

Noricum – Economic Factors in the Alps

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This paper deals with the cultural landscape of central *Noricum* before and during the Roman Empire. It gives an overview of mining materials, prominent sites, distribution and infrastructural features in this landscape dominated by mountains and river valleys.

The Danube Limes and the main road which followed the river's south bank is one of the regions to which products were delivered. From the 3rd century AD onwards, *Lauriacum/Enns* was the main city and legionary fortress of *Noricum*. Some settlements and *mansiones* are known from the *Tabula Peutingeriana* or the *Itinerarium Antonini*. Important roads lead toward *Iuvavum/Salzburg* to the west and from there via mountain passes towards the south and ending at Aquileia. There are two main north-south routes, and both require navigating mountain passes. They converge at the *municipium Virunum* in Carinthia (near Klagenfurt), before heading either southwest to Aquileia, or southeast to *Celeia/Celje*, where it branches off towards Aquileia, or to *Pannonia*. Three main east-west routes cross those north-south ones, always following river valleys of the rivers Enns, Mur, and Drau. Many discussions over the last century have offered variations of these routes.

The focus of this paper lies on the central region of *Noricum* between the so-called Salzkammergut to the north and the Carinthian valleys to the south (fig. 1). The region is defined by the eastern Alps and divided by the rivers Enns and Mur. A number of sites

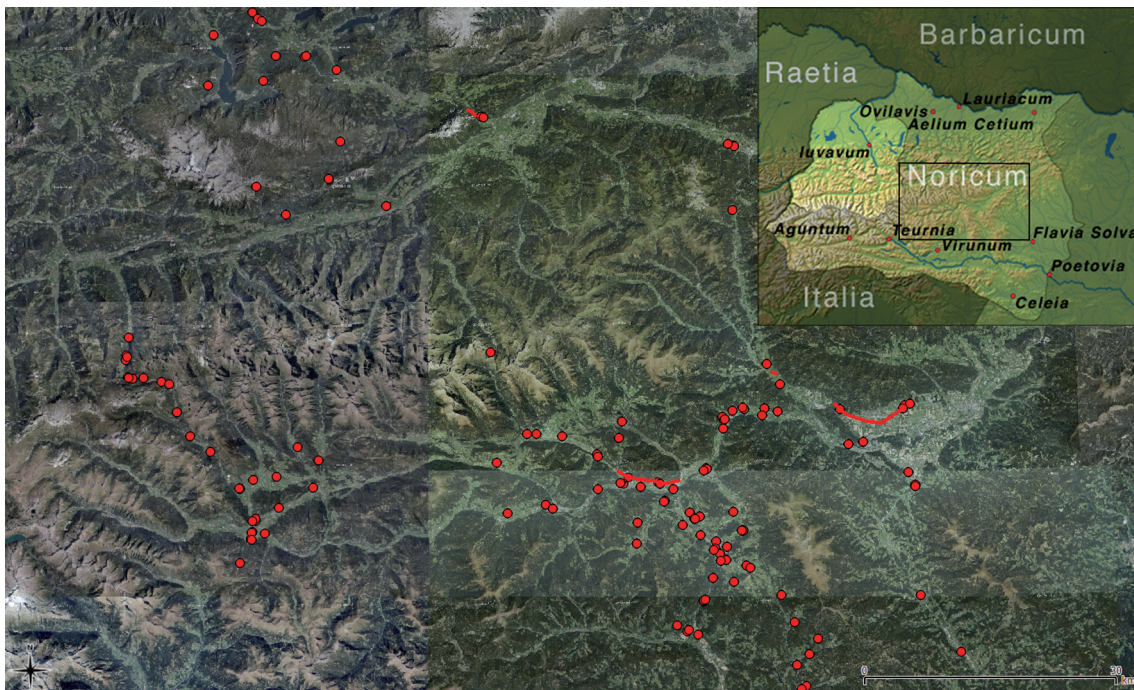


Fig. 1: Map of Roman sites in the Alpine region of *Noricum*.

from cemeteries, parts of roads, settlements, *villae rusticae* as well as a great variety of finds confirm a strong Roman presence in the region – and also quite significant wealth. If we consider such factors as the lay of the land, then climate and agricultural potential, and large-scale agriculture cannot be the reason for the wealth that is evident in the large amounts of imported pottery, imported marble, coins and other luxury items.

Mining was a major regional economic factor which changed the landscape significantly. It is possible to detect a large-scale structural pattern of trade towards the south and Italy as well as towards the north and the Limes. So, the wealth displayed in this region with only some small-scale agriculture, must have come from other sources, such as mining. The resulting influx of money developed a desire, or even need, for luxury items. The visible remains in the landscape of the region combined with its finds lead to an identification of those economic roots. Projects organized by the Department of Archaeology of the Austrian Federal Monuments Authority have provided new insights towards the understanding of the economic factors in the Alps. They shall be presented and shall indicate how iron, salt, and marble extraction, and their trade, defined the inner alpine region of *Noricum* for centuries. Open-source ALS-models of the region, provided by the Styrian and Carinthian regional governments, show the rather bumpy features of mining landscapes in this region.¹

Ferrum Noricum

Ferrum Noricum, Noric steel, is mentioned as high-quality steel in Latin and Greek literary sources since the end of the 1st century BC.² Diplomatic and commercial connections between the *Regnum Noricum* and Rome, however, date back to the first half of the 2nd century BC. These finally led to the foundation of a Roman trading post at the Magdalensberg Mountain in the first half of the 1st century BC.³ Excavations and surveys conducted at the Magdalensberg show that this trading post was connected to a Late La Tène period *oppidum*.⁴ The subsequent Romanisation of the Noric people facilitated the peaceful annexation of *Noricum* by Rome in 15 BC, and the Magdalensberg settlement became the first administrative and commercial centre of the new province. Numerous iron bars, and half-finished, as well as finished, iron objects found in this city on the Magdalensberg Mountain provide evidence of trade with *ferrum Noricum*.⁵

In the middle of the 1st century AD, under the Emperor Claudius, a new capital was established at *Virunum*. It was situated on the plain at the foot of the Magdalensberg Mountain, along the main north-south Roman road through *Noricum*. This route continued across the Alps to Aquileia, the Roman trading port in the northern Adriatic Sea. From here, Noric steel was shipped all over the Roman world.⁶

The most important region for the mining and production of *ferrum Noricum* was the area between Hüttenberg and Mösel, in southern *Noricum*. It has long been suspected that Hüttenberg, located north of the Magdalensberg – with its rich manganiferous iron

ore deposits that were mined until 1978 – was the centre of production of this famous iron.⁷ From 2003 until 2010 Brigitte Cech carried out archaeological research at the site of Semlach/Eisner.⁸ She was able to uncover more than six furnaces, twelve smithies, an ore roasting pit, and the remains of a charcoal kiln. She also discovered beam slots and post holes of wooden buildings, as well as the stone foundations of houses. Iron smelting at the site started in the 1st century BC and lasted until the beginning of the second half of the 4th century AD. The evidence for buildings on the site, in addition to the material finds indicate that the workers and administrators lived there. The stratigraphy reveals that the spatial organisation of the site changed a couple of times during its occupation. Huge slag deposits show that large-scale iron smelting occurred here over a considerable period of time. Bloom smithing was carried out in small earthbound smithing hearths located near the furnaces. So far, the size and construction of the six furnaces excavated provide evidence of the expertise of the smelters working there.

In Möselhof, a few kilometres south of Hüttenberg, another smelting centre has been known for several decades.⁹ In 2013, four smelting furnaces from two different phases were excavated, and a large building dating to the 2nd century AD was used as an out-building.¹⁰ A vast slag dump and two water drainages, also of Roman origin, were found. A second building was a house with floor heating. The whole smelting area was used from the late La Tène period (Latène D2) to the 3rd century AD.

Gold Extraction

The extraction of gold was economically significant for the Roman province of *Noricum* in the early 1st century AD.¹¹ According to scientific analysis, the gold which was processed in the settlement on the Magdalensberg originated from the Tauern region of central *Noricum*.¹² Nothing is known regarding the mining of gold in *Noricum*, while the open-cast working of mined gold and the extraction of placer gold can be assumed based on the evidence from central and south-east *Noricum*.

Casting moulds for the gold ingots found at the settlement on the Magdalensberg Mountain provide sufficient evidence that processing the raw ore into gold ingots took place there.¹³ Inscriptions on the casting moulds – and therefore on the finished ingots – are from the rule of Caligula and provide a firm date from 37–41 AD. Furthermore, a workshop to the south of the Magdalensberg settlement's forum can also be linked to the processing of gold. 15 furnaces erected on tile slats were documented. These were used for the smelting of gold during the first half of the 1st century AD.¹⁴

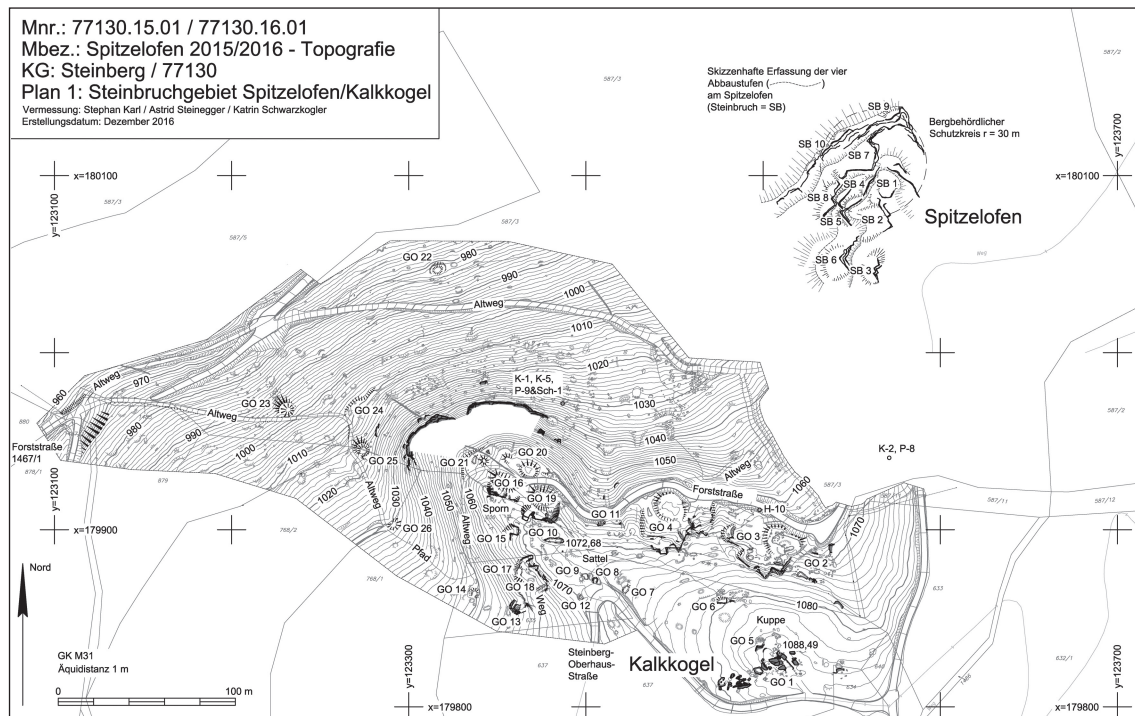
Gold extraction by panning is known from the Karth region in modern-day Lower Austria.¹⁵ This region lies in the eastern foothills of the Alps and was situated in the Roman province *Pannonia*, very close to *Noricum*. Noticeable landscape formations have been identified as the remains of Roman mining activities using hydropower (hydraulic mining). These remains include basins, channels and water pipelines.

Prehistoric gold mining is also presumed at Rauris in the Salzburger Tauern (the so-called Tauerngold).¹⁶

Quarries

Iron ore and gold, however, were not the only commodities that transformed this region. Quarries were an important factor as well. Roman quarries, like the ones at Kraig and Gummern, both modern-day Carinthia, are of a more supra-regional importance and known for a long time. The site of Spitzelofen in eastern Carinthia is quite unknown and shall be presented here (fig. 2).

A Roman inscription found in 1817 was the first hint of something more, and first it was originally believed to be a temple of some sort.¹⁷ In the early 1920s, masonry tools were found, namely 31 timber wedges; later some iron stonemason's hammers and chisels were also unearthed.¹⁸ A small research project was started after new discoveries were reported. In 2015 and 2016 the Department of Archaeology of the Austrian Federal Monuments Authority produced the first complete topographic documentation, resulting in an overall plan. Two groups of quarries were identified and catalogued. Stone analysis proves the origin of the samples to be from Spitzelofen. So far all of them can



be located in Carinthia. Further analysis is required before we can determine how far the marble was transported.

Salt Exploitation

Another important economic factor in the Alps was salt.¹⁹ Although it is commonly assumed that salt production in Hallstatt started during the Neolithic period, the oldest concrete evidence for organized mining activities there dates from the Middle Bronze Age onward (1500 BC).²⁰ The heyday of prehistoric mining, to a depth of 200 meters, was during the Hallstatt period during the early Iron Age, between 800 BC and ca. 400 BC.²¹ Around 350 BC, a gigantic landslide brought mining activities to a standstill.²² The entire high valley, including all mine facilities, was covered beneath meters of rock and dirt. Therefore, salt mining started at a new location, higher up the mountain, during the La-Tène-period, at the so-called Dammwiese.²³

Although the Romans established a large settlement near the lake and in the area of modern-day Hallstatt itself,²⁴ there is no evidence of Roman mining at this location. Scholars therefore assume that both the Late Iron Age settlement on the Dammwiese and the Late Iron Age Western group field still existed during the Roman period, and that the Romans contented themselves with asserting control over the salt trade.²⁵ Several researchers suggest a collapse of inland salt extraction and a shift of production sites to the coastlines in connection with the integration of central Europe into Rome's sphere of control.²⁶

Only 10 km northeast of Hallstatt, however, substantial archaeological evidence for the continued extraction of Alpine rock salts in the Salzkammergut region was discovered at the Michlhallberg site, which lies at the southern foot of the Sandling Mountain.²⁷ The vicus found there was situated in the mountainous heart of *Noricum* at an elevation of about 1000 meters above sea level, but it was nevertheless well integrated in the provincial road network. Recent surveys have shown that the Roman road made a detour ascending the slopes of the Sandling right to Michlhallberg; the survey results have also connected this site with the alpine uplands of *Ovilava* in the north and *Virunum* in the south.²⁸ The area was damaged by several landslides and it was therefore difficult to ascertain traces of buildings. Nevertheless, during archaeological investigations carried out by the Federal Monuments Authority in the 1990s, hundreds of pottery sherds, coins, dress accessories, military equipment and objects of everyday use were found there.²⁹ Mining tools and the local salt deposits suggest an interpretation as a salt-mine, or a saltern. According to the dateable finds from the excavations, the site was occupied from the late 2nd century AD until the end of the 4th century AD. The spectrum of fibulas may also indicate the presence of the military or officials. There may be a correlation between the establishment of this salt production site and the appointment of the *legio II Italica* to *Lauriacum/Enns* after the Marcomannic Wars.³⁰

The road, which led to the Roman site, was also part of the excavations. Over 120 horseshoes were found beside the unpaved trail without any consolidation.³¹ A depot found in 2013 on the Michlhallberg consists of various tools for mining, a 40 kg anvil, and iron fixtures used for installing wooden brine-pipelines in mines.³²

The site of Michlhallberg and the connected trade routes to *Ovilava* in the north and *Virunum* in the south illustrate that some rock salt deposits in the eastern Alpine area were still being extracted in Roman times. Furthermore, another recently discovered site connected to possible salt and certain iron ore mining was partially excavated in 2017–2018, warranted by a new interpretation of old finds. Moreover, in an area where known mines were in use until the 18th century, the site of a Roman villa lies near Mühldorf in the Drau River valley (modern-day Carinthia). It is situated in a location that is considered rather unfavorable for settlement, as it lies on the north side of the hill. Nonetheless, this villa had floor heating and finds which indicate a very wealthy owner.³³

Distribution and Transportation Routes

All sorts of transportation methods must have been in use during Roman times in central *Noricum*. Main roads were paved and maintained certainly by some state officials. There were also small, winding tracks over the passes, and to the mining sites (fig. 3). As well, the first step of processing raw materials in the immediate vicinity of the extraction site should be considered. One recently discovered example of a marble workshop lies in Allersdorf, near the Spitzelofen quarry. Part of a marble base was found there, that could be identified as originating from the Spitzelofen quarry (fig. 2).³⁴

Mountains had to be crossed and one such mountain pass, the so called Sölkpass was documented in the early 2000s by the Federal Monuments Authority, together with the University of Graz.³⁵ Prehistoric as well as Roman use is confirmed there. We should also keep in mind that transportation methods for different materials in the area likely did not change from the Roman times to the 18th century.

Settlement names, and more specifically those of *mansiones*, are known from literary sources, but most of them are not yet linked to sites. Last year we were able to connect the results of aerial photography and old excavation plans from the 1920s of a site at Katsch in the Mur River valley to produce a map for this site.³⁶ The discovery of a Mithras altar there³⁷ makes it probable that this settlement, once identified as a *villa*, is one of the *mansiones* that controlled the passes. Therefore, it controlled the distribution of iron, silver, gold and bronze from the central Alpine region towards the north and the Limes, or towards the south and Aquileia.



Fig. 3: Alpine road “Knappenweg” in Rohrmoos, Styria.

Summary

Metal-working can be counted among the most important economic undertakings in *Noricum*. Italian interest in these raw materials can be traced back historically to the 2nd century BC. Under Roman rule, the marketing and distribution methods were modified and greatly expanded. The extraction of gold was kept under Imperial control, while the iron tax allowed leases to be granted on the part of the state to private proprietors, the so-called *conductores ferrariarum Noricarum*. Salt mining has a very long tradition in the Alps, with the eponymic Hallstatt being one of the most famous prehistoric sites in Upper Austria. For a long time, it was assumed that the Romans also exploited the ancient salt mines of Hallstatt, but so far there is no proof to confirm this. A significant find complex of tools and settlements in an unfavourable environment near Hallstatt point to salt mining there, along with a very distinctive trade route system connecting those mountain settlements to the south and the north. A typically Roman phenomenon was the exploitation and working of marble in *Noricum*; for this, the outcrops in southern *Noricum* were favourably situated – in regard to transport – next to rivers, and were

significant beyond the borders of the province. Evidence of transportation and infrastructure clearly indicates a use of rivers, their valleys, and old, ungraded mountain routes that were adapted for Roman purposes. Mining above ground, as it was done in the region, has left its traces in the landscape. They remain visible for those who are able to detect them in the vast mountain forests which still preserve the remains of mining and processing metal in a region famous for its iron.

Notes

¹ <[https://gis.stmk.gv.at/atlas/\(S\(svzcq4mbzuw2psjqvfvf1jb21\)\)/init.aspx?karte=kat&ks=das&cms=da&massstab=800000](https://gis.stmk.gv.at/atlas/(S(svzcq4mbzuw2psjqvfvf1jb21))/init.aspx?karte=kat&ks=das&cms=da&massstab=800000)> (30th October 2018). <[https://gis.ktn.gv.at/atlas/\(S\(mslwfyfe3iejwrsml2isv5xy\)\)/init.aspx?karte=atlas_basiskarten](https://gis.ktn.gv.at/atlas/(S(mslwfyfe3iejwrsml2isv5xy))/init.aspx?karte=atlas_basiskarten)> (30th October 2018).

² Hofeneder 2017.

³ Piccottini 1996, 169.

⁴ Cech 2014, 11.

⁵ Dolenz 1996.

⁶ Piccottini 1996, 187; Cech 2014, 11.

⁷ Cech 2012; Glaser 2000.

⁸ Cech 2008; Cech 2014; Cech 2015; Cech 2017.

⁹ Glaser 2005.

¹⁰ Eitler 2014; Mandl 2014. The rescue excavation conducted before construction on the site was funded by the Austrian Federal Monuments Authority (Bundesdenkmalamt).

¹¹ Recently e.g. Gleirscher 2013; Gleirscher 2014; Gostenčnik 2016.

¹² Strabo, *Geografika*, 4,6,12; e.g. Vettters – Pohl 2012.

¹³ Piccottini 1996, 184f.

¹⁴ Gostenčnik 2016, 28–32 with older references.

¹⁵ Cech – Kühtreiber 2013.

¹⁶ e.g. Vettters – Pohl 2012.

¹⁷ Karl 2017; Karl – Steinegger 2017; Karl 2021.

¹⁸ Karl 2017; Karl – Steinegger 2017; Karl 2021.

¹⁹ cf. Stockinger 2018, 183.

²⁰ Kern et al. 2008, 46 f. 50.

²¹ Kern et al. 2008, 84.

²² Kern et al. 2008, 158.

²³ Kern et al. 2008, 162–165.

²⁴ Grabherr et al. 2019, 333.

²⁵ Grabherr 2001, 92; Stockinger 2015, 191.

²⁶ Stockinger 2015, 183.

²⁷ Grabherr 2001.

²⁸ Windholz-Konrad 2018, D683–D686. The surveys were funded by the Austrian Federal Monuments Authority (Bundesdenkmalamt) until 2014 in cooperation with the Archäologische Arbeitsgemeinschaft Salzkammergut.

²⁹ Grabherr 2001.

³⁰ Stockinger 2015, 187.

³¹ Grabherr 2001, 12. 71–74.

³² Windholz-Konrad 2018, D683–D686.

³³ Piccottini 1989, 113 f.; Pircher 2020.

³⁴ Hebert 2011, 259.

³⁵ Mandl 2003.

³⁶ Steigberger 2020.

³⁷ Hebert 1997, 532.

Image Credits

Figs. 1–3: Bundesdenkmalamt

References

Cech 2008

B. Cech (ed.), Die Produktion von Ferrum Noricum am Hüttenberger Erzberg. Die Ergebnisse der interdisziplinären Forschungen auf der Fundstelle Sendlach/Eisner in den Jahren 2003–2005, Austria Antiqua 2 (Vienna 2008).

Cech 2012

B. Cech, Die Ergebnisse der archäologischen Untersuchungen zur Produktion von ferrum Noricum am Hüttenberger Erzberg (Kärnten) in den Jahren 2003–2009, Res montanarum 50, 2012, 74–84.

Cech 2014

B. Cech, The Production of *ferrum Noricum* at Hüttenberg, Austria – the Results of Archaeological Excavations Carried out from 2003 to 2010 at the Site Sendlach/Eisner, in: B. Cech – Th. Rehren (eds.), Early Iron in Europe, Instrumentum Monographies 50 (Montagnac 2014) 11–20.

Cech 2015

B. Cech, Norischer Stahl – Römische Eisenproduktion in Kärnten, in: Th. Stöllner – K. Oeggel (eds.), Bergauf Bergab. 10 000 Jahre Bergbau in den Ostalpen, Wissenschaftlicher Beiband zur Ausstellung im Deutschen Bergbau-Museum Bochum vom 31. 10. 2015–24. 04. 2016 und im Vorarlbergmuseum Bregenz vom 11. 06. 2016–26. 10. 2016 (Bochum 2015) 377–381.

Cech 2017

B. Cech (ed.), Die Produktion von Ferrum Noricum am Hüttenberger Erzberg. Die Ergebnisse der interdisziplinären Forschungen auf der Fundstelle Sendlach/Eisner in den Jahren 2006–2009, Austria Antiqua 6 (Vienna 2017).

Cech – Kührtreiber 2013

B. Cech – Th. Kührtreiber, Ein römisches Goldbergbaurevier im “Karth”, einer Landschaft südöstlich von Neunkirchen, Niederösterreich, *Römisches Österreich* 36, 2013, 1–94.

Dolenz 1996

H. Dolenz, Eisenverarbeitung auf dem Magdalensberg, in: Straube 1996, 140–167.

Eitler 2014

J. Eitler, Bericht zum Oberbodenabhub in Möslhof 2013, *Fundberichte aus Österreich* 52, 2013 (Vienna 2014) D230–D238.

Glaser 2000

F. Glaser, Antike Eisengewinnung in Noricum, in: H. Freisinger – K. Pieta – J. Rajtár (eds.), *Metallgewinnung und -verarbeitung in der Antike (Schwerpunkt Eisen)*, *Archaeologica Slovaca Monographiae* 3, 2000, 49–62.

Glaser 2005

F. Glaser, Geschichte vor der Entstehung der Gemeinde. Ein Zentrum norischer Eisenverhüttung in der Marktgemeinde Klein St. Paul, in: W. Wadl – Th. Zeloeth (eds.), *Klein St. Paul. Natur – Geschichte – Gegenwart* (Klagenfurt 2005) 61–74.

Gleirscher 2013

P. Gleirscher, Zur Nachweisbarkeit einer antiken bergmännischen Nutzung der Edelmetallagerstätten in den Hohen Tauern und im Lavanttal, *Mitteilungen der Gesellschaft für Salzburger Landeskunde* 153, 2013, 9–26.

Gleirscher 2014

P. Gleirscher, Frühes Gold aus Kärnten, *Opera Instituti Archaeologici Sloveniae* 30, 2014, 137–147.

Gostenčnik 2016

K. Gostenčnik, Eisen – Bronze – Gold. Zum Metallhandwerk in der römischen Stadt “Alt-Virunum” auf dem Magdalensberg, *Carinthia I* 206, 2016, 11–35.

Grabherr 2001

G. Grabherr, Michlhallberg. Die Ausgrabungen in der römischen Siedlung 1997–1999 und die Untersuchungen an der zugehörigen Straßentrasse, *Schriftenreihe des Kammerhofmuseums Bad Aussee* 22 (Bad Aussee 2001).

Grabherr et al. 2019

G. Grabherr – B. Kainrath – St. Traxler, *KG Hallstatt*, *Fundberichte aus Österreich* 56, 2017 (Vienna 2019), 333.

Hebert 1997

B. Hebert, *KG Katsch*, *Fundberichte aus Österreich* 35, 1996 (Horn 1997) 532.

Hebert 2011

B. Hebert, *KG Raggane*, *Fundberichte aus Österreich* 49, 2010 (Horn 2011) 259.

Hofeneder 2017

A. Hofeneder, Die antiken literarischen Zeugnisse zum Ferrum Noricum, in: Cech 2017, 1–20.

Karl 2017

St. Karl, KG Steinberg, Fundberichte aus Österreich 55, 2016 (Wien 2017) 103–107.

Karl 2021

St. Karl, Das römische Marmorsteinbruchrevier Spitzelofen in Kärnten, Fundberichte aus Österreich Beiheft 1 (Vienna 2021).

Karl – Steinegger 2017

St. Karl – A. Steinegger, Bericht zur Grabung im römischen Marmorsteinbruchrevier Spitzelofen/Kalkkogel, Fundberichte aus Österreich 55, 2016 (Vienna 2017) D1192–D1234.

Kern et al. 2008

A. Kern – K. Kowarik – A. W. Rausch – H. Reschreiter (eds.), Salz – Reich. 7000 Jahre Hallstatt, Veröffentlichungen der Prähistorischen Abteilung 2 (Vienna 2008).

Mandl 2003

F. Mandl (ed.), Sölkpass. Ein 6000 Jahre alter Saumpfad über die Alpen, Mitteilungen der ANISA 23/24 (Gröbming – Haus i.E. 2003).

Mandl 2014

M. Mandl, KG Kirchberg, Fundberichte aus Österreich 52, 2013 (Vienna 2014) 182 f.

Piccottini 1989

G. Piccottini, Die Römer in Kärnten. Ein Führer zu den wichtigsten römischen Ausgrabungen und Denkmälern des Landes (Klagenfurt 1989).

Piccottini 1996

G. Piccottini, Die Stadt auf dem Magdalensberg. Geschichte – Handel – Kultur, in: Straube 1996, 168–187.

Pircher 2020

St. Pircher, Die Oberflächenfunde aus Mühldorf im Mölltal. Neues Licht auf eine altbekannte Fundstelle zwischen Aguntum und Teurnia, in: L. Berger – L. Huber – F. Lang – J. Weilhartner (eds.), Akten des 17. Österreichischen Archäologentages am Fachbereich Altertumswissenschaften, Klassische und Frühägäische Archäologie der Universität Salzburg vom 26. bis 28. Februar 2018, Archaeo Plus 11 (Salzburg 2020) 397–409.

Steigberger 2020

E. Steigberger, Katsch – Eine Siedlung im Wandel der Zeit, in: L. Berger – L. Huber – F. Lang – J. Weilhartner (eds.), Akten des 17. Österreichischen Archäologentages am Fachbereich Altertumswissenschaften, Klassische und Frühägäische Archäologie der Universität Salzburg vom 26. bis 28. Februar 2018, Archaeo Plus 11 (Salzburg 2020) 521–526.

Stockinger 2015

U. Stockinger, The Salt of Rome. Remarks on the Production, Trade and Consumption in the North-Western Provinces, in: R. Brigand – O. Weller (eds.), Archaeology of Salt. Approaching an Invisible Past (Leiden 2015) 183–198.

Stockinger 2018

U. Stockinger, Worth their Salt. The Importance of Salt for Life on the Frontier and on Military Operations, in: C. S. Sommer – S. Matešić (eds.), *Limes XXIII. Proceedings of the 23rd International Congress of Roman Frontier Studies Ingolstadt 2015*, Beiträge zum Welterbe Limes Sonderband 4/I (Mainz 2018) 183–188.

Straube 1996

H. Straube (ed.), *Ferrum Noricum und die Stadt auf dem Magdalensberg* (Vienna 1996).

Vetters – Pohl 2012

W. Vetters – W. Pohl, Das Gold der “Norischen Taurischer”. Die Geologie des Vorkommens von Polybius/Strabon, *Carinthia II* 202, 2012, 273–286.

Windholz-Konrad 2018

M. Windholz-Konrad, Forschungszwischenbericht über die unveröffentlichten archäologischen Maßnahmen des Bundesdenkmalamtes und der “Archäologischen Arbeitsgemeinschaft Salzkammergut” bis zum Jahr 2013 in der Steiermark und in Oberösterreich, *Fundberichte aus Österreich* 55, 2016 (Vienna 2018) D589–D705.