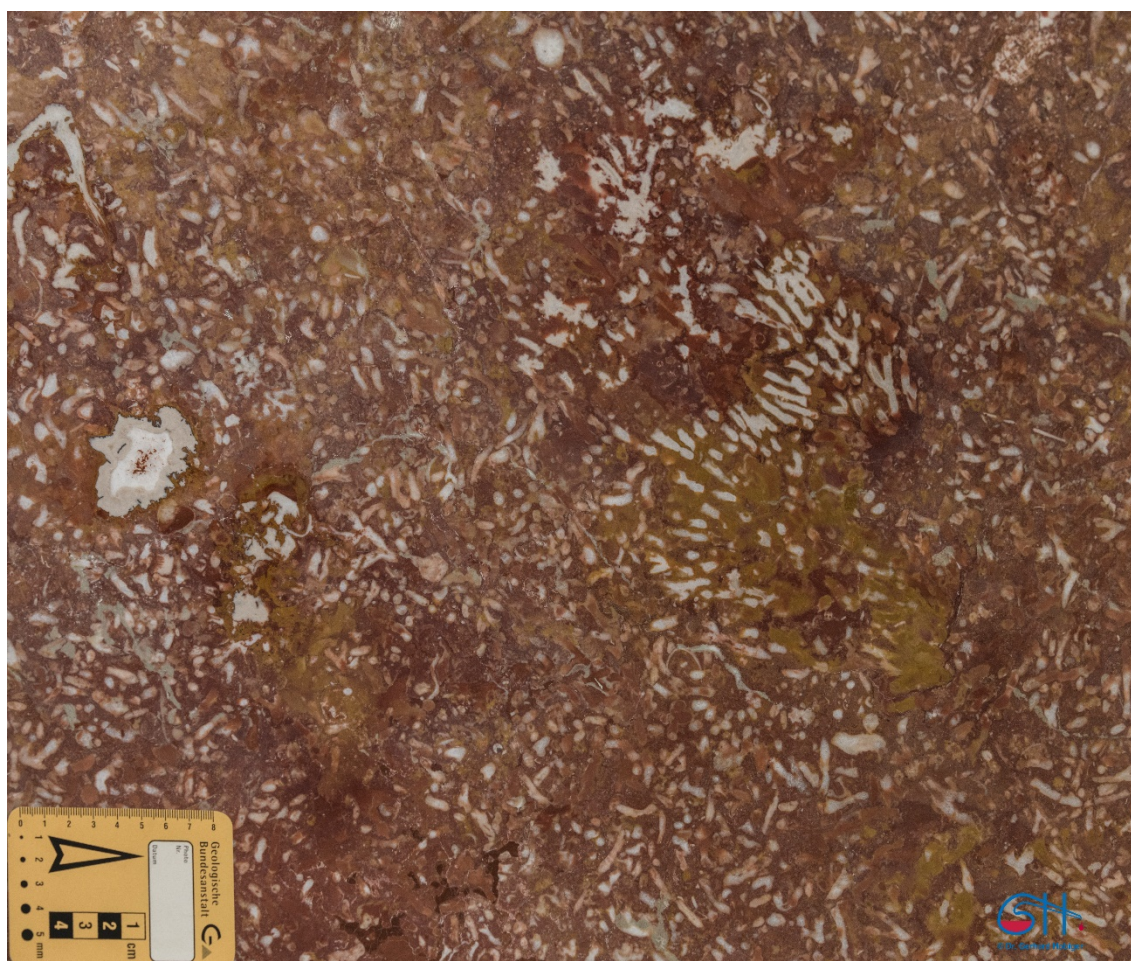


Adneter Rotgrau Tropf

Adneter Rot Tropf

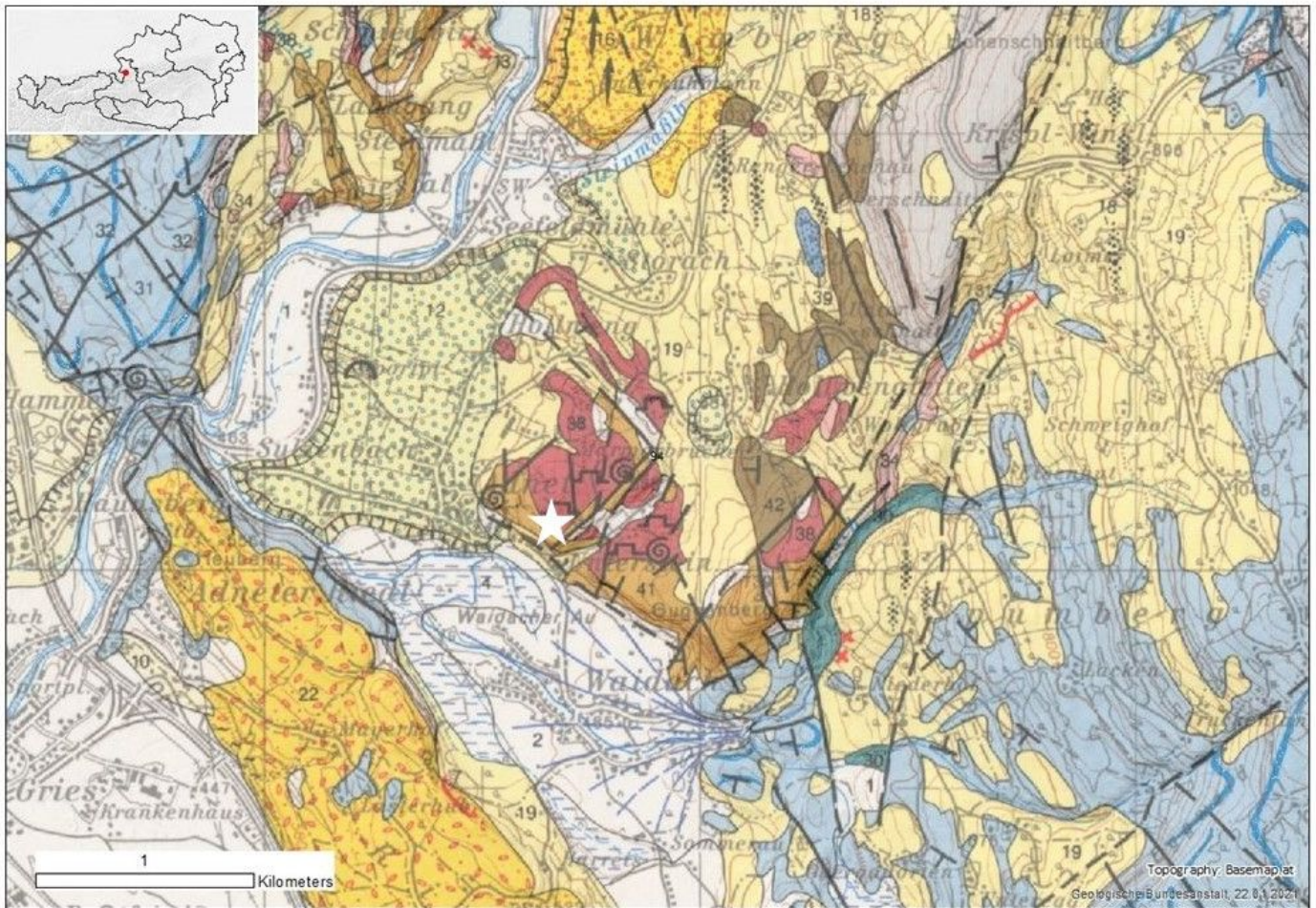
Rotgrautropf



Short description: red-white-spotted, thick-bedded to massive shallow water coral reef limestones, partly also reef debris

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
Commercial Limestone	Limestone	Red	Austria	Adnet/Salzburg	Adnet	Adnet

Geological setting



Geology: Adnet Rotgrau Tropf (orange signature on the map) is the oldest among the many varieties of Adnet limestones and represents the basement. It is a fossil-rich reef limestone, with a predominance of large corals being characteristic. Repeated emersions of the reef area occurred at the Triassic – Jurassic boundary and resulted in karstification phenomena. The resulting cavities in the reef structures, as well as fissures, were subsequently filled with the younger red sediments belonging to the Adnet Formation.

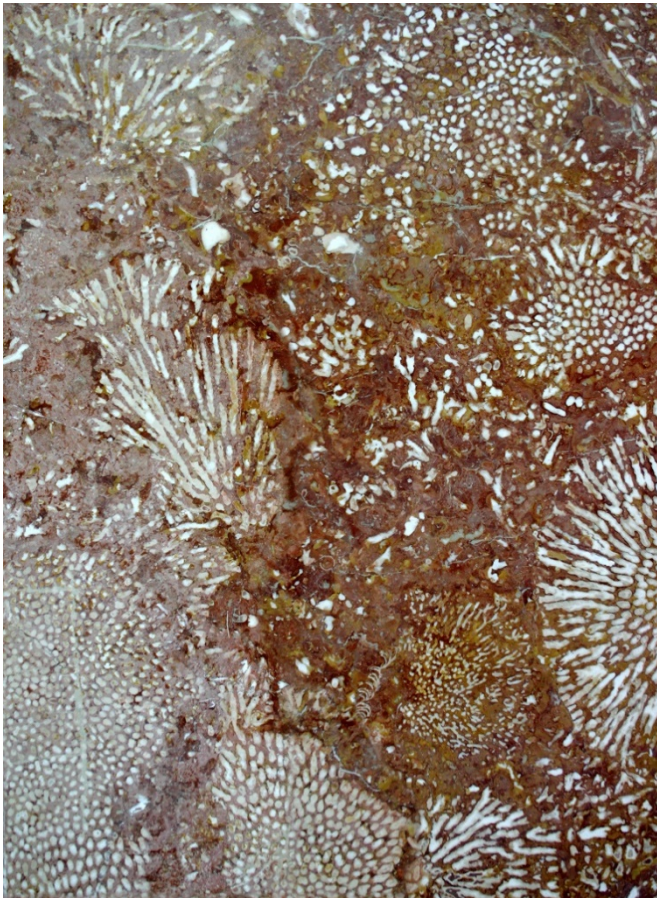
Production: The mining area comprises only very few quarries (white asterisk on the map) within the quarrying area east of Adnet and the limestones' thickness is in the scale of a few meters only. The rock has been used for many centuries. In the meantime, most of the quarries have been abandoned; one of these former quarries (Kirchenbruch) is now protected as a natural monument.

Geological age: Rhaetian (Upper Triassic)

Geological unit: Adnet Formation (URI: <http://resource.geolba.ac.at/GeologicUnit/421>)

Application, use and heritage

Description: Adneter Rotgrau Tropf has been used for numerous historic buildings in Salzburg and Vienna. It was used together with other Adnet marbles in famous stonemasonry masterpieces, e.g. base of tomb of Emperor Frederick III in Saint Stephen's Cathedral Vienna (1469), and is used in numerous old churches (parts of altars, baptismal fonts, etc.) and for fountains (e.g. Donaunixenbrunnen Palais Ferstel /Café Central Vienna).



Description: Left: Example for the fantastic decorative effect in facings of this stone (photograph by G. Mandl). Right: Early Baroque column inside collegiate church Nonnberg in Salzburg presenting coral limestone and banded red and ochre interstitial sediment.

Petrography

Description:

Source of information:

Mineral composition

If no accurate number, use MM=main minerals, SM = Subordinate minerals, AM=accessory minerals

Mineral 1 (%)	Mineral 2 (%)	Mineral 3 (%)	Mineral 4 (%)	Mineral 5 (%)	Mineral 6 (%)	Mineral 7 (%)
Mineral 8 (%)	Mineral n (%)					

Source of information:

Physical properties

Apparent density (EN 1936) kg/m ³	Open porosity (EN 1936) % vol	Water absorption at atmospheric pressure (EN 13755) % wt	Uniaxial Compressive strength (EN 1926) MPa	Flexural strength under concentrated load (EN 12372) MPa

Real density (EN 1936) kg/m ³	Total porosity (EN 1936) % vol	Water absorption coefficient by capillary (EN 1925) (g/m ² x s ^{0,5})	Flexural strength under constant moment (EN 13161) MPa

Frost resistance (EN 12371)				
Technological Test (Test A)				Identification Test (Test B): Number of cycles completed prior to stone failure
Flexural strength (EN 12372) after freeze-thaw cycling, MPa	Number of cycles	Uniaxial compressive strength (EN 1926) after freeze-thaw cycling, MPa	Number of cycles	

Resistance to ageing by thermal shock (EN 14066)			
Change in dynamic modulus of elasticity (increase: +; decrease: -) %	Change in open porosity (increase: +; decrease: -) %	Change in ultrasound pulse velocity (increase: +; decrease: -) %	Change in flexural strength under conc. load (increase: +; decrease: -) %

Abrasion resistance (EN 14157)			Resistance to salt crystallisation (EN 12370)	Breaking load at dowel hole (EN 13364)	
Method A - Wide Wheel Abrasion Test, mm	Method B - Böhme Abrasion Test, cm ³ / 50cm ²	Method C - Amsler Abrasion Test, mm	Change in mass (increase: +; decrease: -), %	Breaking load, N	Thickness of the test specimens, mm

Slip resistance by means of the pendulum tester (EN 14231 / CEN/TS 16165)			Rupture energy (EN 14158), Joule	Thermal Conductivity (EN 1745), W/m·K
Tested surface finish	Slip Resistance Value — SRV			
	Dry test condition	Wet test condition		

Source of information:

Chemical properties

Main elements

SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	TiO ₂ (%)	MgO (%)	CaO (%)	Na ₂ O (%)	K ₂ O (%)	MnO (%)	P ₂ O ₅ (%)	SO ₃ (%)	LOI (%)
0,13	0,08	0,04	0,01	0,83	55,24	0,05	0,05	0,02	0,21	0,1	43,4

Trace elements

V (ppm)	Cr (ppm)	Mn (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)
< 15	20		< 5	7	10	8	0,34
Sr (ppm)	Cd (ppm)	Ba (ppm)	Pb (ppm)	Be (ppm)	Rb (ppm)	Bi (ppm)	U (ppm)
	< 0,8		19				
Sc (ppm)	Y (ppm)	Th (ppm)	Sb (ppm)	Ta (ppm)	Nb (ppm)	Zr (ppm)	Sn (ppm)
Ag (ppm)	B (ppm)	Mo (ppm)	W (ppm)	Ga (ppm)	Ge (ppm)	Se (ppm)	Cs (ppm)
< 0,8		< 5					
Tl (ppm)							

REE

La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)
Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)		

Methods applied and source of information: average value from 5 samples; analysis of major, minor and selected trace elements: energy-dispersive X-ray fluorescence analysis; gravimetric determination of the loss on ignition; Geological Survey of Austria (GBA)

Sources of more information

Type of information	Name of provider	URL
This data sheet	Geological Survey of Austria (GBA)	https://www.geologie.ac.at
Non-commercial directory		
Commercial directory		
Scientific publication		
Other publication		

Bernecker, M., Weidlich, O. & Flügel, E. (1999): Response of Triassic reef coral communities to sea-level fluctuations, storms and sedimentation: evidence from a spectacular outcrop (Adnet, Austria).- *Facies*, 40, pp. 229-280, Erlangen.

Böhm, F. (2003): Lithostratigraphy of the Adnet Group (Lower to Middle Jurassic, Salzburg, Austria).- In: Piller, W. E. (Hrsg.): *Stratigraphia Austriaca*, Österreichische Akademie der Wissenschaften, Schriftenreihe der Erdwissenschaftlichen Kommission, 16, S. 231-268, 16 Abb., Wien.

Dorner, R., Höfling, R. & Lobitzer, H. mit Beiträgen von Feitzinger, G., Svobodová, M. & Svábenická, L. (2009): Nördliche Kalkalpen in der Umgebung Salzburgs (Exkursion H am 17. April 2009).- *Jahresbericht Mitteilungen oberrheinischer geologischer Verein*, N.F. 91, S. 317 - 366, 25 Abb., Stuttgart.

Gawlick, H.-J., Missioni, S., Schlaginweit, F., Suzuki, H., Frisch, W., Krystyn, L., Blau, J. & Lein, R. (2009): Jurassic Tectonostratigraphy of the Austroalpine Domain.- *Jurassic Austroalpine, Stratigraphia Austriaca. Journal of Alpine Geology*, 50, 1-152, 74 Abb., Wien.

Kieslinger, A. (1963): Die nutzbaren Gesteine Salzburgs.- *Mitteilungen der Gesellschaft für Salzburger Landeskunde: Ergänzungsband*, xi+435 S., Bergland-Buch, Salzburg.

Kretschmer, F. (1990): Marmor aus Adnet.- *Heimatsbuch Adnet*, 1. Bd., 332 S., Salzburger Bildungswerk, Adnet.

Plöckinger, B. mit Beiträgen von Brandecker, H., Leditzky, H.P., Maurin, V., Tichy, G. & van Husen, D. (1990): Erläuterungen zur Geologischen Karte der Republik Österreich 1:50.000 Blatt 94 Hallein.- 76 S., 8 Abb., 2 Taf., Geologische Bundesanstalt, Wien.

Schäfer, P. & Senowbari-Daryan, B. (1981): Facies Development and Paleoecologic Zonation of four Upper Triassic Patch-Reefs, Northern Calcareous Alps near Salzburg.- *SEPM Special Publication No. 30*, S. 241-259, 10 Abb., 1 Taf., Tulsa.

Uhlir, C. F. (Herausgeber) & Hauer, K. (Beitrag) (2011): Adneter Marmor: Entstehung, Material, Abbau, Geschichte und seine Bedeutung als Kulturerbe.- *Books on Demand*, 74 S., Norderstedt.

Uhlir, C. (CHC Research Group for Archaeometry and Cultural Heritage Computing) (2013): Project Historic Quarries.- Supported by the Culture (2007 - 2013) programme of the European Union. Historic quarries is co-organized by CHC University of Salzburg and additional institutes.- <http://hq.chc.sbg.ac.at/>

Wagreich, M., Böhm, F. & Lobitzer, H. (1996): Sedimentologie des kalkalpinen Mesozoikums in Salzburg und Oberösterreich (Jura, Kreide) Exkursion B1.- *Exkursionsführer SEDIMENT'96*, 11. Sedimentologentreffen, Wien, 1996, BGBA Nr. 33, 58 S., 35 Abb., 1 Tab., 1 Taf., Wien.

Picture of stone surfaces: Source: Geological Survey of Austria, Wien; Stone slabs, Foto: Gerhard Hobiger

Geological map: Plöckinger, B. (1987): *Geologische Karte der Republik Österreich 1:50.000 Blatt 94 Hallein*.- 1 Bl., Geologische Bundesanstalt, Wien.

Topographic map: Basemap.at (<https://basemap.at>)

Compiled by:	Geological Survey of Austria (GBA) https://www.geologie.ac.at	 Geologische Bundesanstalt
---------------------	---	--