



## Thermal CO<sub>2</sub>-water in Bad Neuenahr

Bad Neuenahr-Ahrweiler, located in the Ahr valley (East Eifel), is a well-known spa town. The water found in Bad Neuenahr is characterized by a (F-)Na-Mg-HCO<sub>3</sub>-signature and anomalous values of both temperature and CO<sub>2</sub>-content.

### Anomalies

The water temperature of the different “Quellen” in Bad Neuenahr varies between 14.8 to 52 °C, largely depending on the depth its extracted from, 17 to 377 m (Griesshaber et al., 1992; Hänel, 2020; Käß and Käß, 2008; Michel, 1997). This is slightly to very anomalous compared to the generally expected temperature of maximum 12 °C for shallow groundwater (< 500 m). Measured CO<sub>2</sub>-concentrations range from 900 to 3200 mg/l (Hänel, 2020; Käß and Käß, 2008; Michel, 1997), significantly higher than 250 mg/l, the criterium to be classified as “Sauerbrunnen” (Weertz and Weertz, 2007). The geological explanation for these geomanifestations can be found in the fissures located in the hinge zone of the Ahr-anticline, which allow thermal, CO<sub>2</sub>-rich water to rise relatively fast, occasionally even as intermittent geysers (Käß and Käß, 2008).



Figure 1: Thermal water in Bad Neuenahr

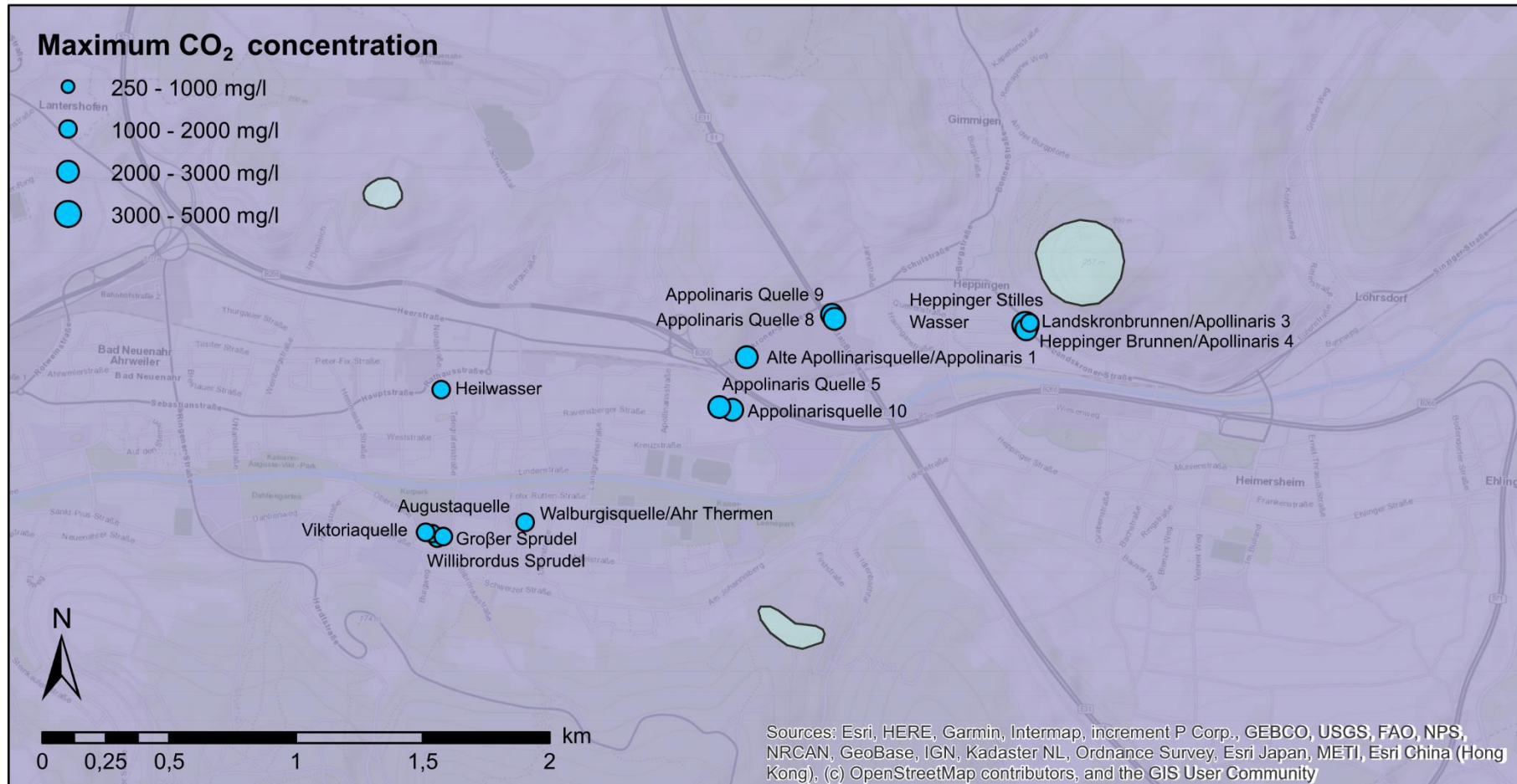


Figure 2: CO<sub>2</sub>-water in Bad Neuenahr



Data

ID	Coordinates	T	Depth	TDS°	Cl	Na	SO <sub>4</sub>	Free CO <sub>2</sub>	He	<sup>3</sup> He/ <sup>4</sup> He	Analysis year	References	
		°C	m	g/l	mg/l	mg/l	mg/l	mg/l	ppmv				
Walburgisquelle (Ahr Thermen)	50°32'29" North 07°08'27" East	38			37	251	36	1115			<1992	Griesshaber et al. (1992)	
										4.4	1992		
		52	359	2.52	42	341	42	900				1976	Michel (1997)
		38.8		1.89	37	250.6	35.6	1115				1985	Käβ and Käβ (2008)
		32		1.90				900				<2008	
Großer Sprudel	50°32'27" North 07°08'09" East	35									<1907	Hänel (2020)	
		36.1	90		62.46	328.2	59.53	1200			1930		
		32.8	90	1.95	67	296	60	1435			1985	Michel (1997)	
		32.2		1.92	67.9	295	65	1410			2005	Käβ and Käβ (2008)	
		36.1	91	2.00				1200			<2008		
Willibrordus Sprudel	50°32'27" North 07°08'10" East	23			21	68	25	1330			<1992	Griesshaber et al. (1992)	
										4.55	1992		
		34	377	3.26					1250		<2008	Käβ and Käβ (2008)	
		35									1907	Hänel (2020)	
34	377		52.99	293.1	55.42	1261			1930				
Viktoriaquelle	50°32'27" North 07°08'08" East	36	30	1.43				1370			<2008	Käβ and Käβ (2008)	
Augustaquelle	50°32'27" North 07°08'06" East	34	10	2.34				1262			<2008	Käβ and Käβ (2008)	
Bad Neuenahr Heilwasser	50°32'46" North 07°08'08" East			1.85				1330			<2008	Käβ and Käβ (2008)	
Alte Apollinarisquelle (Appollinaris 1)	50°32'52" North 07°09'11" East	24.6	17	3.42				2254			<2008	Käβ and Käβ (2008)	
Landskronbrunnen (Apollinaris 3)	50°32'58" North 07°10'10" East	15.2	50	3.61				1858			<2008	Käβ and Käβ (2008)	
Heppinger Brunnen (Apollinaris 4)	50°32'57" North 07°10'09" East	14.8	25	3.42				2266			<2008	Käβ and Käβ (2008)	



Appolinaris-Quelle 5	50°32'45" North 07°09'06" East											Käβ and Käβ (2008)
Appolinaris-Quellen 8 – 10	(8 & 9) 50°32'58" North 07°09'29" East	42			78	473	63	1013			<1992	Griesshaber et al. (1992)
	(10) 50°32'45" North 07°09'09" East	20.7 – 43	42 – 337	2.31 – 4.45				1574 – 2510		4.21	1992	
Heppinger Stilles Wasser	50°32'58" North 07°10'09" East			4.6				3200			<2008	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.
- Michel. G., 1997. *Mineral- und Thermalwässer - Allgemeine Balneogeologie*. Bornträger, Berlin Stuttgart.
- Weertz. J., Weertz. E., 2007. Eifelbronnetjes met een vulkanisch trekje. *Grondboor en Hamer* 2, 37-41.

### Cite this source

Van Daele, J. & Ferket, H., 2021. Thermal CO<sub>2</sub>-water in Bad Neuenahr [Fact sheet]. Flemish Planning Bureau for the Environment and Spatial Development (VPO).