Improving Data Efficiency for Plant Cover Prediction with Label Interpolation and Monte-Carlo Cropping - Supplementary Material

Matthias Körschens[1,2][0000−0002−0755−2006], Solveig Franziska Bucher[1,2,3][0000−0002−2303−4583], Christine Römermann[1,2,3][0000−0003−3471−0951], and Joachim Denzler[1,2,3][0000−0002−3193−3300]

[1] Friedrich Schiller University, D-07743 Jena, Germany
[2] German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, D-04103 Leipzig, Germany
[3] Michael Stifel Center Jena, D-07743 Jena, Germany
{matthias.koerschens,solveig.franziska.bucher, christine.roemermann,joachim.denzler}@uni-jena.de

1 Monte-Carlo Cropping - Numerial Results

In Table 1 the numerical values for our experiments with Monte-Carlo Cropping with weekly images and labels are shown, and in Table 2 the results for the experiments with the interpolated daily labels.

Table 1: Comparison of weekly images with original reference estimates trained with MCC with differing patch sizes and sample counts. Top results are marked in **bold font**.

Patch Size	128								
#Patches	64			128			256		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.577 ±0.007	0.145 ±0.005	0.648 ±0.020	0.582 ±0.004	0.150 ±0.004	0.653 ±0.024	0.579 ±0.007	0.139 ±0.017	0.610 ±0.060
6	0.540 ±0.006	0.186 ±0.012	0.728 ±0.006	0.539 ±0.003	0.197 ±0.001	0.742 ±0.010	0.536 ±0.003	0.194 ±0.006	0.727 ±0.022
10	0.529 ±0.005	0.205 ±0.002	0.738 ±0.009	0.532 ±0.007	0.206 ±0.005	0.754 ±0.004	0.531 ±0.013	0.207 ±0.000	0.739 ±0.018
15	0.518 ±0.004	0.208 ±0.003	0.742 ±0.018	0.518 ±0.005	0.209 ±0.004	0.753 ±0.013	0.523 ±0.002	0.215 ±0.001	0.745 ±0.023
25	0.517 ±0.004	0.212 ±0.006	0.742 ±0.017	0.517 ±0.002	**0.220** ±0.003	0.752 ±0.002	0.523 ±0.002	0.217 ±0.004	0.742 ±0.004
40	0.523 ±0.004	0.219 ±0.002	0.746 ±0.007	0.527 ±0.003	0.212 ±0.006	0.746 ±0.003	0.529 ±0.005	0.216 ±0.001	0.739 ±0.012

Patch Size	256								
#Patches	16			32			64		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.555 ±0.003	0.147 ±0.014	0.682 ±0.028	0.557 ±0.002	0.155 ±0.005	0.651 ±0.042	0.560 ±0.001	0.153 ±0.011	0.656 ±0.045
6	0.516 ±0.003	0.193 ±0.004	0.753 ±0.005	0.513 ±0.002	0.199 ±0.005	0.755 ±0.013	0.513 ±0.001	0.196 ±0.004	0.751 ±0.011
10	0.507 ±0.003	0.200 ±0.006	0.755 ±0.013	0.504 ±0.003	0.206 ±0.007	0.764 ±0.012	0.506 ±0.002	0.205 ±0.005	0.761 ±0.009
15	0.502 ±0.004	0.207 ±0.005	0.766 ±0.003	0.505 ±0.003	0.210 ±0.005	0.762 ±0.008	0.501 ±0.002	0.213 ±0.002	0.758 ±0.004
25	0.499 ±0.003	0.208 ±0.005	0.762 ±0.007	0.503 ±0.006	0.214 ±0.005	0.759 ±0.002	0.500 ±0.006	0.216 ±0.005	0.763 ±0.005
40	0.500 ±0.001	0.211 ±0.003	0.762 ±0.003	0.503 ±0.001	0.212 ±0.009	0.762 ±0.007	0.507 ±0.004	0.217 ±0.007	0.758 ±0.003

Table 1: (Continued) Comparison of weekly images with original reference estimates trained with MCC with differing patch sizes and sample counts. Top results are marked in **bold font**.

Patch Size	512								
#Patches	4			8			16		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.554 ±0.005	0.154 ±0.004	0.702 ±0.023	0.551 ±0.004	0.157 ±0.008	0.682 ±0.023	0.551 ±0.004	0.159 ±0.005	0.668 ±0.028
6	0.512 ±0.004	0.189 ±0.007	0.760 ±0.015	0.509 ±0.003	0.191 ±0.005	0.764 ±0.007	0.509 ±0.001	0.193 ±0.003	0.764 ±0.009
10	0.501 ±0.003	0.193 ±0.010	0.771 ±0.003	0.496 ±0.001	0.198 ±0.010	**0.777** ±0.008	0.500 ±0.004	0.202 ±0.004	0.772 ±0.007
15	0.498 ±0.001	0.193 ±0.011	0.764 ±0.011	0.496 ±0.000	0.205 ±0.006	0.766 ±0.006	0.496 ±0.001	0.204 ±0.005	0.772 ±0.008
25	0.495 ±0.001	0.201 ±0.001	0.766 ±0.004	0.494 ±0.001	0.205 ±0.008	0.758 ±0.007	0.495 ±0.002	0.209 ±0.003	0.760 ±0.007
40	0.494 ±0.003	0.194 ±0.005	0.761 ±0.003	0.492 ±0.003	0.200 ±0.007	0.764 ±0.007	0.491 ±0.002	0.205 ±0.008	0.766 ±0.005

Patch Size	1024								
#Patches	1			2			4		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.554 ±0.003	0.148 ±0.000	0.671 ±0.039	0.552 ±0.011	0.151 ±0.011	0.678 ±0.050	0.545 ±0.003	0.153 ±0.010	0.710 ±0.022
6	0.511 ±0.003	0.171 ±0.003	0.754 ±0.012	0.508 ±0.004	0.185 ±0.001	0.765 ±0.007	0.508 ±0.002	0.182 ±0.009	0.766 ±0.007
10	0.503 ±0.005	0.173 ±0.008	0.761 ±0.013	0.499 ±0.002	0.180 ±0.012	0.772 ±0.001	0.497 ±0.002	0.197 ±0.002	0.771 ±0.006
15	0.498 ±0.002	0.186 ±0.008	0.762 ±0.011	0.496 ±0.002	0.193 ±0.008	0.761 ±0.010	0.493 ±0.002	0.194 ±0.005	0.772 ±0.009
25	0.493 ±0.004	0.177 ±0.009	0.751 ±0.006	**0.489** ±0.002	0.186 ±0.012	0.753 ±0.009	**0.489** ±0.001	0.199 ±0.010	0.758 ±0.005
40	0.493 ±0.002	0.166 ±0.010	0.752 ±0.013	0.490 ±0.001	0.178 ±0.009	0.759 ±0.009	**0.489** ±0.002	0.188 ±0.010	0.762 ±0.014

Table 2: Comparison of daily images with original reference estimates and interpolated ones trained with MCC with differing patch sizes and sample counts. Top results are marked in **bold font**.

Patch Size	128								
#Patches	64			128			256		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.517 ±0.003	0.205 ±0.004	0.753 ±0.006	0.519 ±0.004	0.207 ±0.006	0.763 ±0.003	0.520 ±0.007	0.210 ±0.005	0.759 ±0.017
6	0.516 ±0.004	0.223 ±0.006	0.759 ±0.004	0.526 ±0.001	0.225 ±0.007	0.754 ±0.001	0.526 ±0.005	0.230 ±0.008	0.756 ±0.002
10	0.523 ±0.001	0.229 ±0.005	0.756 ±0.014	0.529 ±0.005	**0.232** ±0.003	0.756 ±0.016	0.537 ±0.006	0.227 ±0.004	0.743 ±0.005
15	0.532 ±0.002	0.227 ±0.006	0.757 ±0.016	0.541 ±0.008	0.221 ±0.003	0.751 ±0.017	0.544 ±0.007	0.222 ±0.002	0.745 ±0.016

Patch Size	256								
#Patches	16			32			64		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.499 ±0.003	0.207 ±0.001	0.776 ±0.005	0.500 ±0.005	0.205 ±0.007	0.777 ±0.009	0.501 ±0.003	0.207 ±0.005	0.775 ±0.002
6	0.499 ±0.002	0.214 ±0.006	0.768 ±0.005	0.498 ±0.003	0.223 ±0.007	0.769 ±0.001	0.502 ±0.003	0.228 ±0.007	0.763 ±0.004
10	0.501 ±0.003	0.223 ±0.010	0.769 ±0.005	0.507 ±0.001	0.224 ±0.003	0.771 ±0.004	0.506 ±0.003	0.227 ±0.016	0.769 ±0.003
15	0.504 ±0.006	0.211 ±0.011	0.775 ±0.003	0.511 ±0.004	0.211 ±0.007	0.775 ±0.005	0.512 ±0.002	0.208 ±0.012	0.777 ±0.003

Table 2: (Continued) Comparison of daily images with original reference estimates and interpolated ones trained with MCC with differing patch sizes and sample counts. Top results are marked in **bold font**.

Patch Size	512								
#Patches	4			8			16		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.496 ±0.001	0.193 ±0.008	0.783 ±0.005	0.492 ±0.002	0.198 ±0.012	**0.784** ±0.007	0.490 ±0.003	0.202 ±0.004	0.780 ±0.004
6	0.492 ±0.003	0.195 ±0.007	0.769 ±0.005	0.494 ±0.002	0.211 ±0.013	0.768 ±0.005	0.494 ±0.004	0.218 ±0.008	0.776 ±0.003
10	0.492 ±0.002	0.201 ±0.012	0.772 ±0.006	0.490 ±0.003	0.209 ±0.007	0.770 ±0.007	0.490 ±0.001	0.214 ±0.012	0.774 ±0.006
15	0.493 ±0.003	0.186 ±0.007	0.772 ±0.009	0.493 ±0.002	0.197 ±0.007	0.775 ±0.004	0.498 ±0.005	0.197 ±0.009	0.778 ±0.007

Patch Size	1024								
#Patches	1			2			4		
Epochs	MSAE	IoU	DPC	MSAE	IoU	DPC	MSAE	IoU	DPC
3	0.498 ±0.004	0.176 ±0.013	0.775 ±0.005	0.494 ±0.003	0.183 ±0.009	0.778 ±0.006	0.492 ±0.001	0.194 ±0.010	0.780 ±0.007
6	0.492 ±0.004	0.162 ±0.015	0.766 ±0.002	0.488 ±0.001	0.187 ±0.012	0.774 ±0.003	0.490 ±0.001	0.198 ±0.015	0.770 ±0.003
10	0.490 ±0.000	0.168 ±0.012	0.769 ±0.005	**0.487** ±0.002	0.172 ±0.009	0.770 ±0.003	0.489 ±0.001	0.193 ±0.006	0.769 ±0.002
15	0.489 ±0.002	0.161 ±0.009	0.772 ±0.005	0.488 ±0.004	0.163 ±0.021	0.772 ±0.004	0.489 ±0.003	0.172 ±0.023	0.772 ±0.003