Supplementary Materials: Article Mapping Annual Forest Change Due to Afforestation in Guangdong Province of China Using Active and Passive Remote Sensing Data. *Remote Sensing* 2019, 2, Article No. remotesensing-447587

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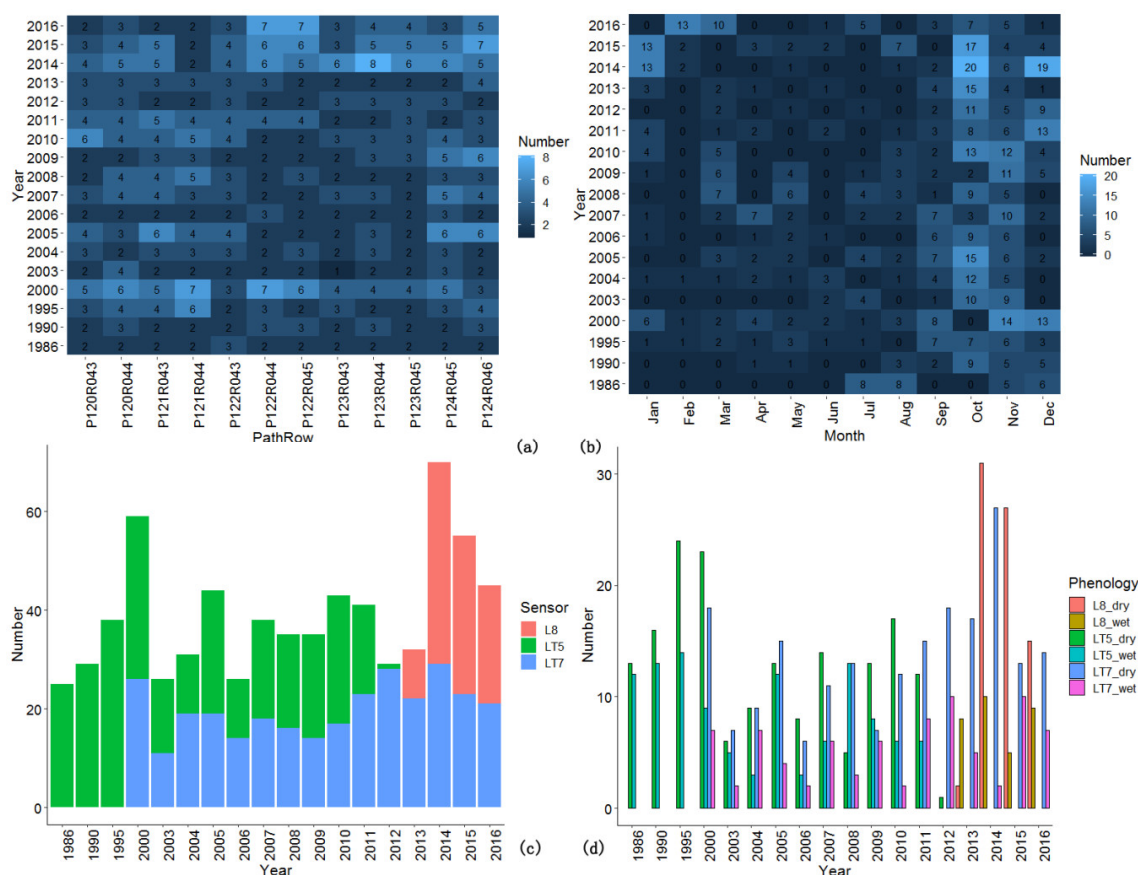
Figure S1. Statistics of the number of Landsat images used by (a) 12paths/rows, (b) 12 months, (c) 3 sensors, and (d) dry season and wet season from Shen et al. (2018).

Code S1. Taking a case of PALSAR-based SVM land cove type classification by traditional classification and parallel processing classification techniques

```
###############################P122R043-2007###############################

#######################Traditional classification#######################

setwd("K:\\FNF_classification")

folder <- getwd()

#read trainroi

mytrainroi = read.table ("./roi_mean_extractions_new/12pathrow07_16_5roi_values.csv_
TRAIN.csv", sep = ",", header = T)

mytrain <- data.frame(mytrainroi)

mytrain.subset <- mytrain[,c(2:2,8:19)]

svmmodel <- svm(category~.,data=mytrain.subset,kernel="radial",

        gamma=1,cost=1,type="C-classification")

####################Parallel processing classification #####################

#read stackedGLCM

filename <- list.files ("./122043/2007",

            pattern = glob2rx("*HH*HV*GLCM*crop*tif"),

            recursive = TRUE, full.names = TRUE)

filename

predictors=raster::brick(filename)

predictors

names(predictors)=c("HH","HV","Ratio","Difference",

        "HV_Mean","HV_Variance")

#register parallel computing backend

library(doParallel)

ncores = 4

cl = parallel::makeCluster(ncores)

doParallel::registerDoParallel(cl,cores)

#compute indices for data spliting

rows = 1:nrow(predictors)
```

```r
split = sort(rows%%ncores)+1

outname = "prediction1220432007"

pt <- proc.time()

#perform the prediction on subsets of the predictor dataset

library(foreach)

prediction1220432007 = foreach(i=unique(split), .combine=c,.packages = c("e1071"))%dopar%{

rows_sub = rows[split==i]

sub= = raster::crop (predictors,raster::extent(predictors,min(rows_sub), max(rows_sub), 1, ncol
(predictors))) raster::predict (sub,svmmodel,filename = paste (outname, i, sep = "_"), overwrite=TRUE)

} #sub: split stackimage; rows_sub:

proc.time()-pt

stopCluster(cl)

##   This will write different files with a suffix "_1" to "_{ncores}"

##   which can then easily mosaicked back together along the y-axis

filename2 <- list.files(".",

                pattern = glob2rx("*prediction1220432007*grd"),

                recursive = TRUE,full.names = TRUE)

filename2

m1<-mosaic(raster(filename2[1]),raster(filename2[2]),

       raster(filename2[3]),raster(filename2[4]),fun=mean)

writeRaster (m1, file.path ('./122043', filename = paste0 ("1220432007", "_SVM", ".tiff", sep = "")), format
= "GTiff", dataType = 'INT2S',overwrite = TRUE)

#################################END###########################################
```

Table S1. The accuracy assessment of land cover classification in 2007 and 2016 [1.]

SVM	Class	Ground Truth ROIs (2007)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	206	1	22	23	2	254	81.10%	18.90%
	F	19	456	86	20	2	583	78.22%	21.78%
	O	211	68	291	138	72	780	37.31%	62.69%
	U	71	30	55	376	16	548	68.61%	31.39%
	W	1	0	13	1	109	124	87.90%	12.10%
Total Ground Truth ROIs		508	555	467	558	201		Kappa coefficient = 0.524	
Producer Accuracy (%)		40.55%	82.16%	62.31%	67.38%	54.23%	Overall Accuracy = 62.82% (95% CI: 60.81%–64.81%)		
Omission error (%)		59.45%	17.84%	37.69%	32.62%	45.77%			

SGB	Class	Ground Truth ROIs (2007)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	233	1	32	32	4	302	77.15%	22.85%
	F	18	417	66	18	2	521	80.04%	19.96%
	O	186	100	291	121	55	753	38.65%	61.35%
	U	70	35	57	386	11	559	69.05%	30.95%
	W	1	2	21	1	129	154	83.77%	16.23%
Total Ground Truth ROIs		508	555	467	558	201		Kappa coefficient = 0.535	
Producer Accuracy (%)		45.97%	75.14%	62.31%	69.18%	64.18%	Overall Accuracy = 63.61% (95% CI: 61.6%–65.58%)		
Omission error (%)		54.03%	24.86%	37.69%	30.82%	35.82%			

RF	Class	Ground Truth ROIs (2007)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	211	1	21	31	2	266	79.32%	20.68%
	F	18	296	42	12	0	368	80.43%	19.57%
	O	204	205	316	139	60	924	34.20%	65.80%
	U	74	51	64	375	9	573	65.45%	34.55%
	W	1	2	24	1	130	158	82.28%	17.72%
Total Ground Truth ROIs		508	555	467	558	201		Kappa coefficient = 0.466	
Producer Accuracy (%)		41.54%	53.33%	67.67%	67.20%	64.68%	Overall Accuracy = 58.02% (95% CI: 55.96%–60.05%)		
Omission error (%)		58.46%	46.67%	32.33%	32.80%	35.32%			

C5.0	Class	Ground Truth ROIs (2007)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	223	2	32	32	7	296	75.34%	24.66%
	F	20	422	74	18	2	536	78.73%	21.27%
	O	184	97	279	133	54	747	37.35%	62.65%
	U	80	31	53	374	8	546	68.50%	31.50%
	W	1	3	29	1	130	164	79.27%	20.73%
Total Ground Truth ROIs		508	555	467	558	201		Kappa coefficient = 0.520	
Producer Accuracy (%)		43.90%	76.04%	59.74%	67.03%	64.68%	Overall Accuracy = 62.39% (95% CI: 60.36%–64.37%)		
Omission error (%)		56.10%	23.96%	40.26%	32.97%	35.32%			

SVM	Class	Ground Truth ROIs (2016)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	277	17	119	33	1	447	61.97%	38.03%
	F	24	384	56	22	1	487	78.85%	21.15%
	O	189	44	343	73	69	718	47.77%	52.23%
	U	98	101	104	503	22	828	60.75%	39.25%
	W	0	0	16	0	93	109	85.32%	14.68%
Total Ground Truth ROIs		588	546	635	631	186	Kappa coefficient = 0.505 Overall Accuracy = 61.8 (95% CI: 59.9%–63.68%)		
Producer Accuracy (%)		47.11%	70.33%	53.76%	79.71%	50.0%			
Omission error (%)		52.89%	29.67%	46.24%	20.29%	50.0%			

SGB	Class	Ground Truth ROIs (2016)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	258	9	96	30	1	394	65.48%	34.52%
	F	14	363	42	13	0	432	84.03%	15.97%
	O	227	63	381	97	52	820	46.46%	53.54%
	U	88	111	103	491	16	809	60.69%	39.31%
	W	1	0	16	0	116	133	87.22%	12.78%
Total Ground Truth ROIs		588	546	635	631	186	Kappa coefficient = 0.510 Overall Accuracy = 62.17% (95 % CI: 60.27%–64.04%)		
Producer Accuracy (%)		43.88%	66.48%	59.72%	77.81%	62.70%			
Omission error (%)		56.12%	33.52%	40.28%	22.19%				

RF	Class	Ground Truth ROIs (2016)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	309	17	125	43	1	495	62.42%	37.58%
	F	7	356	49	13	0	425	83.76%	16.24%
	O	173	52	343	80	52	700	49.00%	51.00%
	U	98	121	107	495	22	843	58.72%	41.28%
	W	1	0	14	0	111	126	88.10%	11.90%
Total Ground Truth ROIs		588	546	635	631	186	Kappa coefficient = 0.513 Overall Accuracy = 62.34% (95% CI: 60.44%–64.21%)		
Producer Accuracy (%)		52.55%	65.20%	53.76%	78.45%	59.68%			
Omission error (%)		47.45%	34.80%	46.24%	21.55%	40.32%			

C5.0	Class	Ground Truth ROIs (2016)					Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		C	F	O	U	W			
Classification	C	316	18	145	37	3	519	60.89%	39.11%
	F	17	341	41	13	1	413	82.57%	17.43%
	O	162	56	315	72	49	654	48.17%	51.83%
	U	92	131	123	509	22	877	58.04%	41.96%
	W	1	0	14	0	111	126	88.10%	11.90%
Total Ground Truth ROIs		588	546	635	631	186	Kappa coefficient = 0.502 Overall Accuracy = 61.49% (95% CI: 59.59%–63.37%)		
Producer Accuracy (%)		53.74%	62.45%	49.37%	80.67%	59.68%			
Omission error (%)		46.26%	37.55%	50.63%	19.33%	40.32%			

[1] C: cropland; F: forest; O: others; U: urban (buildings); W: water.
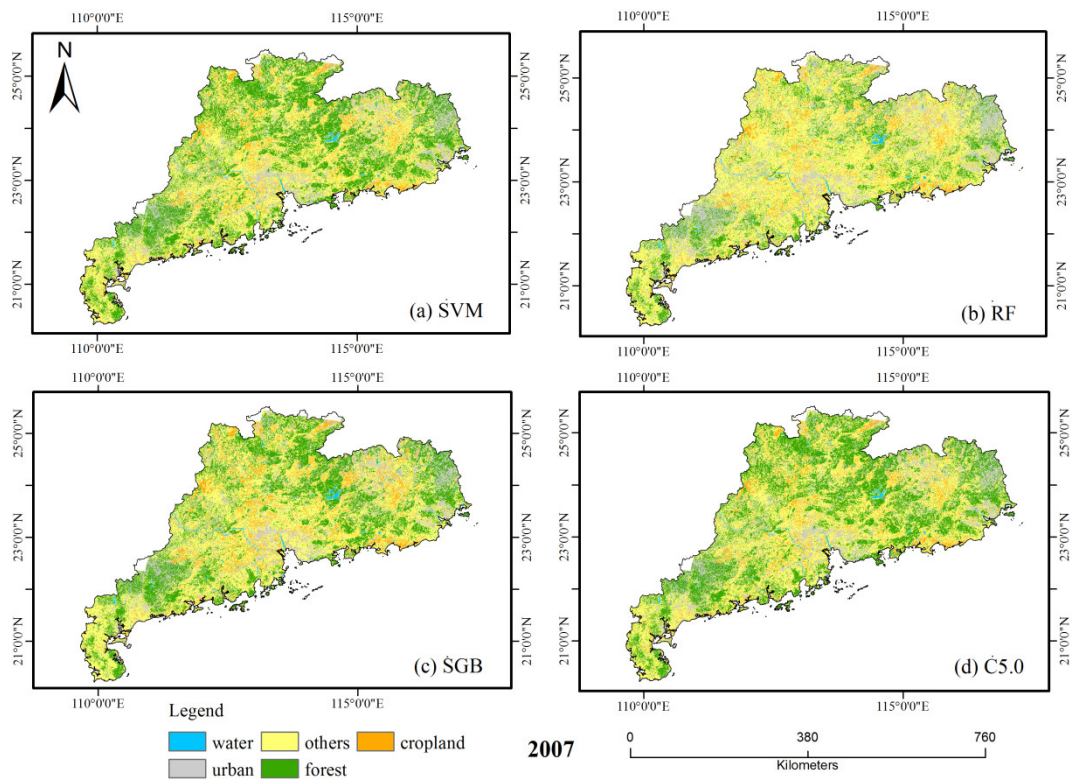
Figure S2. The 2007 land cover classifications based on SVM (a), RF (b), SGB (c), and C5.0 (d) in the Guangdong province of China.

Table S2. The accuracy assessment of forest and non-forest in 2005, 2010, and 2016.

	Class	Ground Truth ROIs (2005)		Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		F	NF			
Classification	F	431	405	836	51.56%	48.44%
	NF	124	1329	1453	91.47%	8.53%
Total Ground Truth ROIs		555	1734			
Producer Accuracy (%)		77.66%	76.64%	Overall Accuracy = 76.89% (95% CI:75.11%–78.6%)		
Omission error (%)		22.34%	23.36%	Kappa coefficient = 0.463		

	Class	Ground Truth ROIs (2010)		Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		F	NF			
Classification	F	372	233	605	61.49%	38.51%
	NF	146	1735	1881	92.24%	7.76%
Total Ground Truth ROIs		518	1968			
Producer Accuracy (%)		71.81%	88.16%	Overall Accuracy = 84.75 % (95% CI: 83.28%–86.2%)		
Omission error (%)		28.19%	11.84%	Kappa coefficient = 0.565		

	Class	Ground Truth ROIs (2016)		Total Classified ROIs	User Accuracy (%)	Commission Error (%)
		F	NF			
Classification	F	467	351	818	57.09%	42.91%
	NF	79	1692	1771	95.54%	4.46%
Total Ground Truth ROIs		546	2043			
Producer Accuracy (%)		85.53%	82.82%	Overall Accuracy = 83.39% (95% CI: 81.9%–84.81%)		
				Kappa coefficient = 0.578		

Table S3. Validation results of different forest and non-forest products in 2010.

GLC30 (GD)	Class	Ground Truth ROIs		Total Classified ROIs	User Accuracy (%)	Commission error (%)
		F	NF			
Classification	F	463	299	762	60.76%	39.24%
	NF	53	1656	1709	96.9%	3.1%
Total Ground Truth ROIs		516	1955	2471		
Producer Accuracy (%)		89.73%	84.71%	Overall Accuracy = 85.75 % (95% CI: 84.31%–87.11%)		
Omission error (%)		10.27%	15.29%	Kappa coefficient = 0.633		

JAXA (GD)	Class	Ground Truth ROIs		Total Classified ROIs	User Accuracy (%)	Commission error (%)
		F	NF			
Classification	F	368	328	696	52.87%	47.13%
	NF	148	1627	1775	91.66%	8.34%
Total Ground Truth ROIs		516	1955	2471		
Producer Accuracy (%)		71.32%	83.22%	Overall Accuracy = 80.74% (95 % CI:79.13%–82.27%)		
Omission error (%)		28.68%	16.78%	Kappa coefficient = 0.483		

This study (p122r043)	Class	Ground Truth ROIs		Total Classified ROI	User Accuracy (%)	Commission error (%)
		F	NF			
Classification	F	26	21	47	55.32 %	44.68 %
	NF	2	117	119	98.32 %	1.68 %
Total Ground Truth ROIs		28	138	166		
Producer Accuracy (%)		92.86%	84.78%	Overall Accuracy = 86.14% (95% CI: 79.94%–91.01%)		
Omission error (%)		7.14%	15.22%	Kappa coefficient = 0.611		

VCT (p122r043)	Class	Ground Truth ROIs		Total Classified ROI	User Accuracy (%)	Commission error (%)
		F	NF			
Classification	F	26	14	40	65.0 %	35 %
	NF	2	124	126	98.41 %	1.59 %
Total Ground Truth ROIs		28	138	166		
Producer Accuracy (%)		92.86%	89.86%	Overall Accuracy = 90.3% (95% CI: 84.82%–94.39%)		
Omission error (%)		7.14%	10.14%	Kappa coefficient = 0.707		