Supplemental Tables and Figures to "Track-dependency of tropical cyclone risk in South Korea" (Nam et al.)

Supplementary Table 1: Description of decision tree model variables – the diagnosis (target) variable and attribute (input) variables. Use column indicates the decision trees that use each variable; both means both of best-track based model (BT) and in-situ observation based model (IS) adopt the variable.

	Variables	Use	Description	Category
Diagnosis	**Damage**	Both	If the TC has recorded any property loss to the province	Yes or No
Attributes	**Province**	Both	Five provinces in South Korea. Two North-western, one south-western, one north-eastern and one south-eastern provinces	Gyeong-gi, Gang-won, Chung-cheong, Jolla and Gyeong-sang
	Track-group	BT	Track pattern groups divided in to four through fuzzy c-means clustering method.	East-short, East-long, West-long, or West-short
	BT radius	BT	The longest radius of 30 knot winds or greater of the TC making landfall to South Korea from RSMC best-track (BT) data	Continuous
	BT maxwind	BT	Maximum sustained wind speed of the TC making landfall to South Korea from BT data	Continuous
	BT pressure	BT	Central pressure of the TC making landfall to South Korea from BT data	Continuous
	Station maxwind	IS	The maximum value among daily maximum sustained wind speed (10 minutes) from all stations in the province and all daily data in the TC influence period	Continuous
	Station precipitation	IS	The maximum value among daily accumulated precipitation data from all stations in the province and all daily data in the TC influence period	Continuous

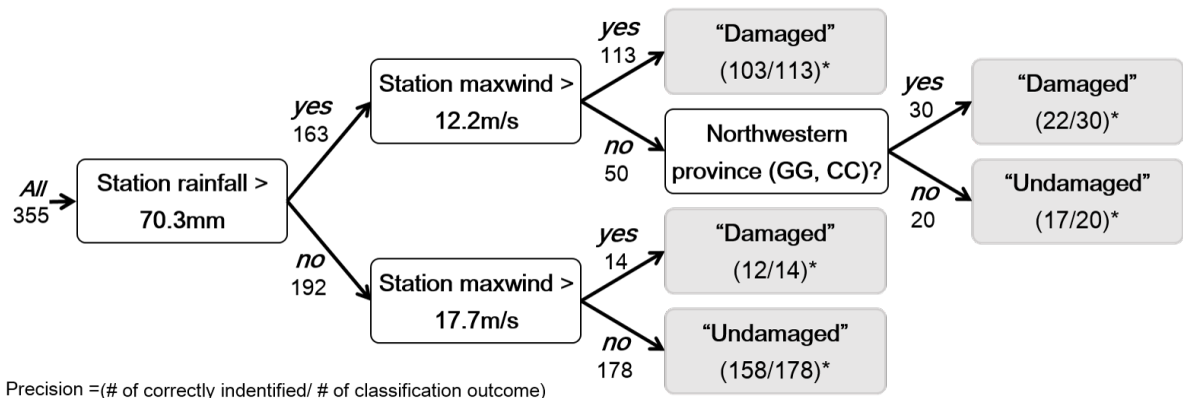
Supplementary Table 2: Damage record availability by track-pattern groups and provinces. Unavailable damage records are cases that have influence duration longer than five days or overlap of more than two TCs in the period. National-undamaged cases are those who have no property loss from any of the provinces.

Track groups			East-short	East-long	West-long	West-short	Sum
All			22	31	16	16	85
Unavailable			1	3	4	6	14
Available	National	All	21	28	12	10	71
		Damaged	8	21	12	10	51
		Undamaged	13	7	0	0	20
	Gyeong-gi (GG)	All	21	28	12	10	71
		Damaged	1	9	9	6	25
		Undamaged	20	19	3	4	46
	Gang-won (GW)	All	21	28	12	10	71
		Damaged	2	9	7	4	22
		Undamaged	19	19	5	6	49
	Chung-cheong (CC)	All	21	28	12	10	71
		Damaged	2	9	6	8	25
		Undamaged	19	19	6	2	46
	Jolla (JL)	All	21	28	12	10	71
		Damaged	5	17	10	9	41
		Undamaged	16	11	2	1	30
	Gyeong-sang (GS)	All	21	28	12	10	71
		Damaged	7	21	10	9	47
		Undamaged	14	7	2	1	24
	Sum of province data	All	105	140	60	50	355
		Damaged	17	65	42	36	160
		Undamaged	88	75	18	14	195

Supplementary Table 3: List of the grouped tropical cyclones that made landfall over South Korea during 1979 – 2010.

Year	East-short	East-long	West-long	West-short
1979			IRVING	JUDY
1980		ORCHID		JUNE
1981				AGNES
1982	KEN	BESS, ELLIS	CECIL	
1983				FORREST
1984	ED	HOLLY		
/1985	ODESSA	PAT	JEFF, KIT,LEE	BRENDA
1986			VERA	NANCY
1987		DINAH	THELMA	
1988				
1989	ELLIS, JUDY			
1990	FLO	ZOLA		ROBYN
1991	GLADYS, noname	CAITLIN, KINNA, MIREILLE		
1992	IRVING, KENT	JANIS	TED	
1993	NATHAN, OFELIA	PERCY, ROBYN, YANCY		
1994	WALT	BRENDAN	ELLIE, SETH	DOUG
1995		FAYE, RYAN		
1996	EVE	KIRK		
1997	ROSIE, OLIWA	PETER	TINA	
1998	ZEB			YANNI
1999	PAUL	BART	OLGA	NEIL, ANN
2000	BOLAVEN		PRAPIROON	SAOMAI
2001				
2002			RAMMASUN	RUSA
2003	LINFA	MAEMI	SOUDELOR	
2004		NAMTHEUN, MEGI, CHABA, SONGDA		MINDULLE
2005		NABI		KHANUN
2006	WUKONG	SHANSHAN		EWINIAR
2007	MAN-YI	USAGI	NARI	
2008				
2009				
2010		DIANMU, KOMPASU, MALOU		
Number of TCs	22	31	16	16

In-situ observation based decision tree

* Precision =(# of correctly indentified/ # of classification outcome)

Supplementary Figure 1: Decision tree model for damage occurrence using two in-situ station observations (precipitation and surface wind) as input variables instead of TC best-track information attributes (intensity, size, and track). The number of cases corresponding to each criterion is presented along each arrow. The shaded boxes indicate the final diagnosis boxes, in which the precision of the diagnosis is written in parentheses (the number of correctly identified cases / the number of cases diagnosed following the specific sequence of criteria).