Additional file 1

Contact between the Siviez-Mischabel nappe and the Faisceau Vermiculaire in the Lüegelti borehole (Zermatt)
Drill core description

Exploratory drilling for the railway tunnel project between Zermatt and Täsch (Matterhorn Gotthard Bahn AG)
Drilling site location: 2'624'477 / 1'097'899; drilling direction (azimut): 343°N; inclination: 4-8°; depth: 443 m; diameter 47.5 mm; drilling method: core drilling; drilling date: 09.2022 - 12.2022

Drill core description after our own examination of the core samples (Adrien Pantet, Jean-Luc Epard, Marc Eichenberger and Christophe Jossevel 31.01.2023)
and data from the detailed drilling description (Rovina+Partner AG) available in the Valais cantonal cadastre of geological boreholes (https://geocadast.crealp.ch/index.php?lang=FR&view=sondage&mode=rapport&id=22569)
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Depth [m]	Lithology	*Comments*	Pictures (Additional file 2)	Proposed attributions		
				Series / Formation	Age	Tectonic Unit
0 - 47.4	Unconsolidated material: scree/rockfall deposits			Quaternary		
47.4 - 96.2	Chlorite-mica schists with graphite	*Quartz and calcite veins up to 5 cm*		Série Grise	Upper Jurassic - Upper Cretaceous	Tsaté nappe
96.2 - 100.5	Compact light to dark gray calcschists	*Quartz veins up to 3 cm*				
100.5 - 144.5	Chlorite-micaschists with graphite and garnet	*Quartz and calcite veins up to 5 cm*				
144.5 - 179.0	Compact light to dark gray calcschists	*Quartz veins up to 3 cm*				
179.0 - 181.0	Chlorite-micaschists with graphite and garnet	*Quartz and calcite veins up to 5 cm*				
181.0 - 228.9	Compact light to dark gray calcschists	*Quartz veins up to 3 cm*				
228.9 - 230.0	Prasinite					
230.0 - 242.6	Chlorite-micaschists with graphite and garnet	*Quartz and calcite veins up to 5 cm*				
242.6 - 243.5	Prasinite					
243.5 - 261.9	Chlorite-micaschists with graphite and garnet	*Quartz and calcite veins up to 5 cm*				
261.9 - 264.5	Prasinite					
264.5 - 278.4	Compact light to dark gray calcschists	*No trace of ophiolitic material, quartz veins up to 3 cm*		Série Rousse?	Cretaceous-Paleocene?	Mont Fort nappe?
278.4 - 278.6	Calcitic marble level	*Quartz veins up to 3 cm*				
278.6 - 285.0	Compact light to dark gray calcschists	*No trace of ophiolitic material*				
285.0 - 288.2	Compact light to dark gray calcschists	*No trace of ophiolitic material, abundant quartz veins up to 3 cm*				
288.2 - 288.4	Calcitic marble level					
288.4 - 291.5	Compact light to dark gray calcschists	*No trace of ophiolitic material, abundant quartz veins up to 3 cm*	Add. file 2 - b			
291.5 - 298.5	Calcschists and micaschists with graphite and garnet	*No trace of ophiolitic material, quartz and calcite veins up to 1 cm*				
298.5 - 302.4	Light-colored fine-grained calcitic marbles with some decimeter-thick calcschist levels			Faisceau Vermiculaire	Middle Triassic - Upper Jurassic	Mont Fort nappe
302.4 - 302.6	Marmorized breccias with cm-sized black dolomitic elements and calcitic matrix		Add. file 2 - c			
302.6 - 308.5	Light-colored fine-grained calcitic marbles					
308.5 - 313.8	Fine-grained dolomitic/calcitic marbles					
313.8 - 319.9	Fine-grained calcitic marble					
319.9 - 320.0	Dolomitic marble					
320.0 - 320.5	Calcitic marble					
320.5 - 321.0	Dolomitic marble					
321.0 - 322.5	Calcschist					
322.5 - 323.1	Dolomitic marble					
323.1 - 323.3	Calcschist					
323.3 - 324.5	Dolomitic/calcitic marble					
324.5 - 324.9	Calcschist					
324.9 - 326.0	Calcitic marble					
326.0 - 327.1	White pure quartzite with thin levels richer in phyllosilicates	*Tabular Quartzite*			Lower Triassic	
327.1 - 331.4	Light-colored quartzmicaschists with localy abundant levels or pockets of reddish (Fe?-)carbonates		Add. file 2 - d		(Lower?) Permian	
331.4 - 333.3	Cornieules / crushed and tectonized carbonates				Triassic - Jurassic	
333.3 - 334.5	Grey quartzitic calcschist	*No trace of ophiolitic material, supposed Série Rousse syncline*	Add. file 2 - e	Série Rousse	Cretaceous-Paleocene?	
334.5 - 338.0	Cornieules / crushed and tectonized carbonates, clasts of quartzschists, dolomites, etc. are recognizable	*Minerals: calcite, dolomite, quartz, micas (incl. biotite), chlorite, plagioclase, talc*	Add. file 2 - f	Faisceau Vermiculaire	Mesozoic	
338.0 - 338.3	Light-colored quartzmicaschist with chlorite and talc, and levels or pockets of reddish (Fe?-)carbonates	*Very abundant quartz veins up to 7 cm*		Moosalp Fm. / Col de Chassoure Fm.	Lower Permian	Siviez-Mischabel nappe
338.3 - 338.7		*Abundant quartz veins*				
338.7 - 339.0		*Very abundant pyrite crystals*	Add. file 2 - g			
339.0 - 361.1			Add. file 2 - h			
361.1 - 368.8	Dark chlorite schist with graphite and talc, with 0.2-1 m thick black graphitic schist levels		Add. file 2 - i	Törbel Fm. / Distulberg Fm. ?	Carboniferous / Cambrien?	
368.8 - 386.0	Sericite schist with chlorite, amphibole and talc	*Quartz-chlorite veins up to 6 cm*				
386.0 - 397.8	Paragneiss with chlorite and pyrite	*Pyrite-filled cracks*		Ergischhorn Complex	Proterozoic?	
397.8 - 398.4	Fine-grained amphibolite with pyrite					
398.4 - 401.4	Paragneiss with chlorite and pyrite	*Quartz veins up to 4 cm*				
401.4 - 401.6	Fine-grained amphibolite with pyrite					
401.6 - 438.5	Paragneiss with chlorite and pyrite	*Quartz or quartz-chlorite veins up to 5 cm*				
438.5 - 441.1	Fine-grained amphibolite with pyrite					
441.1 - 443.0	Paragneiss with chlorite and pyrite	*Quartz veins up to 5 cm*				