UNIVERSITAT POLITÈCNICA DE CATALUNYA

DEPARTAMENT DE ÒPTICA I OPTOMETRIA

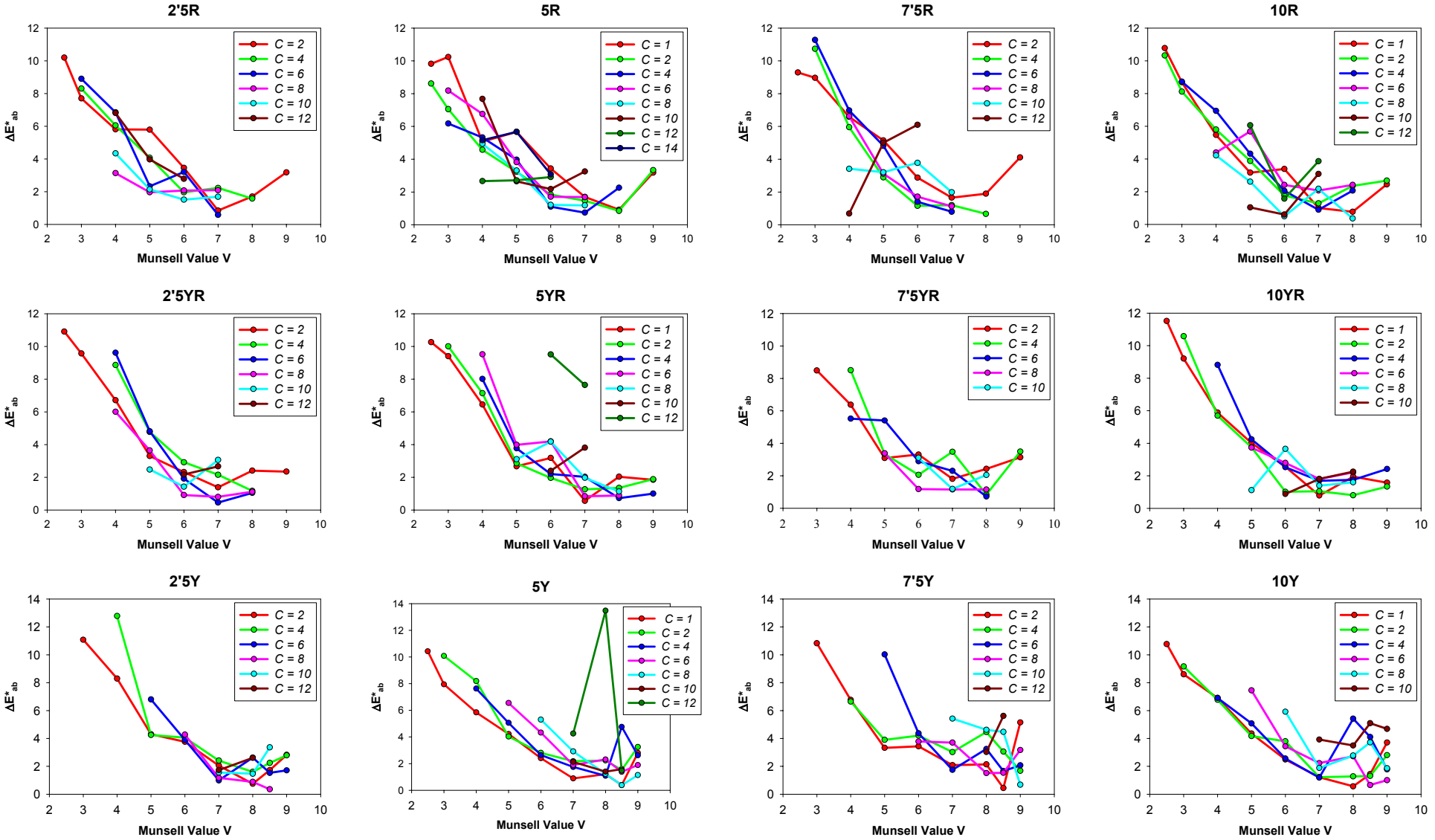
Thorough characterization and analysis of a multispectral imaging system developed for colour measurement

Thesis

Student: Marta De Lasarte Rigueiro

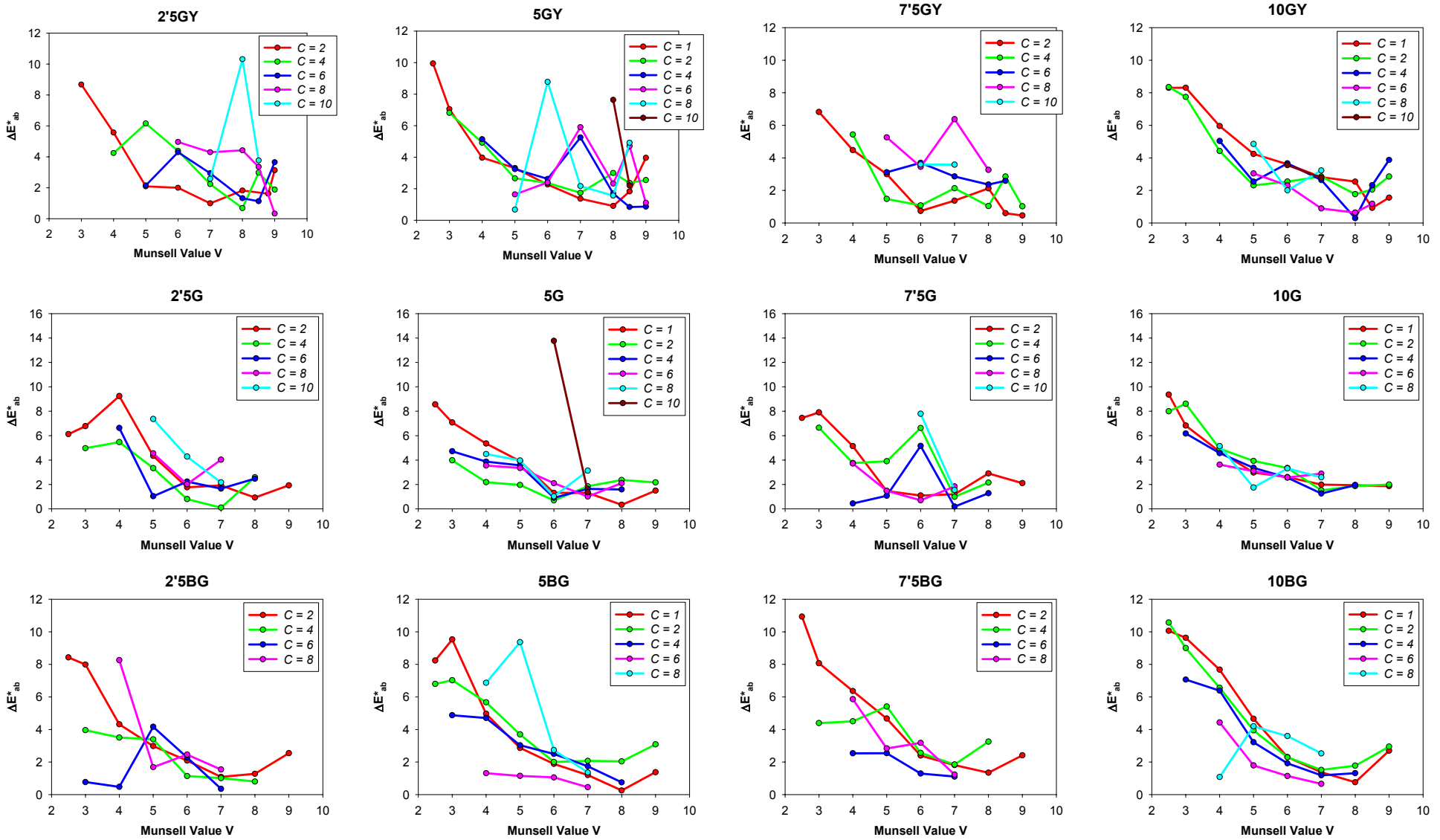
Appendix 3 Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates

Figure A3.1 (1) *Colorimetric Configuration + Tungsten Lamp*: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



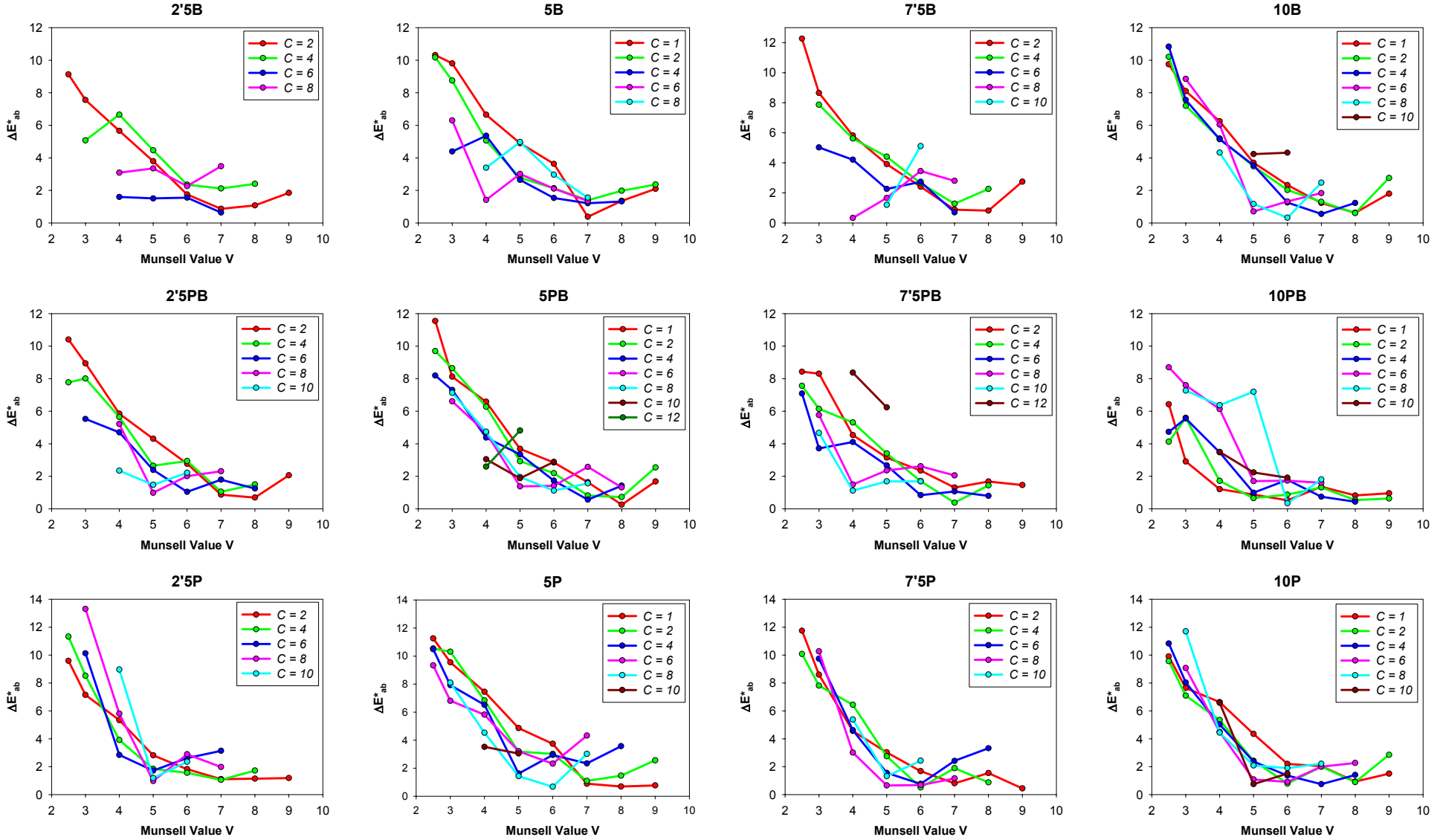
Appendix 3 Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates

Figure A3.1 (2) *Colorimetric Configuration + Tungsten Lamp*: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



Appendix 3 Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates

Figure A3.1 (3) *Colorimetric Configuration + Tungsten Lamp*: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



Appendix 3 Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates

Figure A3.1 (4) ***Colorimetric Configuration + Tungsten Lamp***: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

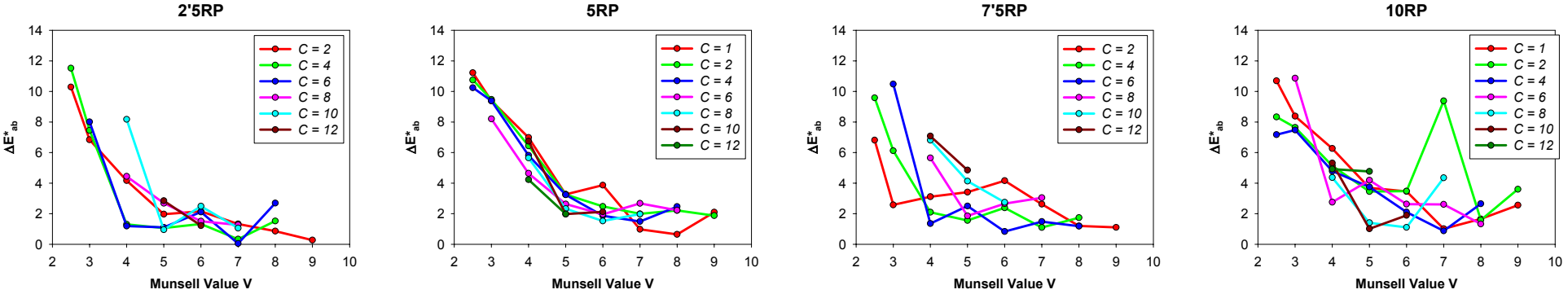
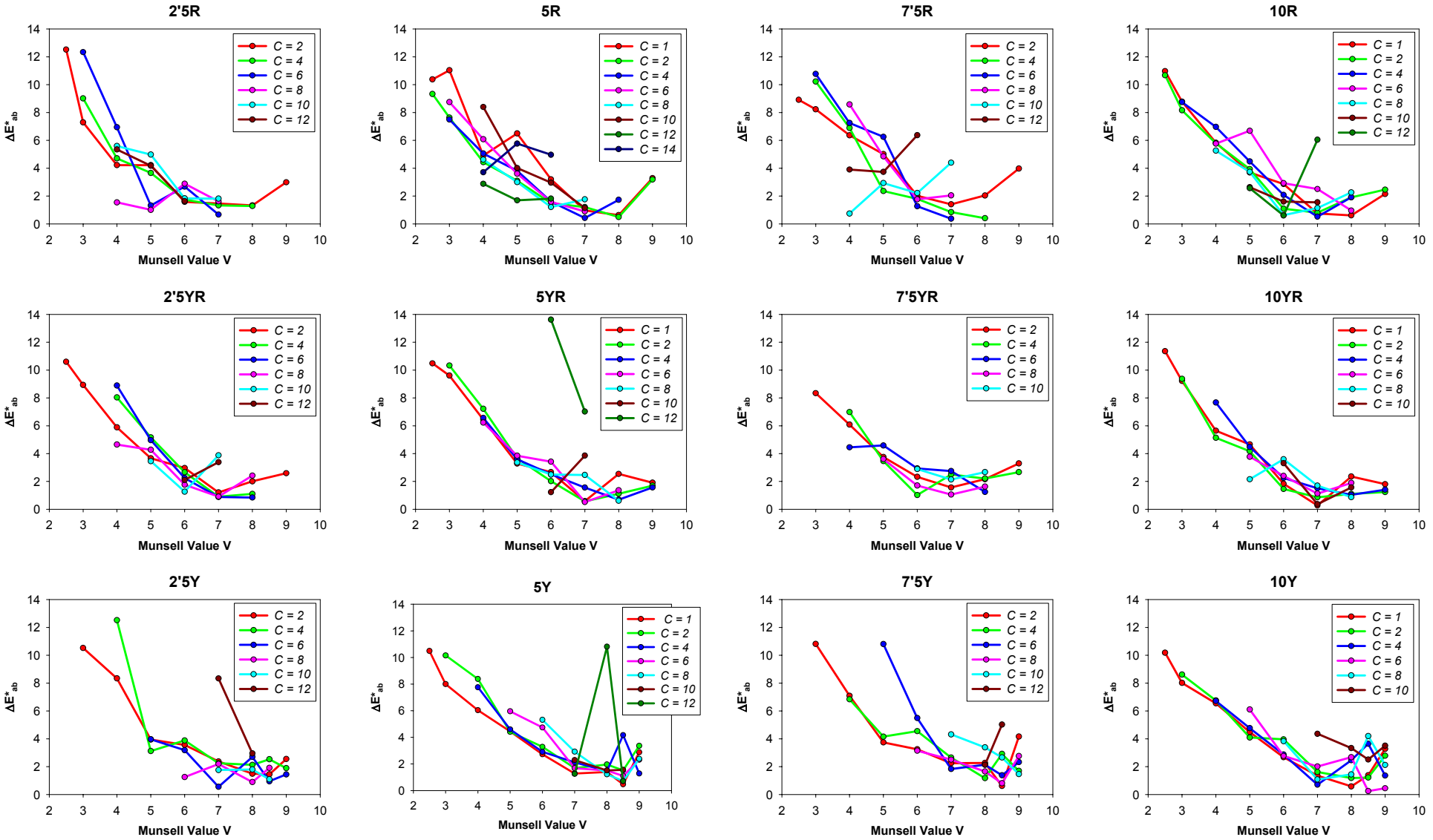


Figure A3.2 (1) ***Colorimetric Configuration + D65 Simulator***: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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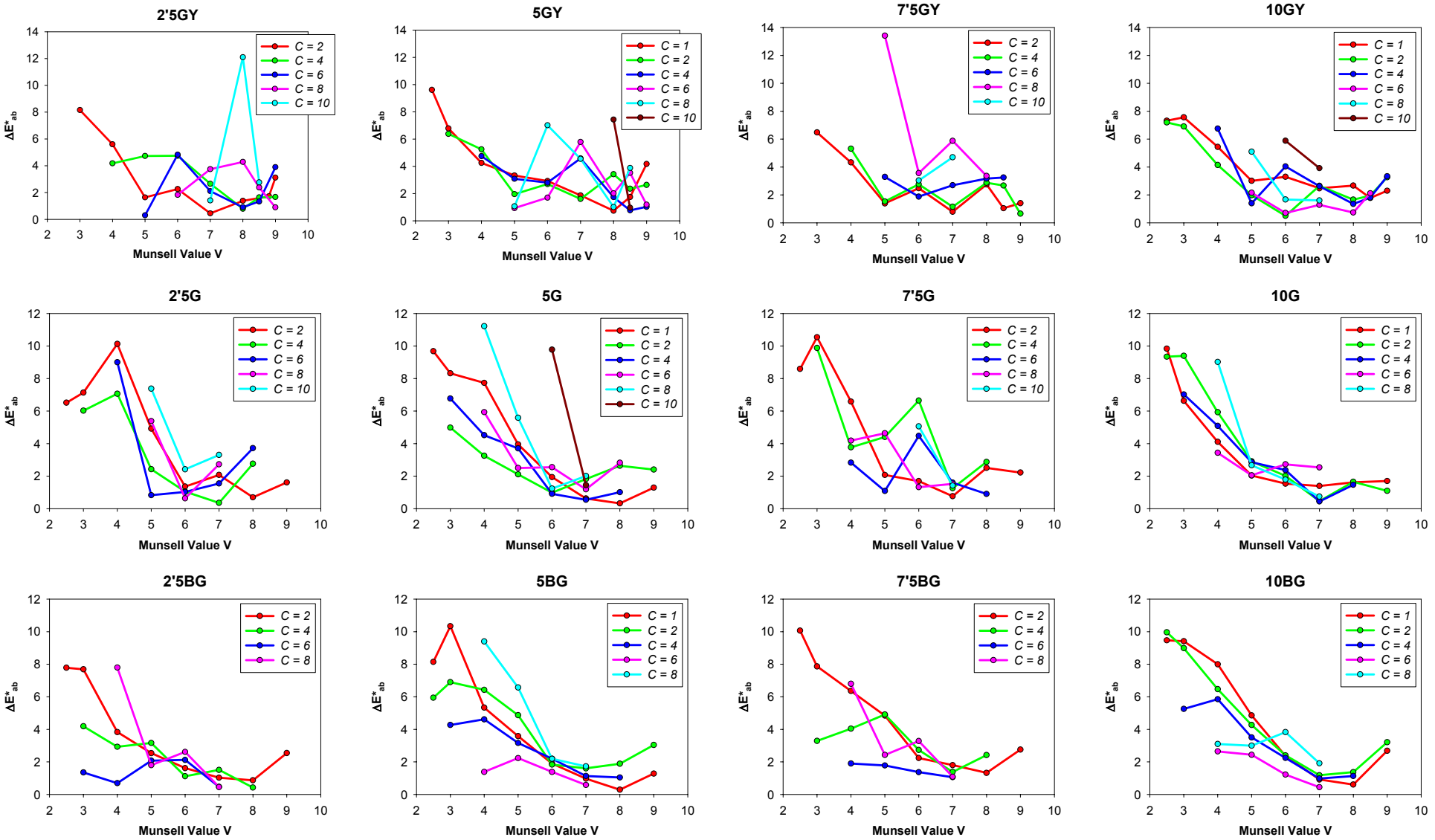

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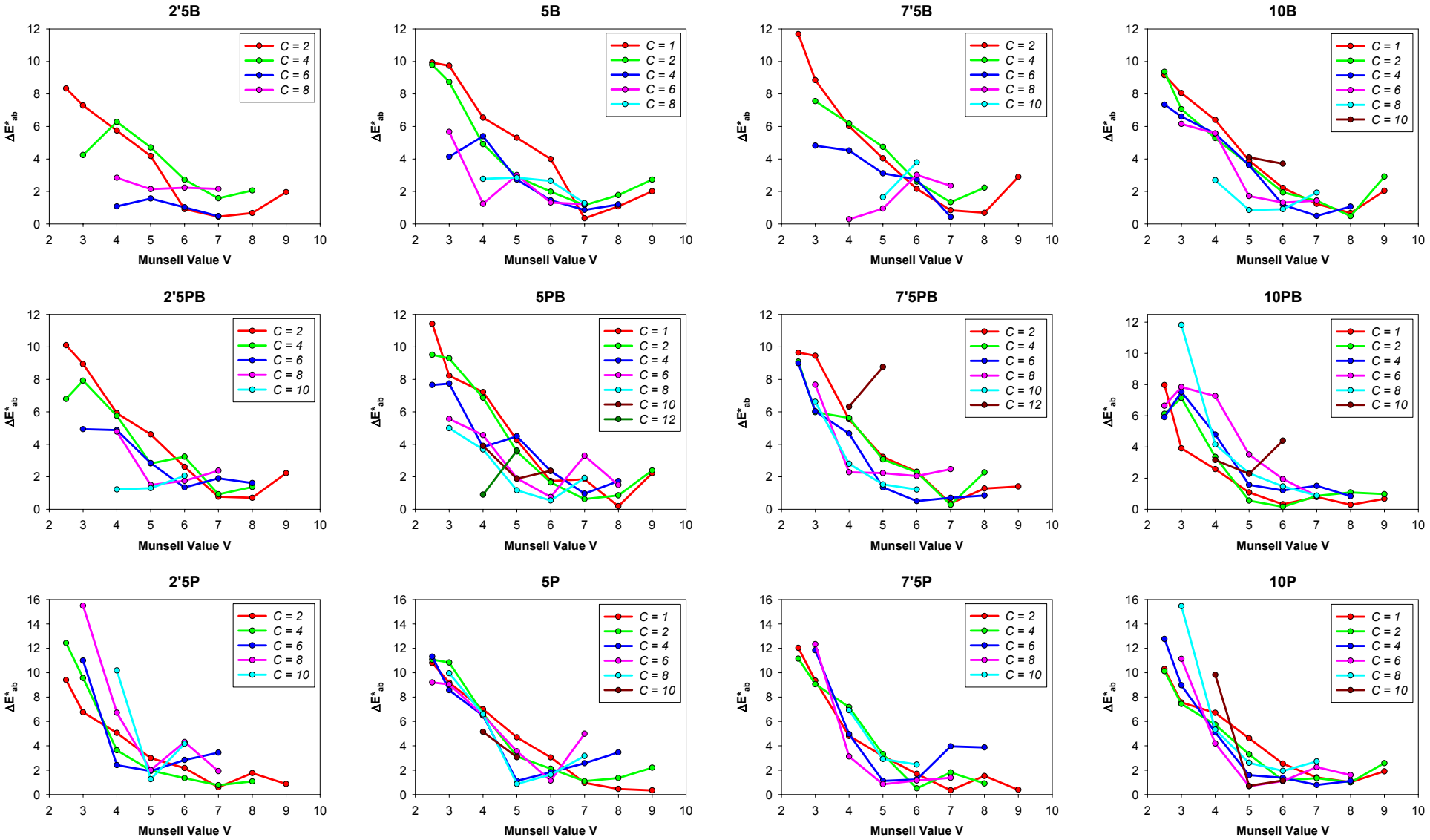

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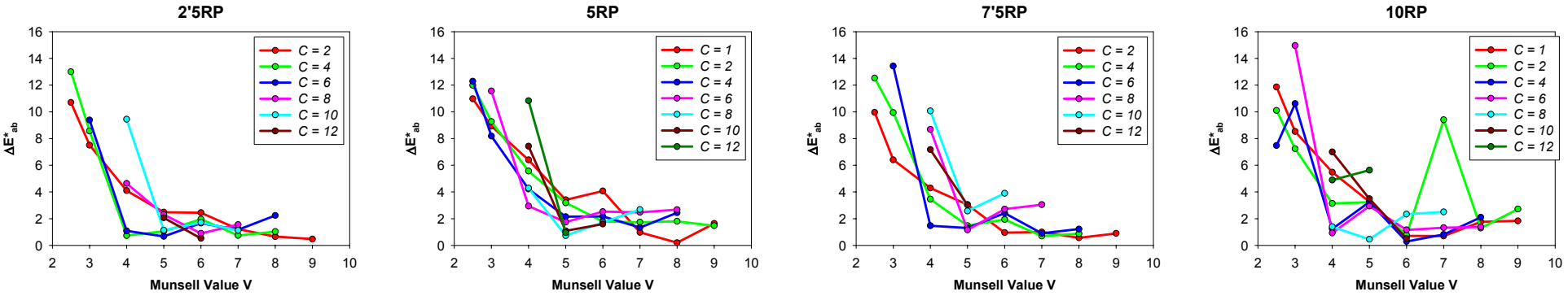
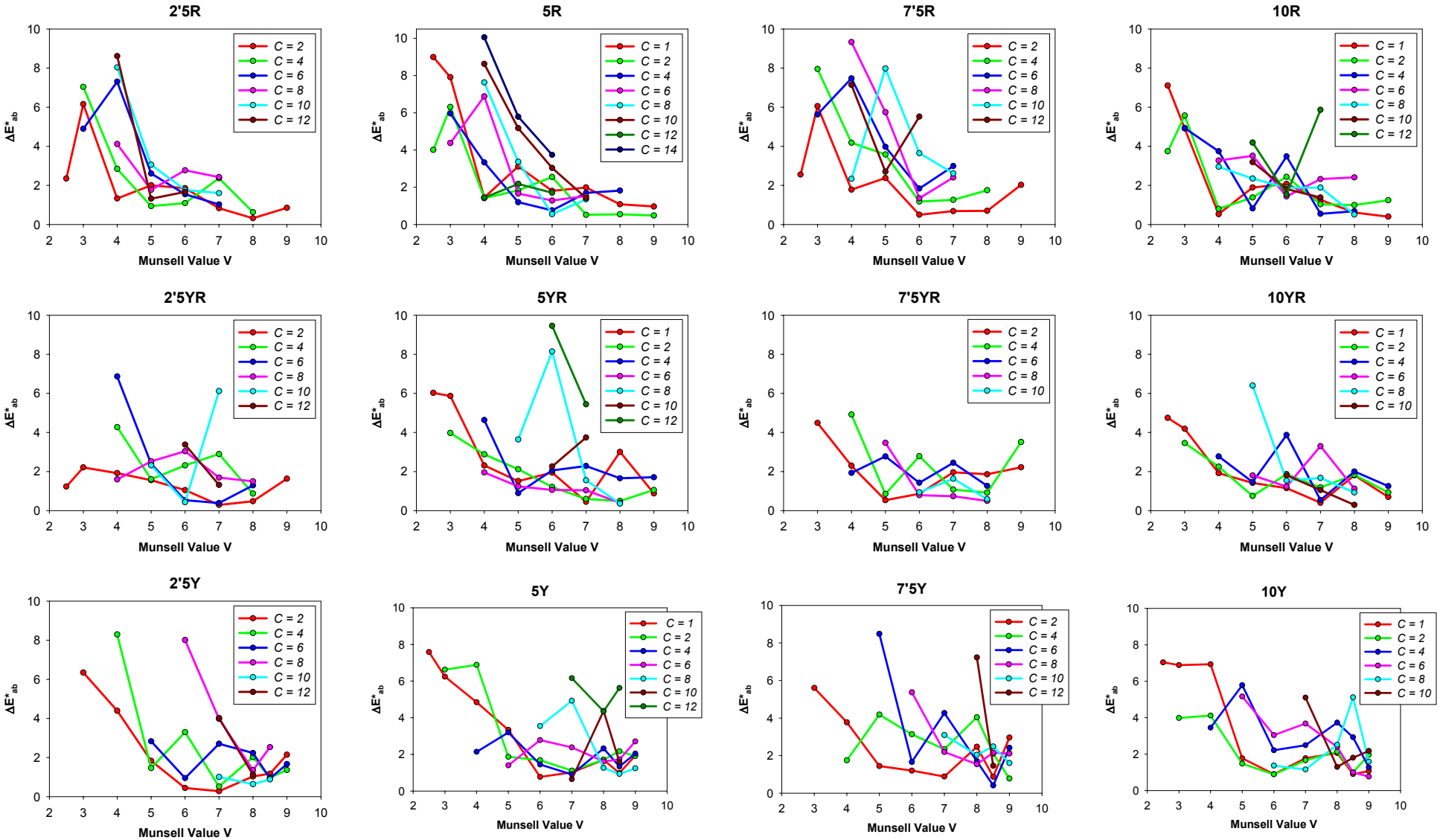


Figure A3.3 (1) ***Multispectral Configuration + Tungsten Lamp***: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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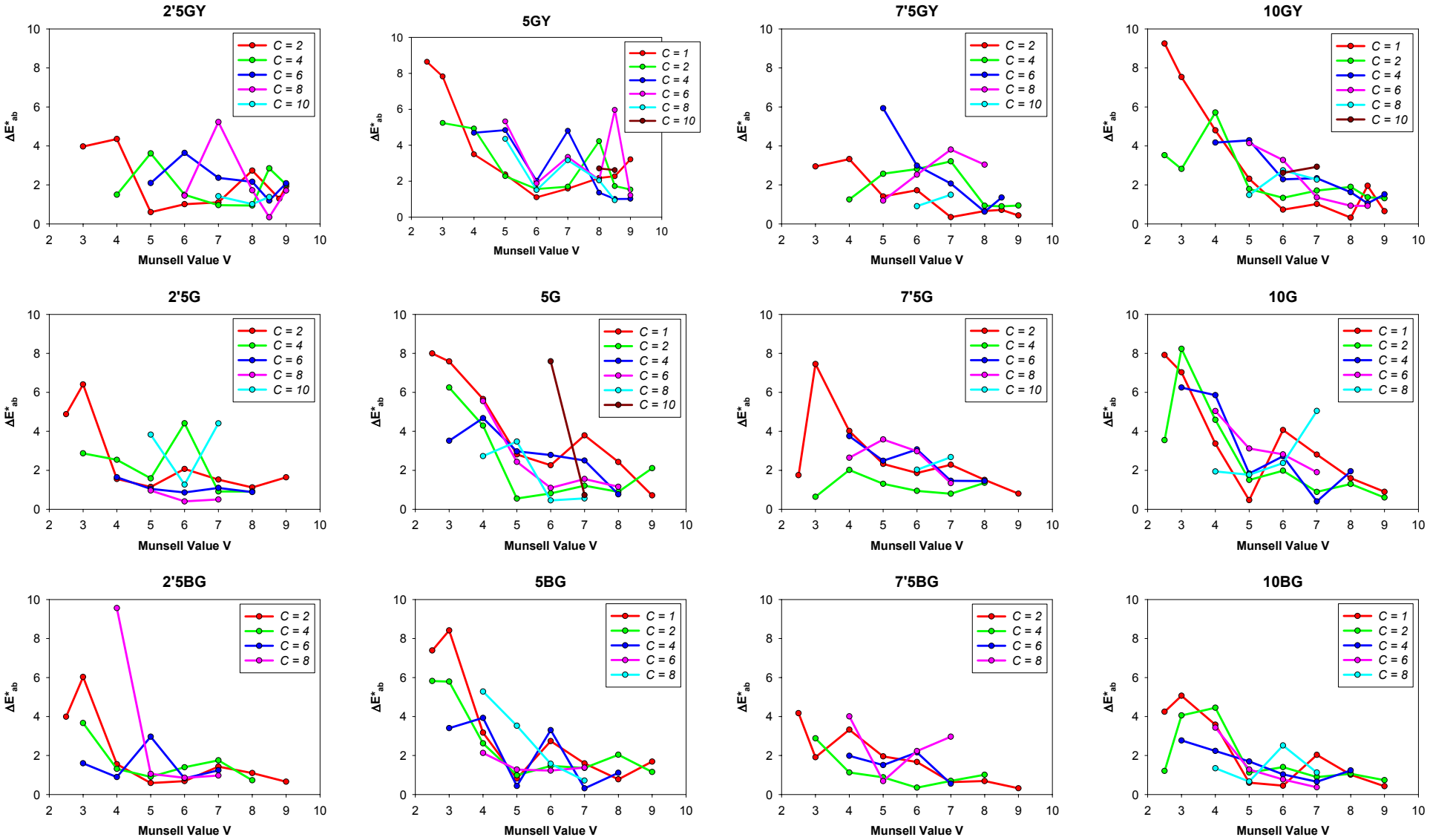

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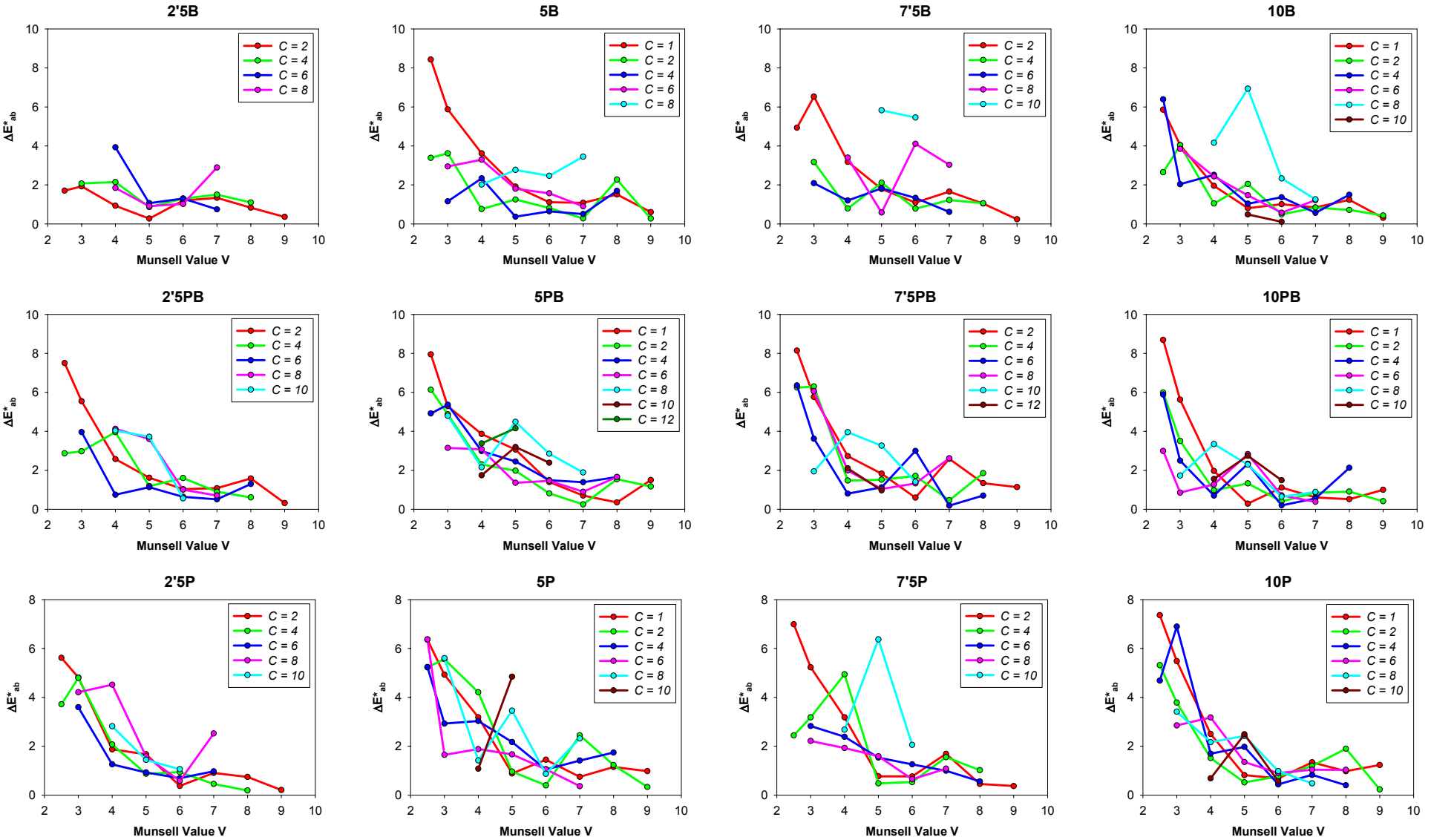

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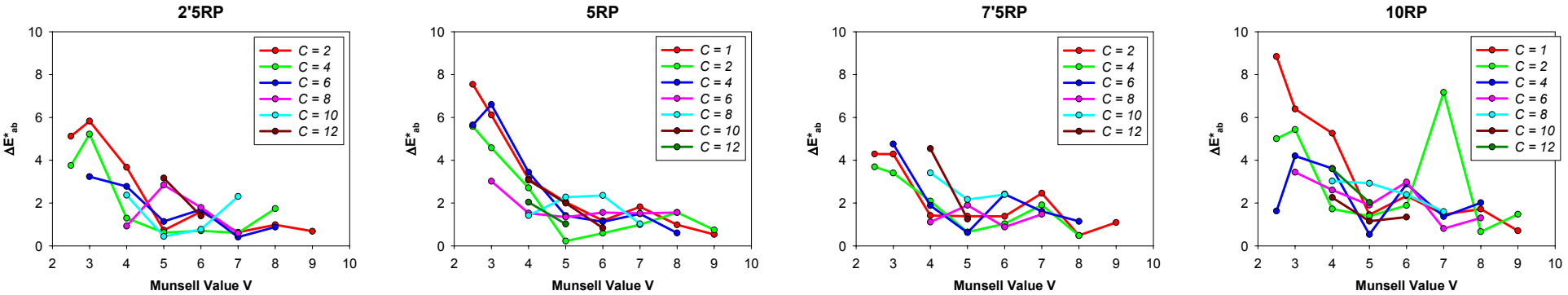


Figure A3.4 (1) ***Multispectral Configuration + D65 Simulator***: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

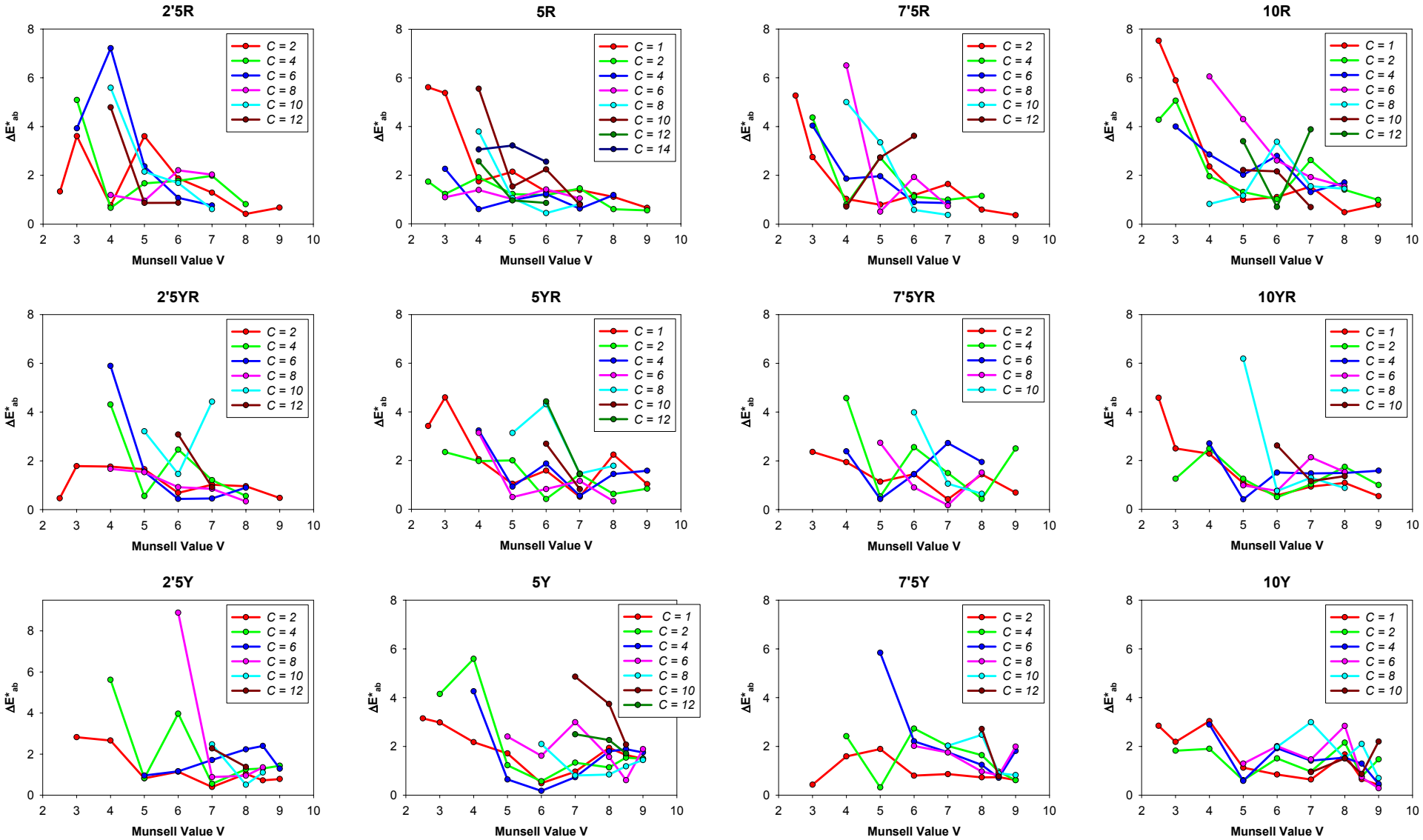
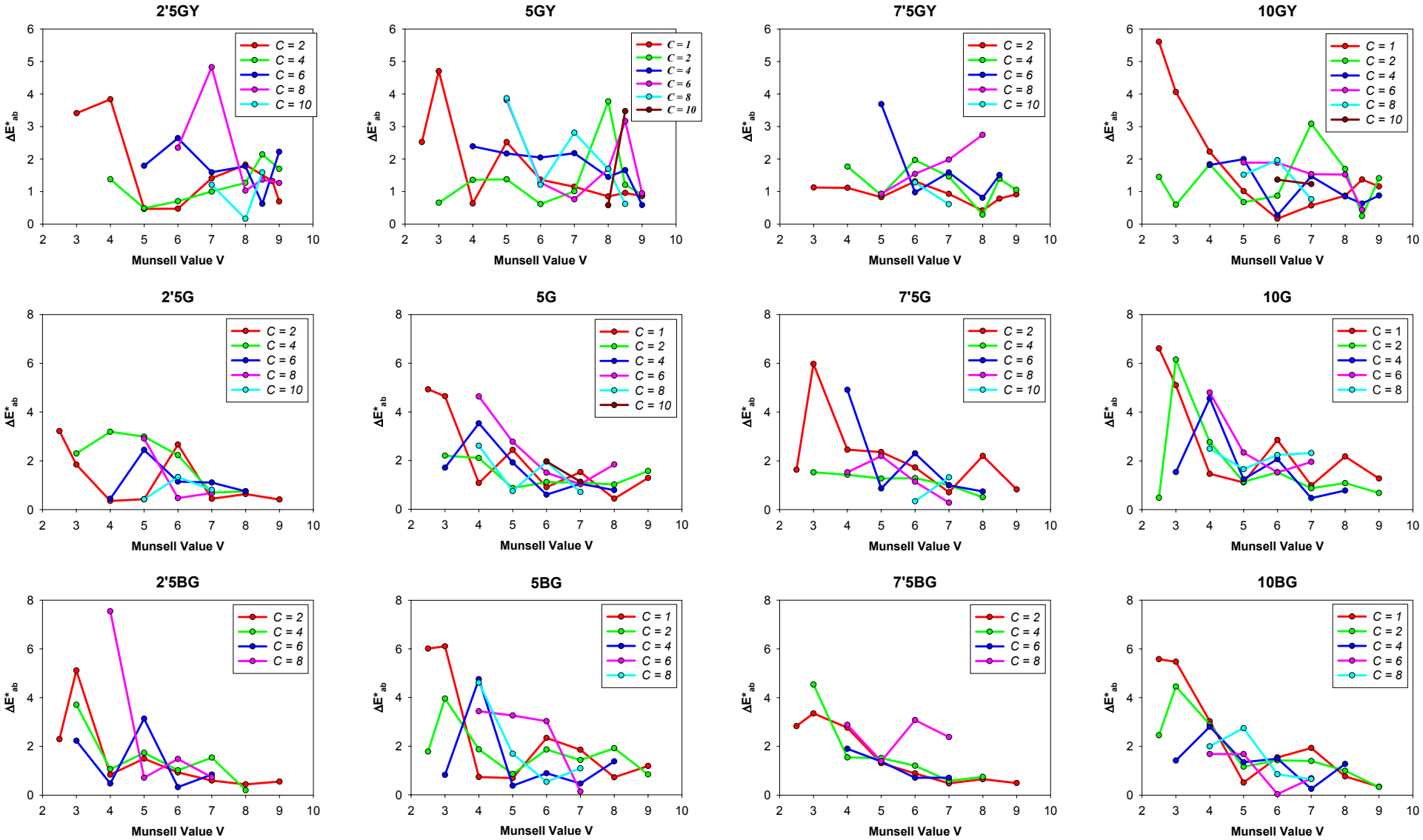


Figure A3.4 (2) ***Multispectral Configuration + D65 Simulator***: *Analysis of accuracy of colour measurement depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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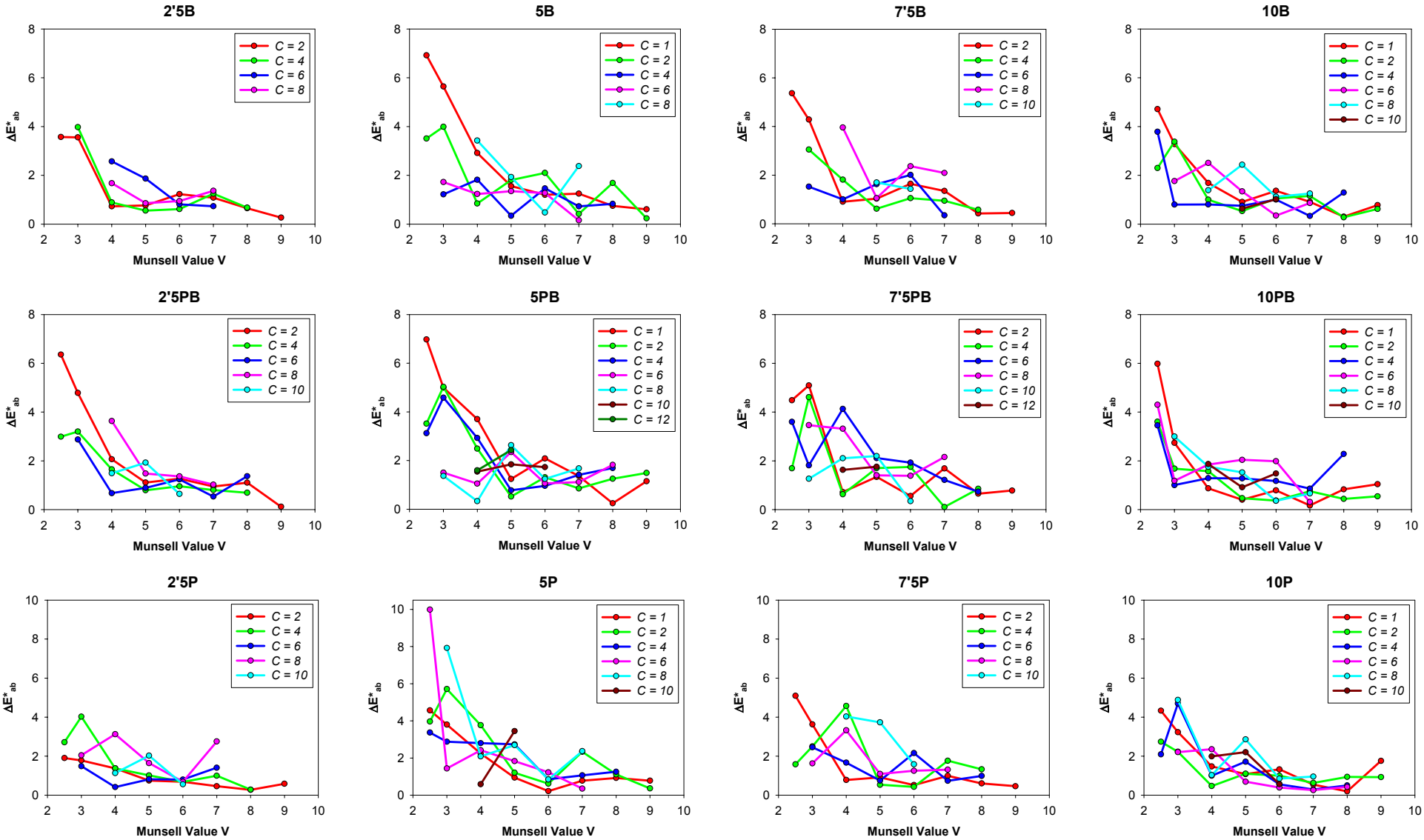

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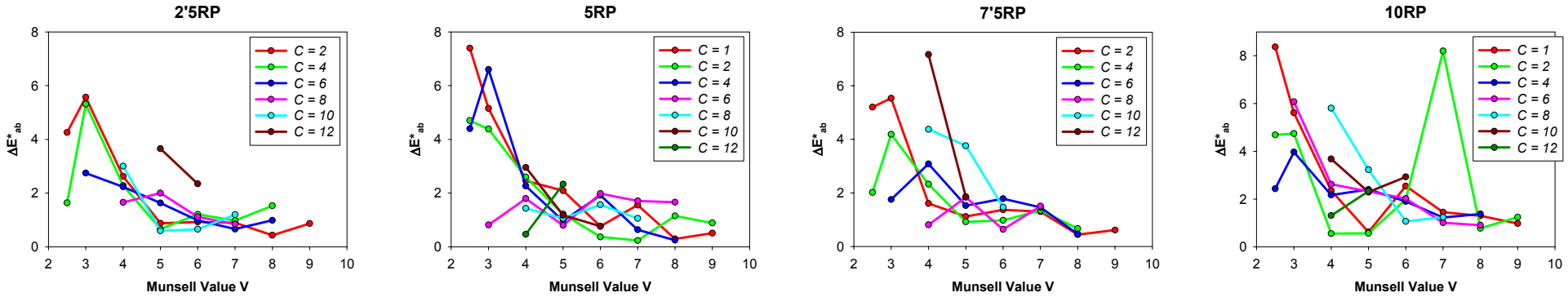


Appendix 4 Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates

Figure A4.1 (1) ***Colorimetric Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

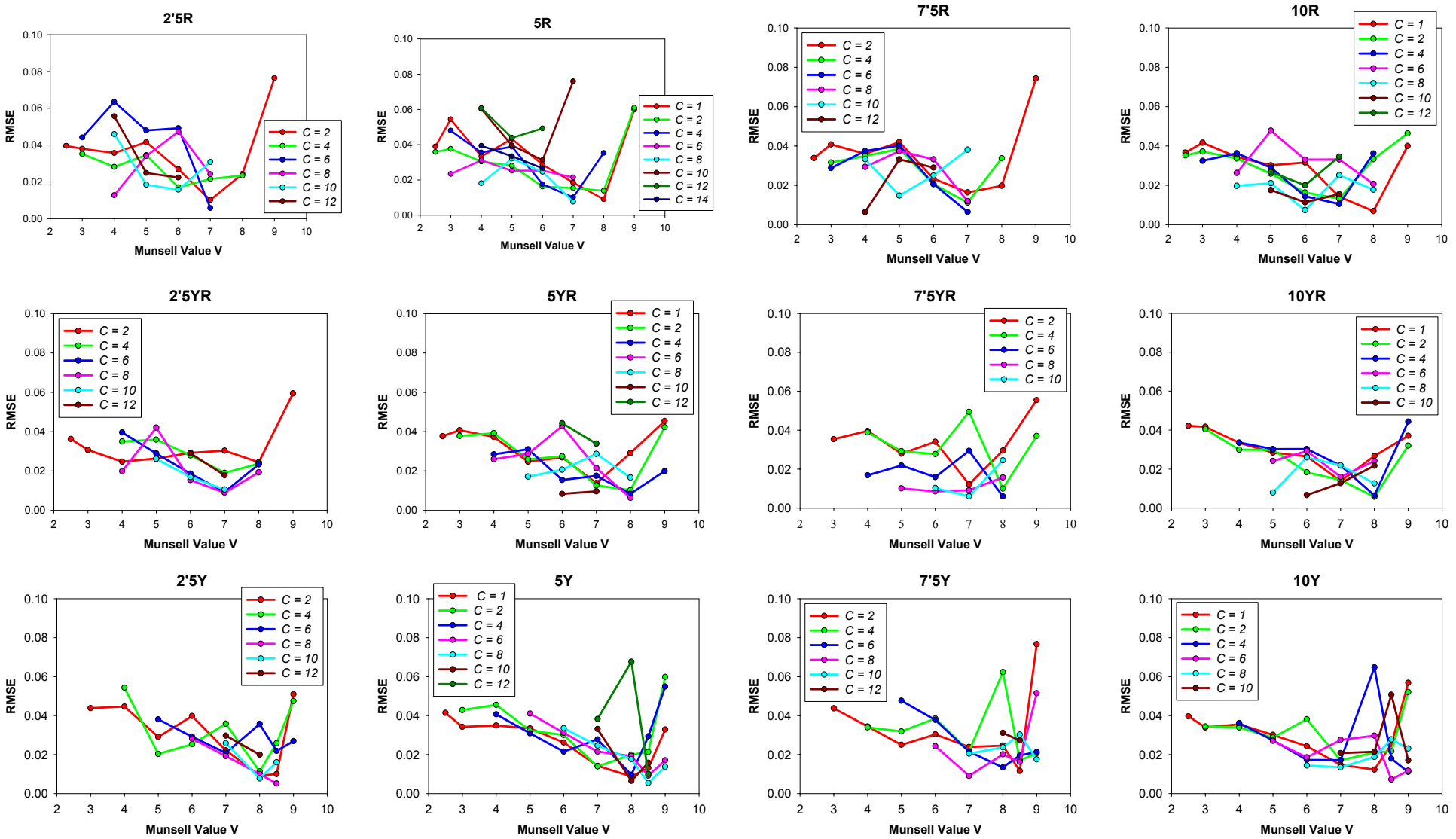


Figure A4.1 (2) ***Colorimetric Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

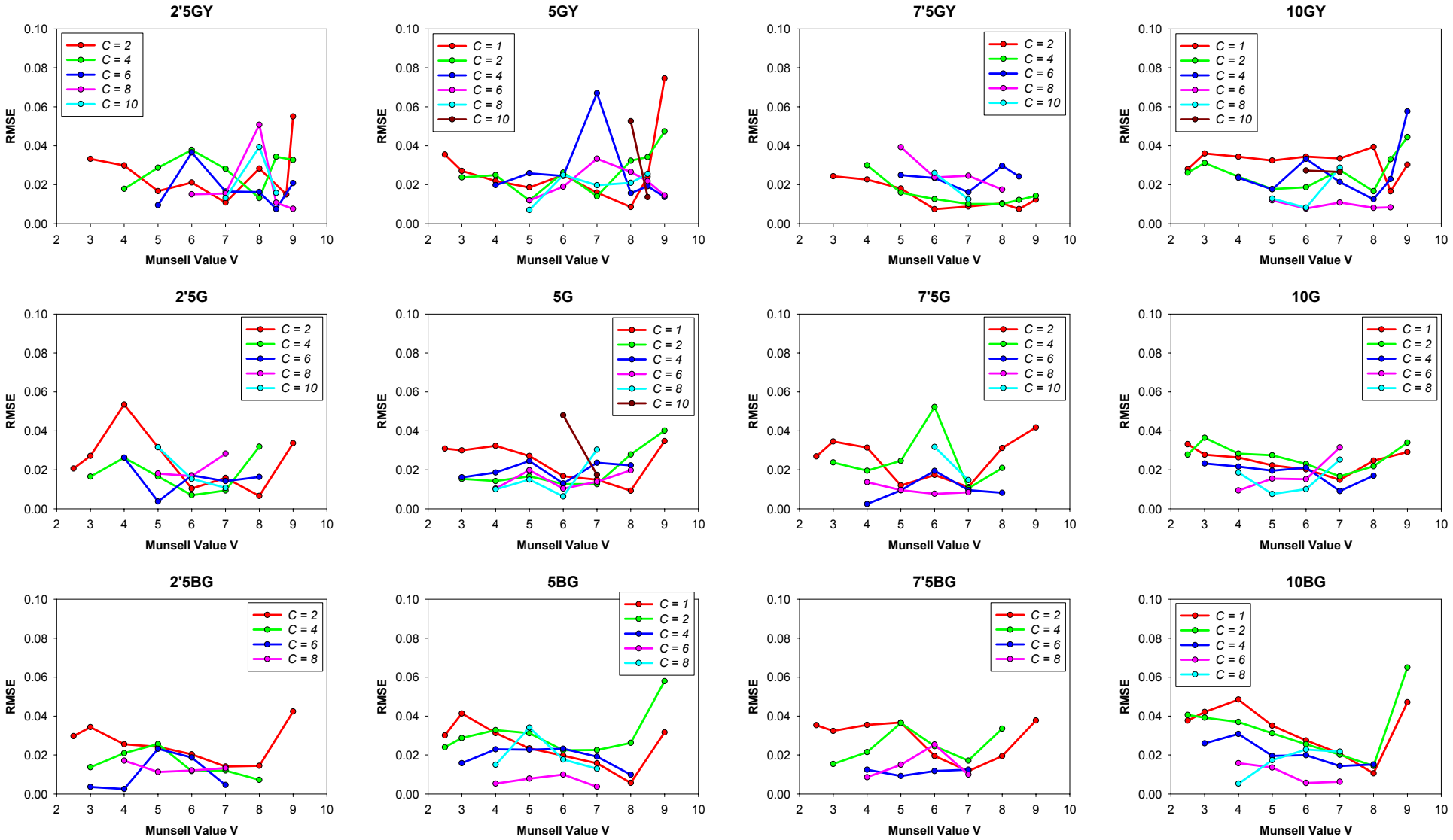
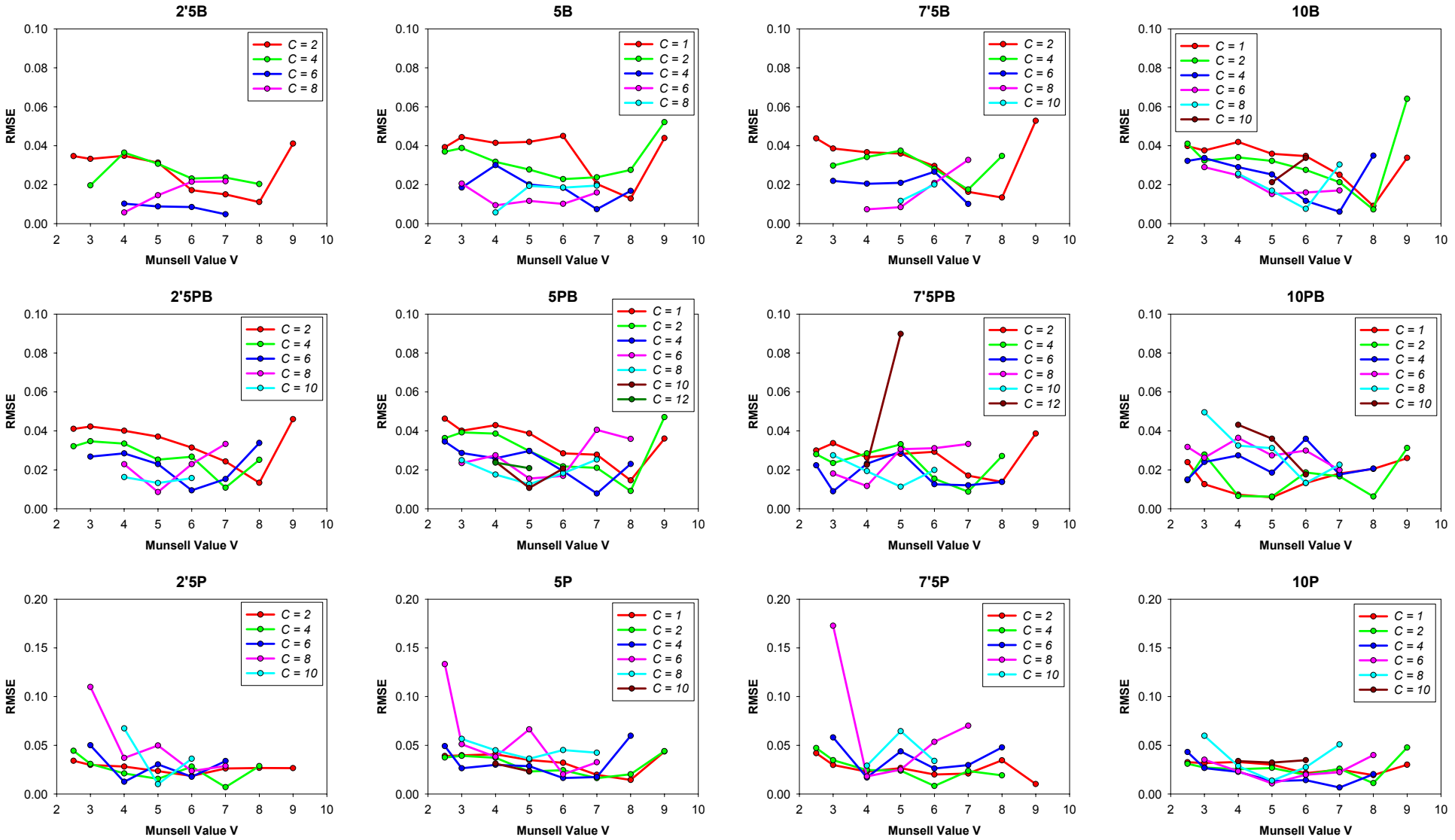


Figure A4.1 (3) ***Colorimetric Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



Appendix 4 Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates

Figure A4.1 (4) ***Colorimetric Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

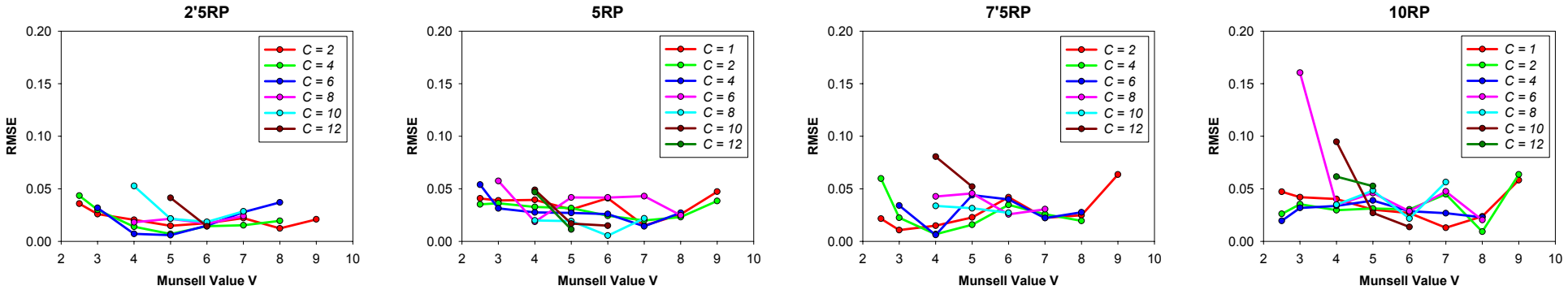


Figure A4.2 (1) ***Colorimetric Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

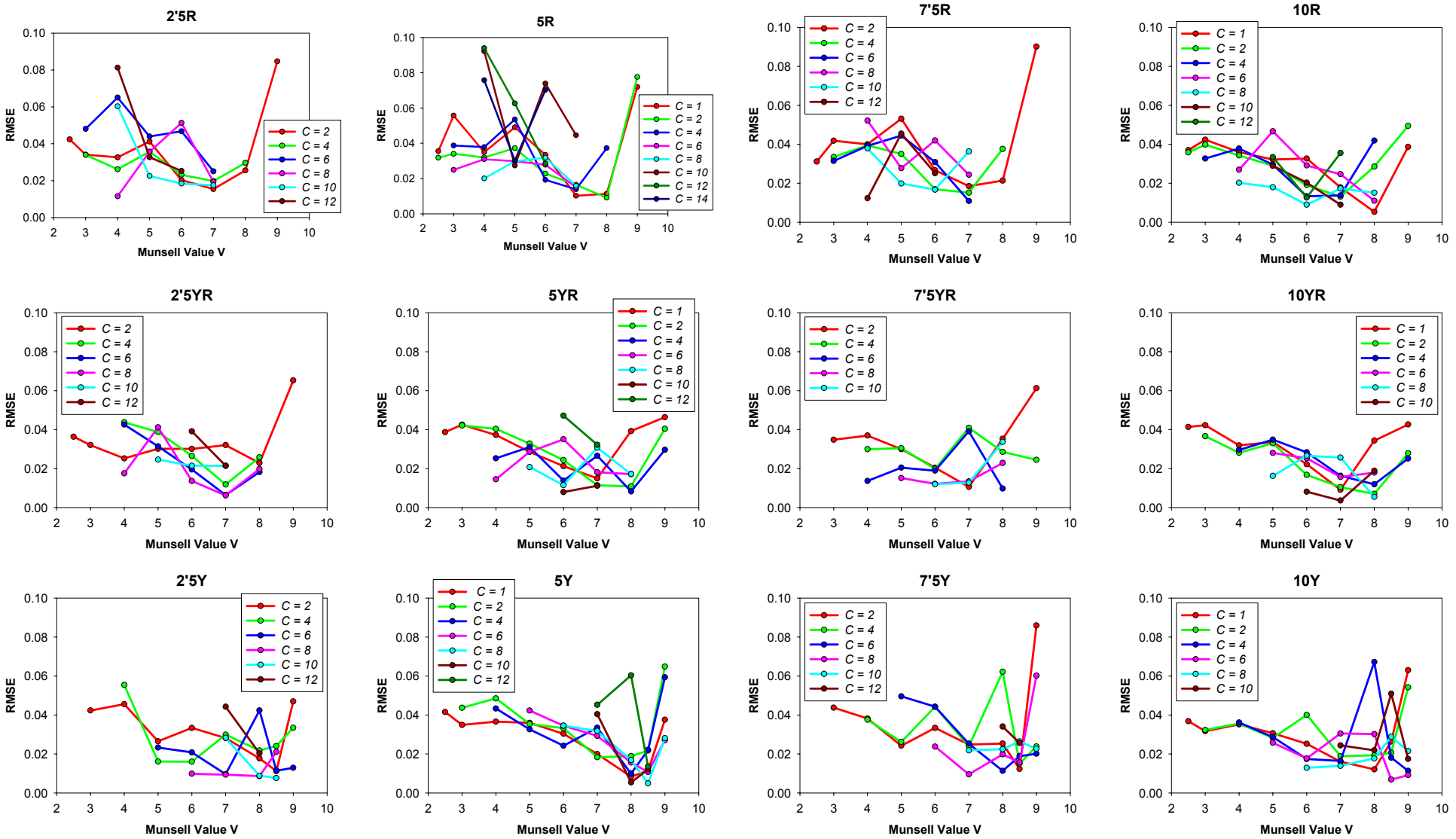


Figure A4.2 (2) ***Colorimetric Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

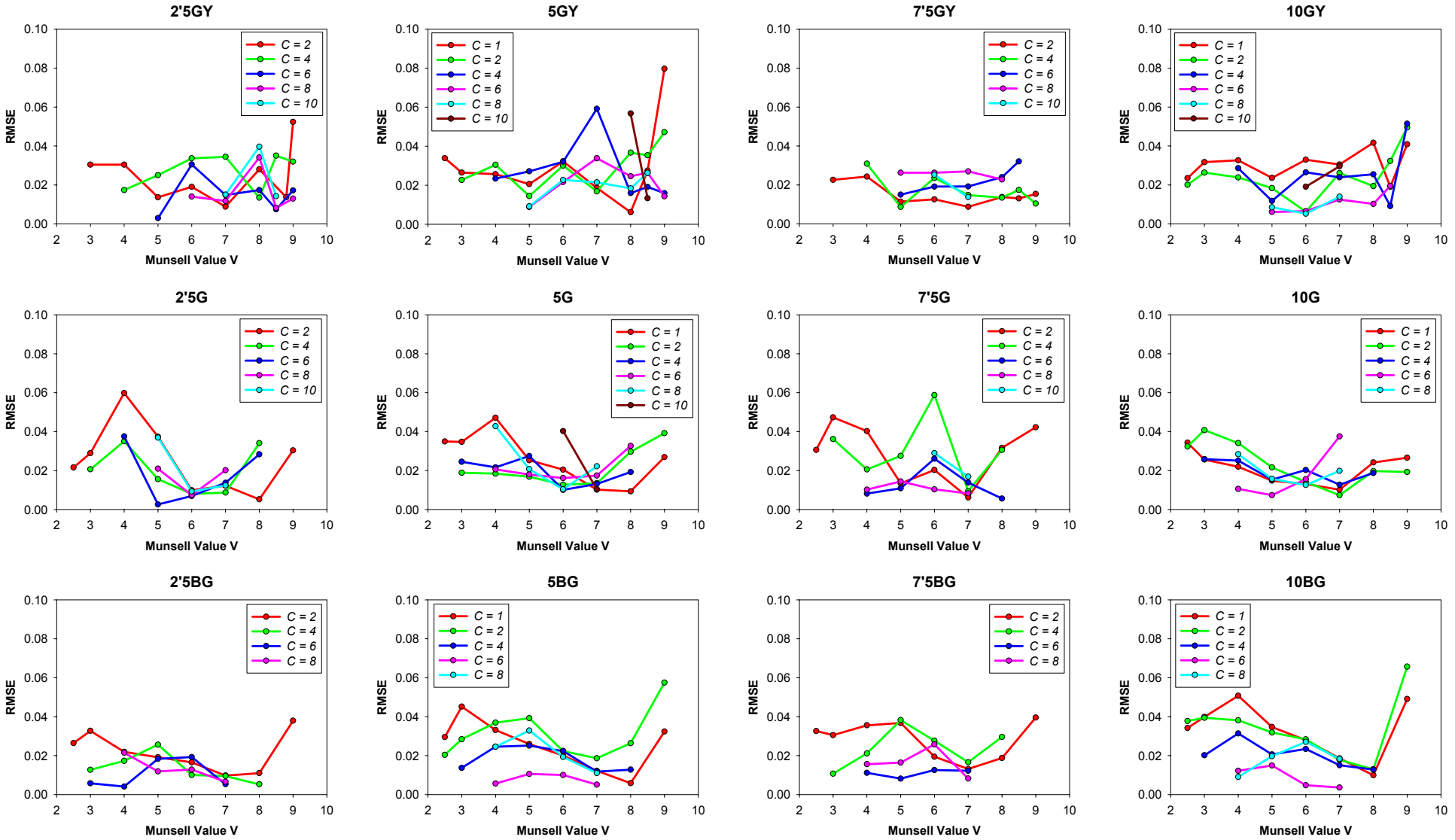
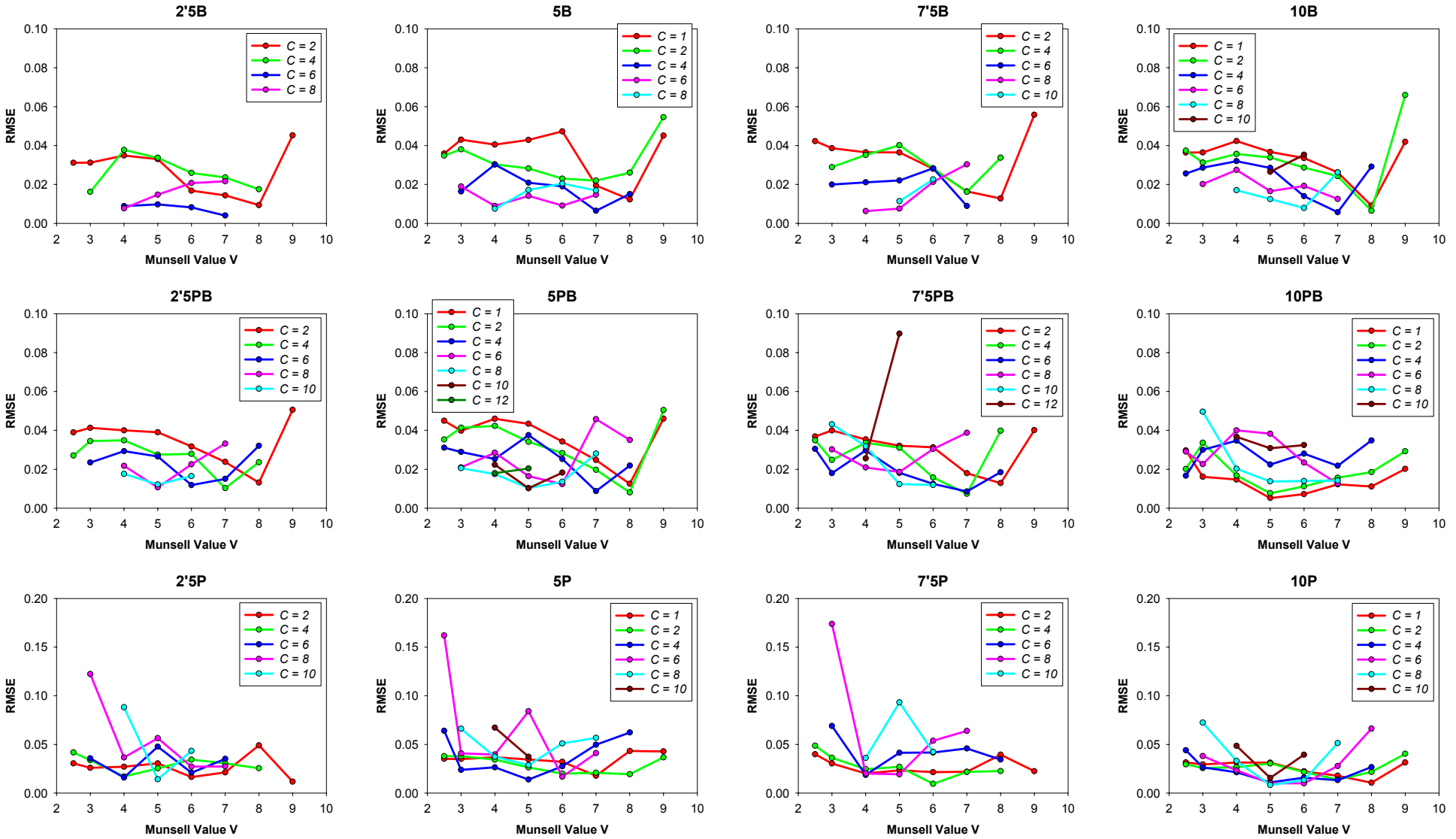


Figure A4.2 (3) ***Colorimetric Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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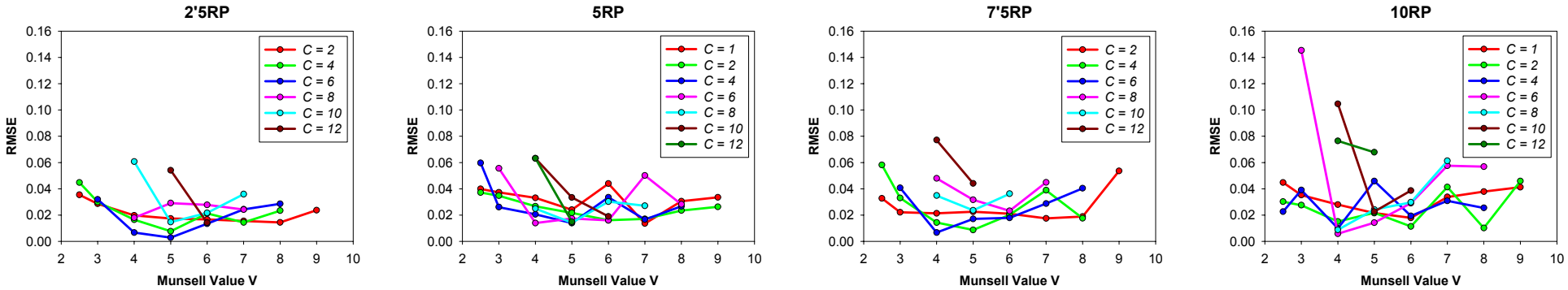


Figure A4.3 (1) ***Multispectral Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

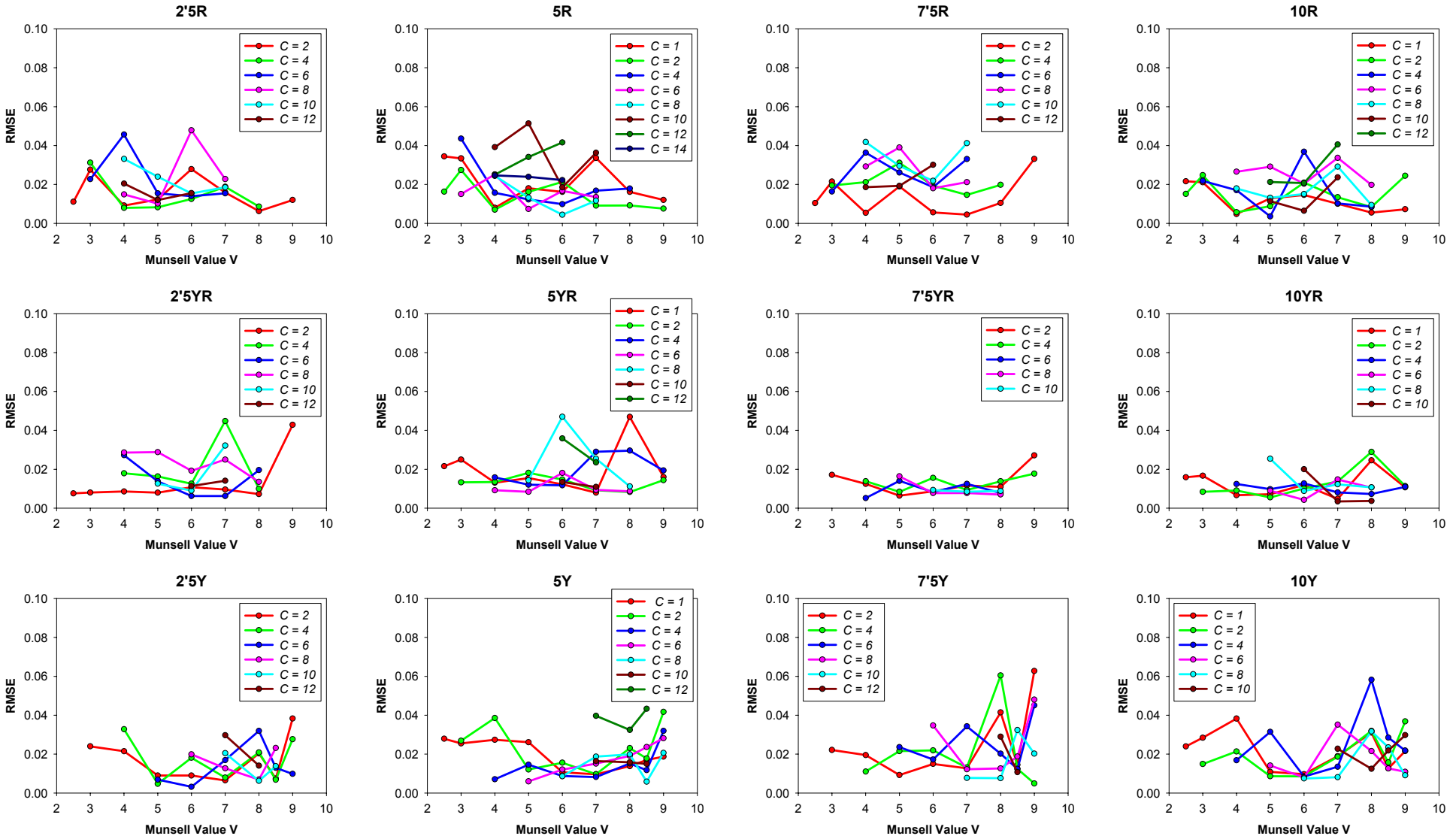


Figure A4.3 (2) ***Multispectral Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

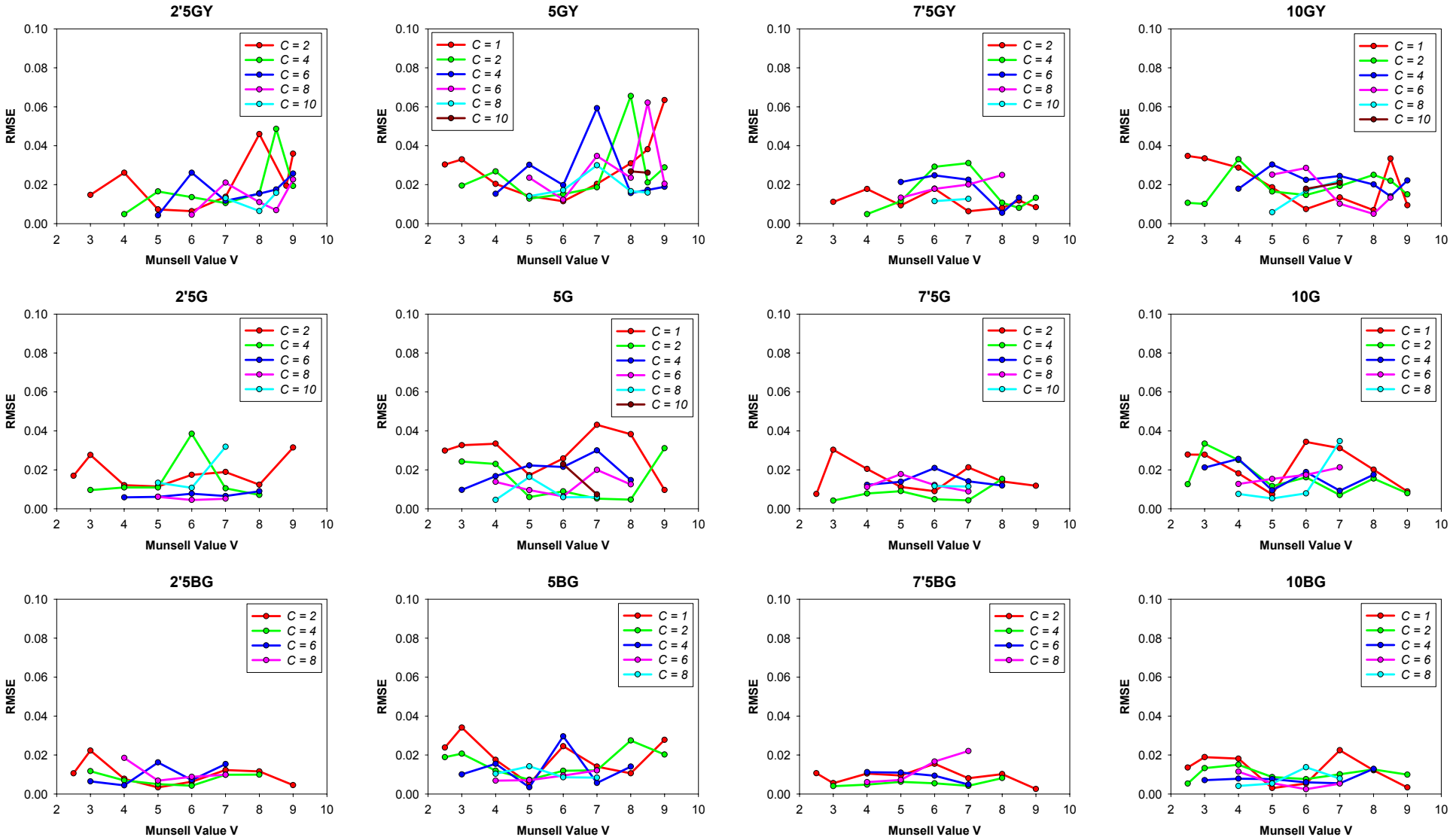
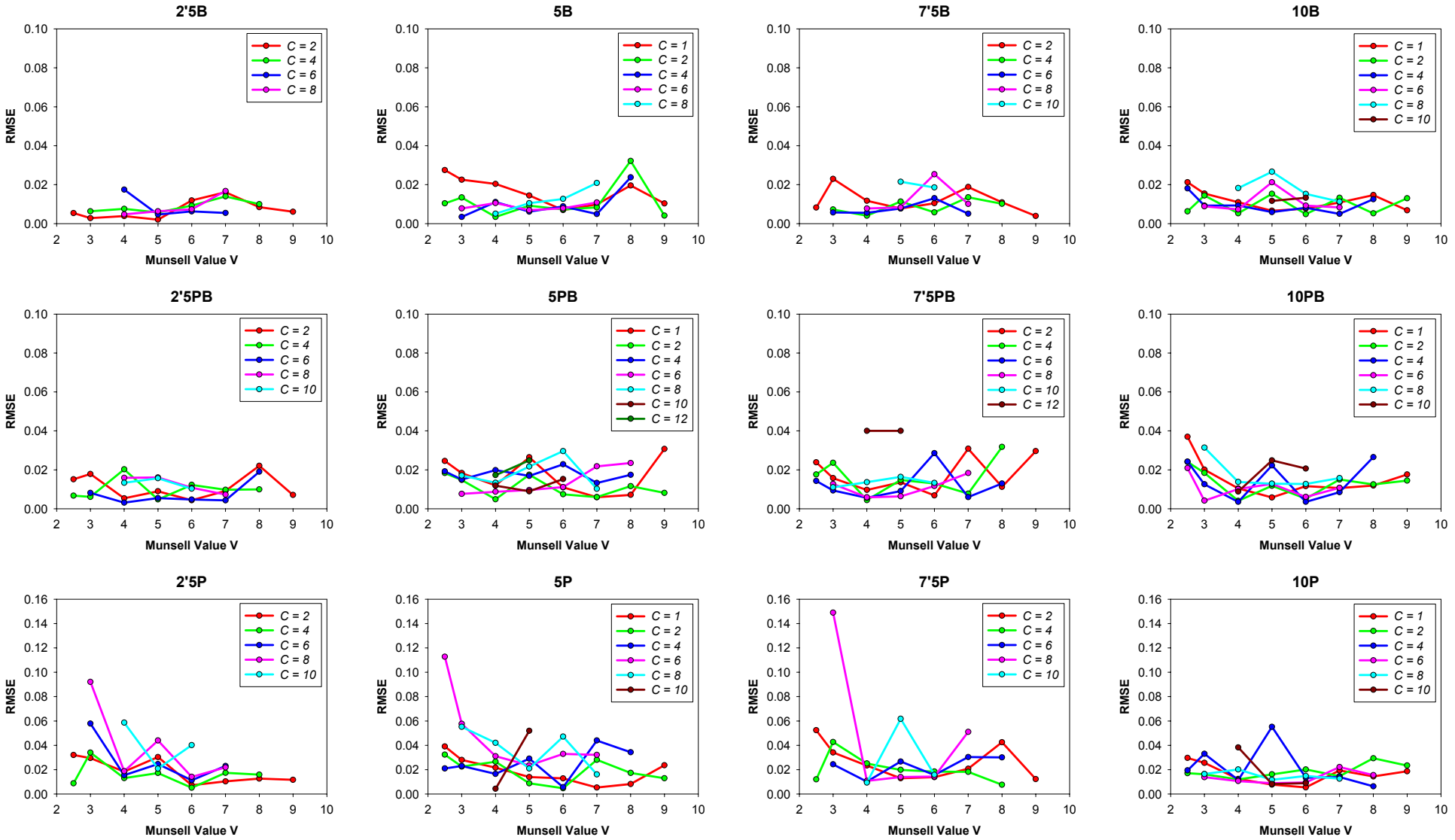


Figure A4.3 (3) ***Multispectral Configuration + Tungsten Lamp***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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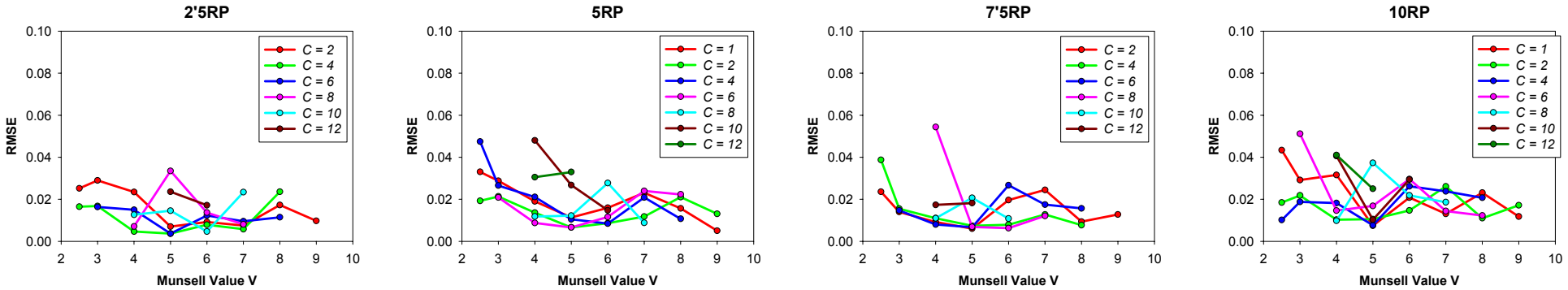


Figure A4.4 (1) ***Multispectral Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

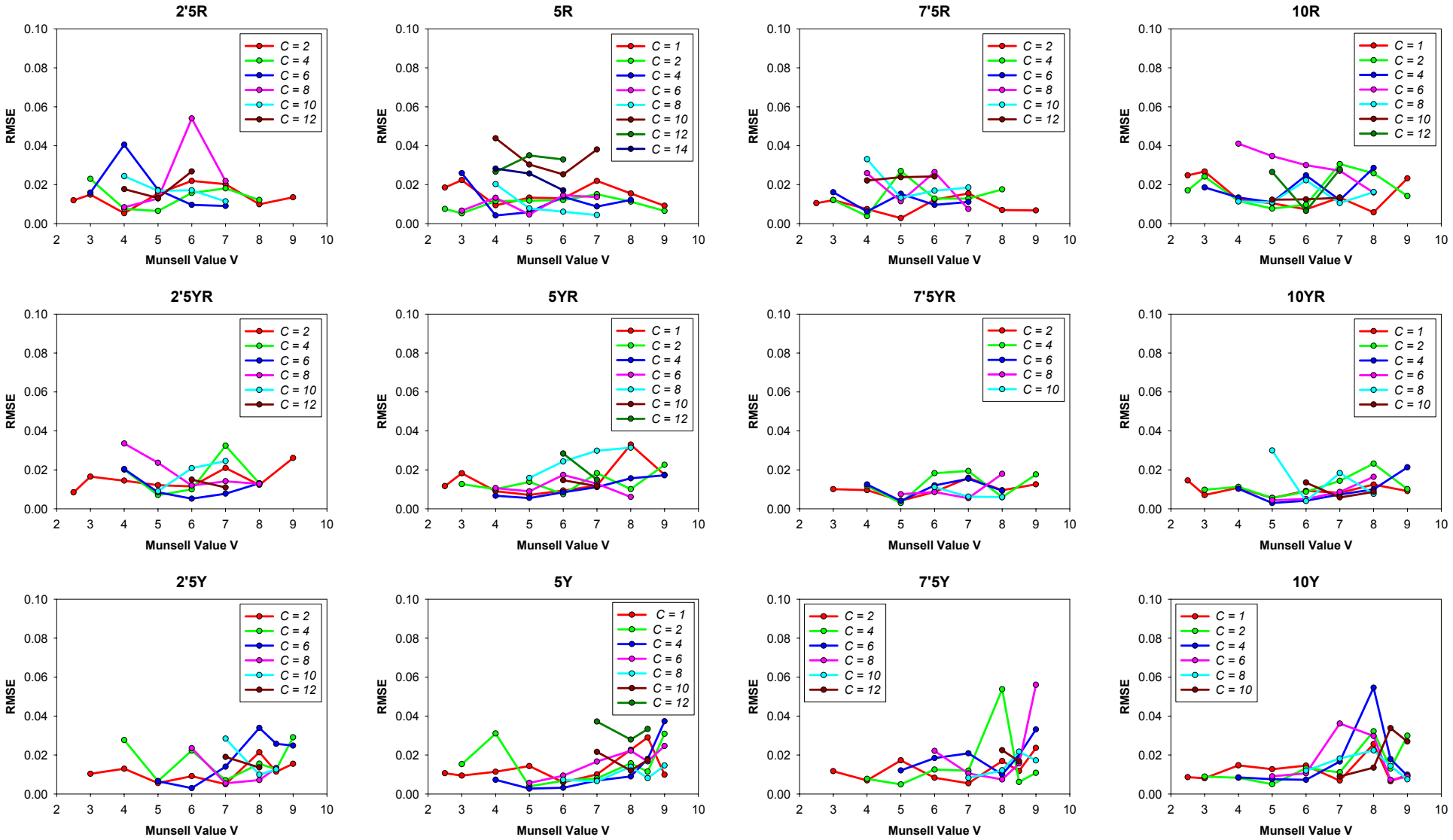


Figure A4.4 (2) ***Multispectral Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*

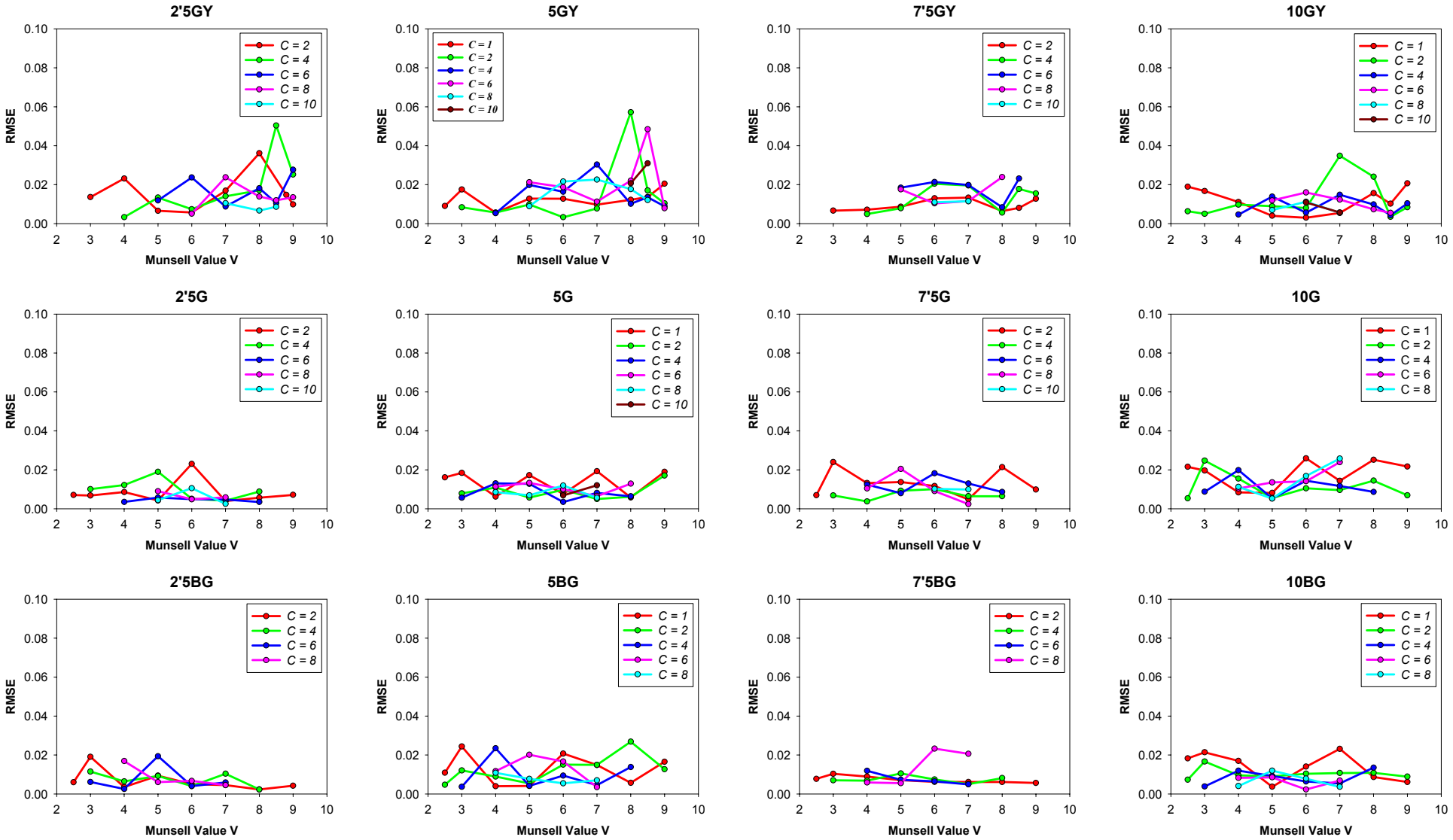
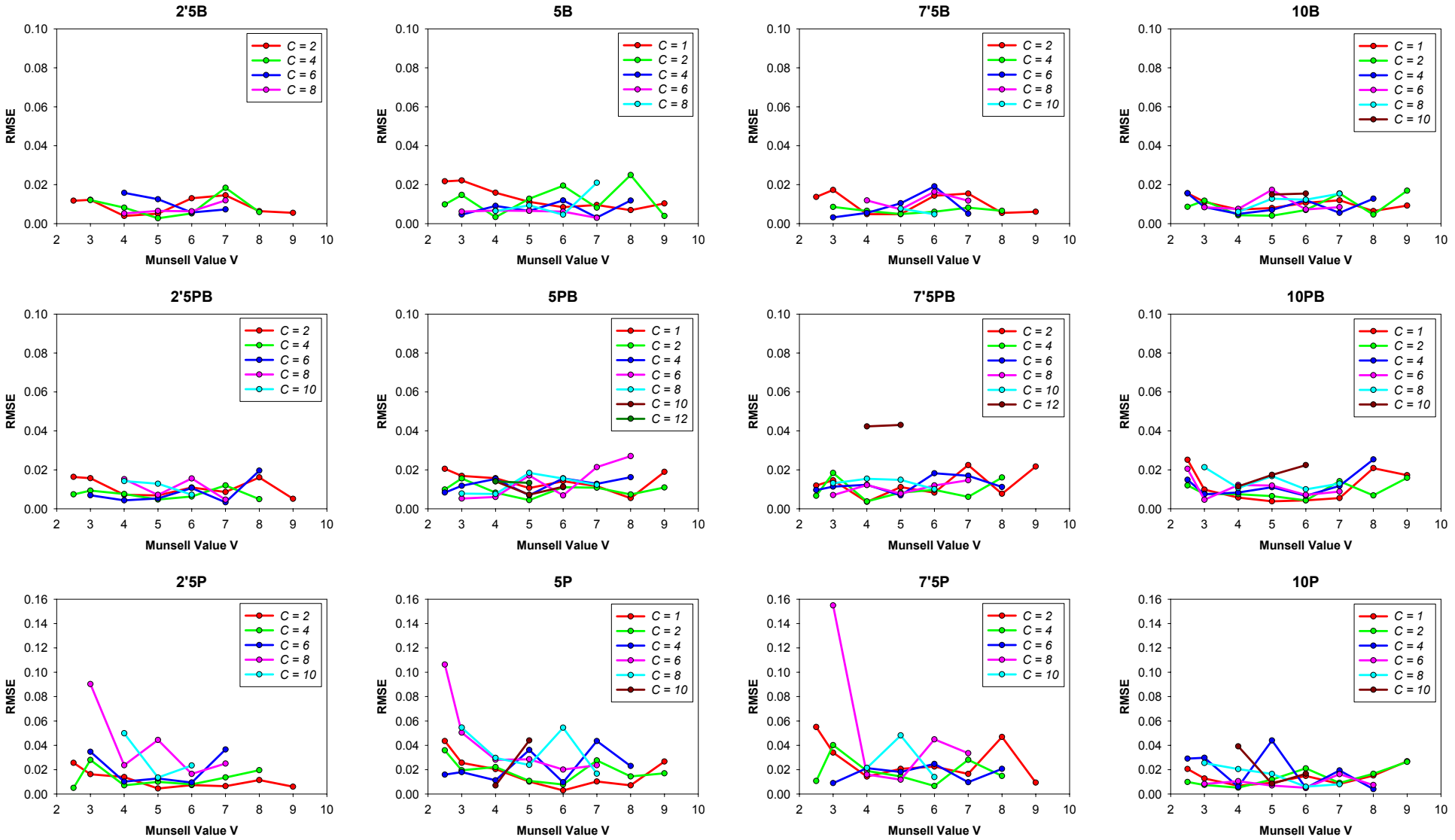


Figure A4.4 (3) ***Multispectral Configuration + D65 Simulator***: *Analysis of accuracy of spectral reconstruction depending on the Munsell Value and Chroma coordinates for the colour patches of the sets of Munsell's sub-hues, used as training and test sets, for all Munsell hues.*



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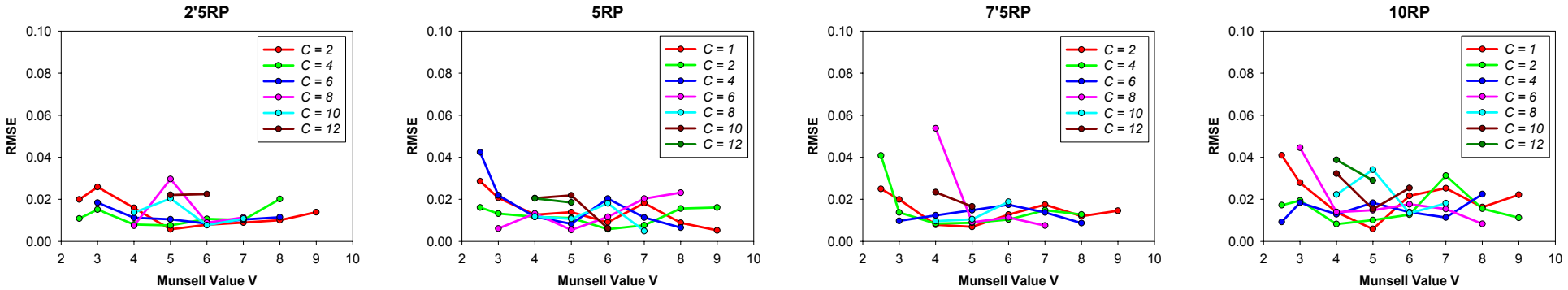
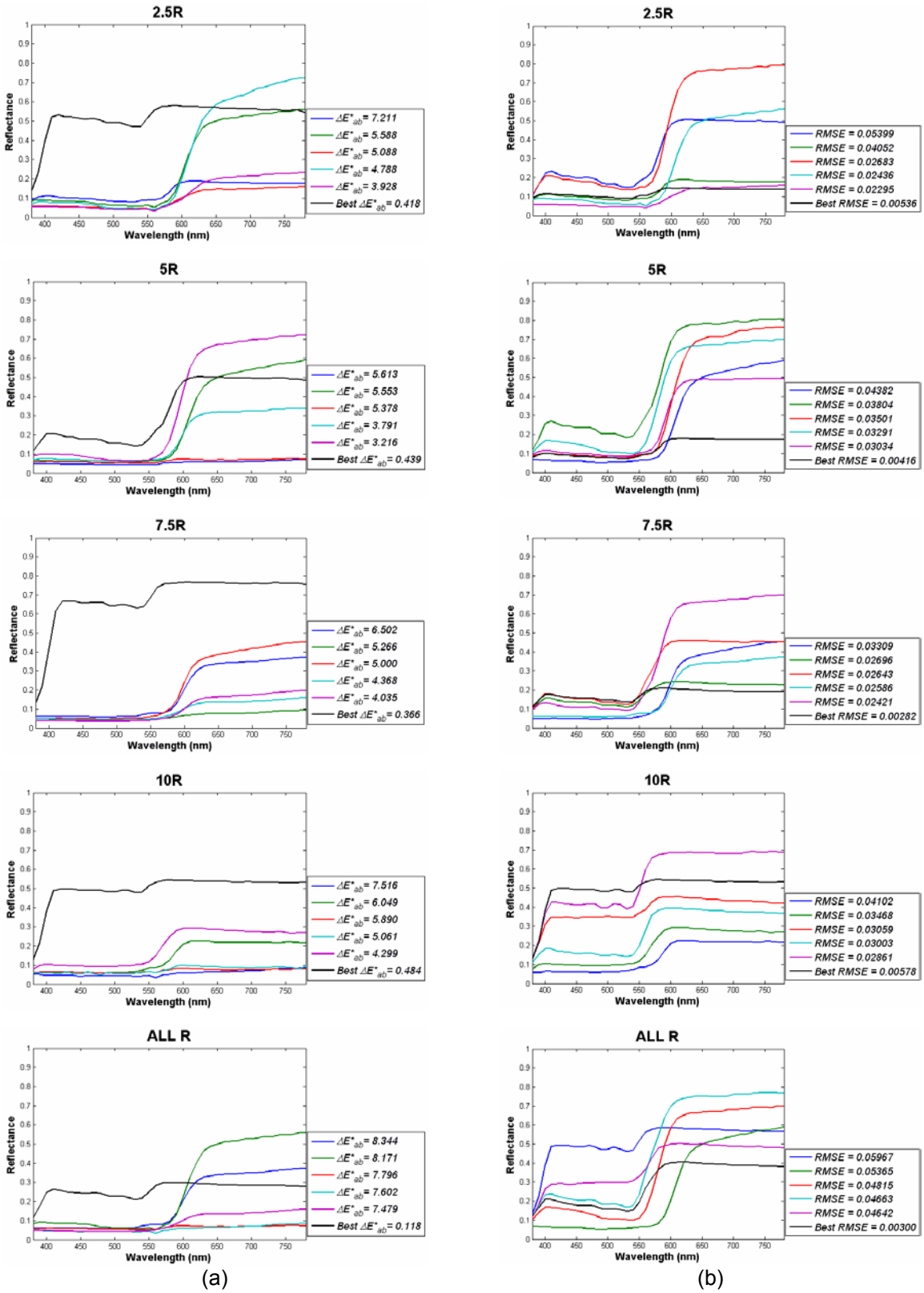


Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (1) ***MUNSELL R****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

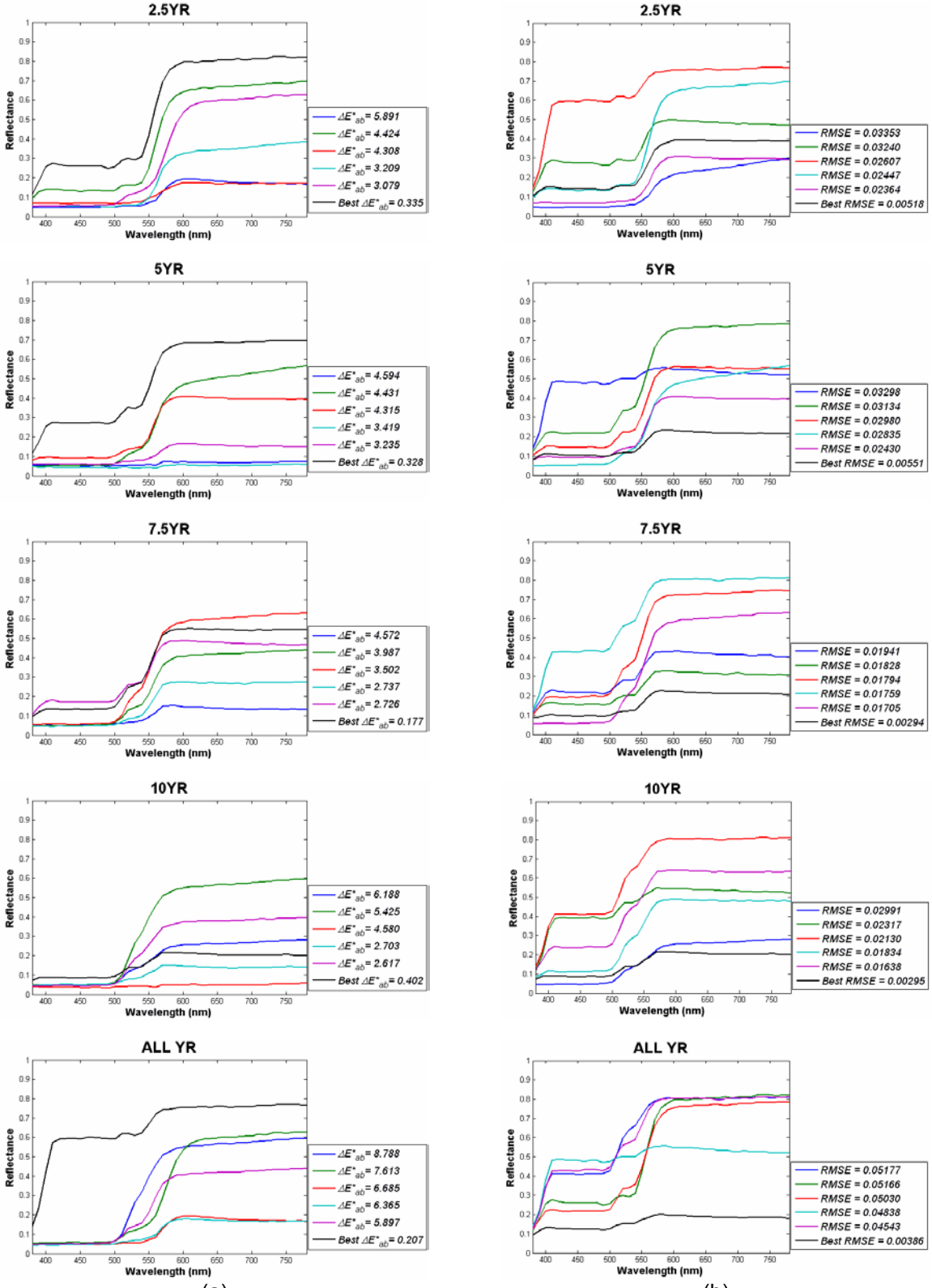


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (2) ***MUNSELL YR****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

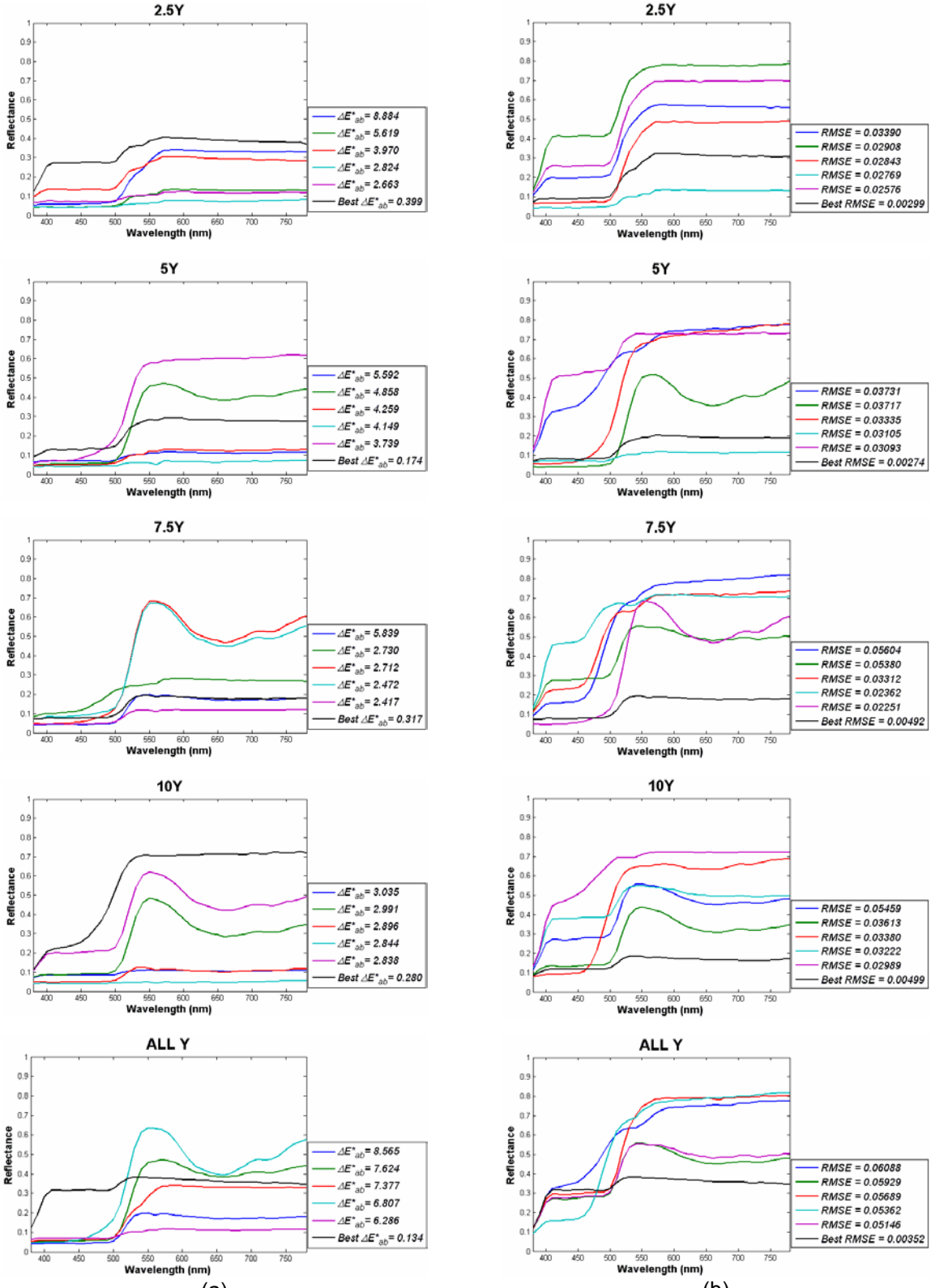


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (3) ***MUNSELL Y****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

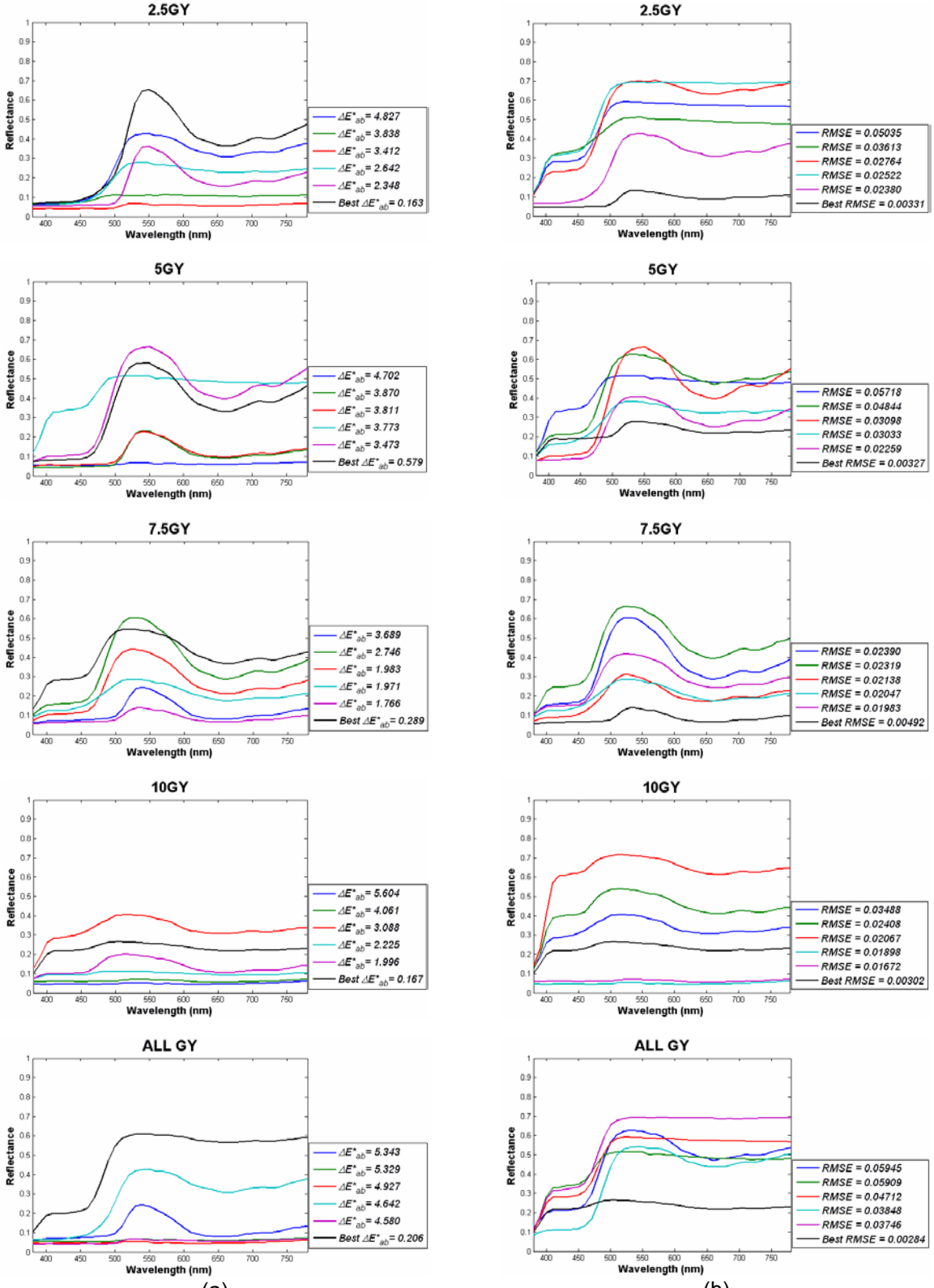


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (4) ***MUNSELL GY****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

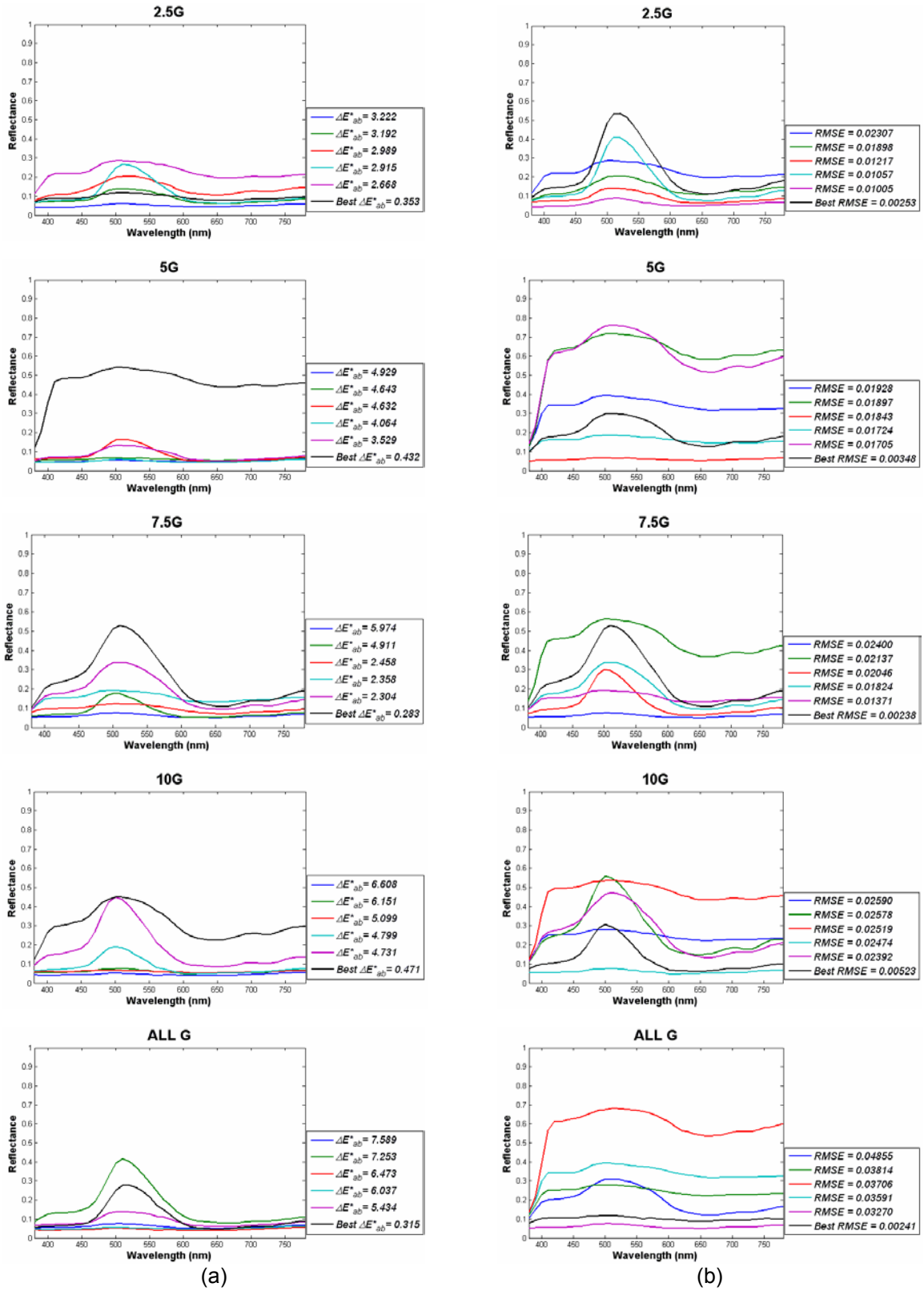


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (5) ***MUNSELL G****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

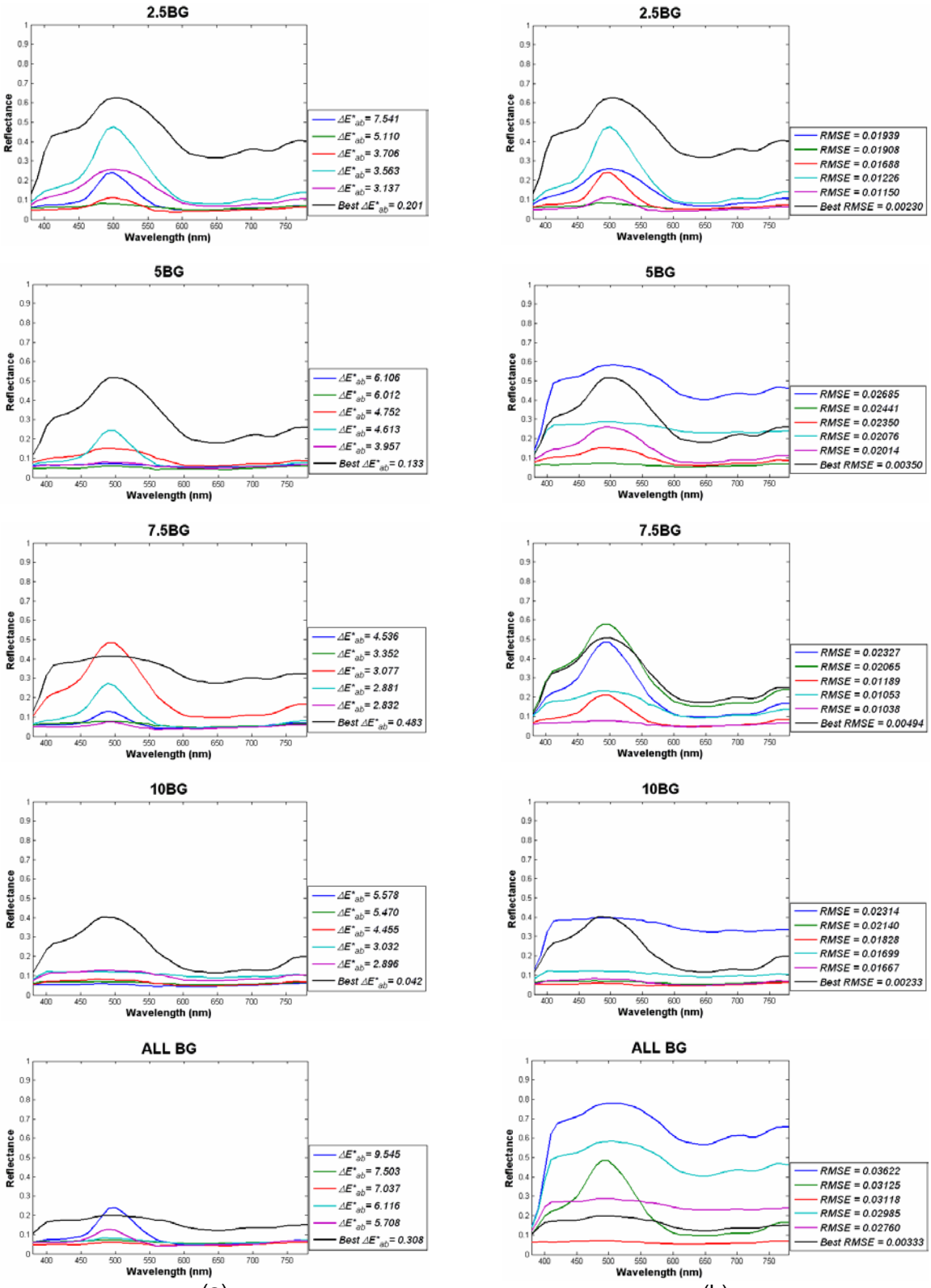


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (6) ***MUNSELL BG****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

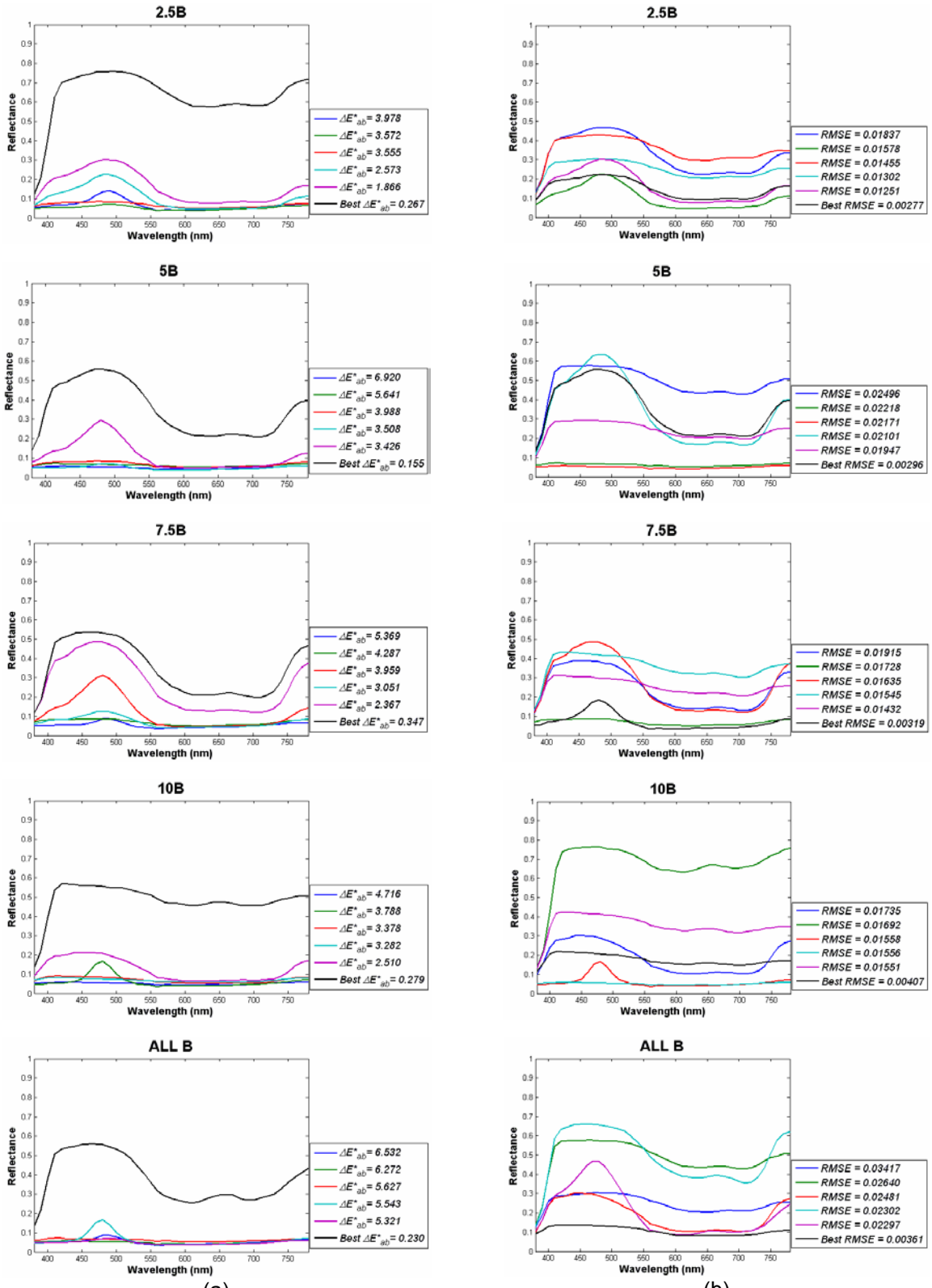


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (7) ***MUNSELL B****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

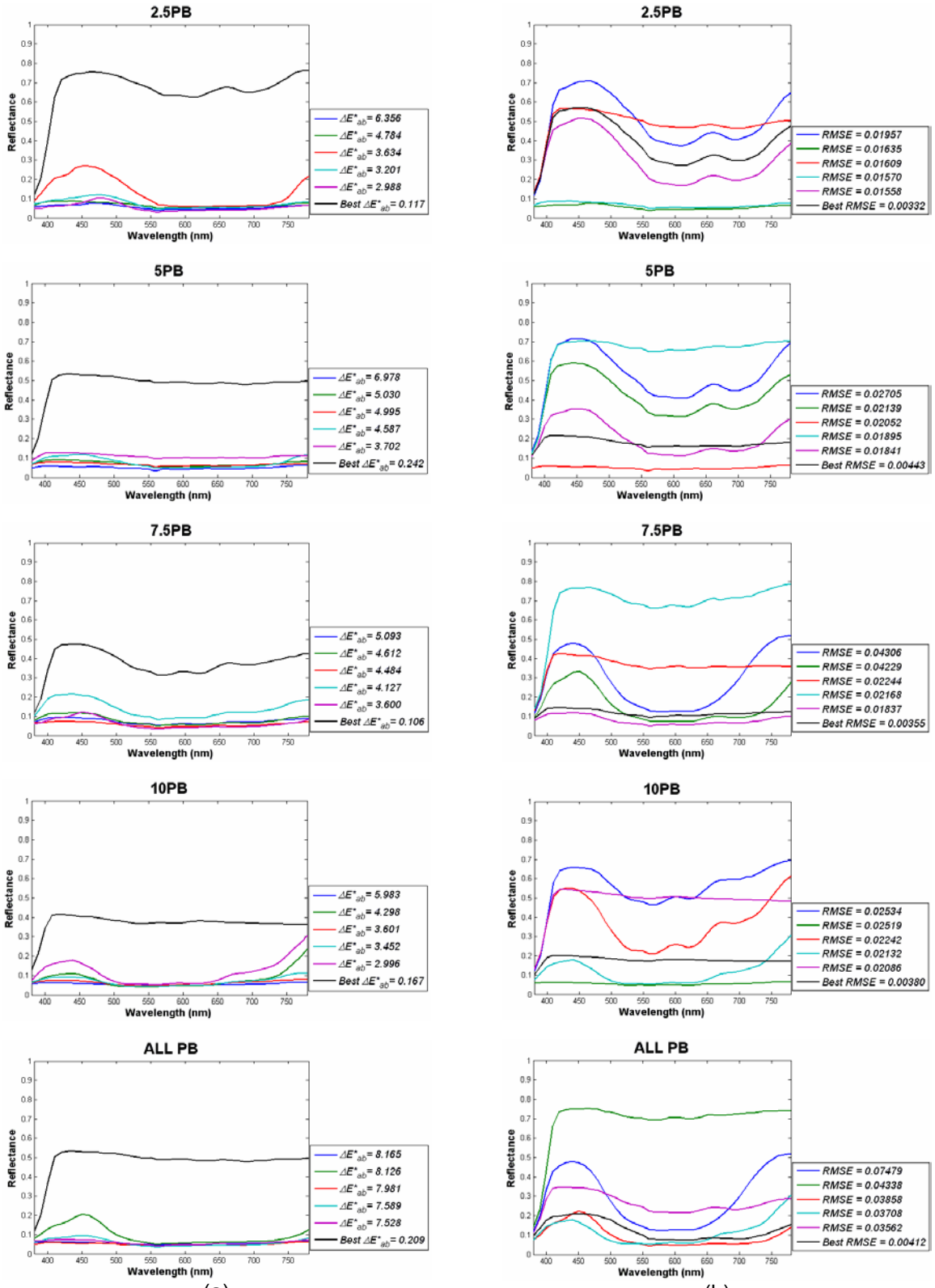


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (8) ***MUNSELL PB****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

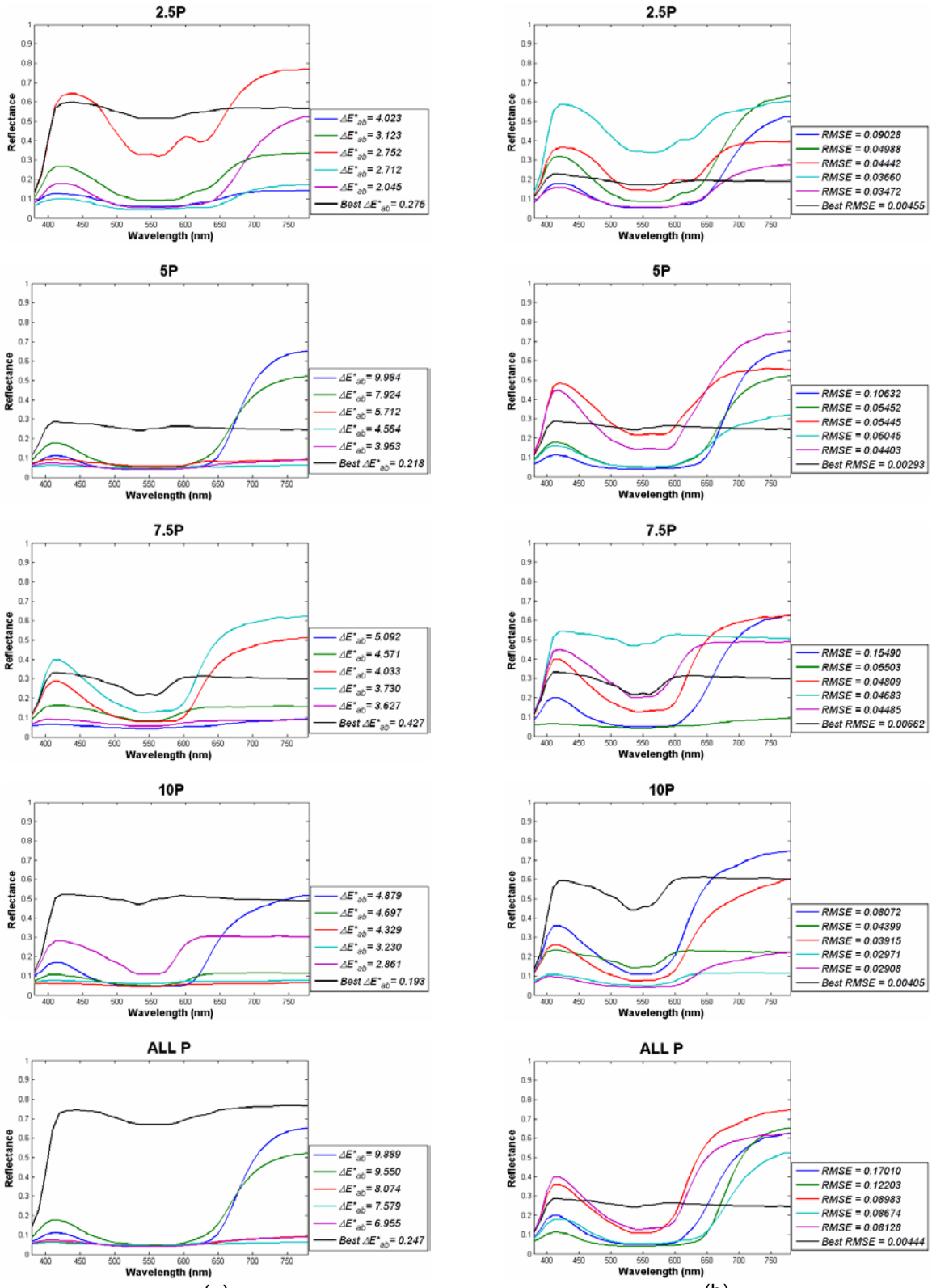


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (9) ***MUNSELL P****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*

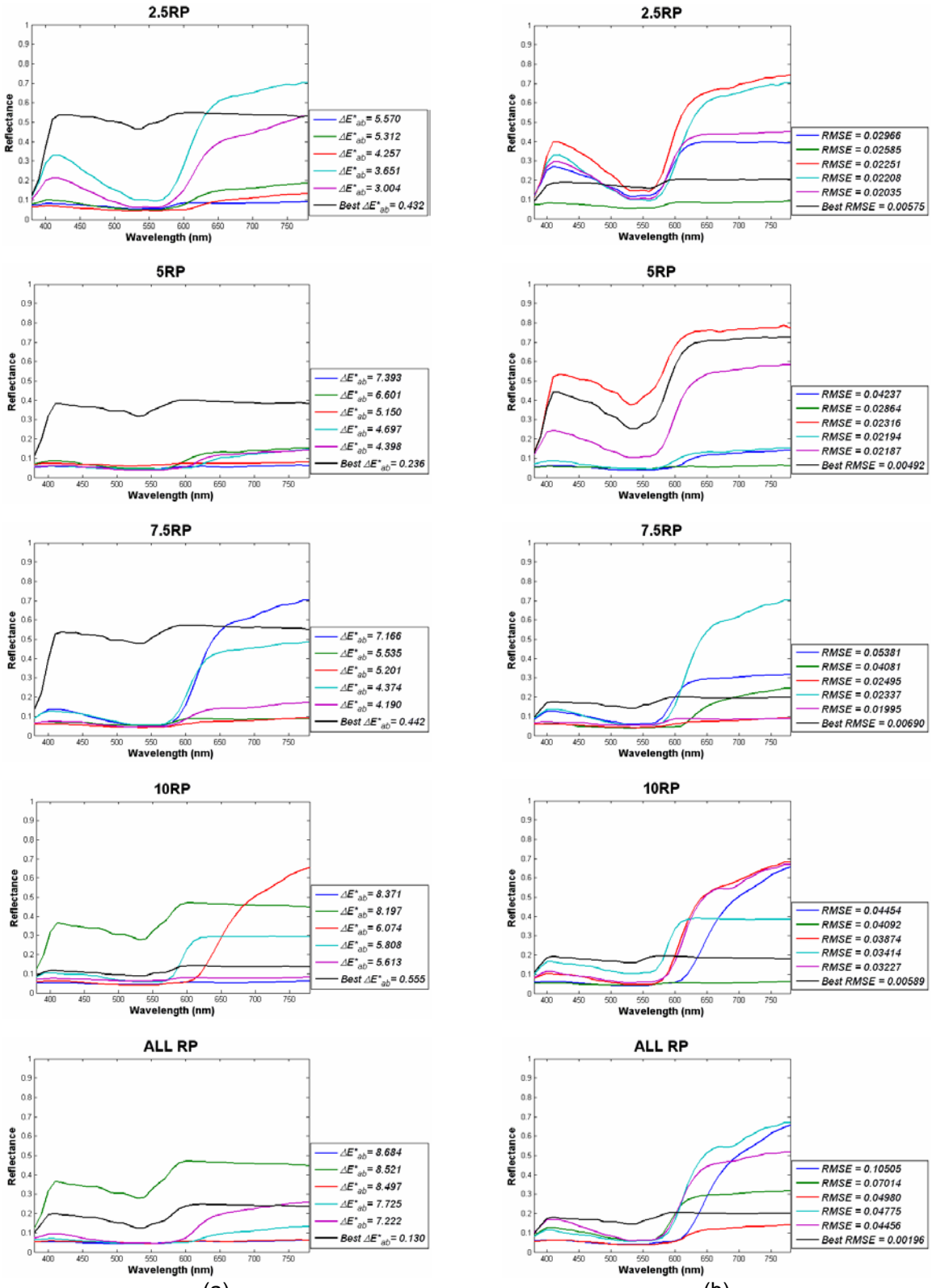


(a) (b)

Appendix 5

A5.1 Reflectance spectra of Munsell's colour patches classified in hues and sub-hues, for the five worst and the best ΔE^*_{ab} and RMSE values

Figure A5.1 (10) ***MUNSELL RP****: Reflectance spectra of the colour patches with the five worst and the best (a) ΔE^*_{ab} and (b) RMSE values.*



(a) (b)

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (1) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell R hue and its associated sub-hues.*

MUNSELL 2.5R

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 R 4 / 6	18	7.211	2.5 R 6 / 8	21	5.400E-02
2.5 R 4 / 10	27	5.589	2.5 R 4 / 6	18	4.053E-02
2.5 R 3 / 4	14	5.088	2.5 R 6 / 12	28	2.683E-02
2.5 R 4 / 12	30	4.789	2.5 R 4 / 10	27	2.436E-02
2.5 R 3 / 6	19	3.928	2.5 R 3 / 4	14	2.295E-02
2.5 R 8 / 2	2	0.418	2.5 R 4 / 2	6	0.536E-02

MUNSELL 5R

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 R 2.5 / 1	38	5.613	5 R 4 / 10	65	4.382E-02
5 R 4 / 10	65	5.553	5 R 7 / 10	62	3.805E-02
5 R 3 / 1	37	5.378	5 R 5 / 12	67	3.502E-02
5 R 4 / 8	61	3.792	5 R 6 / 12	66	3.291E-02
5 R 5 / 14	70	3.216	5 R 5 / 10	64	3.034E-02
5 R 6 / 8	59	0.439	5 R 4 / 4	51	0.417E-02

MUNSELL 7.5R

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 R 4 / 8	94	6.502	7.5 R 4 / 1	98	3.310E-02
7.5 R 2.5 / 2	79	5.266	7.5 R 5 / 4	83	2.697E-02
7.5 R 4 / 10	98	5.000	7.5 R 6 / 8	92	2.643E-02
7.5 R 3 / 4	85	4.369	7.5 R 4 / 8	94	2.586E-02
7.5 R 3 / 6	90	4.036	7.5 R 6 / 12	99	2.422E-02
7.5 R 9 / 2	72	0.367	7.5 R 5 / 2	76	0.282E-02

MUNSELL 10R

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 R 2.5 / 1	109	7.517	10 R 4 / 6	128	4.102E-02
10 R 4 / 6	128	6.049	10 R 5 / 6	127	3.469E-02
10 R 3 / 1	108	5.890	10 R 7 / 2	112	3.059E-02
10 R 3 / 2	116	5.061	10 R 6 / 6	126	3.004E-02
10 R 5 / 6	127	4.300	10 R 8 / 4	118	2.862E-02
10 R 8 / 1	103	0.484	10 R 8 / 1	103	0.579E-02

MUNSELL All R

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 R 4 / 8	94	8.344	10 R 8 / 2	111	5.967E-02
2.5 R 4 / 10	27	8.171	5 R 4 / 10	65	5.366E-02
5 R 3 / 1	37	7.796	5 R 6 / 12	66	4.815E-02
10 R 2.5 / 1	109	7.603	7.5 R 7 / 10	95	4.663E-02
7.5 R 3 / 4	85	7.480	10 R 7 / 4	119	4.642E-02
5 R 6 / 2	42	0.118	7.5 R 6 / 6	87	0.301E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (2) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell YR hue and its associated sub-hues.*

MUNSELL 2.5YR

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 YR 4 / 6	157	5.891	2.5 YR 4 / 8	162	3.354E-02
2.5 YR 7 / 10	163	4.424	2.5 YR 7 / 4	149	3.241E-02
2.5 YR 4 / 4	152	4.309	2.5 YR 9 / 2	140	2.607E-02
2.5 YR 5 / 10	165	3.210	2.5 YR 7 / 10	163	2.448E-02
2.5 YR 6 / 12	167	3.080	2.5 YR 5 / 8	161	2.364E-02
2.5 YR 8 / 8	158	0.335	2.5 YR 6 / 6	155	0.518E-02

MUNSELL 5YR

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 YR 3 / 1	175	4.595	5 YR 8 / 1	170	3.299E-02
5 YR 6 / 12	202	4.432	5 YR 8 / 8	195	3.134E-02
5 YR 6 / 8	197	4.316	5 YR 7 / 8	196	2.980E-02
5 YR 2.5 / 1	176	3.420	5 YR 6 / 12	202	2.836E-02
5 YR 4 / 4	189	3.235	5 YR 6 / 8	197	2.430E-02
5 YR 8 / 6	190	0.329	5 YR 5 / 4	188	0.551E-02

MUNSELL 7.5YR

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 YR 4 / 4	215	4.572	7.5 YR 7 / 4	212	1.942E-02
7.5 YR 6 / 10	227	3.988	7.5 YR 6 / 4	213	1.828E-02
7.5 YR 7 / 12	228	3.502	7.5 YR 8 / 8	221	1.795E-02
7.5 YR 5 / 8	224	2.738	7.5 YR 9 / 4	210	1.760E-02
7.5 YR 7 / 6	217	2.726	7.5 YR 7 / 12	228	1.705E-02
7.5 YR 7 / 8	222	0.178	7.5 YR 5 / 4	214	0.294E-02

MUNSELL 10YR

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 YR 5 / 8	257	6.188	10 YR 5 / 8	257	2.992E-02
10 YR 7 / 12	261	5.425	10 YR 8 / 2	238	2.318E-02
10 YR 2.5 / 1	236	4.580	10 YR 9 / 4	244	2.131E-02
10 YR 4 / 4	249	2.704	10 YR 7 / 8	255	1.835E-02
10 YR 6 / 10	260	2.618	10 YR 8 / 6	250	1.639E-02
10 YR 5 / 4	248	0.402	10 YR 5 / 4	248	0.295E-02

MUNSELL All YR

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 YR 7 / 12	261	8.788	10 YR 9 / 4	244	5.178E-02
2.5 YR 6 / 12	167	7.613	2.5 YR 8 / 8	158	5.167E-02
2.5 YR 4 / 6	157	6.685	5 YR 8 / 8	195	5.030E-02
5 YR 4 / 6	194	6.365	5 YR 8 / 1	170	4.838E-02
7.5 YR 6 / 10	227	5.898	7.5 YR 9 / 4	210	4.543E-02
2.5 YR 9 / 2	140	0.208	10 YR 5 / 2	241	0.387E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (3) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell Y hue and its associated sub-hues.*

MUNSELL 2.5Y

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
2.5 Y 6 / 8	286	8.885	2.5 Y 8 / 6	279	3.391E-02
2.5 Y 4 / 4	276	5.619	2.5 Y 9 / 4	270	2.909E-02
2.5 Y 6 / 4	274	3.970	2.5 Y 7 / 10	289	2.844E-02
2.5 Y 3 / 2	269	2.824	2.5 Y 4 / 4	276	2.769E-02
2.5 Y 4 / 2	268	2.663	2.5 Y 8.5 / 6	278	2.577E-02
2.5 Y 7 / 2	265	0.400	2.5 Y 6 / 6	281	0.299E-02

MUNSELL 5Y

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
5 Y 4 / 2	307	5.592	5 Y 9 / 4	309	3.731E-02
5 Y 7 / 10	329	4.858	5 Y 7 / 12	332	3.718E-02
5 Y 4 / 4	315	4.260	5 Y 8.5 / 12	330	3.335E-02
5 Y 3 / 2	308	4.150	5 Y 4 / 2	307	3.106E-02
5 Y 8 / 10	328	3.740	5 Y 9 / 2	301	3.093E-02
5 Y 6 / 4	313	0.174	5 Y 5 / 4	314	0.275E-02

MUNSELL 7.5Y

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 Y 5 / 6	353	5.839	7.5 Y 9 / 8	354	5.605E-02
7.5 Y 6 / 4	345	2.731	7.5 Y 8 / 4	343	5.380E-02
7.5 Y 8 / 12	364	2.712	7.5 Y 9 / 6	348	3.313E-02
7.5 Y 8 / 10	361	2.473	7.5 Y 9 / 2	333	2.363E-02
7.5 Y 4 / 4	347	2.417	7.5 Y 8 / 12	364	2.251E-02
7.5 Y 5 / 4	346	0.318	7.5 Y 5 / 4	346	0.492E-02

MUNSELL 10Y

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 Y 4 / 1	371	3.036	10 Y 8 / 4	384	5.459E-02
10 Y 7 / 8	398	2.992	10 Y 7 / 6	392	3.613E-02
10 Y 4 / 4	388	2.896	10 Y 8.5 / 10	401	3.381E-02
10 Y 2.5 / 1	373	2.845	10 Y 8 / 2	376	3.223E-02
10 Y 8 / 6	391	2.838	10 Y 9 / 2	374	2.989E-02
10 Y 9 / 6	389	0.281	10 Y 5 / 2	379	0.499E-02

MUNSELL All Y

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 Y 5 / 6	353	8.565	5 Y 9 / 4	309	6.089E-02
5 Y 7 / 10	329	7.625	10 Y 8 / 4	384	5.930E-02
2.5 Y 6 / 8	286	7.378	2.5 Y 9 / 6	277	5.690E-02
10 Y 8 / 12	404	6.808	7.5 Y 9 / 8	354	5.362E-02
5 Y 4 / 2	307	6.286	7.5 Y 8 / 4	343	5.146E-02
10 Y 7 / 1	368	0.135	10 Y 7 / 1	368	0.353E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (4) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell GY hue and its associated sub-hues.*

MUNSELL 2.5GY

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
2.5 GY 7 / 8	429	4.828	2.5 GY 8.5 / 4	414	5.036E-02
2.5 GY 4 / 2	411	3.838	2.5 GY 8 / 2	407	3.614E-02
2.5 GY 3 / 2	412	3.412	2.5 GY 9 / 6	420	2.764E-02
2.5 GY 6 / 6	424	2.643	2.5 GY 9 / 4	413	2.522E-02
2.5 GY 6 / 8	430	2.349	2.5 GY 7 / 8	429	2.381E-02
2.5 GY 8 / 10	432	0.163	2.5 GY 4 / 4	419	0.332E-02

MUNSELL 5GY

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
5 GY 3 / 1	441	4.702	5 GY 8 / 2	445	5.719E-02
5 GY 5 / 8	468	3.870	5 GY 8.5 / 6	459	4.844E-02
5 GY 5 / 6	463	3.812	5 GY 8.5 / 10	469	3.099E-02
5 GY 8 / 2	445	3.774	5 GY 7 / 4	454	3.033E-02
5 GY 8.5 / 10	469	3.474	5 GY 7 / 8	466	2.260E-02
5 GY 8 / 10	470	0.580	5 GY 6 / 2	447	0.328E-02

MUNSELL 7.5GY

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 GY 5 / 6	490	3.690	7.5 GY 8 / 8	491	2.391E-02
7.5 GY 8 / 8	491	2.747	7.5 GY 8.5 / 6	486	2.319E-02
7.5 GY 7 / 8	492	1.983	7.5 GY 6 / 6	489	2.139E-02
7.5 GY 6 / 4	483	1.972	7.5 GY 6 / 4	483	2.047E-02
7.5 GY 4 / 4	485	1.767	7.5 GY 7 / 6	488	1.984E-02
7.5 GY 8 / 4	481	0.290	7.5 GY 4 / 4	485	0.493E-02

MUNSELL 10GY

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 GY 2.5 / 1	505	5.604	10 GY 7 / 2	509	3.488E-02
10 GY 3 / 1	504	4.061	10 GY 8 / 2	508	2.409E-02
10 GY 7 / 2	509	3.088	10 GY 9 / 1	497	2.067E-02
10 GY 4 / 1	503	2.226	10 GY 2.5 / 1	505	1.899E-02
10 GY 5 / 4	520	1.996	10 GY 3 / 1	504	1.672E-02
10 GY 6 / 1	501	0.167	10 GY 6 / 1	501	0.302E-02

MUNSELL All GY

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 GY 5 / 6	490	5.344	5 GY 8.5 / 6	459	5.945E-02
5 GY 3 / 1	441	5.329	5 GY 8 / 2	445	5.909E-02
10 GY 2.5 / 1	505	4.928	2.5 GY 8.5 / 4	414	4.712E-02
2.5 GY 7 / 8	429	4.643	2.5 GY 8 / 8	428	3.848E-02
2.5 GY 3 / 2	412	4.581	2.5 GY 9 / 4	413	3.746E-02
2.5 GY 8.5 / 6	421	0.206	10 GY 6 / 1	501	0.284E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (5) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell G hue and its associated sub-hues.*

MUNSELL 2.5G

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 G 2.5 / 2	539	3.222	2.5 G 6 / 2	535	2.307E-02
2.5 G 4 / 4	544	3.192	2.5 G 5 / 4	543	1.898E-02
2.5 G 5 / 4	543	2.990	2.5 G 4 / 4	544	1.217E-02
2.5 G 5 / 8	553	2.915	2.5 G 6 / 10	555	1.058E-02
2.5 G 6 / 2	535	2.668	2.5 G 3 / 4	545	1.005E-02
2.5 G 4 / 2	537	0.354	2.5 G 7 / 10	554	0.253E-02

MUNSELL 5G

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 G 2.5 / 1	565	4.929	5 G 7 / 1	560	1.929E-02
5 G 3 / 1	564	4.643	5 G 9 / 1	558	1.898E-02
5 G 4 / 6	584	4.632	5 G 3 / 1	564	1.844E-02
5 G 2.5 / 2	573	4.064	5 G 5 / 1	562	1.725E-02
5 G 4 / 4	578	3.529	5 G 9 / 2	566	1.706E-02
5 G 8 / 1	559	0.432	5 G 6 / 4	576	3.483E-03

MUNSELL 7.5G

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 G 3 / 2	597	5.974	7.5 G 3 / 2	597	2.400E-02
7.5 G 4 / 6	609	4.911	7.5 G 8 / 2	592	2.137E-02
7.5 G 4 / 2	596	2.458	7.5 G 5 / 8	612	2.046E-02
7.5 G 5 / 2	595	2.358	7.5 G 6 / 6	607	1.824E-02
7.5 G 6 / 6	607	2.304	7.5 G 5 / 2	595	1.372E-02
7.5 G 7 / 8	610	0.284	7.5 G 7 / 8	610	0.239E-02

MUNSELL 10G

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 G 2.5 / 1	623	6.608	10 G 6 / 1	619	2.590E-02
10 G 3 / 2	630	6.151	10 G 7 / 8	642	2.578E-02
10 G 3 / 1	622	5.100	10 G 8 / 1	617	2.520E-02
10 G 4 / 6	641	4.799	10 G 3 / 2	630	2.475E-02
10 G 6 / 10	646	4.731	10 G 7 / 6	638	2.392E-02
10 G 7 / 4	633	0.472	10 G 5 / 8	644	0.523E-02

MUNSELL All G

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 G 3 / 2	597	7.589	7.5 G 6 / 4	601	4.855E-02
5 G 6 / 10	590	7.253	10 G 6 / 1	619	3.814E-02
10 G 2.5 / 1	623	6.474	10 G 9 / 1	616	3.707E-02
5 G 2.5 / 1	565	6.037	5 G 7 / 1	560	3.591E-02
2.5 G 4 / 4	544	5.434	7.5 G 3 / 2	597	3.270E-02
2.5 G 5 / 10	556	0.315	10 G 4 / 1	621	0.241E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (6) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell BG hue and its associated sub-hues.*

MUNSELL 2.5BG

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 BG 4 / 8	669	7.541	2.5 BG 5 / 6	663	1.939E-02
2.5 BG 3 / 2	653	5.110	2.5 BG 3 / 2	653	1.909E-02
2.5 BG 3 / 4	660	3.706	2.5 BG 4 / 8	669	1.688E-02
2.5 BG 6 / 10	670	3.563	2.5 BG 6 / 10	670	1.227E-02
2.5 BG 5 / 6	663	3.137	2.5 BG 3 / 4	660	1.150E-02
2.5 BG 8 / 4	655	0.202	2.5 BG 8 / 4	655	0.231E-02

MUNSELL 5BG

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 BG 3 / 1	677	6.107	5 BG 8 / 2	680	2.686E-02
5 BG 2.5 / 1	678	6.013	5 BG 3 / 1	677	2.442E-02
5 BG 4 / 4	691	4.753	5 BG 4 / 4	691	2.350E-02
5 BG 4 / 8	700	4.613	5 BG 6 / 1	674	2.077E-02
5 BG 3 / 2	685	3.958	5 BG 5 / 6	695	2.015E-02
5 BG 7 / 6	693	0.134	5 BG 7 / 6	693	0.351E-02

MUNSELL 7.5BG

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 BG 3 / 4	714	4.537	7.5 BG 6 / 8	720	2.327E-02
7.5 BG 3 / 2	707	3.352	7.5 BG 7 / 8	719	2.065E-02
7.5 BG 6 / 8	720	3.077	7.5 BG 4 / 6	718	1.190E-02
7.5 BG 4 / 8	722	2.882	7.5 BG 5 / 4	712	1.053E-02
7.5 BG 2.5 / 2	708	2.833	7.5 BG 3 / 2	707	1.039E-02
7.5 BG 7 / 2	703	0.484	7.5 BG 7 / 6	715	0.494E-02

MUNSELL 10BG

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 BG 2.5 / 1	730	5.579	10 BG 7 / 1	725	2.315E-02
10 BG 3 / 1	729	5.471	10 BG 3 / 1	729	2.141E-02
10 BG 3 / 2	737	4.455	10 BG 2.5 / 1	730	1.828E-02
10 BG 4 / 1	728	3.032	10 BG 4 / 1	728	1.699E-02
10 BG 4 / 2	736	2.896	10 BG 3 / 2	737	1.668E-02
10 BG 6 / 6	746	0.043	10 BG 6 / 6	746	0.233E-02

MUNSELL All BG

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 BG 4 / 8	669	9.545	5 BG 9 / 2	679	3.622E-02
5 BG 3 / 1	677	7.503	7.5 BG 6 / 8	720	3.125E-02
5 BG 2.5 / 1	678	7.037	5 BG 3 / 1	677	3.118E-02
2.5 BG 3 / 2	653	6.117	5 BG 8 / 2	680	2.986E-02
7.5 BG 3 / 4	714	5.708	5 BG 6 / 1	674	2.761E-02
5 BG 5 / 2	683	0.308	5 BG 5 / 2	683	0.334E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (7) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell B hue and its associated sub-hues.*

MUNSELL 2.5B

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 B 3 / 4	766	3.978	2.5 B 7 / 4	762	1.838E-02
2.5 B 2.5 / 2	760	3.572	2.5 B 4 / 6	770	1.578E-02
2.5 B 3 / 2	759	3.555	2.5 B 7 / 2	755	1.455E-02
2.5 B 4 / 6	770	2.573	2.5 B 6 / 2	756	1.302E-02
2.5 B 5 / 6	769	1.867	2.5 B 5 / 6	769	1.251E-02
2.5 B 9 / 2	753	0.267	2.5 B 5 / 4	764	0.278E-02

MUNSELL 5B

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 B 2.5 / 1	782	6.921	5 B 8 / 2	784	2.496E-02
5 B 3 / 1	781	5.642	5 B 3 / 1	781	2.218E-02
5 B 3 / 2	789	3.989	5 B 2.5 / 1	782	2.172E-02
5 B 2.5 / 2	790	3.509	5 B 7 / 8	802	2.101E-02
5 B 4 / 8	805	3.427	5 B 6 / 2	786	1.948E-02
5 B 7 / 6	797	0.155	5 B 7 / 6	797	0.296E-02

MUNSELL 7.5B

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 B 2.5 / 2	813	5.369	7.5 B 6 / 6	821	1.916E-02
7.5 B 3 / 2	812	4.287	7.5 B 3 / 2	812	1.729E-02
7.5 B 4 / 8	828	3.959	7.5 B 6 / 8	826	1.635E-02
7.5 B 3 / 4	819	3.052	7.5 B 7 / 2	808	1.545E-02
7.5 B 6 / 8	826	2.368	7.5 B 6 / 2	809	1.432E-02
7.5 B 7 / 6	820	0.348	7.5 B 3 / 6	824	0.319E-02

MUNSELL 10B

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 B 2.5 / 1	838	4.717	10 B 5 / 6	856	1.736E-02
10 B 2.5 / 4	853	3.788	10 B 9 / 2	839	1.692E-02
10 B 3 / 2	845	3.378	10 B 2.5 / 4	853	1.559E-02
10 B 3 / 1	837	3.283	10 B 2.5 / 1	838	1.556E-02
10 B 4 / 6	857	2.511	10 B 7 / 2	841	1.551E-02
10 B 8 / 2	840	0.280	10 B 5 / 2	843	0.408E-02

MUNSELL All B

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 B 2.5 / 2	813	6.533	2.5 B 6 / 2	756	3.418E-02
5 B 2.5 / 1	782	6.272	5 B 8 / 2	784	2.640E-02
5 B 3 / 1	781	5.627	10 B 5 / 6	856	2.481E-02
10 B 2.5 / 4	853	5.543	7.5 B 8 / 4	814	2.303E-02
5 B 2.5 / 2	790	5.321	10 B 5 / 10	864	2.297E-02
10 B 7 / 6	854	0.231	5 B 4 / 2	788	0.361E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (8) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell PB hue and its associated sub-hues.*

MUNSELL 2.5PB

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
2.5 PB 2.5 / 2	872	6.357	2.5 PB 8 / 6	880	1.957E-02
2.5 PB 3 / 2	871	4.784	2.5 PB 2.5 / 2	872	1.635E-02
2.5 PB 4 / 8	889	3.634	2.5 PB 8 / 2	866	1.609E-02
2.5 PB 3 / 4	878	3.202	2.5 PB 3 / 2	871	1.571E-02
2.5 PB 2.5 / 4	879	2.988	2.5 PB 6 / 8	887	1.558E-02
2.5 PB 9 / 2	865	0.118	2.5 PB 7 / 6	881	0.333E-02

MUNSELL 5PB

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
5 PB 2.5 / 1	900	6.979	5 PB 8 / 6	916	2.705E-02
5 PB 3 / 2	907	5.030	5 PB 7 / 6	917	2.139E-02
5 PB 3 / 1	899	4.996	5 PB 2.5 / 1	900	2.052E-02
5 PB 3 / 4	914	4.588	5 PB 9 / 1	893	1.895E-02
5 PB 4 / 1	898	3.702	5 PB 5 / 8	924	1.842E-02
5 PB 8 / 1	894	0.242	5 PB 5 / 2	905	0.444E-02

MUNSELL 7.5PB

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 PB 3 / 2	938	5.094	7.5 PB 5 / 12	963	4.306E-02
7.5 PB 3 / 4	945	4.613	7.5 PB 4 / 12	964	4.229E-02
7.5 PB 2.5 / 2	939	4.484	7.5 PB 7 / 2	934	2.245E-02
7.5 PB 4 / 6	951	4.128	7.5 PB 9 / 2	932	2.169E-02
7.5 PB 2.5 / 6	953	3.601	7.5 PB 3 / 4	945	1.838E-02
7.5 PB 7 / 4	941	0.106	7.5 PB 4 / 2	937	0.355E-02

MUNSELL 10PB

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 PB 2.5 / 1	972	5.983	10 PB 8 / 4	981	2.534E-02
10 PB 2.5 / 6	993	4.298	10 PB 2.5 / 1	972	2.520E-02
10 PB 2.5 / 2	980	3.602	10 PB 6 / 10	999	2.243E-02
10 PB 2.5 / 4	987	3.452	10 PB 3 / 8	998	2.132E-02
10 PB 3 / 8	998	2.996	10 PB 8 / 1	966	2.086E-02
10 PB 7 / 1	967	0.168	10 PB 5 / 1	969	0.381E-02

MUNSELL All PB

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 PB 2.5 / 1	972	8.166	7.5 PB 5 / 12	963	7.479E-02
7.5 PB 3 / 8	958	8.127	10 PB 9 / 1	965	4.338E-02
5 PB 2.5 / 1	900	7.982	7.5 PB 3 / 10	962	3.859E-02
7.5 PB 2.5 / 4	946	7.589	10 PB 3 / 8	998	3.709E-02
7.5 PB 2.5 / 2	939	7.528	5 PB 6 / 4	911	3.563E-02
5 PB 8 / 1	894	0.209	2.5 PB 4 / 6	884	0.413E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (9) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell P hue and its associated sub-hues.*

MUNSELL 2.5P

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
2.5 P 3 / 4	1015	4.024	2.5 P 3 / 8	1026	9.028E-02
2.5 P 4 / 8	1025	3.124	2.5 P 4 / 10	1029	4.989E-02
2.5 P 7 / 8	1022	2.753	2.5 P 5 / 8	1024	4.442E-02
2.5 P 2.5 / 4	1016	2.713	2.5 P 7 / 6	1017	3.660E-02
2.5 P 3 / 8	1026	2.045	2.5 P 3 / 6	1021	3.473E-02
2.5 P 8 / 2	1003	0.275	2.5 P 5 / 2	1006	0.456E-02

MUNSELL 5P

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 P 2.5 / 6	1058	9.985	5 P 2.5 / 6	1058	10.63E-02
5 P 3 / 8	1063	7.924	5 P 3 / 8	1063	5.452E-02
5 P 3 / 2	1044	5.712	5 P 6 / 8	1060	5.446E-02
5 P 2.5 / 1	1037	4.565	5 P 3 / 6	1057	5.046E-02
5 P 2.5 / 2	1045	3.964	5 P 5 / 10	1064	4.403E-02
5 P 6 / 1	1033	0.218	5 P 6 / 1	1033	0.293E-02

MUNSELL 7.5P

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
7.5 P 2.5 / 2	1073	5.092	7.5 P 3 / 8	1091	15.49E-02
7.5 P 4 / 4	1078	4.571	7.5 P 2.5 / 2	1073	5.504E-02
7.5 P 4 / 10	1094	4.033	7.5 P 5 / 10	1093	4.810E-02
7.5 P 5 / 10	1093	3.730	7.5 P 8 / 2	1067	4.683E-02
7.5 P 3 / 2	1072	3.628	7.5 P 6 / 8	1088	4.486E-02
7.5 P 6 / 4	1076	0.428	7.5 P 6 / 4	1076	0.662E-02

MUNSELL 10P

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
10 P 3 / 8	1128	4.880	10 P 5 / 12	1132	8.073E-02
10 P 3 / 4	1116	4.698	10 P 5 / 4	1114	4.399E-02
10 P 2.5 / 1	1102	4.330	10 P 4 / 10	1131	3.916E-02
10 P 3 / 1	1101	3.231	10 P 3 / 4	1116	2.972E-02
10 P 5 / 8	1126	2.862	10 P 2.5 / 4	1117	2.908E-02
10 P 8 / 1	1096	0.194	10 P 8 / 4	1111	0.405E-02

MUNSELL All P

Sample	*Munsell index*	ΔE^*_{ab}	*Sample*	*Munsell index*	*RMSE*
5 P 2.5 / 6	1058	9.889	7.5 P 3 / 8	1091	17.01E-02
5 P 3 / 8	1063	9.550	5 P 2.5 / 6	1058	1.220E-01
7.5 P 2.5 / 2	1073	8.074	10 P 5 / 12	1132	8.984E-02
5 P 2.5 / 1	1037	7.580	2.5 P 3 / 8	1026	8.675E-02
5 P 2.5 / 2	1045	6.956	7.5 P 5 / 10	1093	8.128E-02
5 P 9 / 2	1038	0.247	5 P 6 / 1	1033	0.445E-02

Appendix 5
A5.2 Munsell's patches having the five worst and the best ΔE^*_{ab} and RMSE

Table A5.2 (10) *Samples having the five worst and the best ΔE^*_{ab} and RMSE values for the Munsell RP hue and its associated sub-hues.*

MUNSELL 2.5RP

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
2.5 RP 3 / 2	1139	5.570	2.5 RP 5 / 8	1156	2.967E-02
2.5 RP 3 / 4	1146	5.312	2.5 RP 3 / 2	1139	2.586E-02
2.5 RP 2.5 / 2	1140	4.258	2.5 RP 6 / 12	1162	2.252E-02
2.5 RP 5 / 12	1163	3.652	2.5 RP 5 / 12	1163	2.209E-02
2.5 RP 4 / 10	1161	3.005	2.5 RP 5 / 10	1160	2.035E-02
2.5 RP 8 / 2	1134	0.432	2.5 RP 5 / 2	1137	0.575E-02

MUNSELL 5RP

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
5 RP 2.5 / 1	1171	7.394	5 RP 2.5 / 4	1186	4.237E-02
5 RP 3 / 4	1185	6.601	5 RP 2.5 / 1	1171	2.865E-02
5 RP 3 / 1	1170	5.150	5 RP 8 / 6	1187	2.317E-02
5 RP 2.5 / 2	1179	4.697	5 RP 3 / 4	1185	2.195E-02
5 RP 2.5 / 4	1186	4.398	5 RP 5 / 10	1198	2.188E-02
5 RP 7 / 2	1174	0.236	5 RP 7 / 8	1193	0.492E-02

MUNSELL 7.5RP

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
7.5 RP 4 / 12	1231	7.167	7.5 RP 4 / 8	1226	5.381E-02
7.5 RP 3 / 2	1208	5.535	7.5 RP 2.5 / 4	1216	4.081E-02
7.5 RP 2.5 / 2	1209	5.201	7.5 RP 2.5 / 2	1209	2.496E-02
7.5 RP 4 / 10	1229	4.375	7.5 RP 4 / 12	1231	2.338E-02
7.5 RP 3 / 4	1215	4.191	7.5 RP 3 / 2	1208	1.995E-02
7.5 RP 8 / 2	1203	0.443	7.5 RP 5 / 2	1206	0.691E-02

MUNSELL 10RP

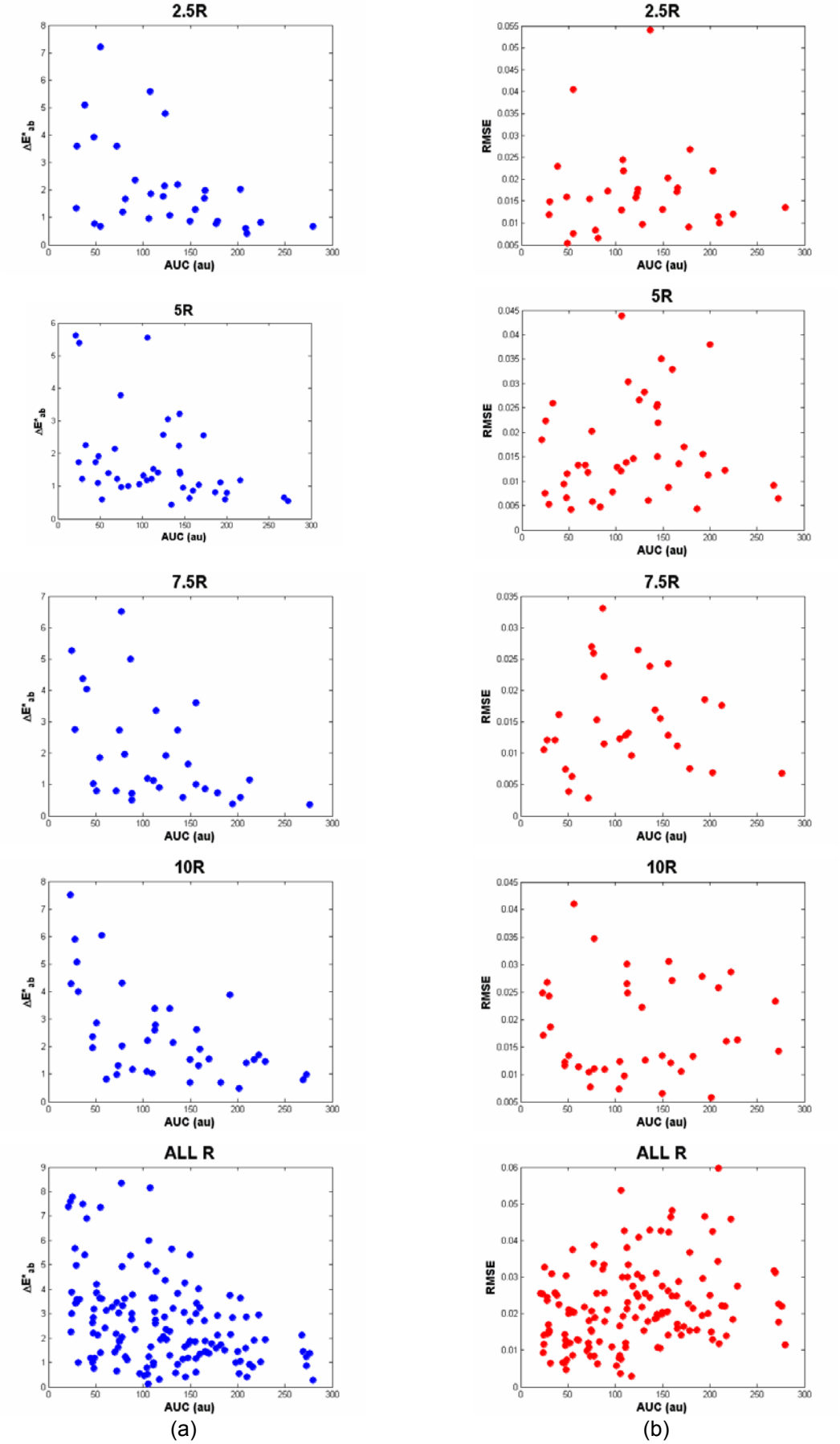
Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 RP 2.5 / 1	1239	8.371	10 RP 3 / 6	1260	4.454E-02
10 RP 7 / 2	1242	8.197	10 RP 2.5 / 1	1239	4.093E-02
10 RP 3 / 6	1260	6.075	10 RP 4 / 12	1269	3.875E-02
10 RP 4 / 8	1264	5.809	10 RP 5 / 8	1263	3.414E-02
10 RP 3 / 1	1238	5.614	10 RP 4 / 10	1267	3.227E-02
10 RP 4 / 2	1245	0.555	10 RP 5 / 1	1236	5.891E-03

MUNSELL All RP

Sample	*Munsell index*	*ΔE^*_{ab}*	*Sample*	*Munsell index*	*RMSE*
10 RP 2.5 / 1	1239	8.685	10 RP 3 / 6	1260	10.51E-02
10 RP 7 / 2	1242	8.521	7.5 RP 4 / 8	1226	7.014E-02
5 RP 2.5 / 1	1171	8.498	5 RP 2.5 / 4	1186	4.980E-02
2.5 RP 2.5 / 2	1140	7.726	10 RP 4 / 10	1267	4.775E-02
5 RP 3 / 6	1192	7.222	5 RP 4 / 10	1199	4.456E-02
5 RP 5 / 4	1183	0.130	10 RP 5 / 2	1244	0.197E-02

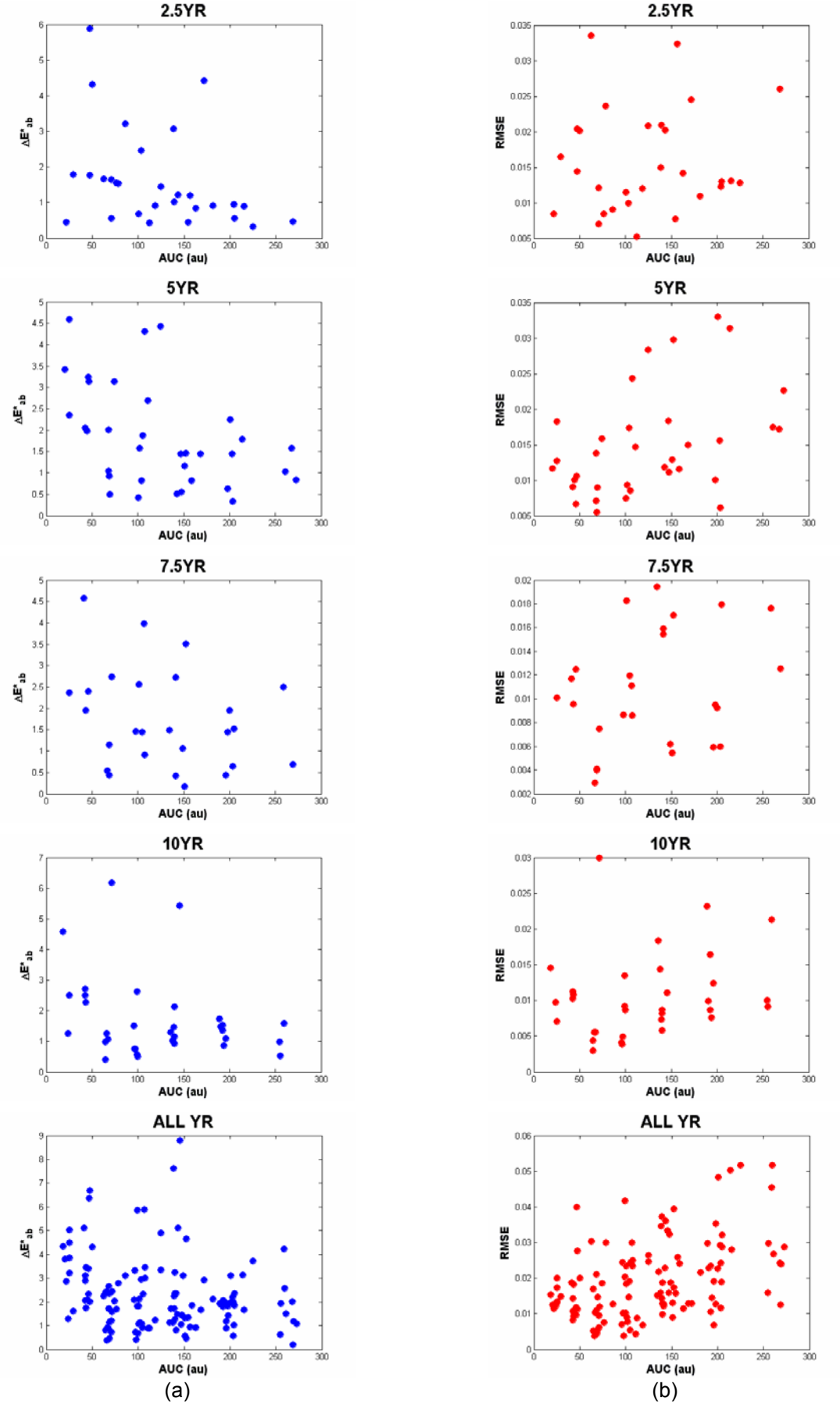
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (1) ***MUNSELL R****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



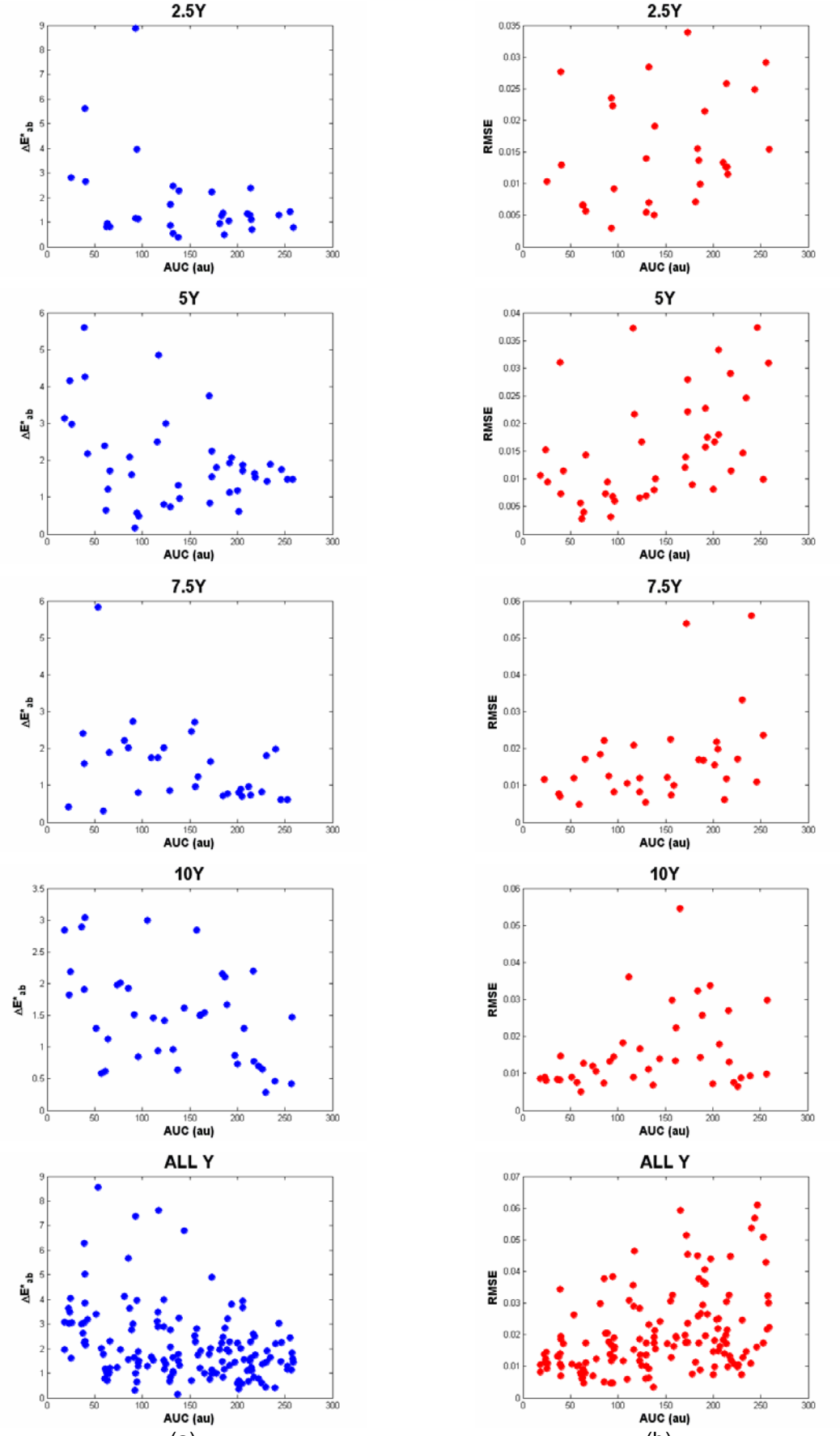
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (2) *MUNSELL YR*: *(a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



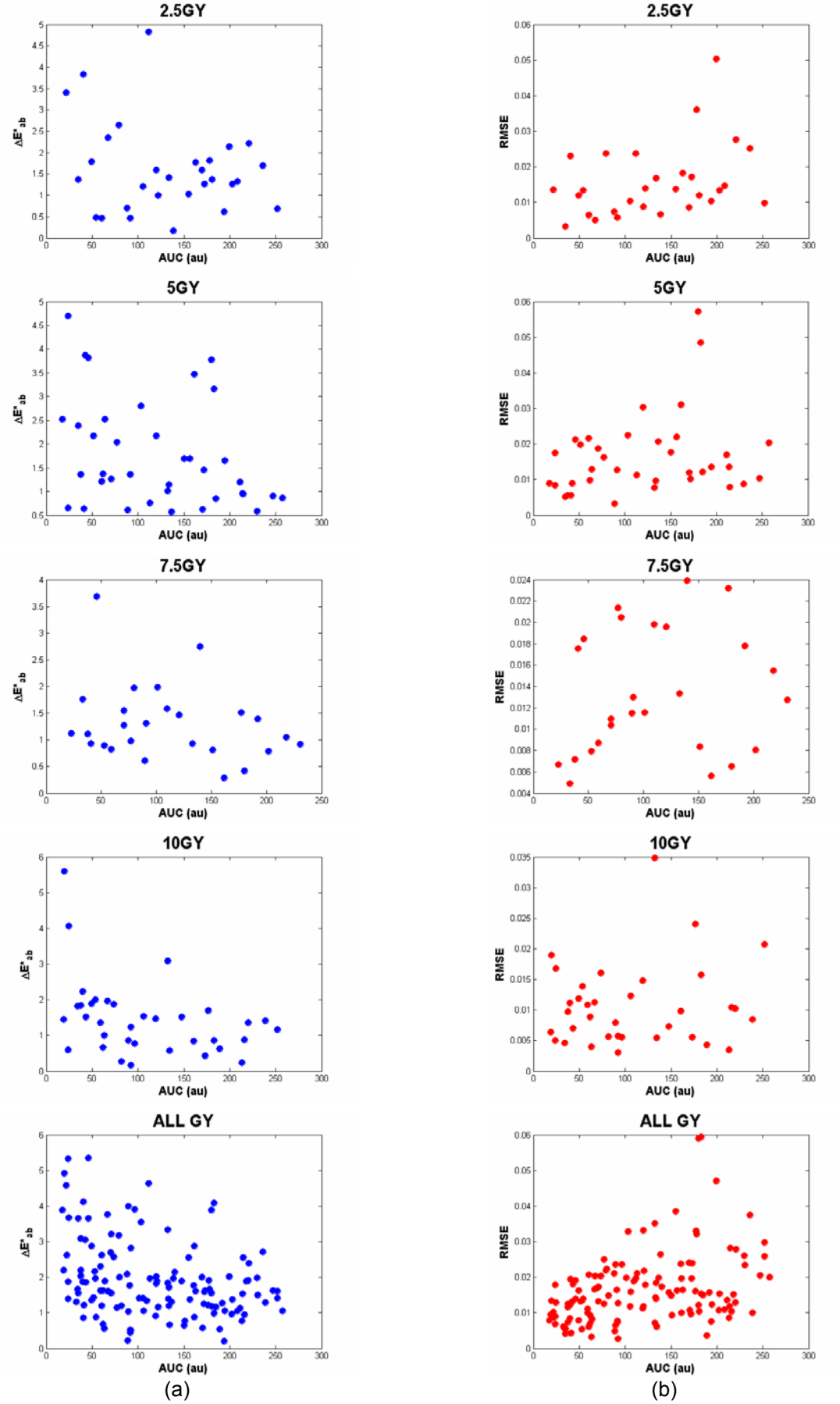
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (3) ***MUNSELL Y****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

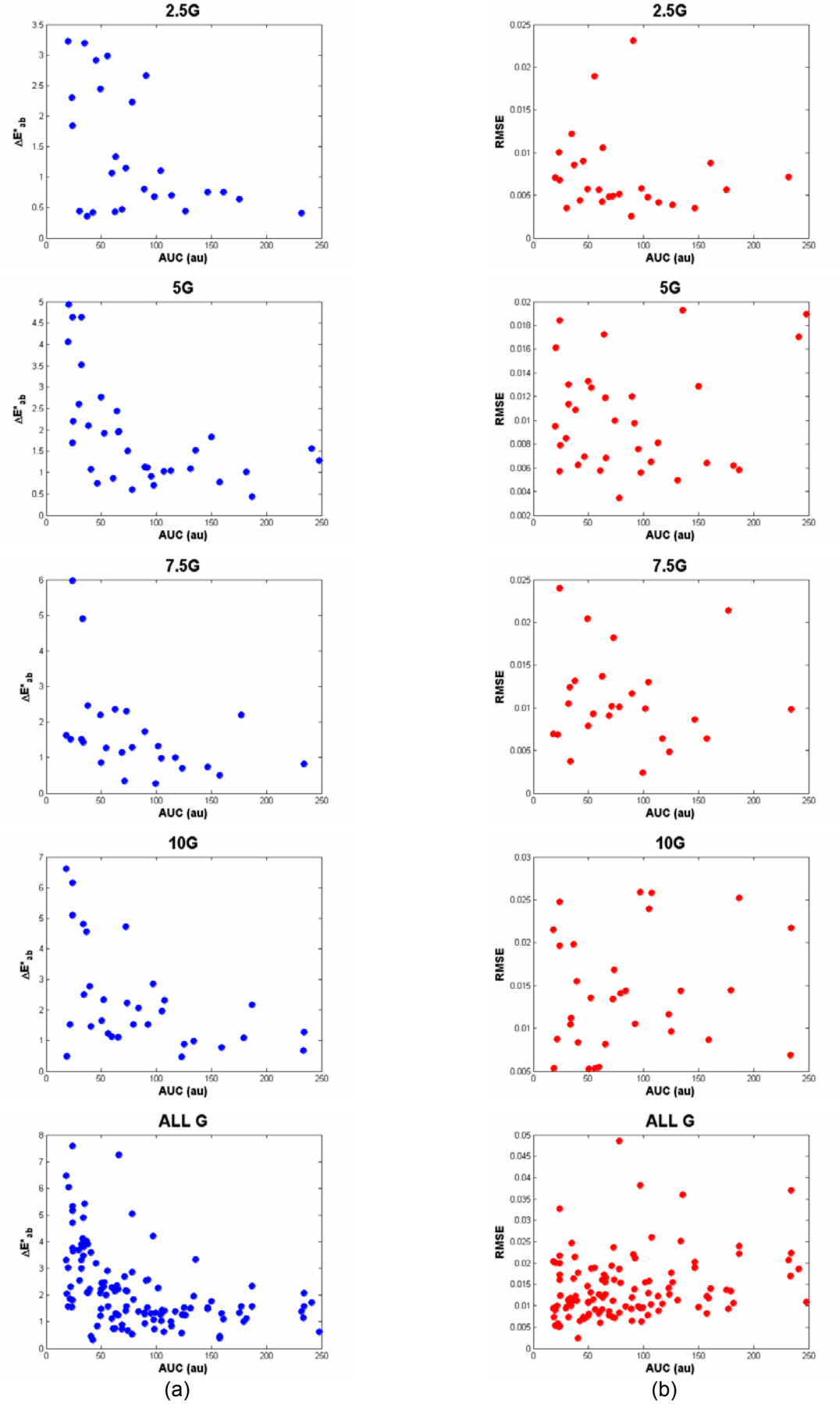
Figure A6 (4) ***MUNSELL GY****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



(a) (b)

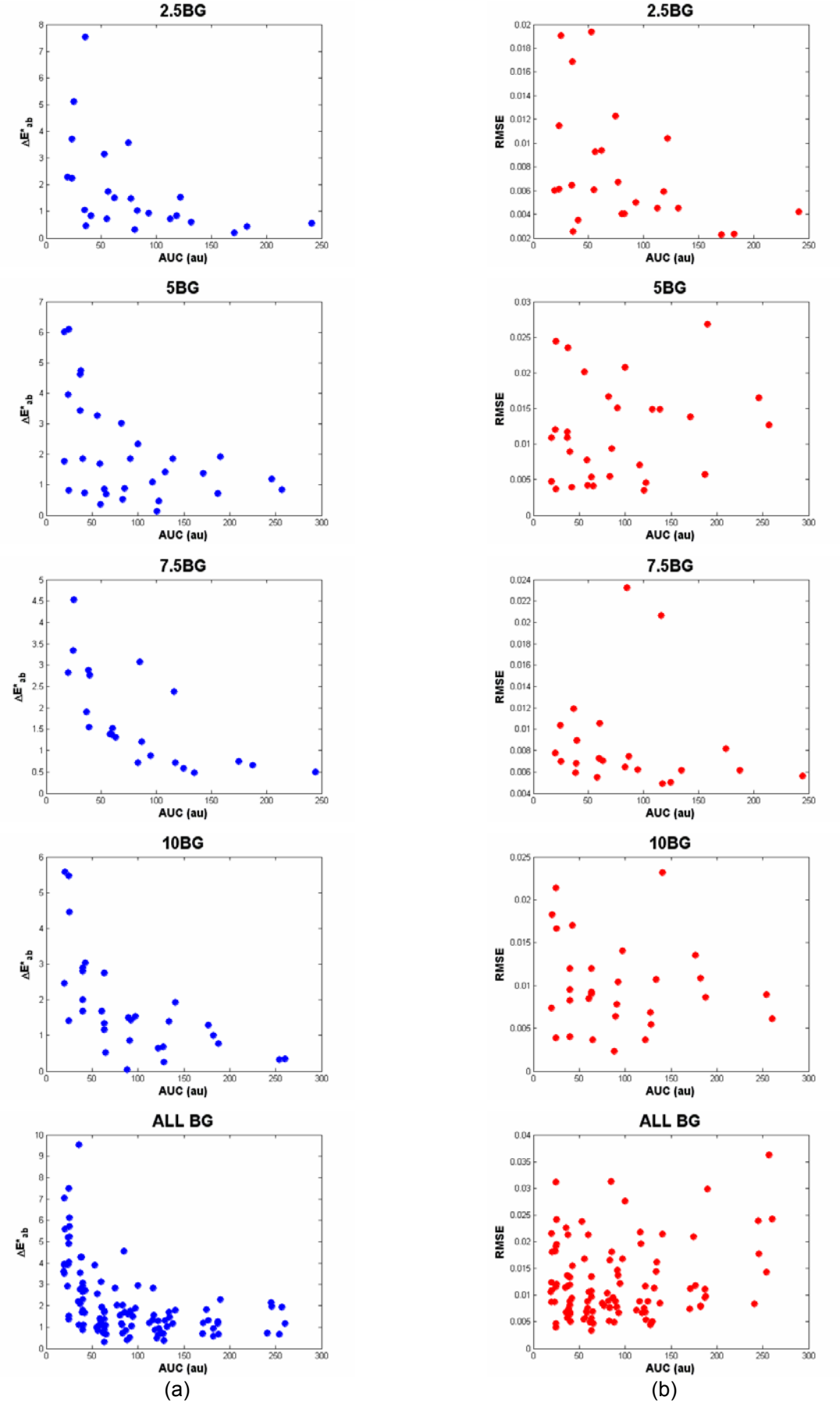
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (5) ***MUNSELL G****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



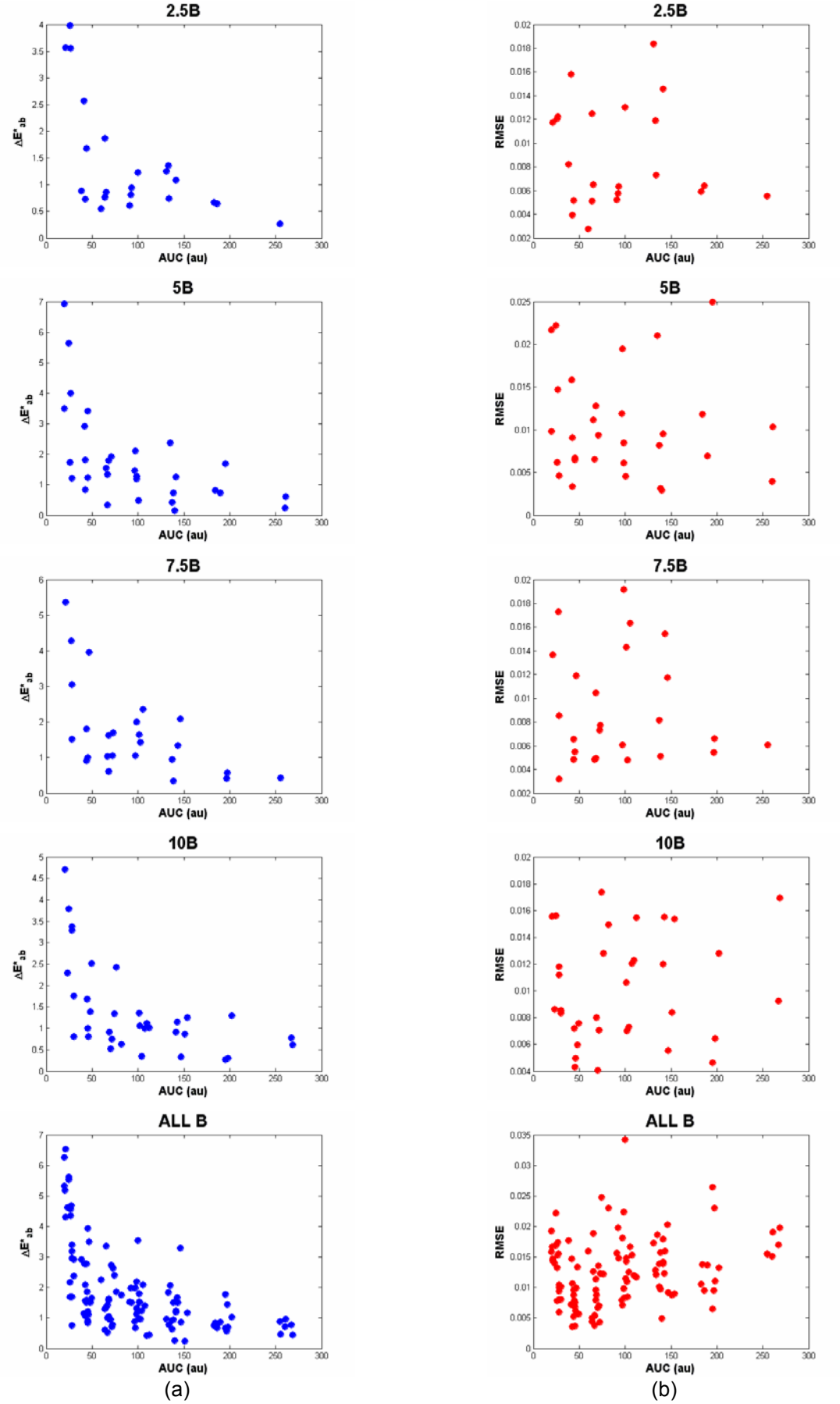
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (6) ***MUNSELL BG****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



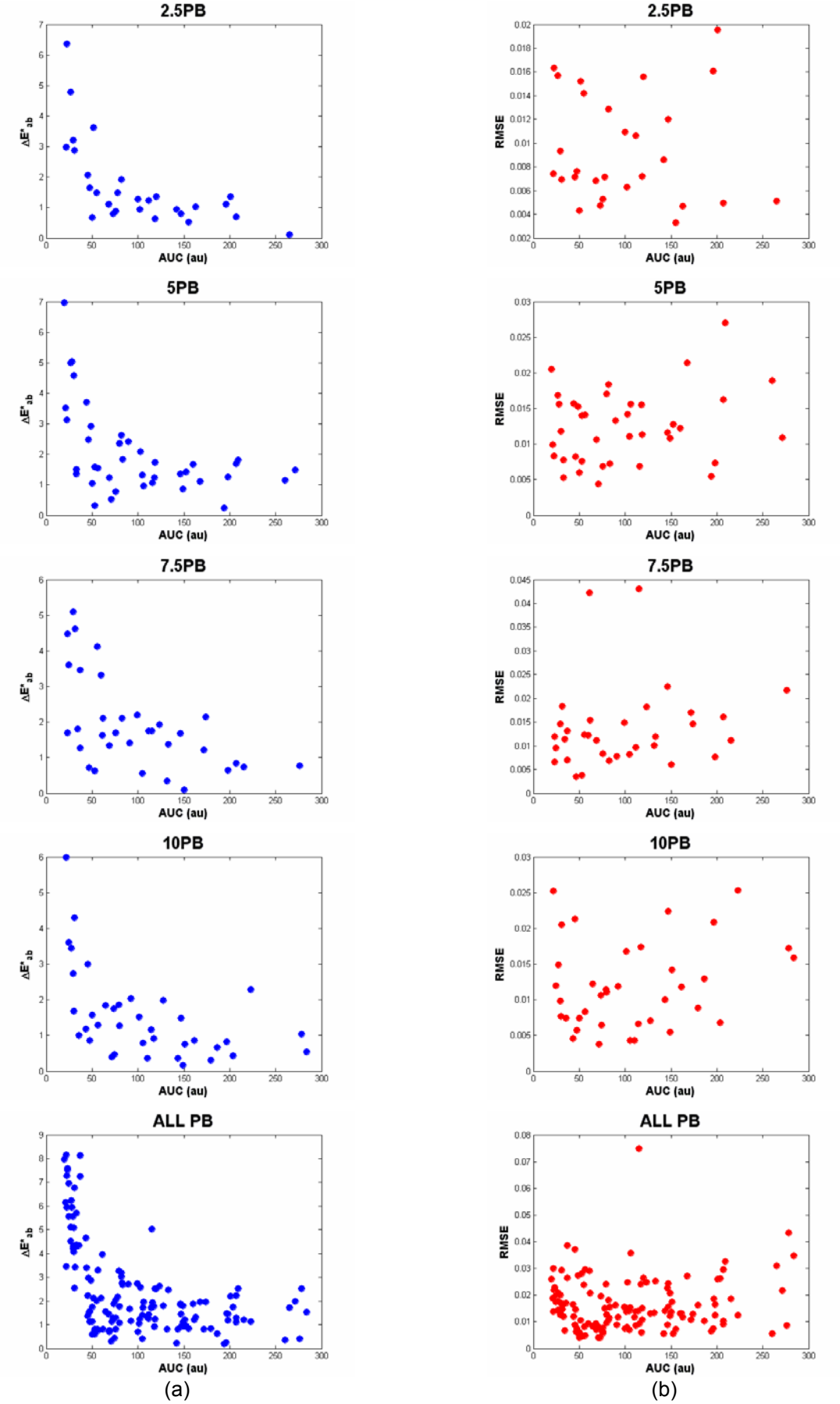
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (7) ***MUNSELL B****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



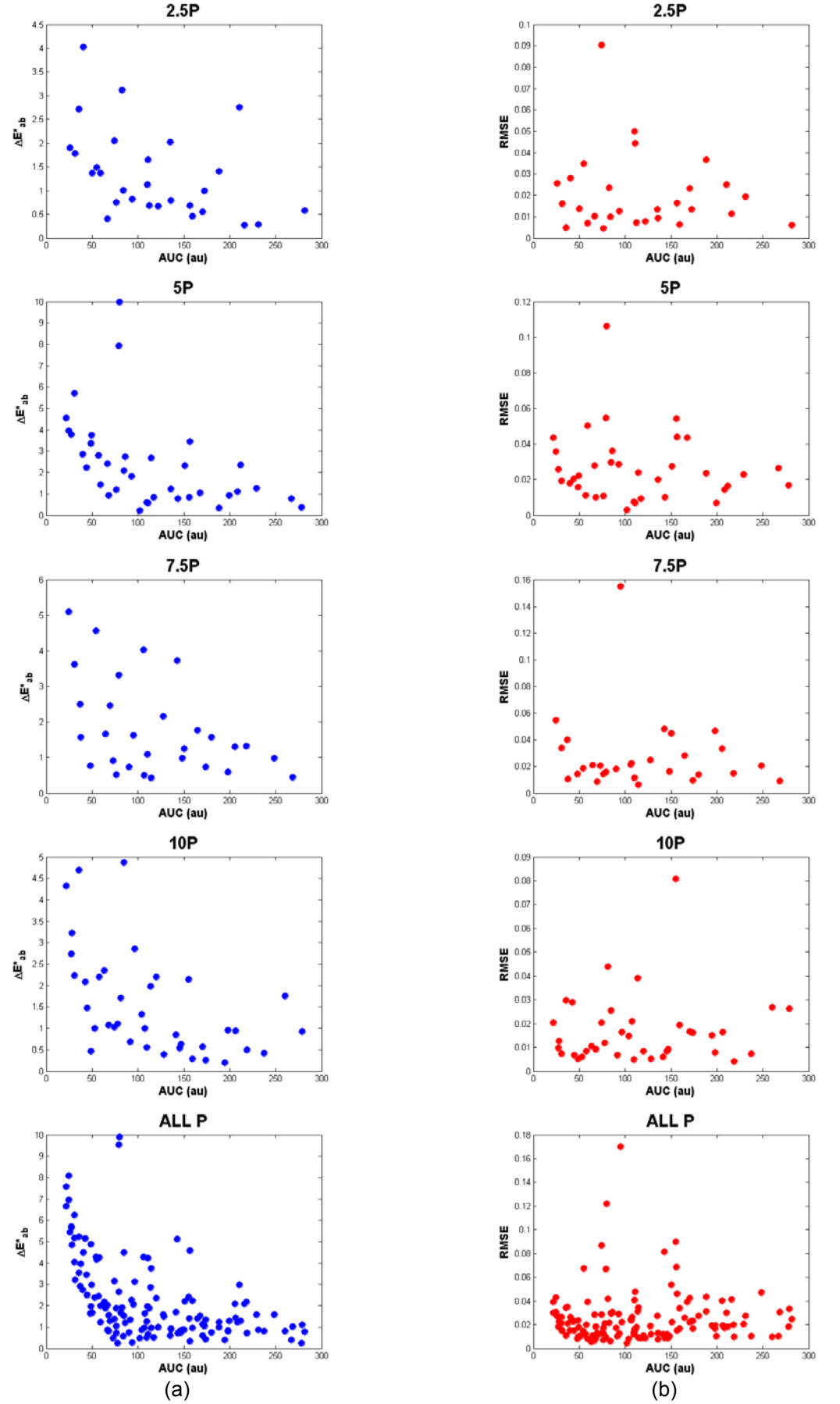
Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (8) ***MUNSELL PB****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (9) ***MUNSELL P****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*



Appendix 6 Accuracy of colour measurement and spectral reconstruction depending on the area under the curve (AUC) of the reflectance spectra

Figure A6 (10) ***MUNSELL RP****: (a) ΔE^*_{ab} and (b) RMSE values vs the AUC of the reflectance spectra.*