



## Thermal and CO<sub>2</sub>-rich water in the area of Trier – Luxemburg

North of Trier, in the heart of the Mosel valley, multiple CO<sub>2</sub>-rich and/or thermal springs are observed. Water from the ‘Source de Rosport’ is commercially available under various names such as Rosport Classic, Rosport Blue, ... (Sources Rosport, 2021).

### Anomalies

On the one hand, all springs around Heckenmünster (\*), as well as the Rosport and Rahlingen geomanifestations in Luxemburg, show an enrichment in CO<sub>2</sub>, sometimes deduced visually and indicated by their name (e.g. Ralingen Sprudel, Salmthal Sauerbrunnen), but most often confirmed by geochemical analyses: 1355 – 2763 mg/l CO<sub>2</sub> (Heckenmünster, 2021). These quantitative data significantly exceed the threshold value of 250 mg/l CO<sub>2</sub> to be accounted as Sauerbrunnen (Weertz and Weertz, 2007). In most cases, these springs do not qualify as thermal springs (i.e.  $T < 12^{\circ}\text{C}$ , the expected maximum surface water temperature). On the other hand, the springs around Trier and Schweiz (\*), except for the Enscher Sauerbrunnen, all display a temperature higher than 12 °C, hence can be classified as thermal springs (Hänel, 2020). The positive temperature anomaly observed varies between 0.4 and 5.9 °C. In addition, 25 km more northeast, three springs further downstream in the Mosel valley<sup>(i)</sup>, are slightly anomalous as well, with a temperature between 12.5 and 15.2 °C (Hänel, 2020).

Large-scale NNE-SSW to EW-oriented faults are abundantly present in the southern part of Luxemburg, and are interpreted to provide a connection to the volcanic Eifel region. In the Rosport area, this fault and joint system plays an important role as it forms a pathway for the CO<sub>2</sub>-gas. Moreover, it was a crucial aspect in determining the exact drilling location that discovered this natural CO<sub>2</sub>-rich water in 1932 (Rosport, 2021). Early interpretations postulate that the CO<sub>2</sub>-gas originates from the extinct volcanoes in the Eifel area, migrates along the deep-seated faults, and eventually mixes with shallow groundwater that reaches the surface. Later, 20 to 30 km deep magmatic bodies below Rosport, in the periphery of the Eifel volcanism, were brought forward as the source of the CO<sub>2</sub> (Lucius, 1959). The CO<sub>2</sub>-springs more north-eastwards, in the Wittlicher valley, are lined up along the ‘Dreiser Störung’, the northwest boundary fault of the Rotliegend Graben (Heckenmünster, 2021). It has already been suggested in 1886 by dr. Leopold van Werveke that the same factors and processes as in Rosport are responsible for these springs as well (Rosport, 2021). No information was found in literature regarding the possible origin or explanation of the thermal anomalies in the area of Trier and Schweiz, nor of those further northeast.

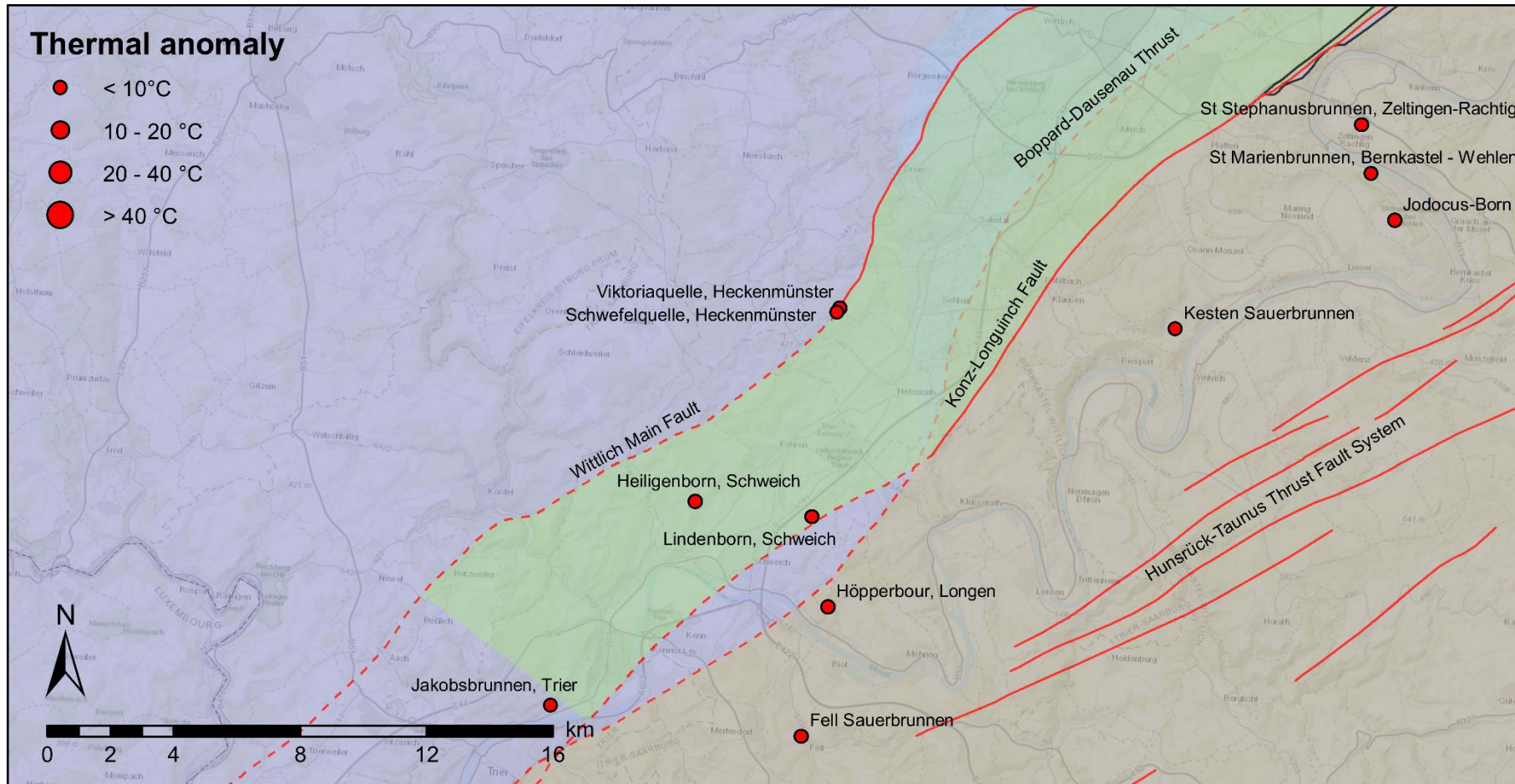


Figure 1: Thermal water in the area of Trier-Luxemburg

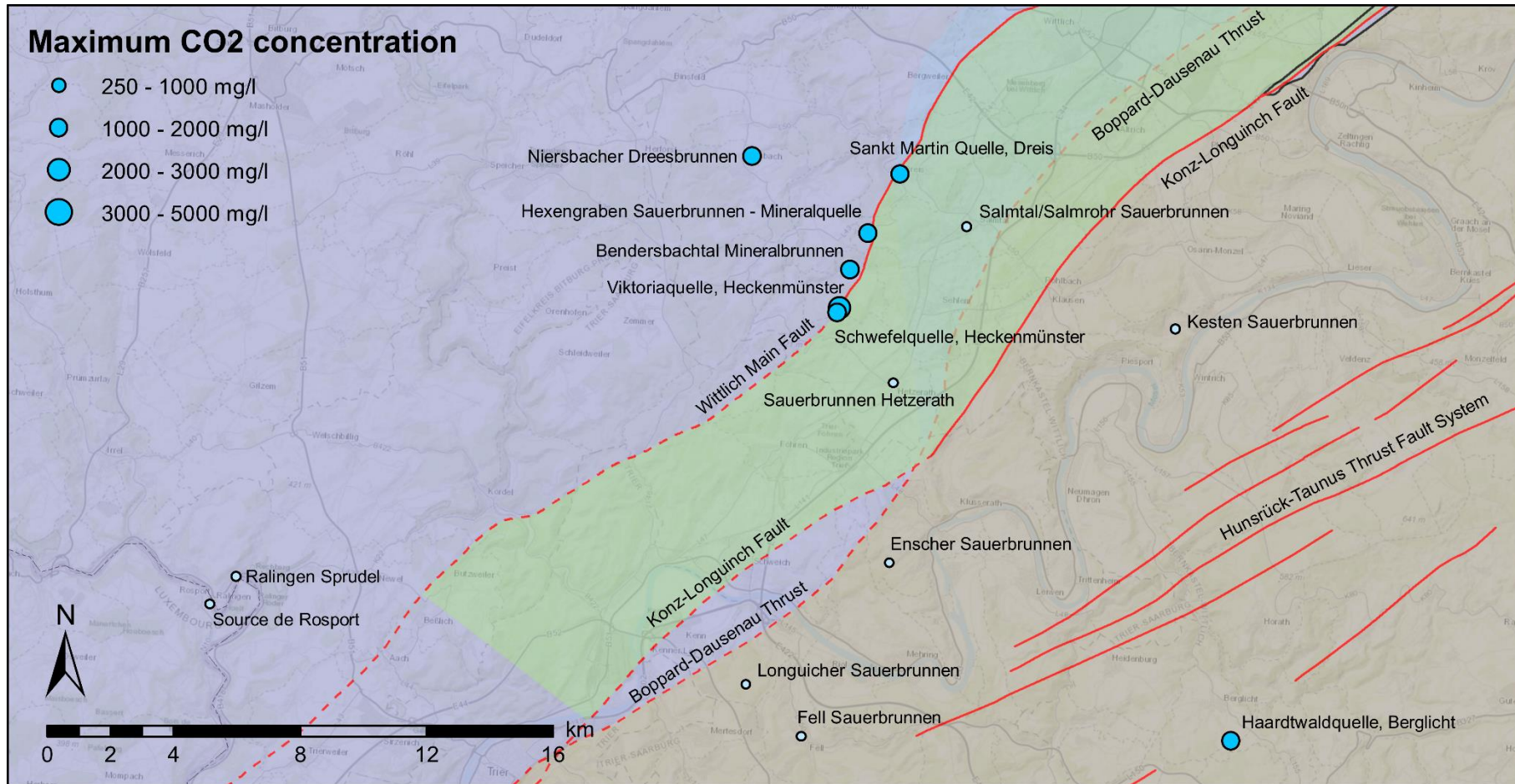


Figure 2: CO<sub>2</sub>-rich water in the area of Trier-Luxemburg



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			
Source de Rosport	49°48'15" North 06°30'27" East	12						2763				Rosport (2021)
Ralingen Sprudel	49°48'46" North 06°31'07" East		67									Datenbank der Kulturgüter in der Region Trier (2020)
*Niersbacher Dreesbrunnen	49°56'36" North 06°44'42" East	11.4 8.8			12.8	38.2	10.9	1786			<2021	Hänel (2020) Heckenmünster (2021)
*Sankt Martin Quelle, Dreis	49°56'24" North 06°48'46" East											Datenbank der Kulturgüter in der Region Trier (2020); Hänel (2020)
		11.6			52.5	415.9	224.7	1857			<2021	Heckenmünster (2021)
*Hexengraben Sauerbrunnen - Mineralquelle	49°55'20" North 06°47'57" East	9.8			15.6	7.61	7.07	1355			<2020	Hänel (2020); Heckenmünster (2021)
*Salmtal/Salmrohr Sauerbrunnen	49°55'31" North 06°50'38" East											Datenbank der Kulturgüter in der Region Trier (2020)
*Bendersbachtal Mineralbrunnen	49°54'40" North 06°47'30" East	8.7			12.8	78.6	9.2	1786			<2021	Heckenmünster (2021)
*Viktoriaquelle, Heckenmünster	49°53'59" North 06°47'16" East	10.9 – 12.3 7.8							32 – 37.8	4.19 – 4.46	2005 – 2010	Bräuer et al. (2013)
					8.5	3.2	19.0	2297			<2021	Heckenmünster (2021)
*Schwefelquelle, Heckenmünster	49°53'54" North 06°47'12" East	11.2 – 14.2 7.4							30.2 – 37.8	4.21 – 4.49	2005 – 2010	Bräuer et al. (2013)
					5.7	3.3	34.8	1866			<2021	Heckenmünster (2021)
*Sauerbrunnen Hetzerath	49°52'42" North 06°48'49" East											Datenbank der Kulturgüter in der Region Trier (2020)



*Jakobsbrunnen, Trier	49°46'45" North 06°39'52" East	17.9										<2020	Hänel (2020)
*Fell Sauerbrunnen	49°46'24" North 06°46'44" East	16.3										<2010	Hänel (2020)
*Longuicher Sauerbrunnen	49°47'16" North 06°45'10" East												Datenbank der Kulturgüter in der Region Trier (2020); Hänel (2020)
*Enscher Sauerbrunnen	49°49'32" North 06°48'56" East	11.4										<2020	Hänel (2020)
*Heiligenborn, Schweich	49°50'28" North 06°43'33" East	12.9										<2020	Hänel (2020)
*Lindenborn, Schweich	49°50'17" North 06°46'45" East	14.8										<2020	Hänel (2020)
*Höpperbour, Longen	49°48'42" North 06°47'18" East	12.4										<2020	Hänel (2020)
Kesten Sauerbrunnen	49°53'52" North 06°56'28" East	12.7										<2020	Hänel (2020)
			20										Datenbank der Kulturgüter in der Region Trier (2020)
<sup>i</sup> St Marienbrunnen, Bernkastel - Wehlen	49°56'45" North 07°01'39" East	15.2										<2020	Hänel (2020)
<sup>i</sup> St Stephanusbrunnen, Zeltingen-Rachtig	49°57'36" North 07°01'20" East	14.1										<2020	Hänel (2020)
<sup>i</sup> Jodocus-Born	49°55'56" North 07°02'21" East	12.5										<2020	Hänel (2020)

° TDS = Total Dissolved Solids

\* CO2-enriched spring water in Heckenmünster

+ Thermal spring water just north of Trier-Schweiz

<sup>i</sup> Thermal spring water northeast of Trier-Schweiz



## References

- Bräuer, K., Kämpf, H., Niedermann, S., Strauch, G., 2013. Indications for the existence of different magmatic reservoirs beneath the Eifel area (Germany): A multi-isotope (C, N, He, Ne, Ar) approach. *Chemical Geology* 356, 193-208.
- Datenbank der Kulturgüter in der Region Trier, 2020. Datenbank der Kulturgüter in der Region Trier - 3. Kategorie - Mineralquellen. <https://kulturdb.de/alleobjekte.php?kat=c&kd=Mineralquellen>
- Hänel, M., 2020. Wasserquellen-Atlas. <http://www.quellenatlas.eu/39994.html>
- Heckenmünster, 2021. Quellen - Die Mineralquellen an den nördlichen Randverwerfungen der Wittlicher Senke. <https://www.heckenmuenster.com/quellen-2/>
- Lucius, M., 1959. Hydrogéologie de l'eau minérale carbogazeuse dite Source de Rosport". *Revue Technique Luxembourgeoise*. 51. 4.
- Rosport, 2021. Source Rosport. <https://industrie.lu/sourcerosport.html>
- Sources Rosport, 2021. Homepage. <http://www.rosport.com/>
- 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. Thermal and CO<sub>2</sub>-rich water in the area of Trier – Luxemburg [Fact sheet]. Flemish Planning Bureau for the Environment and Spatial Development (VPO).