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Figure 1: The framework of the RAMARS system.

Figure 2: The predictor importance weights for the 85 predictor indices as revealed by the RReleifF algorithm.

Figure 3: The indices as a function of rain rate over three surface types (ocean, land, and coast). Only top 5 features are shown as revealed by the RReliefF algorithm depending on the surface types.

Figure 4: Comparison of the dichotomous skill scores (POD, FAR, and CSI) as a function of rain rate over ocean, land, and coast surface types.

Figure 5: The evaluation of rain rate estimated by the RAMARS and 2A12 GPROF algorithm over ocean, land, and coast surface types. The PR 2A25 was taken as the “truth”.

Figure 6: Case study of Hurricane Sandy over coastlines of Maryland, Virginia and North Carolina on 28th October 2012 showing the distribution of the hurricane field as produced by the TMI RAMARS, PR 2A25, and gridded TMI 2A12 algorithm. The non-gridded TMI 2A12 output is also shown in the bottom-right panel.

Figure 7: Case study of Cyclone Mahasen over Bangladesh on 16th May 2013 UTC 0406 showing the distribution of the hurricane field as produced by the TMI RAMARS, PR 2A25, and gridded TMI 2A12 algorithm. The non-gridded TMI 2A12 output is also shown in the bottom-right panel.

Table 2 Top ranked 5 indices as revealed by the RReliefF algorithm.

Rank	1	2	3	4	5
Ocean	10H-19V	10V-19V	19V-37V	85V-85H	10H-19H
Land	85V-85H	37V-85H	37V-85V	37V	21V+37V
Coast	10H-19H	10V-19V	PCT ₃₇	PCT ₈₅	85V-85H

Table 3. The predictive performance of the final MARS model by using 5-fold cross validation.

	Correlation	Mean Bias	GCV	#Basis functions
Ocean	0.73	0.01	32.23	20.00
Land	0.63	0.02	22.17	20.00
Coast	0.61	0.00	13.60	16.00

Table 4 Contingency table for the calculation of dichotomous scores.

		yes	no	Total
Prediction	yes	<i>hits</i>	<i>false alarms</i>	<i>prediction yes</i>
	no	<i>misses</i>	<i>correct negatives</i>	<i>prediction no</i>
Total		<i>observed yes</i>	<i>observed no</i>	<i>total</i>