



CO₂-rich groundwater in Bad Peterstal-Griesbach

Bad Peterstal-Griesbach is a small town in SW Germany. Its groundwater is mineral- and CO₂-rich, officially classified as Heilwasser, and used in various healing treatments (Hänel, 2020).

Anomalies

Analyses of the water in Bad Peterstal-Griesbach (n = 39) show CO₂-concentrations of at least 350 mg/l, and on average 1860 mg/l (Käb and Käb, 2008). This is in all cases above the threshold value of 250 mg/l to be classified as Sauerbrunnen (Weertz and Weertz, 2007). A maximum temperature of 20 °C is observed, and about one third of the temperature observations (10 of 27) are higher than 12°C (Käb and Käb, 2008), the maximum temperature expected for shallow groundwater, indicating the slightly thermal anomalous nature of the water.

In Bad Peterstal-Griesbach, meteoric water infiltrates in disturbed zones of the "Grundgebirge" and circulates at quite shallow levels through joints and fissures. The fault zone central in the valley, along which CO₂ from the nearby degassing volcanic field could rise, is thought responsible for the enriched CO₂-signature of the groundwater (Käb & Käb, 2008).

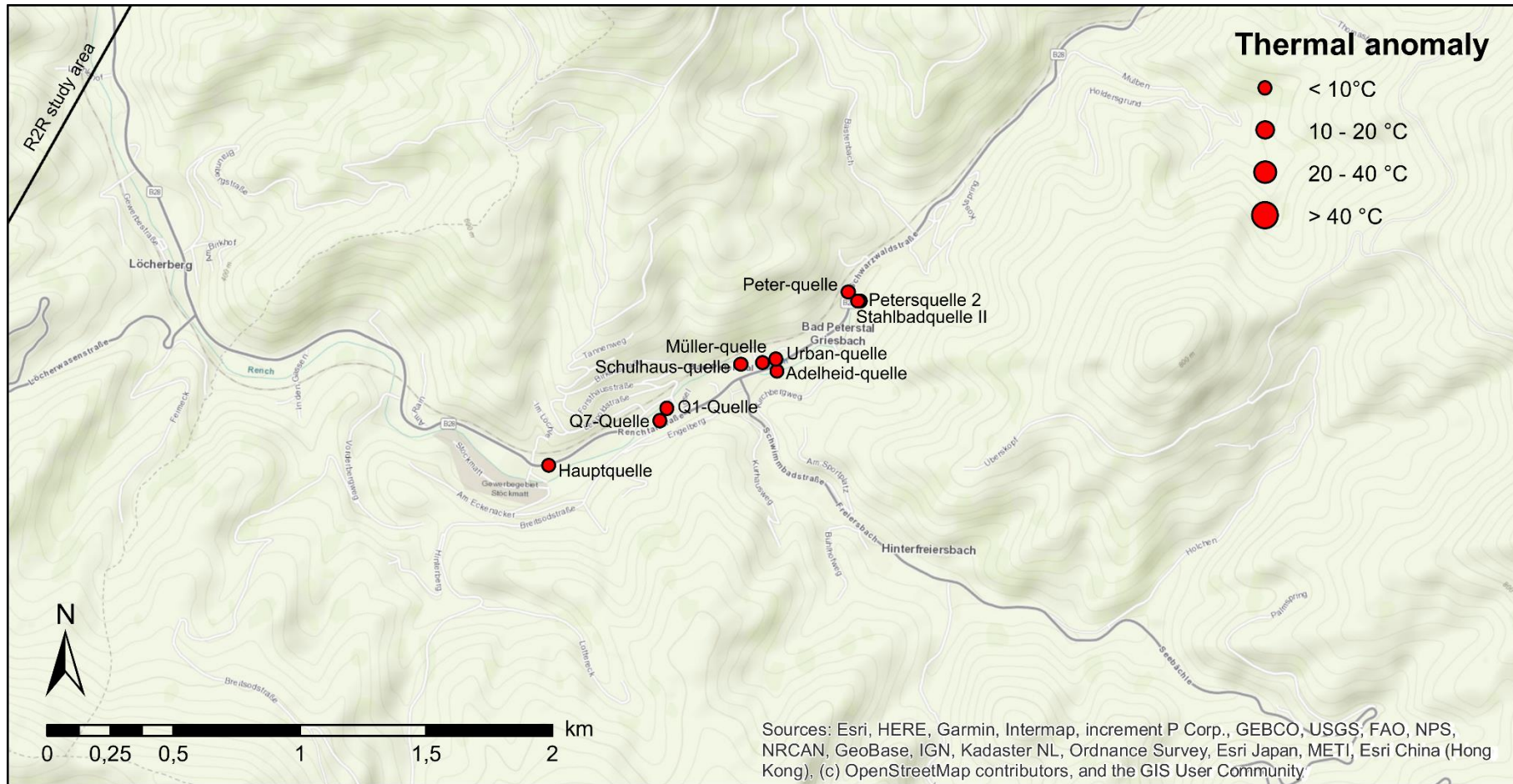


Figure 1: Thermal anomalies in Bad Peterstal and Bad Freyersbach

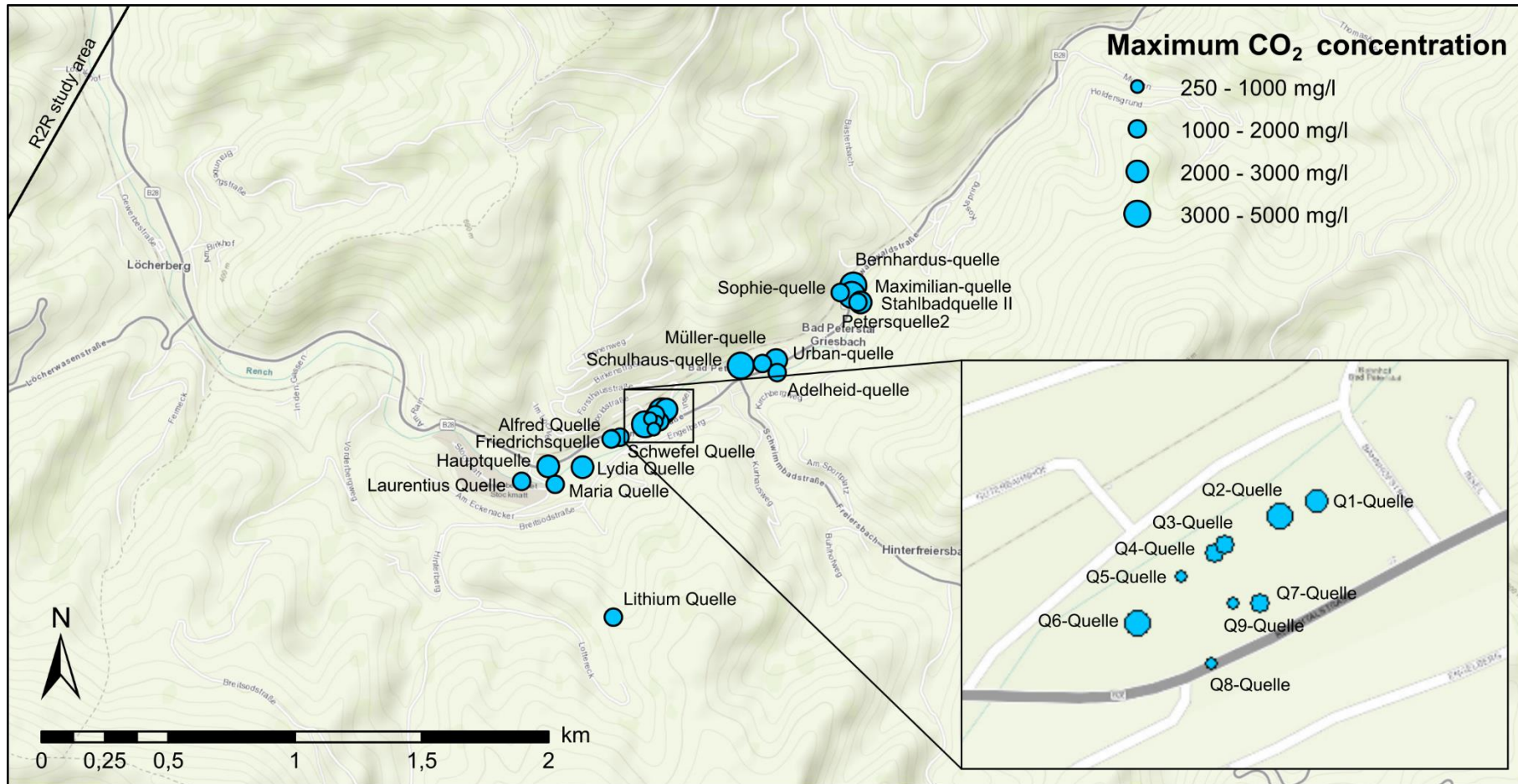


Figure 2: CO₂-rich groundwater in Bad Peterstal and Bad Freyersbach

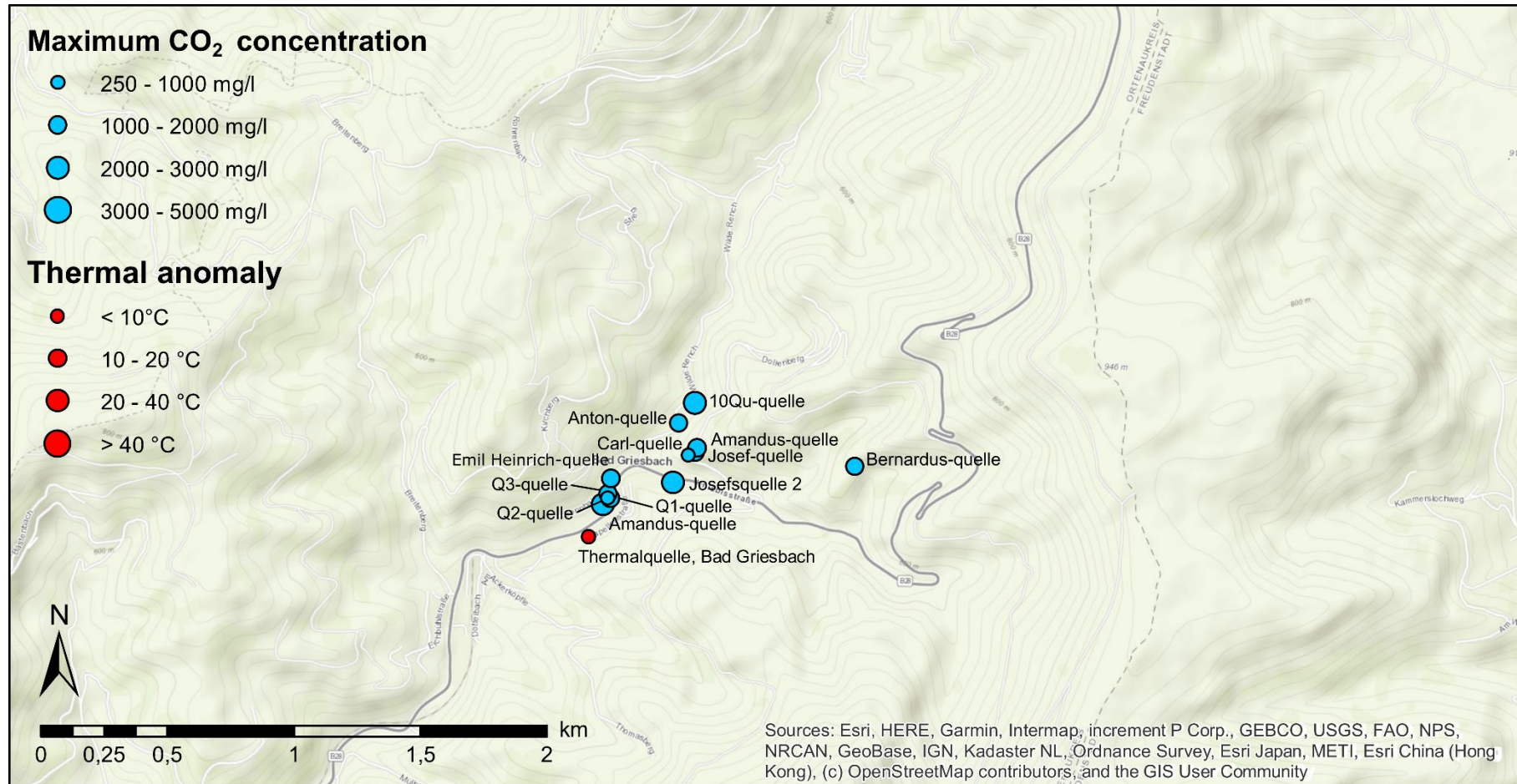


Figure 3: Thermal anomaly and CO₂-rich water in Bad Griesbach



Data

ID	Coordinates	T	Depth	TDS°	Cl	Na	SO ₄	Free CO ₂	He	³ He/ ⁴ He	Analysis year	References
		°C	m	g/l	mg/l	mg/l	mg/l	mg/l	ppmv			
Laurentius Quelle, Bad Freyersbach	48°25'32" North 08°11'40" East	10.8	39	3.02				1540			1976	Käβ and Käβ (2008)
Maria Quelle, Bad Freyersbach	48°25'31" North 08°11'46" East	9.7	34	2.22				1046			1976	Käβ and Käβ (2008)
Hauptquelle, Bad Freyersbach	48°25'34" North 08°11'45" East	13.7	26	5.34				2531			1976	Käβ and Käβ (2008)
Lydia Quelle, Bad Freyersbach	48°25'34" North 08°11'52" East	11.6	59	0.04				2240			1976	Käβ and Käβ (2008)
Alfred Quelle, Bad Freyersbach	48°25'38" North 08°11'57" East	14.7		3.00				1049			1976	Käβ and Käβ (2008)
Friedrichsquelle, Bad Freyersbach	48°25'38" North 08°11'57" East	14.4		4.30				1435			1976	Käβ and Käβ (2008)
Lithium Quelle, Bad Freyersbach	48°25'14" North 08°11'58" East	15.8		3.72				1185			1976	Käβ and Käβ (2008)
Schwefel Quelle, Bad Freyersbach	48°25'38" North 08°11'59" East	18.1		2.21				1240			1976	Käβ and Käβ (2008)
Q8-Quelle, Bad Freyersbach	48°25'39" North 08°12'05" East	10	34	0.95				350			1976	Käβ and Käβ (2008)
Q6-Quelle, Bad Freyersbach	48°25'40" North 08°12'04" East	11.7	34	6.89				3490			1976	Käβ and Käβ (2008)
Q5-Quelle, Bad Freyersbach	48°25'40" North 08°12'05" East			1.16				398			1976	Käβ and Käβ (2008)
Q4-Quelle, Bad Freyersbach	48°25'41" North 08°12'06" East	9.5		4.80				1760			1976	Käβ and Käβ (2008)
Q9-Quelle, Bad Freyersbach	48°25'40" North 08°12'06" East	10.9	47	1.87				648			1976	Käβ and Käβ (2008)
Q3-Quelle, Bad Freyersbach	48°25'41" North 08°12'06" East	11		5.17				1750			1976	Käβ and Käβ (2008)



Q7-Quelle, Bad Freyersbach	48°25'40" North 08°12'07" East	12.1	39	3.26				1998			1976	Käβ and Käβ (2008)
Q2-Quelle, Bad Freyersbach	48°25'41" North 08°12'07" East	4.6	98	6.76				3465			1976	Käβ and Käβ (2008)
Q1-Quelle, Bad Freyersbach	48°25'42" North 08°12'08" East	15.4	100	4.92				2552			1976	Käβ and Käβ (2008)
Schulhaus-quelle, Bad Peterstal	48°25'48" North 08°12'23" East	14.4	99	7.19				4230			1976	Käβ and Käβ (2008)
Müller-quelle, Bad Peterstal	48°25'48" North 08°12'27" East	13.4	24	3.67				1970			1976	Käβ and Käβ (2008)
Adelheid-quelle, Bad Peterstal	48°25'47" North 08°12'30" East	15.6	26	2.21				1065			1976	Käβ and Käβ (2008)
Urban-quelle, Bad Peterstal	48°25'48" North 08°12'29" East	14.2	16	4.57				2740			1976	Käβ and Käβ (2008)
Maximilian-quelle, Bad Peterstal	48°25'57" North 08°12'44" East	11.3	23	6.12				3215			1976	Käβ and Käβ (2008)
Sophie-quelle, Bad Peterstal	48°25'58" North 08°12'42" East	11.7		3.00				1310			1976	Käβ and Käβ (2008)
Peter-quelle, Bad Peterstal	48°25'58" North 08°12'43" East	13.1		3.05				1770			1976	Käβ and Käβ (2008)
Bernhardus-quelle, Bad Peterstal	48°25'59" North 08°12'44" East	11.7	39	7.19				4230			1976	Käβ and Käβ (2008)
Petersquelle 2, Bad Peterstal	48°25'56" North 08°12'45" East	16.7		3.08	29	290	440	1900			1997	Käβ and Käβ (2008)
Stahlbadquelle II, Bad Peterstal	48°25'56" North 08°12'46" East	20		2.80	30.8	254.4	376	2734			1979	Käβ and Käβ (2008)
					30.1	314	492			?	Hänel (2020)	
Amandus-quelle, Bad Griesbach	48°27'04" North 08°14'16" East			0.48				2100			1976	Käβ and Käβ (2008)
Q1-quelle, Bad Griesbach	48°27'05" North 08°14'18" East			3.24				1450			1976	Käβ and Käβ (2008)



Q2-quelle, Bad Griesbach	48°27'05" North 08°14'17" East			1.09				500			1976	Käβ and Käβ (2008)
Q3-quelle, Bad Griesbach	48°27'05" North 08°14'17" East			2.80				1290			1976	Käβ and Käβ (2008)
									0.10		1992	Griesshaber et al. (1992)
Emil Heinrich-quelle, Bad Griesbach	48°27'07" North 08°14'18" East			2.69				1155			1976	Käβ and Käβ (2008)
Bernardus-quelle, Bad Griesbach	48°27'10" North 08°14'06" East			3.61				1870			1976	Käβ and Käβ (2008)
Anton-quelle, Bad Griesbach	48°27'15" North 08°14'31" East			3.22				1569			1976	Käβ and Käβ (2008)
Carl-quelle, Bad Griesbach	48°27'11" North 08°14'33" East			2.55				990			1976	Käβ and Käβ (2008)
Josef-quelle, Bad Griesbach	48°27'11" North 08°14'34" East			3.43				1470			1976	Käβ and Käβ (2008)
Amandus-quelle, Bad Griesbach	48°27'12" North 08°14'35" East			4.19				1430			1976	Käβ and Käβ (2008)
10Qu-quelle, Bad Griesbach	48°27'18" North 08°14'34" East			4.15				2500			1976	Käβ and Käβ (2008)
Josefsquelle 2, Bad Griesbach	48°27'07" North 08°14'30" East			1.52	13.2	126	334	2400			2004	Käβ and Käβ (2008)
Thermalquelle, Bad Griesbach	48°27'00" North 08°14'13" East	16.4		2.27	39	447	1320				2004	Käβ and Käβ (2008)

° TDS = Total Dissolved Solids

References

- Griesshaber, E., O'Nions, R.K., Oxburg, E.R., 1992. Helium and carbon isotope systematics in crustal fluids from the Eifel, the Rhine Graben and Black Forest, F.R.G. *Chemical Geology* 99, 213-235.
- Hänel, M., 2020. Wasserquellen-Atlas. <http://www.quellenatlas.eu/39994.html>
- Käβ, W., Käβ, H., 2008. *Deutsches Baderbuch*, 2 ed. Vereinigung für Bäder- und Klimakunde e.V., Stuttgart.
- Weertz, J., Weertz, E., 2007. Eifelbronnnetjes met een vulkanisch trekje. *Grondboor en Hamer* 2, 37-41.



Cite this source

Van Daele, J. & Ferket, H., 2021. CO₂-rich groundwater in Bad Peterstal-Griesbach [Fact sheet]. Flemish Planning Bureau for the Environment and Spatial Development (VPO).