

*Supplementary Material*

# **Automatic land-cover mapping using Landsat time-series data based on Google Earth Engine**

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Section 4.2:

**Table S1.** Accuracy assessment of the automatically extracted samples.

Class	ENF	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR
ENF	100	0	0	0	0	0	0	0	0	0
DBF	0	100	0	0	0	0	0	0	0	0
MF	0	0	100	0	0	0	0	0	0	0
CSL	0	0	0	100	0	0	0	0	0	0
WS	0	0	0	0	100	0	0	0	0	0
SVN	0	0	0	0	0	100	0	0	0	0
GRL	0	0	0	0	0	0	98	2	0	0
CRL	0	0	0	0	0	0	1	99	0	0
UB	0	0	0	0	0	0	0	5	95	0
WTR	0	0	0	0	0	0	0	0	0	100

Overall accuracy: 0.992

Note: Columns are the reference class labels (i.e. the visually interpreted labels from very high resolution images of Google Earth) of extracted samples while rows are the MCD12Q1.006 class labels of extracted samples.

Section 4.3:

**Table S2.** Confusion matrix for the classification result of scene\_123032 based on percentile features. Accuracy measures are adjusted with the area of each class and presented with a 95% confidence interval (The same for Table S3-S10).

Class	DBF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	169	14	7	16	1	0	0	0	207	0.82±0.05	0.84±0.04	0.75±0.03
CSL	17	115	10	15	20	2	0	0	179	0.64±0.07	0.56±0.07	
WS	11	9	106	1	3	2	0	0	132	0.80±0.07	0.85±0.06	
SVN	12	12	1	103	24	4	0	0	156	0.66±0.07	0.55±0.06	
GRL	0	17	2	39	217	27	0	0	302	0.72±0.05	0.85±0.04	
CRL	0	0	0	0	6	175	40	0	221	0.79±0.05	0.83±0.04	
UB	0	0	0	0	0	22	59	0	81	0.73±0.10	0.55±0.08	
WTR	0	0	0	0	0	0	0	97	97	1.00±0.00	1.00±0.00	
Ref Total	209	167	126	174	271	232	99	97				

Note: "Ref Total" in this table represents the number of validation samples for each class; "Clf Total" in this table represents the number of classified samples for each class; "UA" represents the user accuracy; "PA" represents the producer accuracy; "OA" represents the overall accuracy. The same for Table S3-S10.

**Table S3.** Confusion matrix for the classification result of scene\_123032 based on maximum NDVI composited monthly features.

Class	DBF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	167	15	5	19	0	0	0	0	206	0.81±0.05	0.83±0.04	0.77±0.03
CSL	15	114	11	6	21	0	0	0	167	0.68±0.07	0.55±0.07	
WS	13	16	105	0	2	3	0	0	139	0.76±0.07	0.84±0.06	
SVN	14	6	3	108	12	4	0	0	147	0.73±0.07	0.56±0.06	
GRL	0	16	2	41	233	18	0	0	310	0.75±0.05	0.90±0.03	
CRL	0	0	0	0	3	175	37	0	215	0.81±0.05	0.83±0.03	
UB	0	0	0	0	0	32	62	0	94	0.66±0.10	0.56±0.08	
WTR	0	0	0	0	0	0	0	97	97	1.00±0.00	1.00±0.00	
Ref Total	209	167	126	174	271	232	99	97				

**Table S4.** Confusion matrix for the classification result of scene\_123032 based on median composited monthly features.

Class	DBF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	181	13	3	17	2	0	0	0	216	0.84±0.05	0.89±0.04	0.79±0.03
CSL	17	123	8	10	10	0	0	0	168	0.73±0.07	0.59±0.07	
WS	6	7	115	1	5	2	0	0	136	0.85±0.06	0.92±0.04	
SVN	5	4	0	114	16	0	0	0	139	0.82±0.06	0.62±0.06	
GRL	0	20	0	32	232	20	0	0	304	0.76±0.05	0.88±0.04	
CRL	0	0	0	0	6	181	36	0	223	0.81±0.05	0.85±0.03	
UB	0	0	0	0	0	29	63	0	92	0.68±0.10	0.57±0.08	
WTR	0	0	0	0	0	0	0	97	97	1.00±0.00	1.00±0.00	
Ref Total	209	167	126	174	271	232	99	97				

**Table S5.** Confusion matrix for the classification result of scene\_125034 based on percentile features.

Class	ENF	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
ENF	36	0	1	0	0	0	0	0	0	0	37	0.97±0.05	0.54±0.20	0.78±0.03
DBF	0	122	2	0	0	4	0	0	0	0	128	0.95±0.04	0.94±0.04	
MF	0	1	157	1	7	6	0	0	0	0	172	0.91±0.04	0.79±0.06	
CSL	0	0	2	119	0	5	2	0	0	0	128	0.93±0.04	0.87±0.11	
WS	6	0	15	0	116	7	0	1	0	0	145	0.80±0.07	0.82±0.08	
SVN	0	7	12	5	14	176	16	2	0	0	232	0.76±0.06	0.72±0.09	
GRL	0	0	0	1	1	13	219	89	8	0	331	0.66±0.05	0.98±0.01	
CRL	0	0	0	0	0	0	0	183	17	0	200	0.92±0.04	0.68±0.04	
UB	0	0	0	0	0	0	0	13	47	0	60	0.78±0.11	0.51±0.10	
WTR	0	0	0	0	0	0	0	0	0	56	56	1.00±0.00	1.00±0.00	
Ref Total	42	130	189	126	138	211	237	288	72	56				

**Table S6.** Confusion matrix for the classification result of scene\_125034 based on maximum NDVI composited monthly features.

Class	ENF	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
ENF	35	0	0	0	0	0	0	0	0	0	35	1.00±0.00	0.59±0.18	0.79±0.03
DBF	0	119	1	0	0	0	0	0	0	0	120	0.99±0.02	0.94±0.04	
MF	0	9	162	1	5	5	0	0	0	0	182	0.89±0.05	0.82±0.06	
CSL	0	0	1	115	0	1	2	0	0	0	119	0.97±0.03	0.86±0.09	
WS	7	0	13	1	118	5	0	0	0	0	144	0.82±0.06	0.82±0.08	
SVN	0	2	12	8	13	187	18	2	0	0	242	0.77±0.05	0.74±0.09	
GRL	0	0	0	1	2	13	217	87	7	0	327	0.66±0.05	0.98±0.01	
CRL	0	0	0	0	0	0	0	191	23	0	214	0.89±0.04	0.71±0.04	
UB	0	0	0	0	0	0	0	8	42	0	50	0.84±0.10	0.44±0.09	
WTR	0	0	0	0	0	0	0	0	0	56	56	1.00±0.00	1.00±0.00	
Ref Total	42	130	189	126	138	211	237	288	72	56				

**Table S7.** Confusion matrix for the classification result of scene\_125034 based on median composited monthly features.

Class	ENF	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
ENF	38	0	1	0	0	0	0	0	0	0	39	0.97±0.05	0.47±0.24	0.80±0.03
DBF	0	124	1	2	0	0	0	0	0	0	127	0.98±0.03	0.96±0.03	
MF	0	6	164	1	4	5	0	0	0	0	180	0.91±0.04	0.83±0.05	
CSL	0	0	1	117	0	4	2	0	0	0	124	0.94±0.04	0.82±0.13	
WS	4	0	13	0	126	5	0	0	0	0	148	0.85±0.06	0.91±0.05	
SVN	0	0	9	4	8	189	18	3	0	0	231	0.82±0.05	0.82±0.08	
GRL	0	0	0	2	0	8	217	86	6	0	319	0.68±0.05	0.98±0.01	
CRL	0	0	0	0	0	0	0	187	22	0	209	0.89±0.04	0.70±0.04	
UB	0	0	0	0	0	0	0	12	44	0	56	0.79±0.11	0.47±0.09	
WTR	0	0	0	0	0	0	0	0	0	56	56	1.00±0.00	1.00±0.00	
Ref Total	42	130	189	126	138	211	237	288	72	56				

**Table S8.** Confusion matrix for the classification result of scene\_125033 based on percentile features.

Class	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	168	0	13	0	3	0	0	0	0	184	0.91±0.04	0.92±0.05	0.77±0.03
MF	0	108	1	0	7	0	0	0	0	116	0.93±0.05	0.88±0.08	
CSL	7	7	121	2	12	2	0	0	0	151	0.80±0.06	0.74±0.09	
WS	0	0	1	33	0	0	0	0	0	34	0.97±0.06	0.17±0.09	
SVN	0	1	13	8	136	18	0	0	0	176	0.77±0.06	0.67±0.08	
GRL	0	0	0	0	25	269	68	9	0	371	0.73±0.05	0.97±0.01	
CRL	0	0	0	0	1	0	177	39	0	217	0.82±0.05	0.71±0.05	
UB	0	0	0	0	0	0	3	118	0	121	0.98±0.03	0.28±0.05	
WTR	0	0	0	0	0	0	0	0	81	81	1.00±0.00	1.00±0.00	
Ref Total	175	116	149	43	184	289	248	166	81				

**Table S9.** Confusion matrix for the classification result of scene\_125033 based on maximum NDVI composited monthly features.

Class	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	166	0	7	0	2	0	0	0	0	175	0.95±0.03	0.88±0.07	0.79±0.03
MF	0	110	2	0	7	0	1	0	0	120	0.92±0.05	0.88±0.09	
CSL	8	3	123	3	18	0	0	0	0	155	0.79±0.06	0.69±0.09	
WS	0	0	1	36	0	0	0	0	0	37	0.97±0.05	0.35±0.21	
SVN	1	3	16	3	142	21	0	0	0	186	0.76±0.06	0.78±0.07	
GRL	0	0	0	1	15	268	58	9	0	351	0.76±0.04	0.97±0.01	
CRL	0	0	0	0	0	0	178	38	0	216	0.82±0.05	0.74±0.05	
UB	0	0	0	0	0	0	12	119	0	131	0.91±0.05	0.35±0.06	
WTR	0	0	0	0	0	0	0	0	81	81	1.00±0.00	1.00±0.00	
Ref Total	175	116	149	43	184	289	249	166	81				

**Table S10.** Confusion matrix for the classification result of scene\_125033 based on median composited monthly features.

Class	DBF	MF	CSL	WS	SVN	GRL	CRL	UB	WTR	Clf Total	UA	PA	OA
DBF	166	0	5	0	3	0	0	0	0	174	0.95±0.03	0.94±0.04	0.80±0.03
MF	0	111	0	1	7	0	0	0	0	119	0.93±0.05	0.91±0.09	
CSL	9	3	139	1	9	1	0	0	0	162	0.86±0.05	0.82±0.11	
WS	0	0	0	24	1	0	0	0	0	25	0.97±0.05	0.50±0.22	
SVN	0	2	5	17	148	18	0	0	0	190	0.84±0.05	0.80±0.07	
GRL	0	0	0	0	16	270	63	9	0	358	0.75±0.04	0.97±0.01	
CRL	0	0	0	0	0	0	175	34	0	209	0.84±0.05	0.73±0.05	
UB	0	0	0	0	0	0	10	123	0	133	0.92±0.05	0.34±0.06	
WTR	0	0	0	0	0	0	0	0	81	81	1.00±0.00	1.00±0.00	
Ref Total	175	116	149	43	184	289	248	166	81				