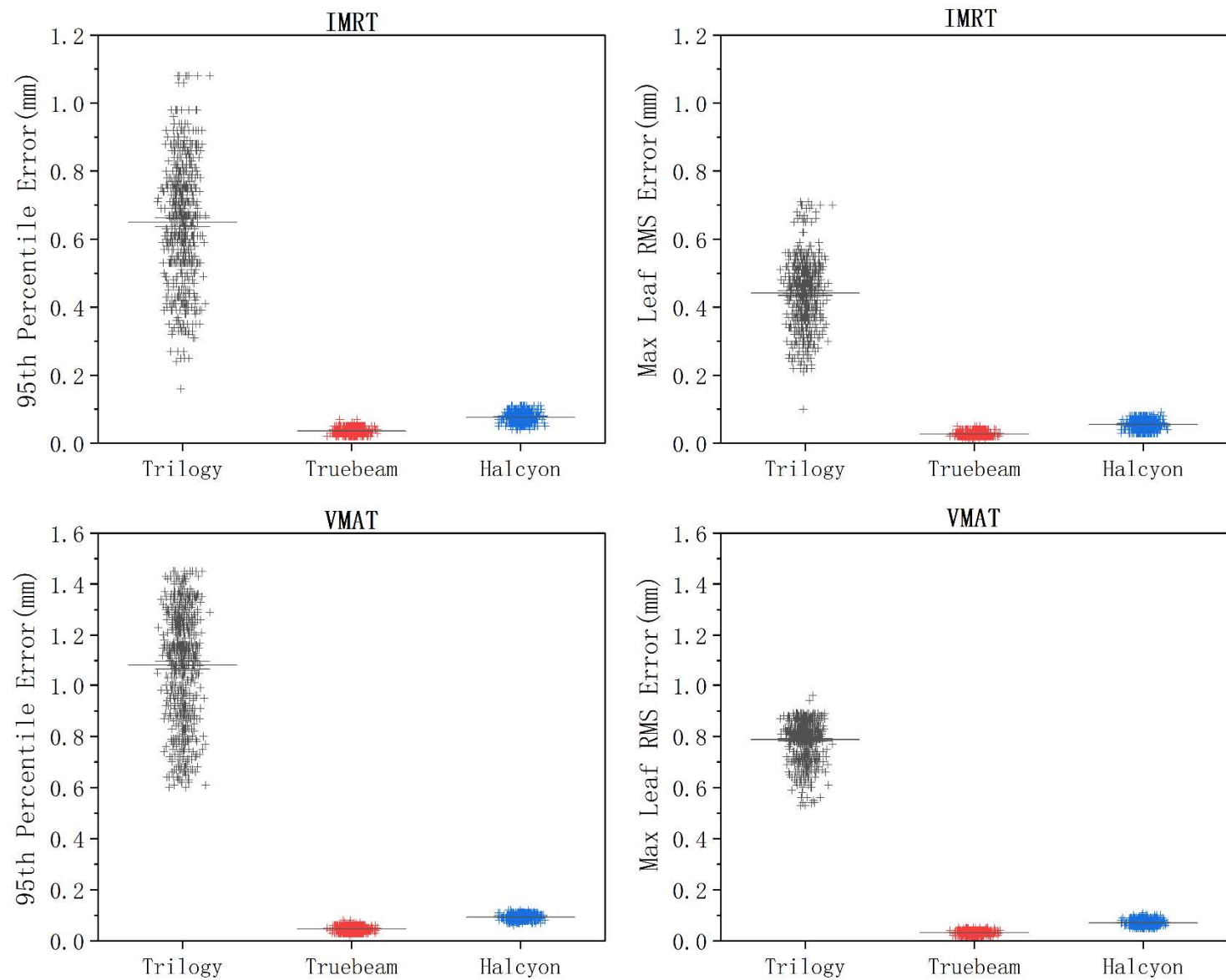
Supplementary data

Supplementary Table 1. Specific characteristic data for 420 treatment plans

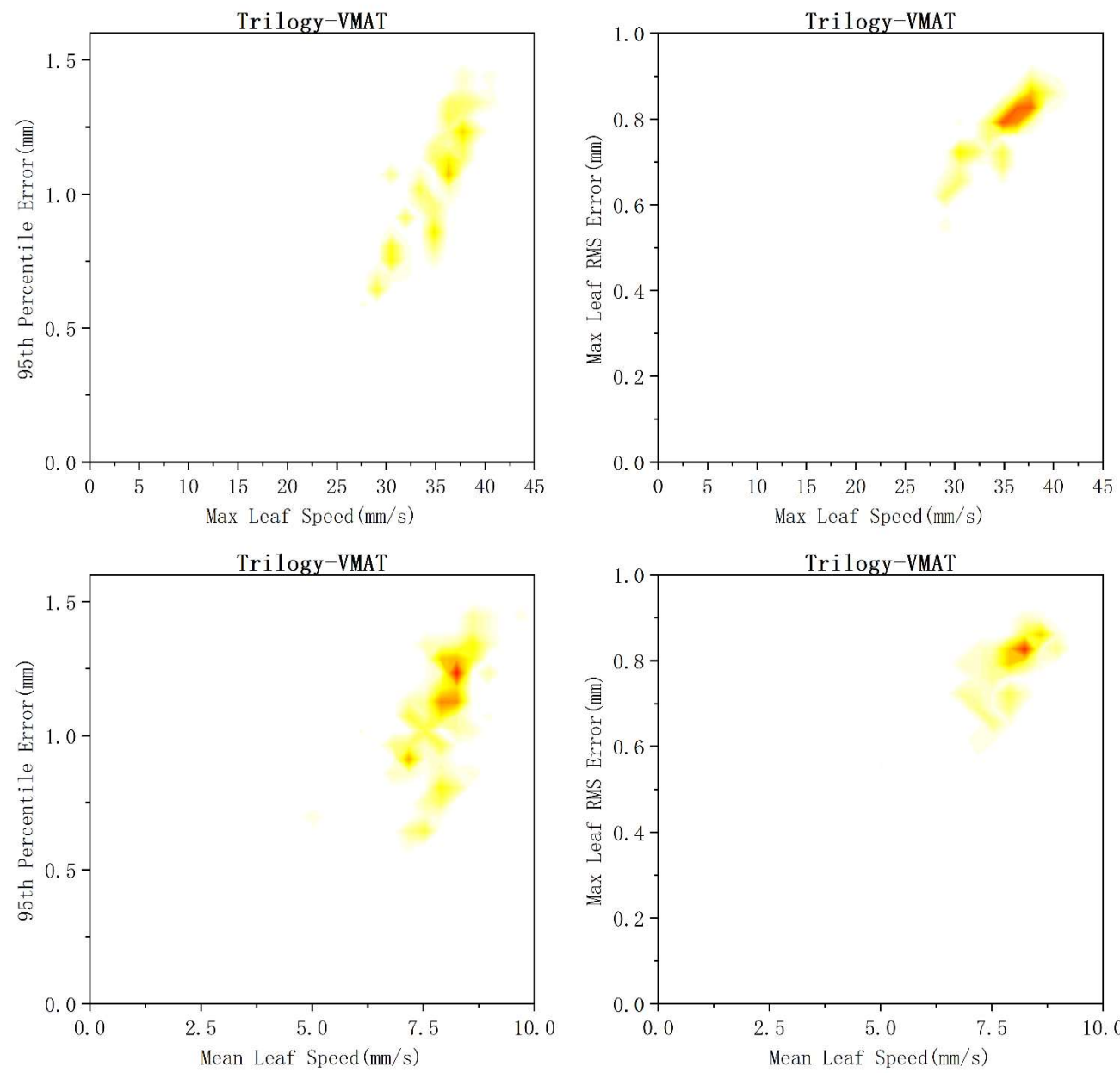
| Treatment site                                 | Head&Neck                                |                                        | Chest                                    |                                        | Pelvis                                    |                                        | Breast                                  |                                        | Others                                 |                                        |
|------------------------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|----------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Planning mode                                  | IMRT                                     | VMAT                                   | IMRT                                     | VMAT                                   | IMRT                                      | VMAT                                   | IMRT                                    | VMAT                                   | IMRT                                   | VMAT                                   |
| Corresponding number of plans                  | 16*, 15 <sup>×</sup> , 8 <sup>#</sup>    | 19*, 21 <sup>×</sup> , 11 <sup>#</sup> | 19*, 21 <sup>×</sup> , 15 <sup>#</sup>   | 9*, 8 <sup>×</sup> , 9 <sup>#</sup>    | 17*, 16 <sup>×</sup> , 34 <sup>#</sup>    | 25*, 24 <sup>×</sup> , 37 <sup>#</sup> | 12*, 13 <sup>×</sup> , 6 <sup>#</sup>   | 9*, 9 <sup>×</sup> , 3 <sup>#</sup>    | 6*, 5 <sup>×</sup> , 7 <sup>#</sup>    | 8*, 8 <sup>×</sup> , 10 <sup>#</sup>   |
| Total numbers of fields/arcs                   | 135*, 128 <sup>×</sup> , 73 <sup>#</sup> | 42*, 48 <sup>×</sup> , 14 <sup>#</sup> | 102*, 112 <sup>×</sup> , 82 <sup>#</sup> | 28*, 25 <sup>×</sup> , 23 <sup>#</sup> | 129*, 120 <sup>×</sup> , 246 <sup>#</sup> | 54*, 52 <sup>×</sup> , 64 <sup>#</sup> | 87*, 101 <sup>×</sup> , 45 <sup>#</sup> | 37*, 37 <sup>×</sup> , 12 <sup>#</sup> | 28*, 23 <sup>×</sup> , 33 <sup>#</sup> | 27*, 26 <sup>×</sup> , 23 <sup>#</sup> |
| Width of fields in X direction (cm)            | 15.15±2.83*                              | 14.93±0.98*                            | 9.21±2.60*                               | 15.21±0.98*                            | 16.07±3.26*                               | 12.55±2.41*                            | 10.50±3.22*                             | 9.84±2.80*                             | 10.90±1.46*                            | 11.17±2.09*                            |
|                                                | 15.28±3.57 <sup>×</sup>                  | 15.29±0.46 <sup>×</sup>                | 9.11±2.84 <sup>×</sup>                   | 14.19±2.38 <sup>×</sup>                | 13.72±4.81 <sup>×</sup>                   | 15.56±4.86 <sup>×</sup>                | 10.37±4.01 <sup>×</sup>                 | 10.26±2.35 <sup>×</sup>                | 12.12±2.37 <sup>×</sup>                | 11.82±2.41 <sup>×</sup>                |
|                                                | 15.23±1.93 <sup>#</sup>                  | —— <sup>#</sup>                        | 9.33±2.43 <sup>#</sup>                   | —— <sup>#</sup>                        | 14.89±3.03 <sup>#</sup>                   | —— <sup>#</sup>                        | 9.67±2.70 <sup>#</sup>                  | —— <sup>#</sup>                        | 11.40±2.06 <sup>#</sup>                | —— <sup>#</sup>                        |
| Width of fields in Y direction (cm)            | 18.50±2.46*                              | 19.68±3.95*                            | 11.34±3.77*                              | 19.28±4.41*                            | 19.79±3.32*                               | 22.29±6.51*                            | 18.24±5.31*                             | 17.43±4.30*                            | 13.11±2.22*                            | 11.94±2.45*                            |
|                                                | 17.47±3.61 <sup>×</sup>                  | 20.10±3.23 <sup>×</sup>                | 11.75.2±5.35 <sup>×</sup>                | 16.52±6.23 <sup>×</sup>                | 20.17±8.31 <sup>×</sup>                   | 22.98±4.75 <sup>×</sup>                | 15.35±6.84 <sup>×</sup>                 | 20.58±4.14 <sup>×</sup>                | 15.68±2.48 <sup>×</sup>                | 13.21±3.38 <sup>×</sup>                |
|                                                | 19.60±1.94 <sup>#</sup>                  | —— <sup>#</sup>                        | 10.59±2.83 <sup>#</sup>                  | —— <sup>#</sup>                        | 20.2±1.48 <sup>#</sup>                    | —— <sup>#</sup>                        | 19.34±3.58 <sup>#</sup>                 | —— <sup>#</sup>                        | 14.91±3.98 <sup>#</sup>                | —— <sup>#</sup>                        |
| Fractional prescription dose (number of cases) | 2.0Gy(30)                                | 2.0Gy(40)                              | 2.0Gy(31)                                | 2.0Gy(20)                              | 2.0Gy(37)                                 | 2.0Gy(53)                              | 2.0Gy(31)                               | 2.0Gy(21)                              | 3.0Gy(3)                               | 2.0Gy(24)                              |
|                                                | 2.2Gy(9)                                 | 2.2Gy(11)                              | 1.8Gy(24)                                | 1.8Gy(6)                               | 1.8Gy(30)                                 | 1.8Gy(33)                              |                                         |                                        | 2.0Gy(15)                              | 2.2Gy(2)                               |

Notes: \* means Trilogy; <sup>×</sup> means Truebeam; <sup>#</sup> means Halcyon; Halcyon has no JAW, the width of Field X/Y in IMRT plans of Halcyon were got by manual measurement of the maximum opening diameter of the Field MLC, and no manual measurement was made for VMAT plans

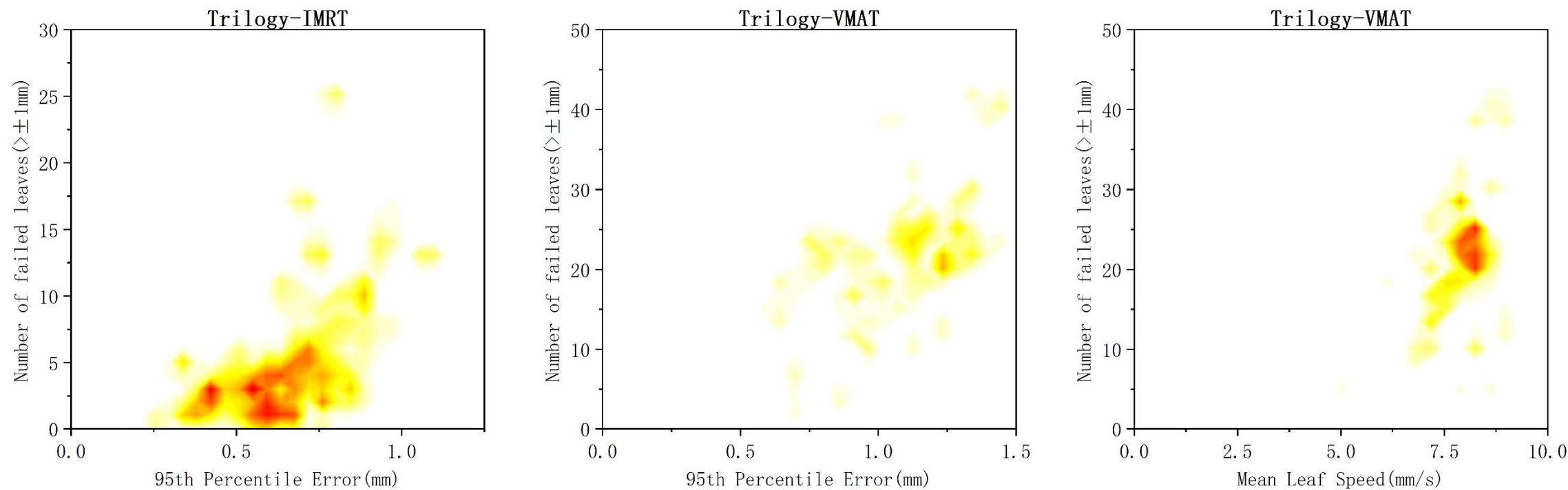
Supplementary Fig. 1 Comparisons of maximum leaf RMS errors and 95th percentile errors among the three accelerators with IMRT and VMAT technique



Supplementary Fig. 2 The density plots of correlation between the maximum leaf RMS and 95th percentile error and leaf speed in Trilogy with VMAT technique



Supplementary Fig. 3 The density plots of correlation between the number of failed leaves and the 95th percentile error and mean leaf speed in Trilogy with IMRT and VMAT technique

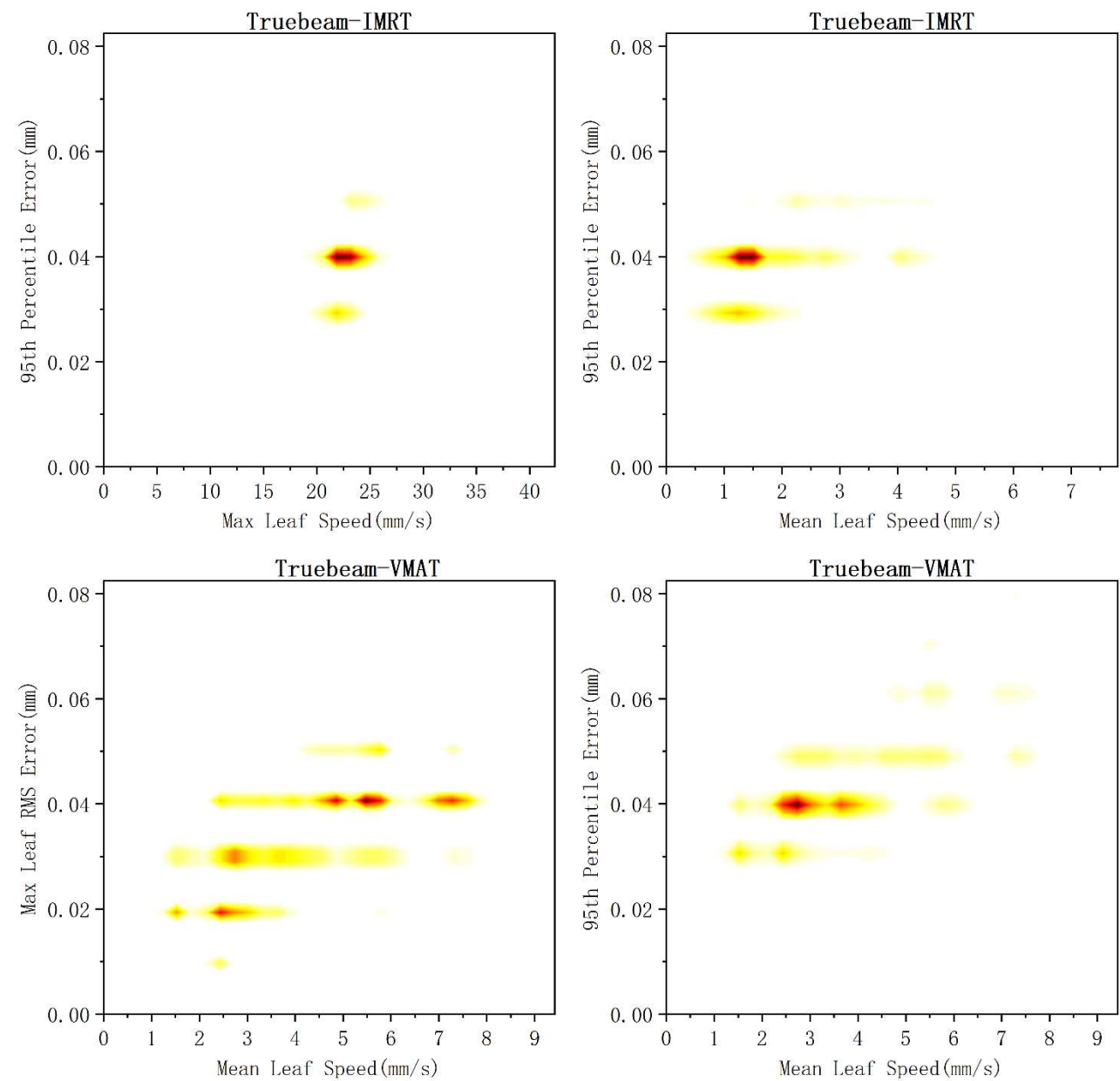


Supplementary Table 2. Correlation analysis between evaluation parameters

|         |                       | Trilogy |      | Truebeam |      | Halcyon |      |
|---------|-----------------------|---------|------|----------|------|---------|------|
|         |                       | IMRT    | VMAT | IMRT     | VMAT | IMRT    | VMAT |
| Pearson | 95 <sup>th</sup> -RMS | 0.59    | 0.86 | 0.61     | 0.70 | 0.61    | 0.58 |
|         | 95 <sup>th</sup> -MMS | 0.29    | 0.84 | 0.52     | 0.27 | 0.36    | 0.39 |
|         | 95 <sup>th</sup> -AMS | 0.67    | 0.61 | 0.60     | 0.70 | 0.60    | 0.50 |
|         | 95 <sup>th</sup> -FLN | 0.55    | 0.55 | *        | *    | *       | *    |
|         | RMS-MMS               | 0.65    | 0.87 | 0.41     | 0.21 | 0.22    | 0.24 |
|         | RMS-AMS               | 0.70    | 0.72 | 0.47     | 0.57 | 0.28    | 0.34 |
|         | RMS-FLN               | 0.51    | 0.53 | *        | *    | *       | *    |
|         | MMS-AMS               | 0.29    | 0.66 | 0.60     | 0.21 | 0.41    | 0.36 |
|         | MMS-FLN               | 0.36    | 0.48 | *        | *    | *       | *    |
|         |                       | AMS-FLN | 0.37 | 0.55     | *    | *       | *    |

Notes: 95<sup>th</sup> : 95th percentile errors; RMS: maximum leaf RMS errors; MMS:max MLC speed; AMS: average MLC speed; FLN: number of fail leaves

Supplementary Fig. 4 The density plots of correlation between the maximum leaf RMS and 95th percentile error and leaf speed in TrueBeam with IMRT and VMAT technique



Supplementary Fig. 5 The density plots of the correlation between the 95th percentile error and mean leaf speed in IMRT and VMAT plans of Halcyon

