

Table Appendix S9: Phylogenetic β -diversity output statistics. Table summarizing results of decomposed UniFrac index for each summit pair with all species collected above treeline (All Alpine) or just species found on talus slopes (Talus): observed UniFrac distance (UniFrac), observed component of UniFrac distance describing species replacement (UniFrac Turn), observed component of UniFrac distance describing species nestedness (UniFrac PD), standardized effect size (SES) comparing observed UniFrac distance to expected from shuffling the phylogeny tips (SES UniFrac), SES component of UniFrac distance describing species replacement (SES UniFrac Turn), SES component of UniFrac distance describing species nestedness (SES UniFrac PD).

Summit Pair	All Alpine: betadiv UniFrac	All Alpine: betadiv UniFrac Turn	All Alpine: betadiv UniFrac PD	All Alpine: betadiv SES UniFrac	All Alpine: betadiv SES UniFrac Turn	All Alpine: betadiv SES UniFrac PD	Talus: betadiv UniFrac	Talus: betadiv UniFrac Turn	Talus: betadiv UniFrac PD	Talus: betadiv SES UniFrac	Talus: betadiv SES UniFrac Turn	Talus: betadiv SES UniFrac PD
Braxton Peak-Castle Peak	0.6098	0.3731	0.2367	1.4935	0.9043	0.1169	0.6098	0.3731	0.2367	1.5798	1.0470	0.0833
Braxton Peak-D.O. Lee Peak	0.5489	0.4354	0.1135	-0.2457	0.4801	-0.7922	0.5621	0.5550	0.0071	0.1443	0.7883	-1.1166
Braxton Peak-Horstmann Peak	0.5486	0.3679	0.1807	0.8272	-0.2599	1.2909	0.5486	0.3679	0.1807	0.8545	-0.1443	1.2041
Braxton Peak-Hyndman Peak	0.6036	0.3997	0.2039	0.7006	1.5160	-1.1751	0.4837	0.4503	0.0334	0.0851	1.2575	-1.4993
Braxton Peak-Mount Cramer	0.5324	0.4164	0.1160	0.9571	0.7468	-0.0061	0.5324	0.4164	0.1160	1.0937	0.8204	-0.0004
Braxton Peak-Salzbürger Spitzl	0.6556	0.4052	0.2504	1.4273	0.8385	-0.0018	0.6199	0.4274	0.1925	1.4004	0.5424	0.5462
Braxton Peak-Snowyside Peak	0.6132	0.4871	0.1261	1.7346	1.0148	0.5141	0.6132	0.4871	0.1261	1.7446	1.0619	0.4455
Braxton Peak-Thompson Peak	0.4468	0.2594	0.1874	-0.6248	-0.5907	0.2000	0.5241	0.3703	0.1538	0.1343	-0.1194	0.2903
Castle Peak-D.O. Lee Peak	0.5781	0.4748	0.1033	1.9040	1.0528	1.3780	0.6352	0.4071	0.2280	1.9567	0.6650	0.8853
Castle Peak-Horstmann Peak	0.4261	0.3447	0.0814	-0.4308	0.2305	-0.6838	0.4261	0.3447	0.0814	-0.1536	0.4683	-0.7116
Castle Peak-Hyndman Peak	0.5016	0.4778	0.0238	1.2227	1.8617	-1.1944	0.5391	0.2996	0.2395	2.2074	0.0440	2.7218
Castle Peak-Mount Cramer	0.4226	0.2569	0.1657	-0.1331	-0.6129	0.6610	0.4226	0.2569	0.1657	0.0832	-0.4028	0.6100
Castle Peak-Salzbürger Spitzl	0.3999	0.3529	0.0470	-0.6542	-0.3283	-0.3739	0.3623	0.3293	0.0330	-0.8101	-0.1924	-0.7511
Castle Peak-Snowyside Peak	0.4140	0.3047	0.1093	0.3052	0.7134	-0.5538	0.4140	0.3047	0.1093	0.4453	0.8543	-0.5573
Castle Peak-Thompson Peak	0.5552	0.4677	0.0875	1.3725	0.9063	0.4459	0.6709	0.2587	0.4121	1.3139	0.3006	0.5193
D.O. Lee Peak-Horstmann Peak	0.5789	0.5396	0.0393	0.6917	1.1862	-0.9473	0.6469	0.5091	0.1378	0.9458	-0.2255	1.7686
D.O. Lee Peak-Hyndman Peak	0.4275	0.3099	0.1177	0.1396	0.0179	0.1177	0.4209	0.3701	0.0508	-0.3936	0.3138	-0.7946
D.O. Lee Peak-Mount Cramer	0.5550	0.5530	0.0020	0.3899	1.3044	-1.4085	0.6106	0.5112	0.0993	0.9724	0.3974	0.6929
D.O. Lee Peak-Salzbürger Spitzl	0.4371	0.2124	0.2247	0.5245	-1.4484	2.6763	0.5328	0.2553	0.2775	0.9539	-1.0499	2.3962
D.O. Lee Peak-Snowyside Peak	0.6339	0.6128	0.0210	1.9991	2.4704	-1.2922	0.6504	0.5316	0.1188	2.4294	1.5418	1.0243
D.O. Lee Peak-Thompson Peak	0.4992	0.4797	0.0195	0.7216	1.2282	-0.8802	0.4761	0.3144	0.1617	-0.4655	-0.0862	-0.2744
Horstmann Peak-Hyndman Peak	0.4971	0.4574	0.0397	-0.1188	1.8613	-2.2060	0.5671	0.4404	0.1268	1.2101	0.4799	0.8389
Horstmann Peak-Mount Cramer	0.3658	0.2928	0.0730	-1.1268	-1.3259	0.3528	0.3658	0.2928	0.0730	-0.9409	-1.0341	0.2459
Horstmann Peak-Salzbürger Spitzl	0.5250	0.4189	0.1061	0.5927	1.1878	-0.9424	0.4943	0.4539	0.0403	0.5559	0.9464	-0.6732
Horstmann Peak-Snowyside Peak	0.3899	0.3692	0.0206	-0.2901	0.1975	-0.8314	0.3899	0.3692	0.0206	-0.1441	0.3949	-0.8942
Horstmann Peak-Thompson Peak	0.4467	0.4148	0.0319	-0.7663	-0.0398	-0.8466	0.6409	0.3135	0.3275	0.7290	-0.7037	1.4868
Hyndman Peak-Mount Cramer	0.5216	0.4272	0.0944	0.7095	1.7718	-1.4718	0.5574	0.4864	0.0710	1.4185	1.2304	0.0213

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Summit Pair	All Alpine: betadiv UniFrac	All Alpine: betadiv UniFrac Turn	All Alpine: betadiv UniFrac PD	All Alpine: betadiv SES UniFrac	All Alpine: betadiv SES UniFrac Turn	All Alpine: betadiv SES UniFrac PD	Talus: betadiv UniFrac	Talus: betadiv UniFrac Turn	Talus: betadiv UniFrac PD	Talus: betadiv SES UniFrac	Talus: betadiv SES UniFrac Turn	Talus: betadiv SES UniFrac PD
Hyndman Peak-Salzbürger Spitzl	0.3743	0.2866	0.0877	0.5554	0.1361	0.5478	0.4355	0.1680	0.2675	1.2188	-1.6459	4.6351
Hyndman Peak-Snowyside Peak	0.5942	0.5507	0.0435	1.6593	3.2283	-2.2854	0.5891	0.4895	0.0995	2.3221	1.8862	0.1765
Hyndman Peak-Thompson Peak	0.5541	0.4927	0.0614	2.2461	2.8215	-1.3299	0.4047	0.1169	0.2877	-0.7378	0.4936	-1.0359
Mount Cramer-Salzbürger Spitzl	0.5214	0.3404	0.1810	0.3199	-0.0727	0.3765	0.5001	0.3994	0.1007	0.1717	-0.2673	0.6692
Mount Cramer-Snowyside Peak	0.4792	0.4429	0.0363	0.6479	0.8911	-0.4693	0.4792	0.4429	0.0363	0.7798	1.0979	-0.5643
Mount Cramer-Thompson Peak	0.4628	0.4385	0.0242	0.9597	1.4713	-0.9205	0.6009	0.3215	0.2794	0.6034	-0.0807	0.5372
Salzbürger Spitzl-Snowyside Peak	0.4376	0.2747	0.1629	-0.7014	-0.2810	-0.2411	0.3860	0.3086	0.0773	-0.5124	-0.3488	-0.1345
Salzbürger Spitzl-Thompson Peak	0.6328	0.5314	0.1014	2.1590	1.6520	0.1021	0.6341	0.2095	0.4246	1.3714	-0.0968	1.0802
Snowyside Peak-Thompson Peak	0.5631	0.5536	0.0095	1.6815	2.2601	-1.2981	0.6748	0.4180	0.2568	1.8663	0.8948	0.3747