Geoscientific
Model Development

Supplement of

Transfer learning for landslide susceptibility modeling using domain adaptation and case-based reasoning

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Target area: Burgenland 1

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 1	1	0.968	0.719	0.654	1
Rimini 25	0.314	0.894	0.732	0.969	1
RBSF 10	0.375	0.889	0.73	0.138	0.33
Piacenza 25	0.314	0.861	0.875	0.929	1
Parma 25	0.314	0.848	0.812	0.916	1
Paldau 1	1	0.959	0.927	0.941	1
Modena 25	0.314	0.815	0.769	0.868	1
Ecuador highway 10	0.375	0.889	0.668	0.478	1
Bologna 25	0.314	0.833	0.876	0.926	1

Similarity
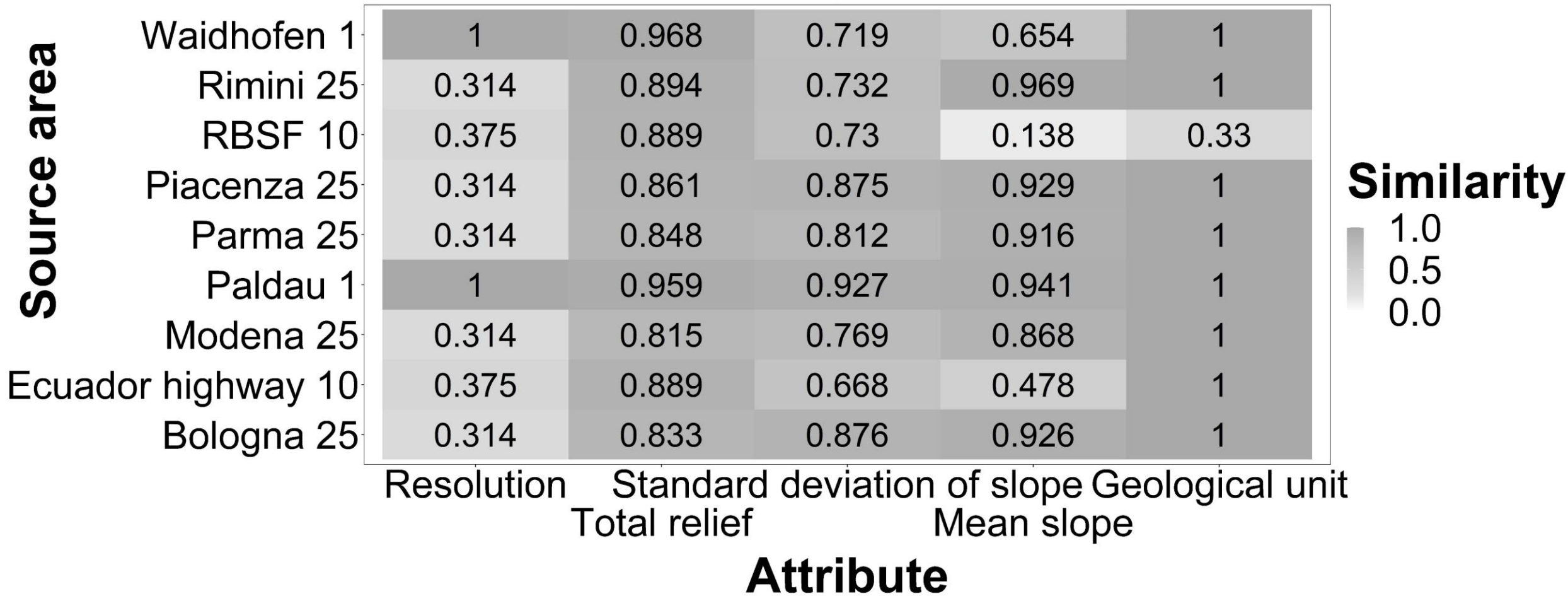1.0
0.5
0.0

Attribute

Figure S1: Similarity scores of different attributes for Burgenland with a 1 m x 1 m resolution. Light colours represent smaller similarities.

Target area: Paldau 1

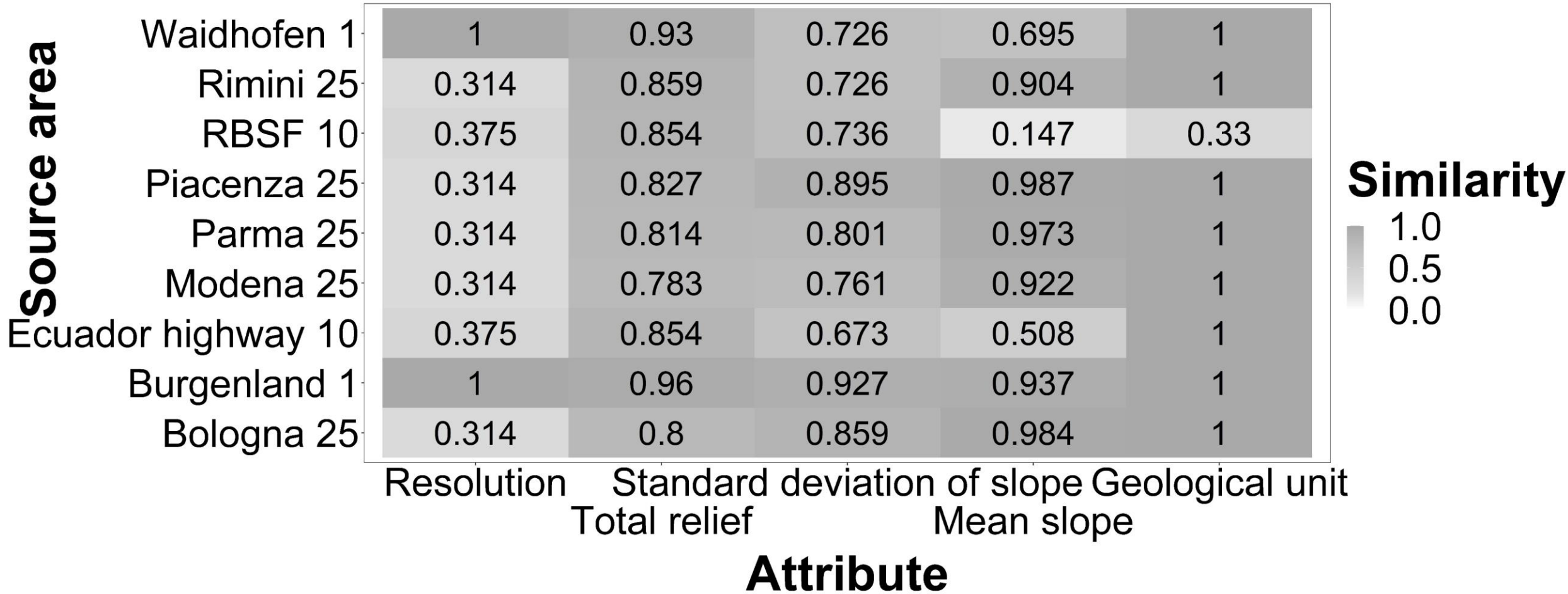| Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 1	1	0.93	0.726	0.695	1
Rimini 25	0.314	0.859	0.726	0.904	1
RBSF 10	0.375	0.854	0.736	0.147	0.33
Piacenza 25	0.314	0.827	0.895	0.987	1
Parma 25	0.314	0.814	0.801	0.973	1
Modena 25	0.314	0.783	0.761	0.922	1
Ecuador highway 10	0.375	0.854	0.673	0.508	1
Burgenland 1	1	0.96	0.927	0.937	1
Bologna 25	0.314	0.8	0.859	0.984	1

Figure S2: Similarity scores of different attributes for Paldau with a 1 m x 1 m resolution. Light colours represent smaller similarities.
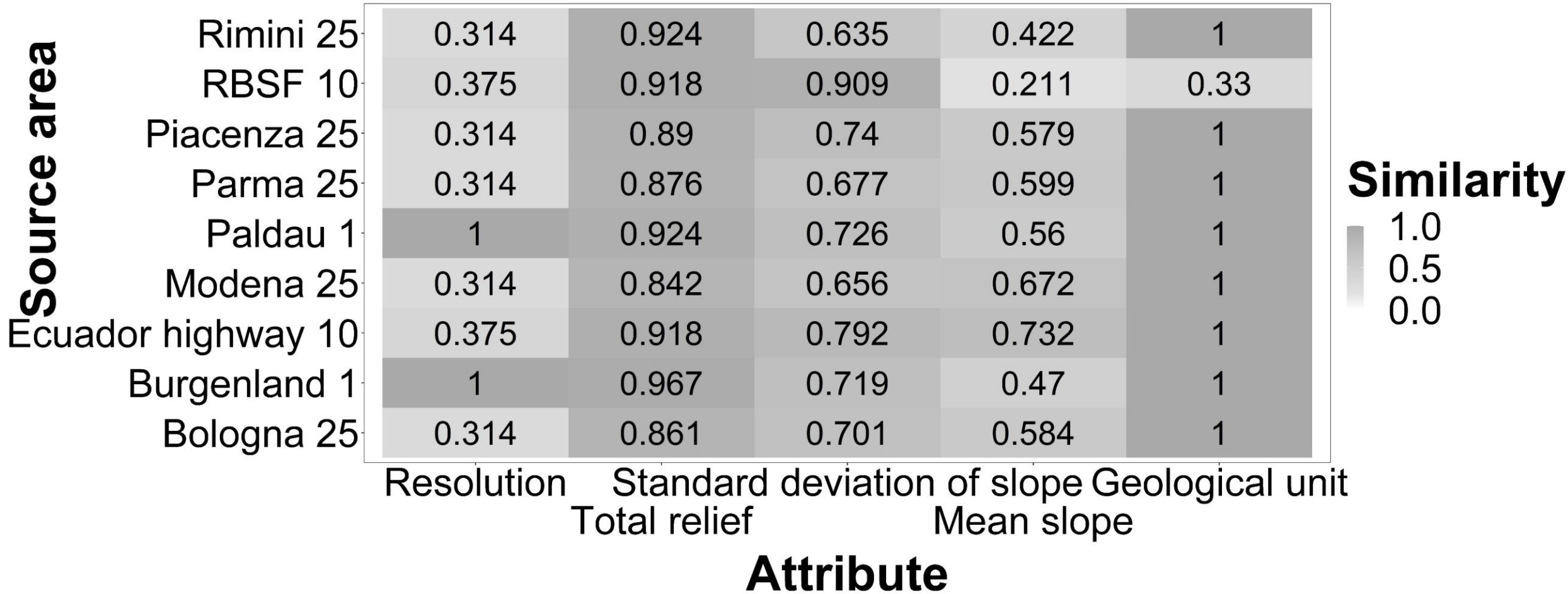
Target area: Waidhofen 1

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Rimini 25	0.314	0.924	0.635	0.422	1
RBSF 10	0.375	0.918	0.909	0.211	0.33
Piacenza 25	0.314	0.89	0.74	0.579	1
Parma 25	0.314	0.876	0.677	0.599	1
Paldau 1	1	0.924	0.726	0.56	1
Modena 25	0.314	0.842	0.656	0.672	1
Ecuador highway 10	0.375	0.918	0.792	0.732	1
Burgenland 1	1	0.967	0.719	0.47	1
Bologna 25	0.314	0.861	0.701	0.584	1

Attribute

Similarity
1.0
0.5
0.0

Figure S3: Similarity scores of different attributes for Waidhofen with a 1 m x 1 m resolution. Light colours represent smaller similarities.
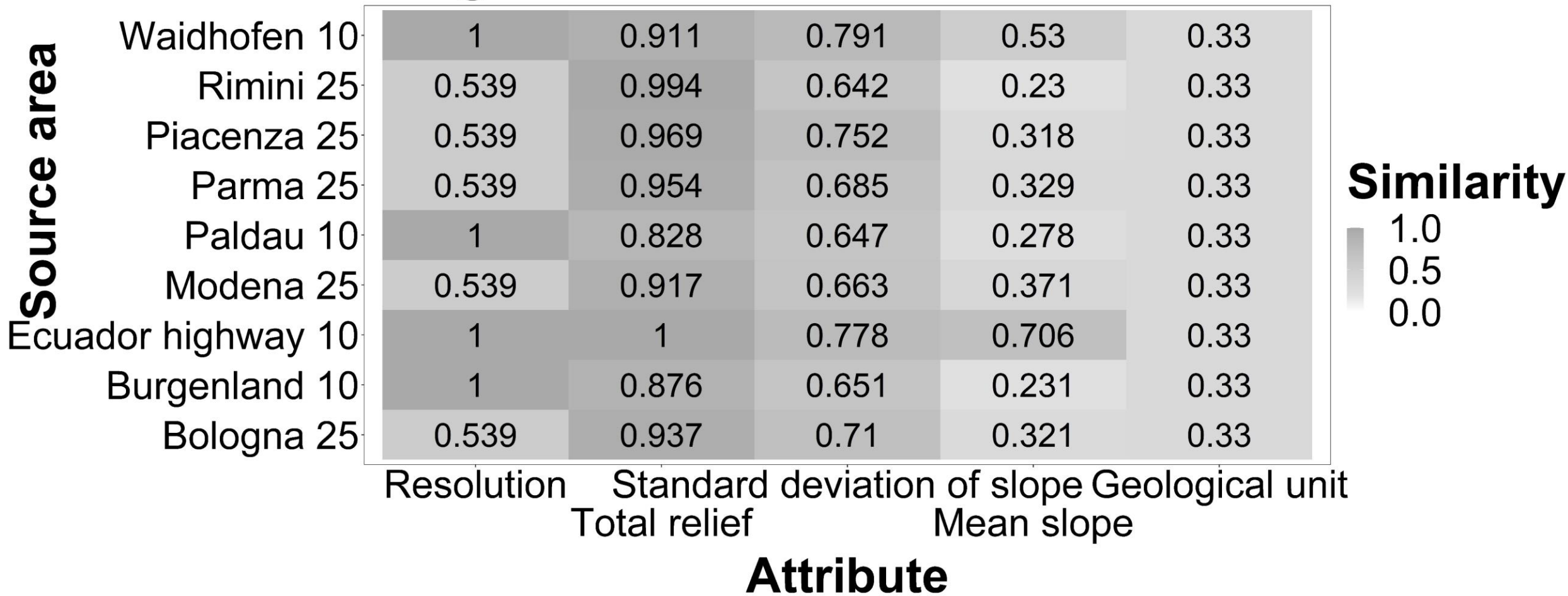
Target area: RBSF 10

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 10	1	0.911	0.791	0.53	0.33
Rimini 25	0.539	0.994	0.642	0.23	0.33
Piacenza 25	0.539	0.969	0.752	0.318	0.33
Parma 25	0.539	0.954	0.685	0.329	0.33
Paldau 10	1	0.828	0.647	0.278	0.33
Modena 25	0.539	0.917	0.663	0.371	0.33
Ecuador highway 10	1	1	0.778	0.706	0.33
Burgenland 10	1	0.876	0.651	0.231	0.33
Bologna 25	0.539	0.937	0.71	0.321	0.33

Similarity

1.0
0.5
0.0

Attribute

Figure S4: Similarity scores of different attributes for RBSF with a 10 m x 10 m resolution. Light colours represent smaller similarities.
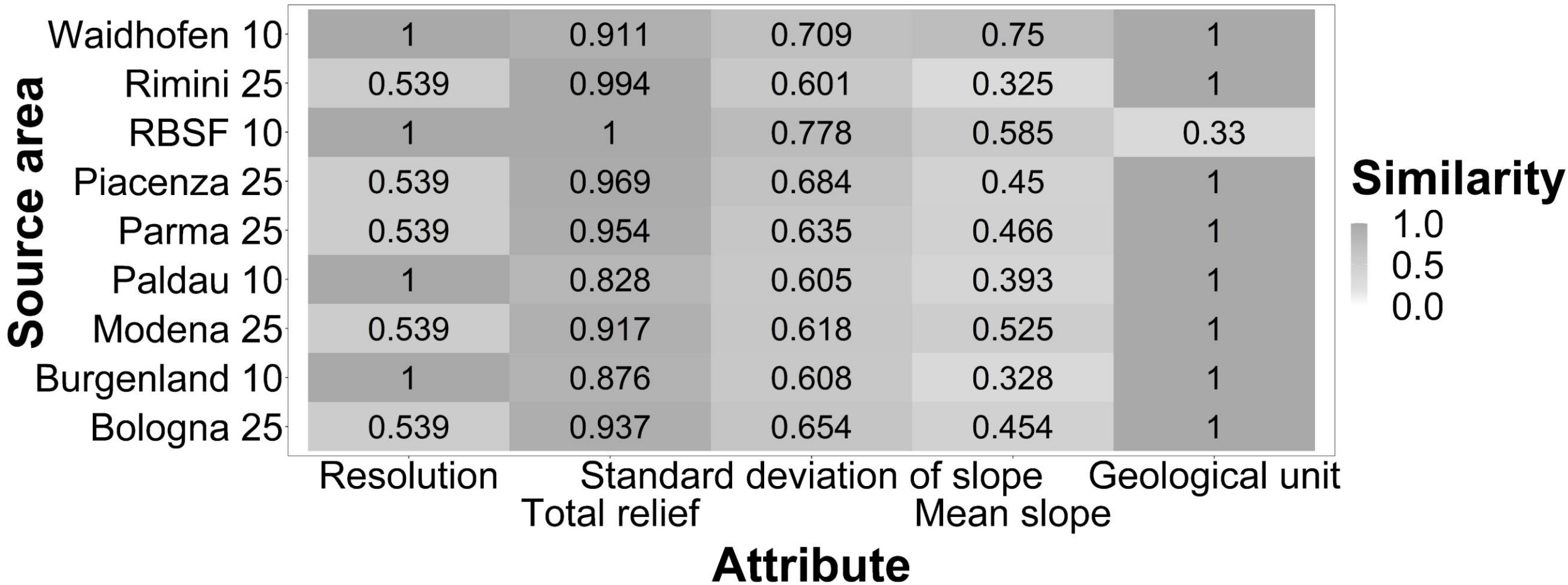
4

Target area: Ecuador highway 10

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 10	1	0.911	0.709	0.75	1
Rimini 25	0.539	0.994	0.601	0.325	1
RBSF 10	1	1	0.778	0.585	0.33
Piacenza 25	0.539	0.969	0.684	0.45	1
Parma 25	0.539	0.954	0.635	0.466	1
Paldau 10	1	0.828	0.605	0.393	1
Modena 25	0.539	0.917	0.618	0.525	1
Burgenland 10	1	0.876	0.608	0.328	1
Bologna 25	0.539	0.937	0.654	0.454	1

Similarity
1.0
0.5
0.0

Figure S5: Similarity scores of different attributes for Ecuador highway with a 10 m x 10 m resolution. Light colours represent smaller similarities.
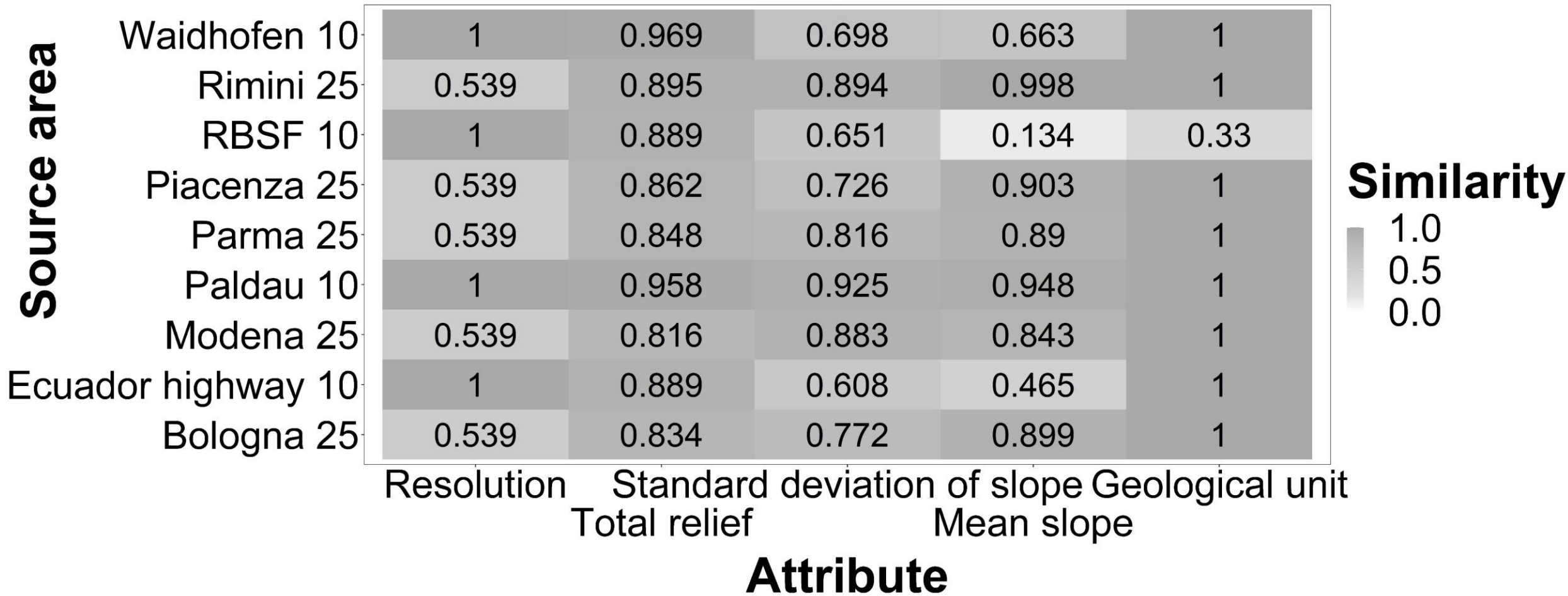
Target area: Burgenland 10

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 10	1	0.969	0.698	0.663	1
Rimini 25	0.539	0.895	0.894	0.998	1
RBSF 10	1	0.889	0.651	0.134	0.33
Piacenza 25	0.539	0.862	0.726	0.903	1
Parma 25	0.539	0.848	0.816	0.89	1
Paldau 10	1	0.958	0.925	0.948	1
Modena 25	0.539	0.816	0.883	0.843	1
Ecuador highway 10	1	0.889	0.608	0.465	1
Bologna 25	0.539	0.834	0.772	0.899	1

Similarity
1.0
0.5
0.0

Figure S6: Similarity scores of different attributes for Burgenland with a 10 m x 10 m resolution. Light colours represent smaller similarities.
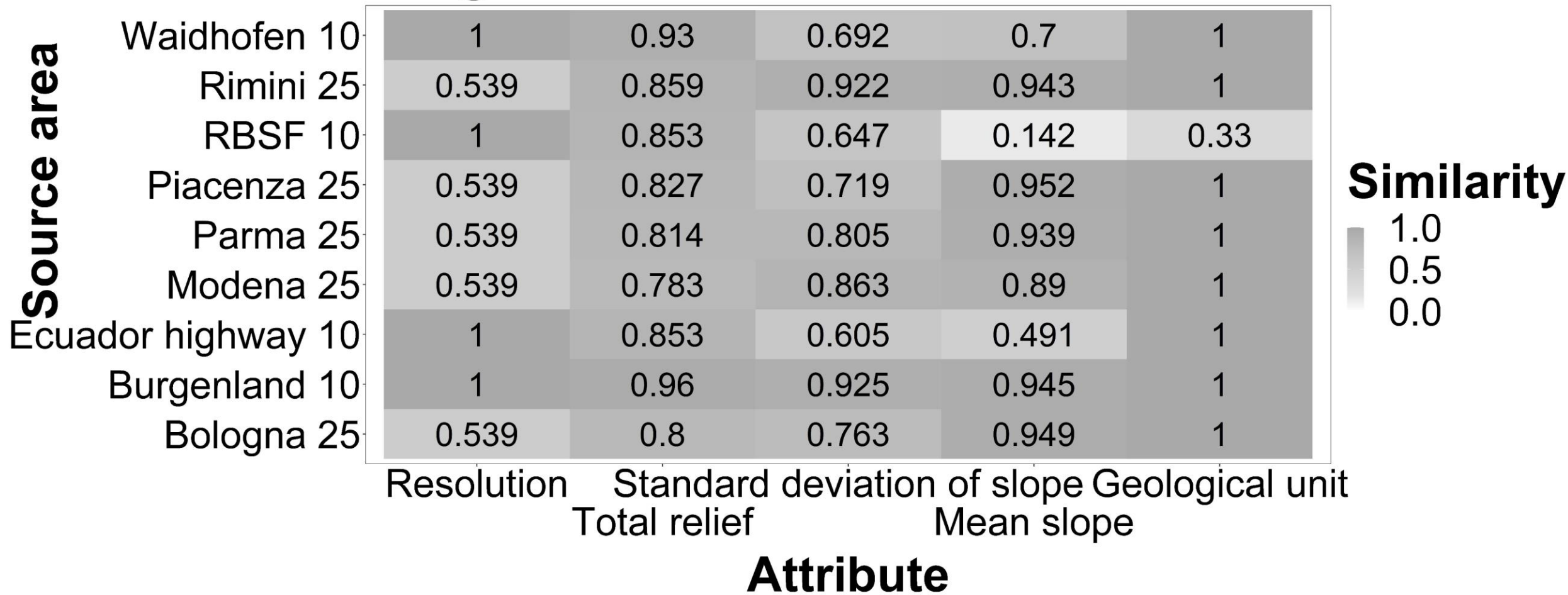
Target area: Paldau 10

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 10	1	0.93	0.692	0.7	1
Rimini 25	0.539	0.859	0.922	0.943	1
RBSF 10	1	0.853	0.647	0.142	0.33
Piacenza 25	0.539	0.827	0.719	0.952	1
Parma 25	0.539	0.814	0.805	0.939	1
Modena 25	0.539	0.783	0.863	0.89	1
Ecuador highway 10	1	0.853	0.605	0.491	1
Burgenland 10	1	0.96	0.925	0.945	1
Bologna 25	0.539	0.8	0.763	0.949	1

Similarity
1.0
0.5
0.0

Attribute

Figure S7: Similarity scores of different attributes for Paldau with a 10 m x 10 m resolution. Light colours represent smaller similarities.
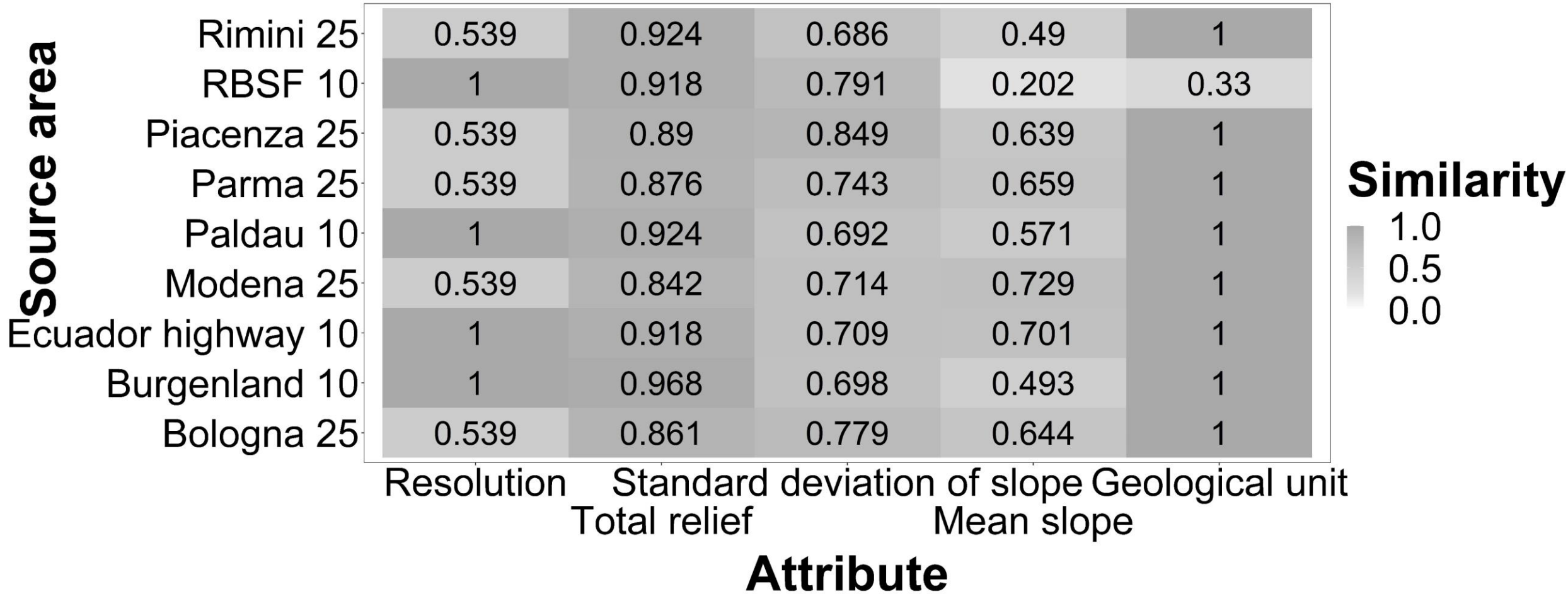
Target area: Waidhofen 10

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Rimini 25	0.539	0.924	0.686	0.49	1
RBSF 10	1	0.918	0.791	0.202	0.33
Piacenza 25	0.539	0.89	0.849	0.639	1
Parma 25	0.539	0.876	0.743	0.659	1
Paldau 10	1	0.924	0.692	0.571	1
Modena 25	0.539	0.842	0.714	0.729	1
Ecuador highway 10	1	0.918	0.709	0.701	1
Burgenland 10	1	0.968	0.698	0.493	1
Bologna 25	0.539	0.861	0.779	0.644	1

Similarity
1.0
0.5
0.0

Attribute

Figure S8: Similarity scores of different attributes for Waidhofen with a 10 m x 10 m resolution. Light colours represent smaller similarities.
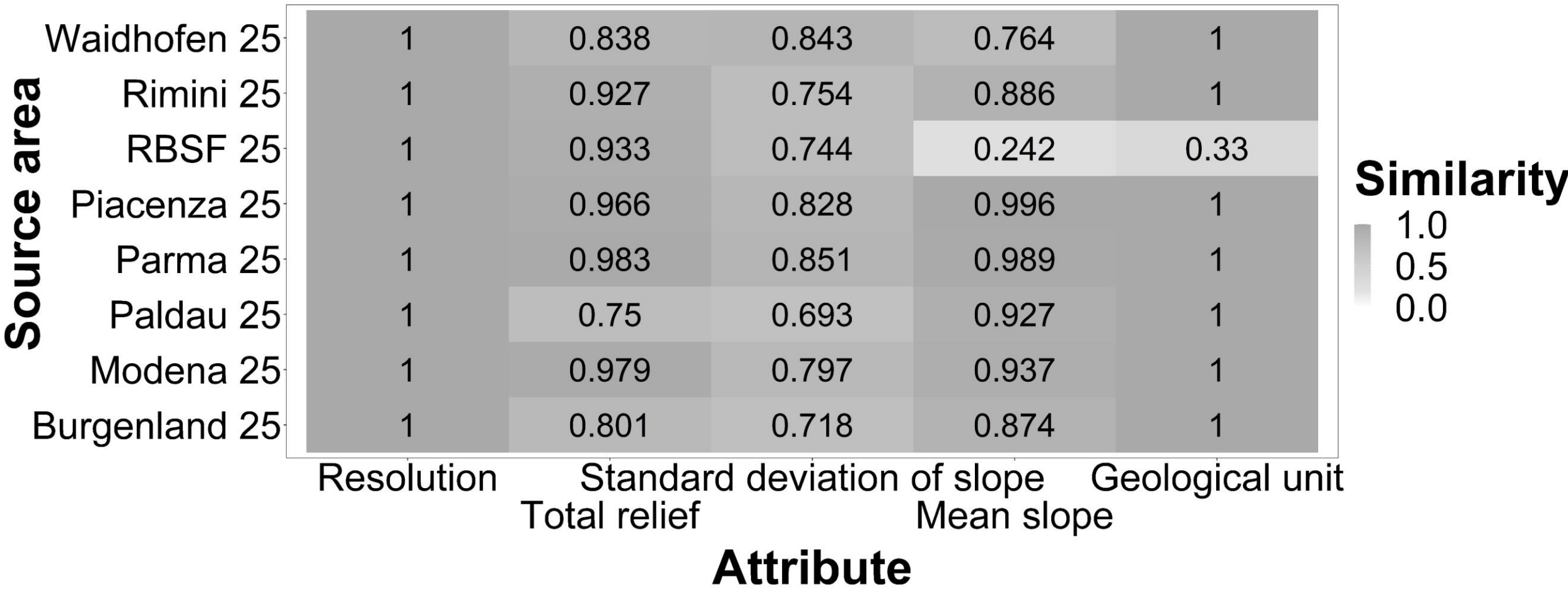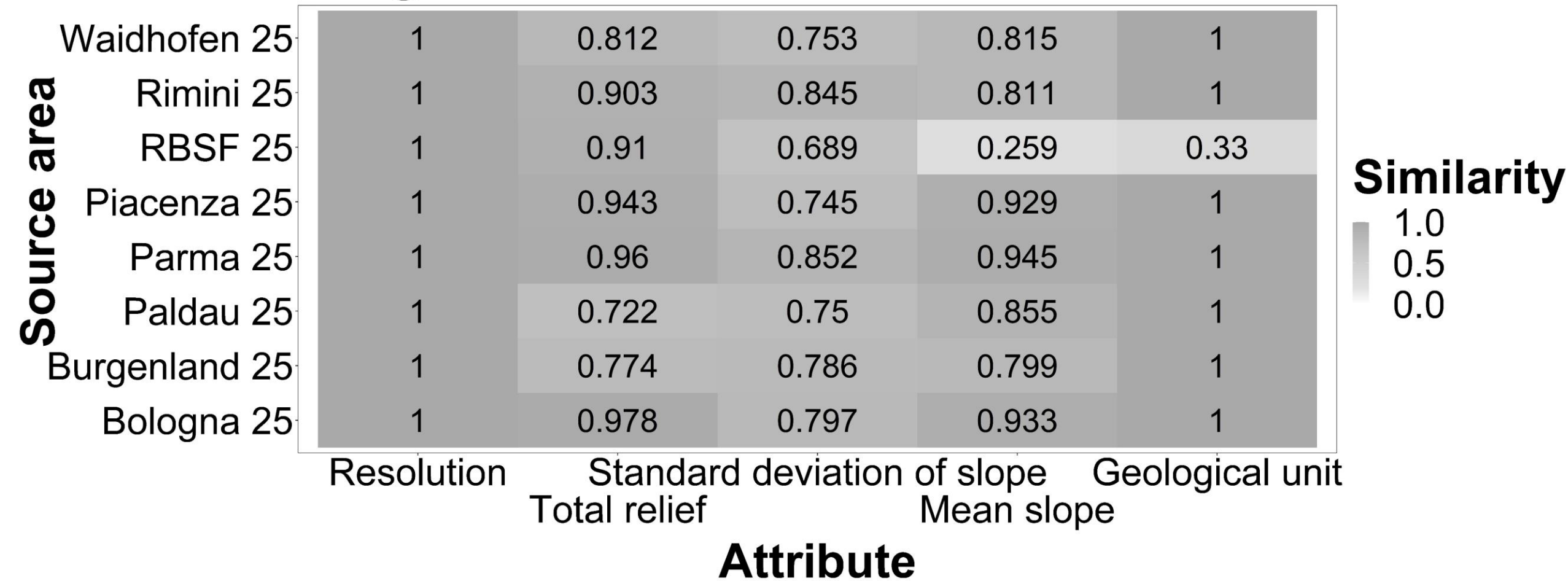
Target area: Bologna 25

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.838	0.843	0.764	1
Rimini 25	1	0.927	0.754	0.886	1
RBSF 25	1	0.933	0.744	0.242	0.33
Piacenza 25	1	0.966	0.828	0.996	1
Parma 25	1	0.983	0.851	0.989	1
Paldau 25	1	0.75	0.693	0.927	1
Modena 25	1	0.979	0.797	0.937	1
Burgenland 25	1	0.801	0.718	0.874	1

Similarity
1.0
0.5
0.0

Figure S9: Similarity scores of different attributes for Bologna with a 25 m x 25 m resolution. Light colours represent smaller similarities.
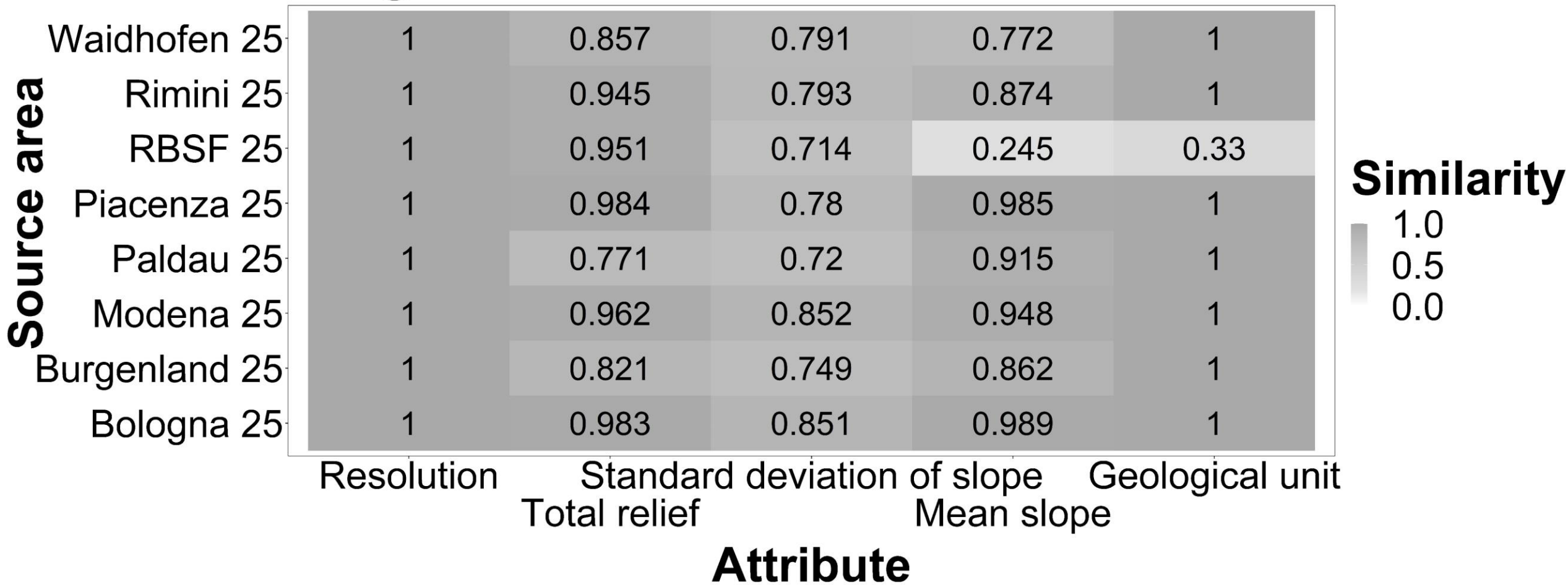
Target area: Modena 25

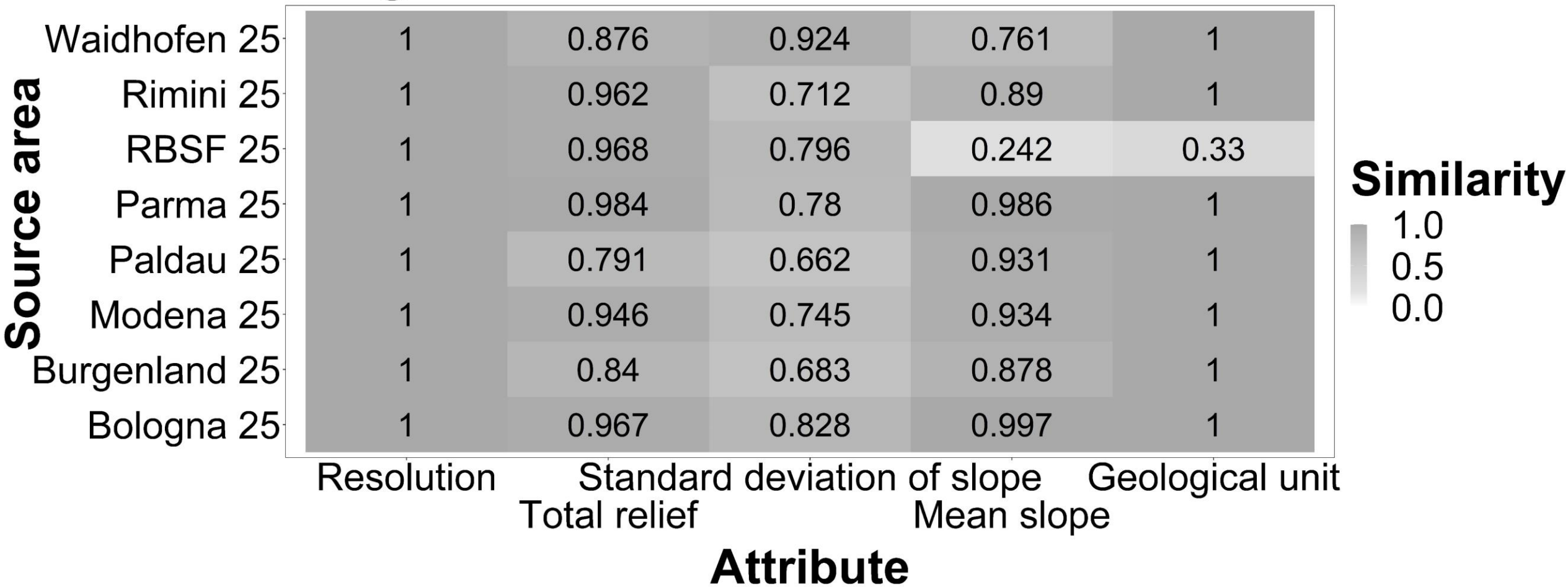| Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.812	0.753	0.815	1
Rimini 25	1	0.903	0.845	0.811	1
RBSF 25	1	0.91	0.689	0.259	0.33
Piacenza 25	1	0.943	0.745	0.929	1
Parma 25	1	0.96	0.852	0.945	1
Paldau 25	1	0.722	0.75	0.855	1
Burgenland 25	1	0.774	0.786	0.799	1
Bologna 25	1	0.978	0.797	0.933	1

Attribute

Similarity
1.0
0.5
0.0

Figure S10: Similarity scores of different attributes for Modena with a 25 m x 25 m resolution. Light colours represent smaller similarities.

Target area: Parma 25

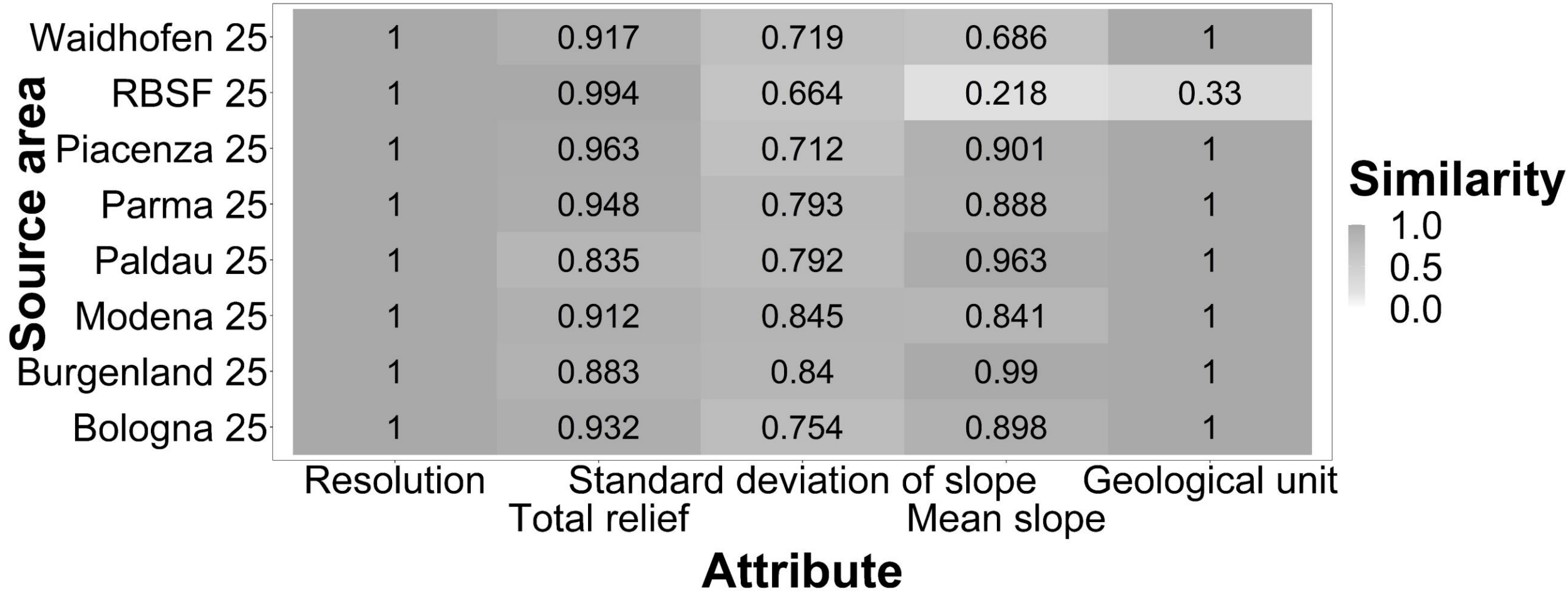| Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.857	0.791	0.772	1
Rimini 25	1	0.945	0.793	0.874	1
RBSF 25	1	0.951	0.714	0.245	0.33
Piacenza 25	1	0.984	0.78	0.985	1
Paldau 25	1	0.771	0.72	0.915	1
Modena 25	1	0.962	0.852	0.948	1
Burgenland 25	1	0.821	0.749	0.862	1
Bologna 25	1	0.983	0.851	0.989	1

Figure S11: Similarity scores of different attributes for Parma with a 25 m x 25 m resolution. Light colours represent smaller similarities.

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Target area: Piacenza 25

| Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.876	0.924	0.761	1
Rimini 25	1	0.962	0.712	0.89	1
RBSF 25	1	0.968	0.796	0.242	0.33
Parma 25	1	0.984	0.78	0.986	1
Paldau 25	1	0.791	0.662	0.931	1
Modena 25	1	0.946	0.745	0.934	1
Burgenland 25	1	0.84	0.683	0.878	1
Bologna 25	1	0.967	0.828	0.997	1

Similarity
1.0
0.5
0.0

Figure S12: Similarity scores of different attributes for Piacenza with a 25 m x 25 m resolution. Light colours represent smaller similarities.

Target area: Rimini 25

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.917	0.719	0.686	1
RBSF 25	1	0.994	0.664	0.218	0.33
Piacenza 25	1	0.963	0.712	0.901	1
Parma 25	1	0.948	0.793	0.888	1
Paldau 25	1	0.835	0.792	0.963	1
Modena 25	1	0.912	0.845	0.841	1
Burgenland 25	1	0.883	0.84	0.99	1
Bologna 25	1	0.932	0.754	0.898	1

Similarity
1.0
0.5
0.0

Figure S13: Similarity scores of different attributes for Rimini with a 25 m x 25 m resolution. Light colours represent smaller similarities.
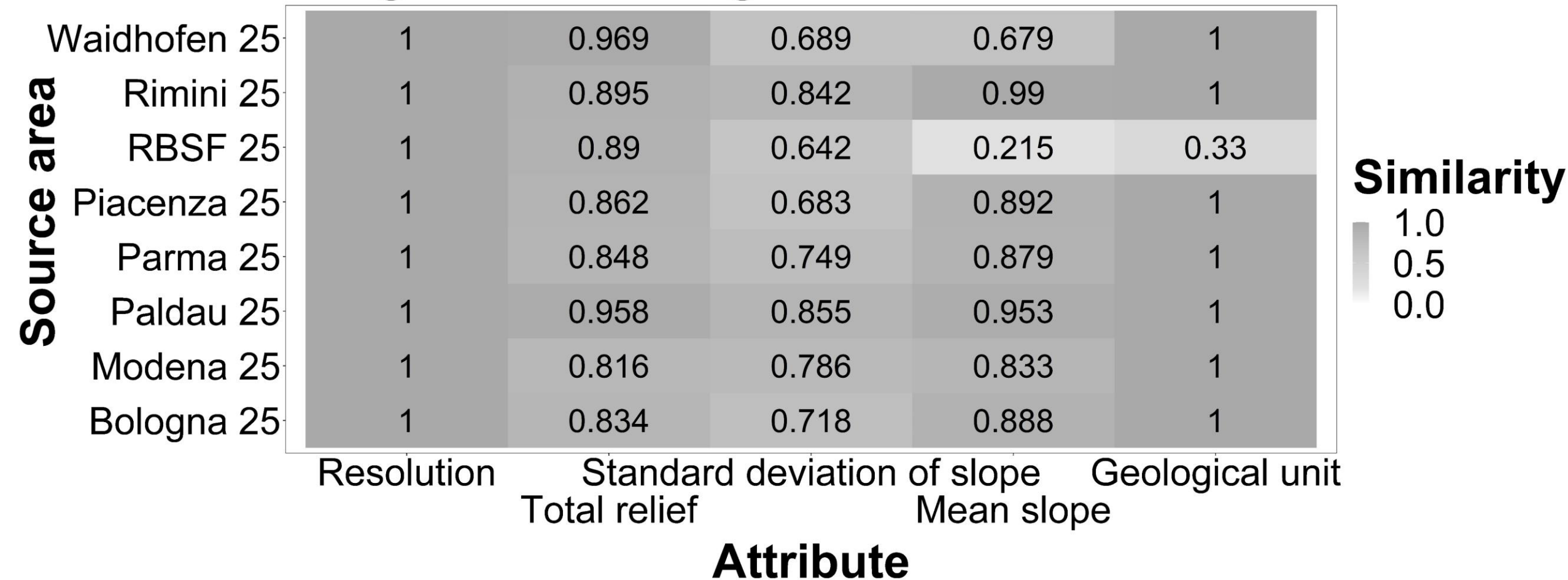
Figure S14: Similarity scores of different attributes for Burgenland with a 25 m x 25 m resolution. Light colours represent smaller similarities.
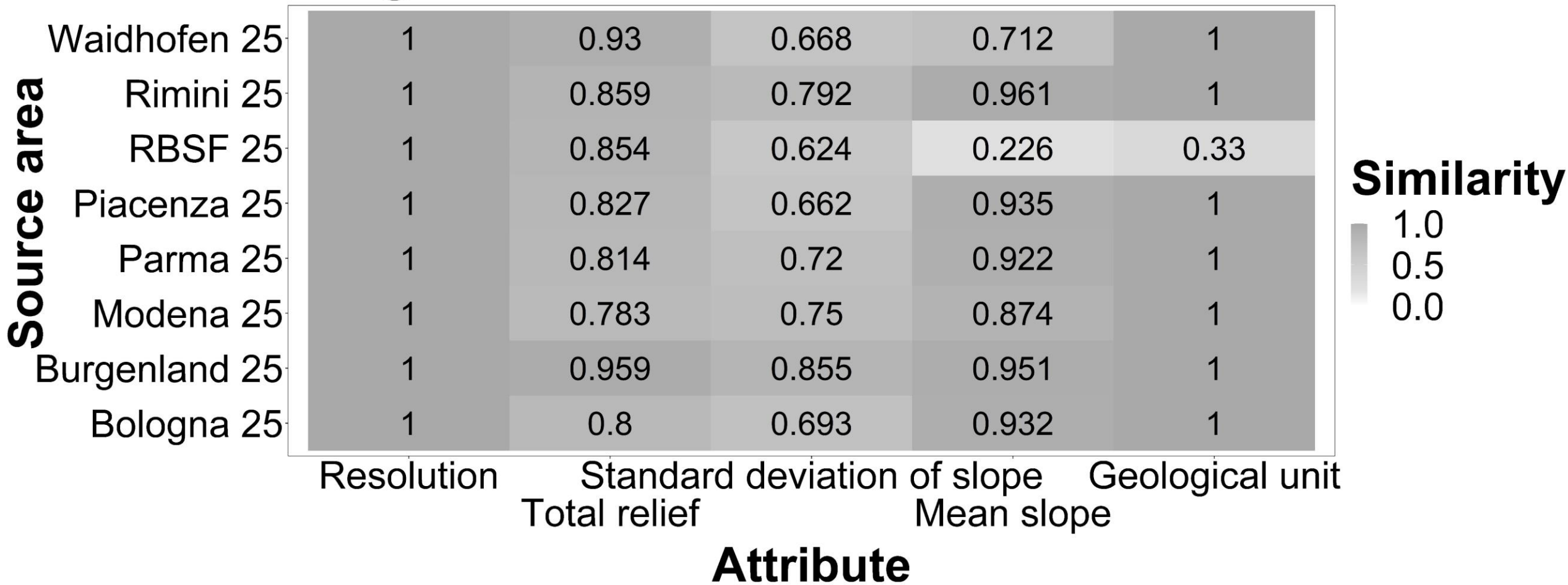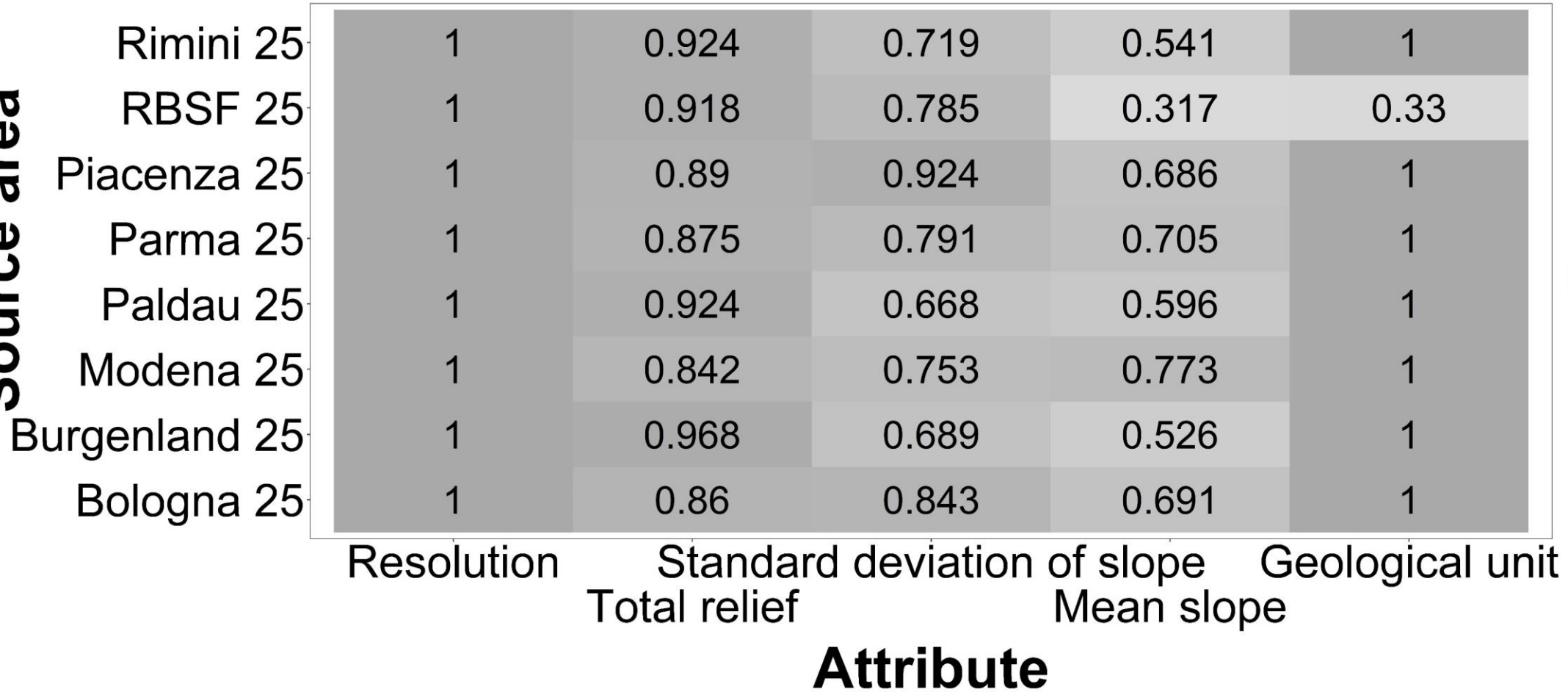
Figure S15: Similarity scores of different attributes for Paldau with a 25 m x 25 m resolution. Light colours represent smaller similarities.

Target area: Waidhofen 25

Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Rimini 25	1	0.924	0.719	0.541	1
RBSF 25	1	0.918	0.785	0.317	0.33
Piacenza 25	1	0.89	0.924	0.686	1
Parma 25	1	0.875	0.791	0.705	1
Paldau 25	1	0.924	0.668	0.596	1
Modena 25	1	0.842	0.753	0.773	1
Burgenland 25	1	0.968	0.689	0.526	1
Bologna 25	1	0.86	0.843	0.691	1

Similarity
1.0
0.5
0.0

Attribute

Figure S16: Similarity scores of different attributes for Waidhofen with a 25 m x 25 m resolution. Light colours represent smaller similarities.

Target area: RBSF 25

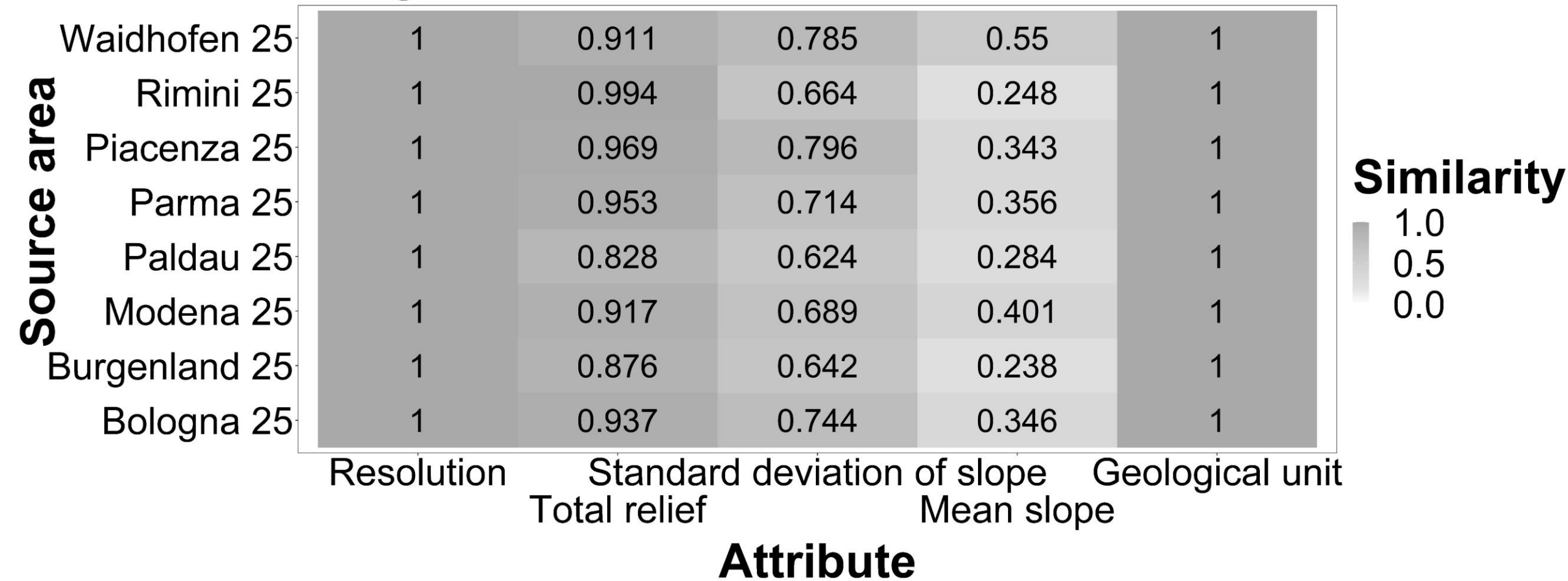| Source area	Resolution	Total relief	Standard deviation of slope	Mean slope	Geological unit
Waidhofen 25	1	0.911	0.785	0.55	1
Rimini 25	1	0.994	0.664	0.248	1
Piacenza 25	1	0.969	0.796	0.343	1
Parma 25	1	0.953	0.714	0.356	1
Paldau 25	1	0.828	0.624	0.284	1
Modena 25	1	0.917	0.689	0.401	1
Burgenland 25	1	0.876	0.642	0.238	1
Bologna 25	1	0.937	0.744	0.346	1

Similarity
1.0
0.5
0.0

Figure S17: Similarity scores of different attributes for RBSF with a 25 m x 25 m resolution. Light colours represent smaller similarities.