Optimal TITAN parameters

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- Parameter tests results reside in $\sim$/`wrf/thompson/param_test/`.

- Over all tests, TITAN (TRT) tracks were cut short 42.9% (54.3%) of the time.

- Over all tests, TITAN (TRT) tracks were split 5.44% (1.07%) of the time.

- Tracks included in these results had a minimum duration of 30 minutes.

- The low dBZ threshold was tested from 34 dBZ to 42 dBZ.

- The dual dBZ threshold was tested from 4 dBZ to 12 dBZ above the low threshold.

- Minimum storm area threshold was tested for 25, 50, 75 km^3 (note this is actually a threshold on volume for TITAN).

- Area comparison in this document shows the TITAN "projected area" (2D) compared to TRT 2D storm area.

- To select the "best" parameter set, we subset the results to those with:

  – absolute value of median relative bias on number of cells per hour within the best 10% of values, THEN subset for

  – absolute value of median relative bias for daily median cell area within the best 10% of values.

  Then we choose the configuration with the best r^2 value for per time-step number of cells.

- The best parameters are:

Low dBZ thresh. [dBZ]	Dual dBZ thresh. [dBZ]	Min storm size [km^3]
40.00	47.00	75.00

- The "winning" statistics are (on cells per hour):

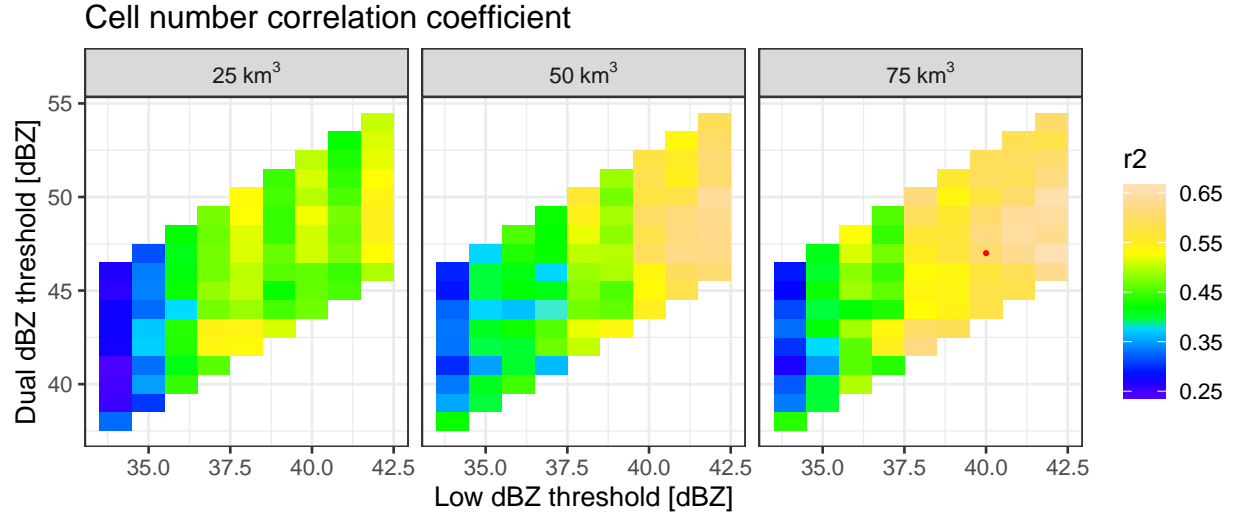| Statistic	Result
Cell number bias [cells/hour]	-0.72
Cell number RMSE [cells/hour]	7.03
Cell number mean rel. bias [%]	42.23
Cell number median rel. bias [%]	-7.14
Cell number rel. bias IQR [% pts]	90.77
Cell number r^2 [-]	0.60
Mean area, median rel. bias [%]	0.79

Cell number correlation coefficient

Figure 1: Cell number correlation coefficient results, with a red dot showing the selected configuration.
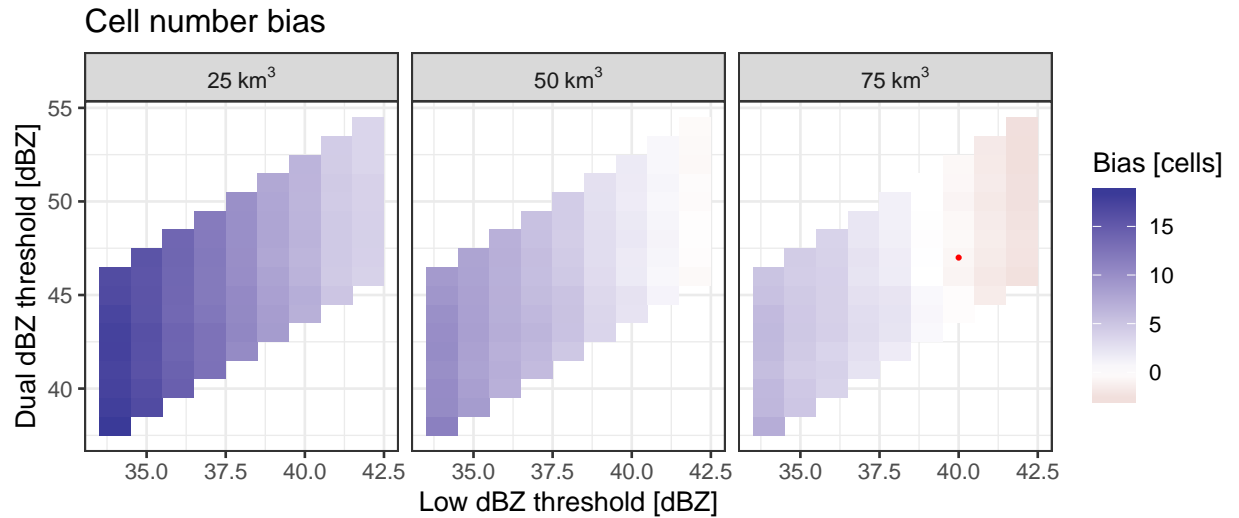
Cell number bias

Figure 2: Cell number bias (mean difference) results, with a red dot showing the selected configuration.
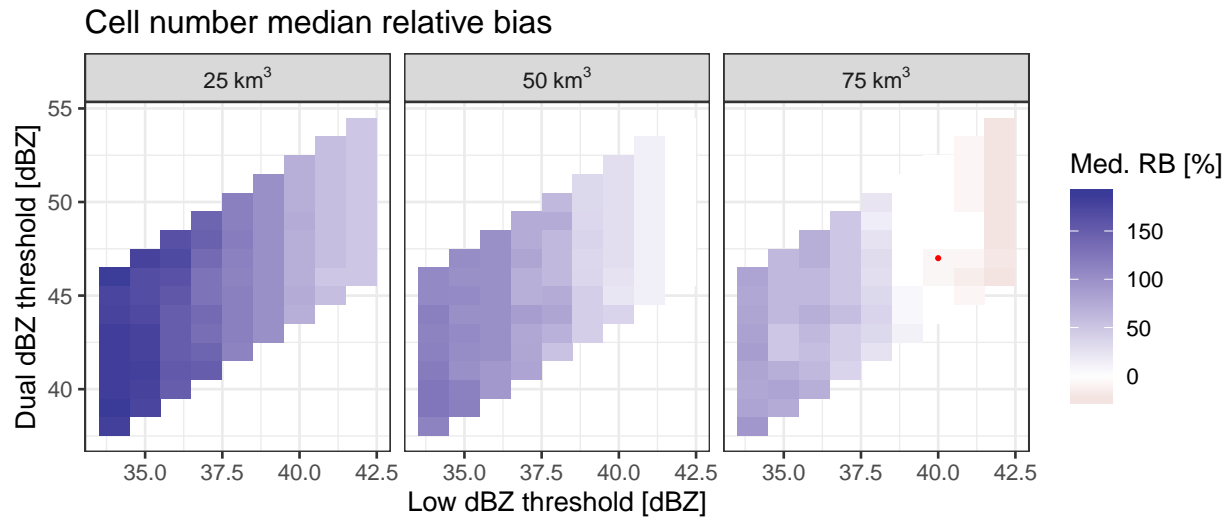
Figure 3: Cell number median relative bias results, with a red dot showing the selected configuration.
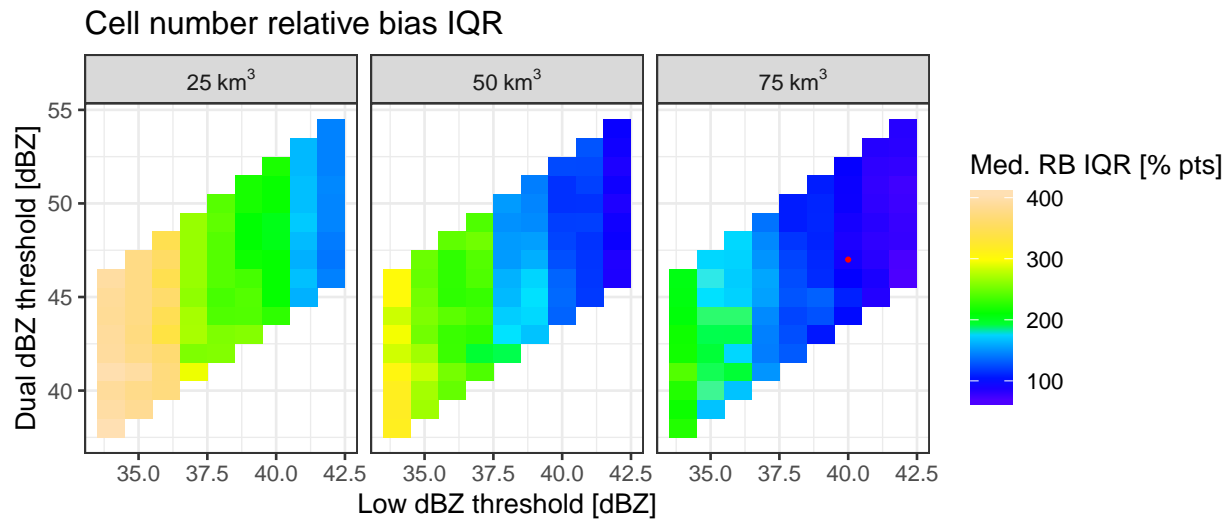

Figure 4: Cell number relative bias IQR results, with a red dot showing the selected configuration.
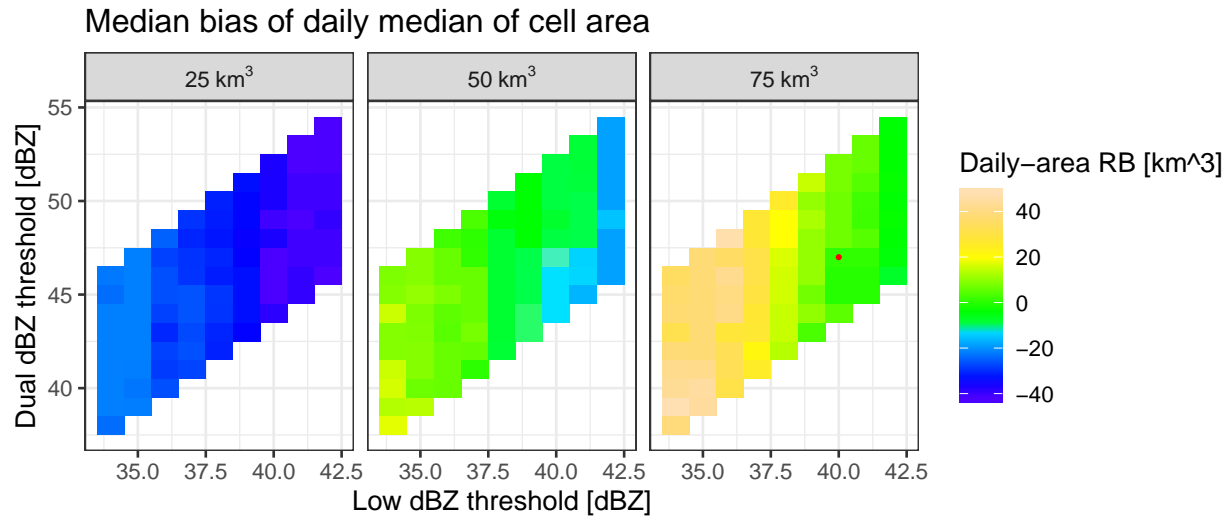
Figure 5: Difference in area distributions, with a red dot showing the selected configuration.
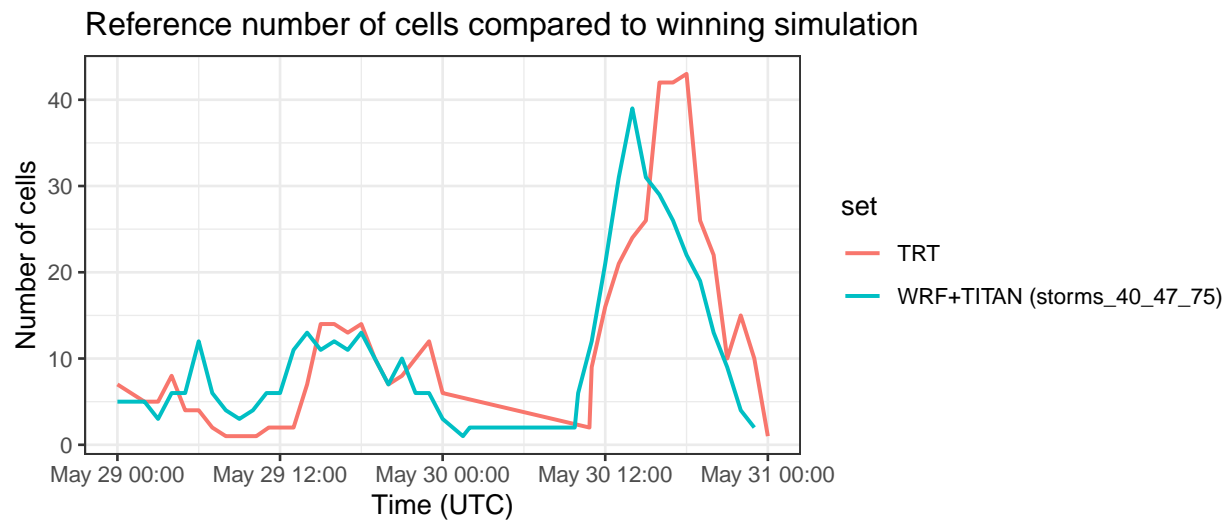

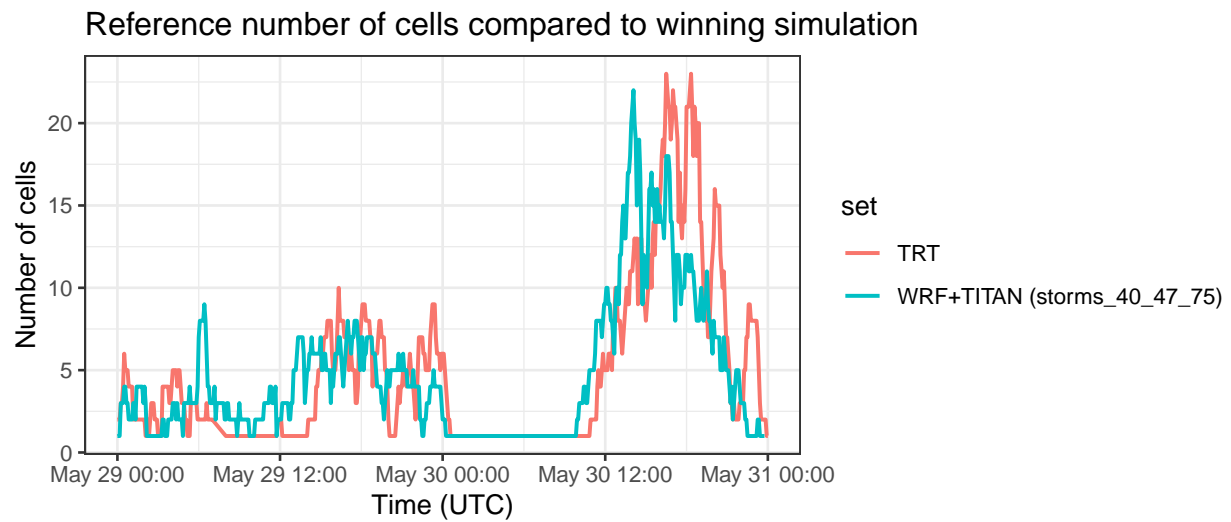Figure 6: Timeseries of number of cells by time step, for TRT vs. the winning parameter set.

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Figure 7: Timeseries of number of cells by time step, for TRT vs. the winning parameter set.
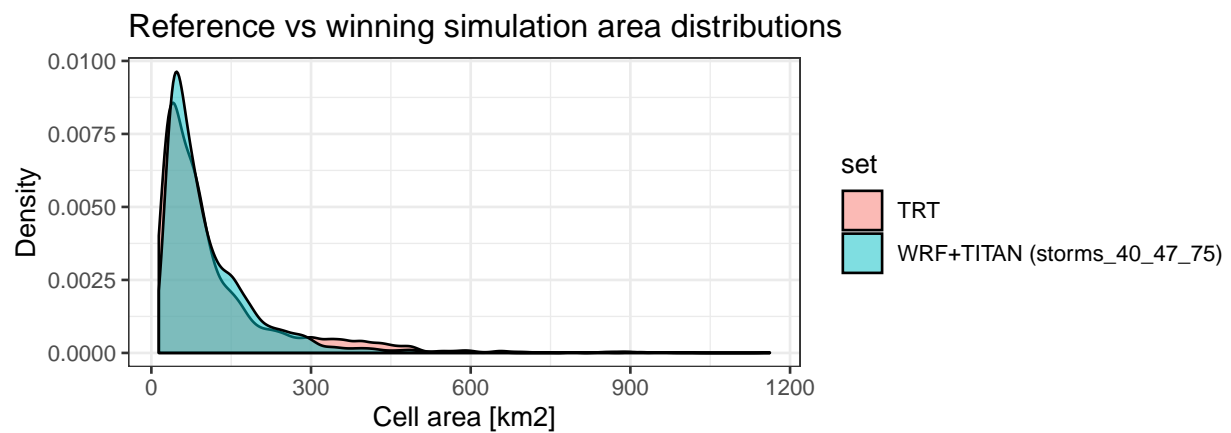

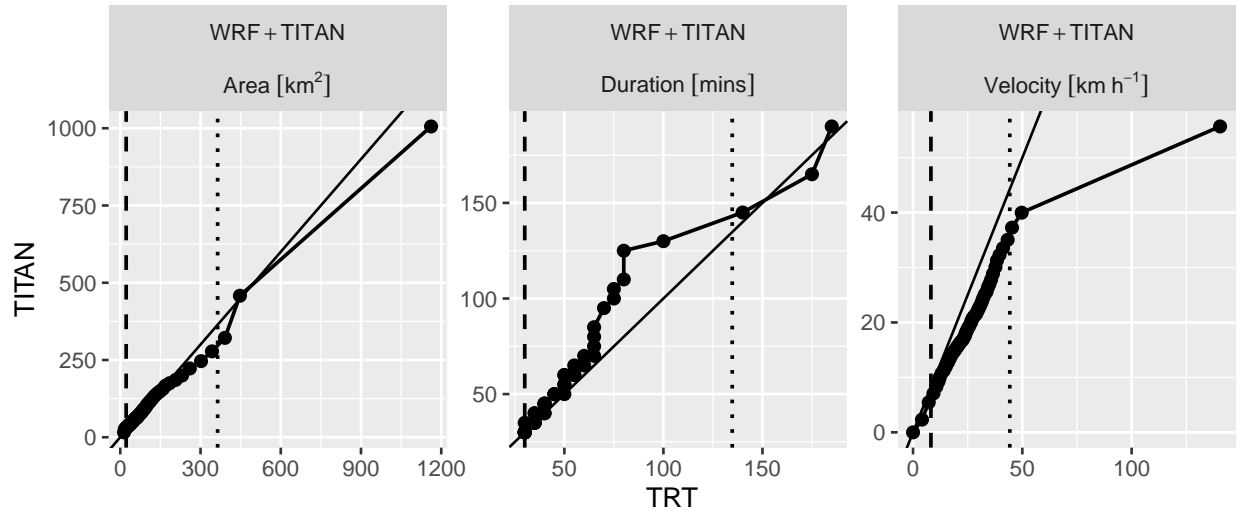Figure 8: Area distributions for TRT vs. winning parameter results.

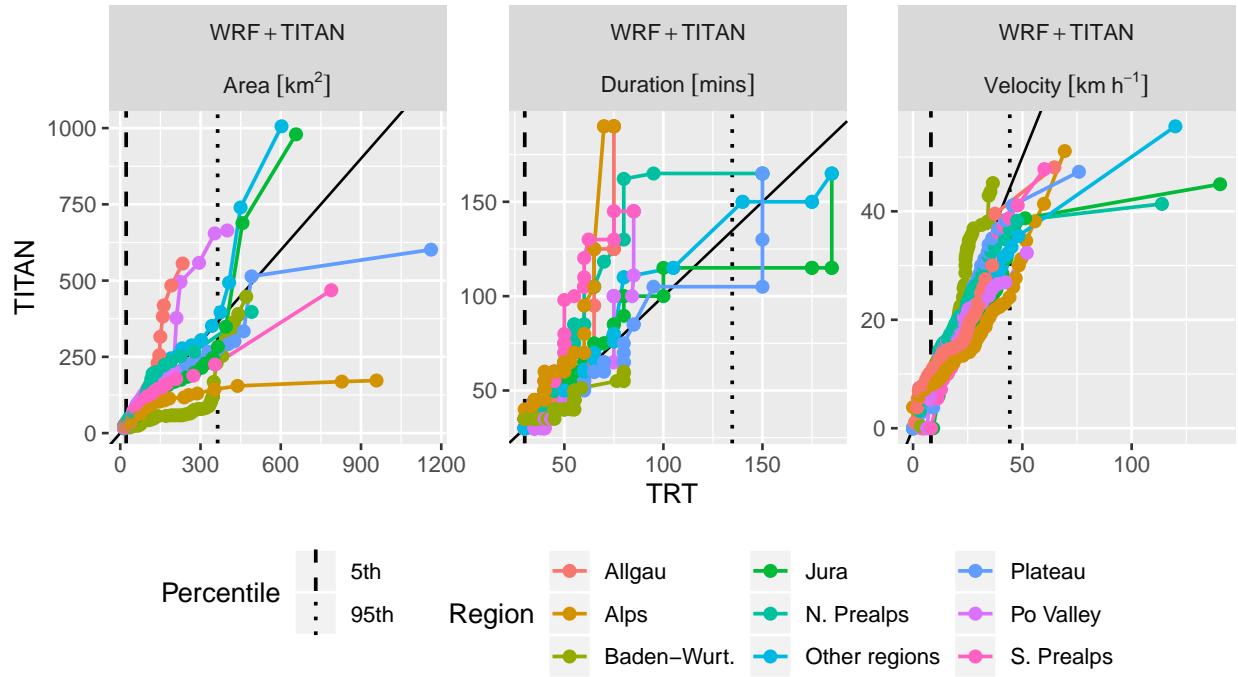Figure 9: QQ plots for all cells. Dashed vertical lines show the 5th and 95th percentile of TRT values.

Figure 10: QQ plots for cell properties by region. Dashed vertical lines show the 5th and 95th percentile of TRT values.