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Klein, S., Westner, K., Ruiz Torres, C., Schäfer, A., Gassmann, G., 2025. Effort and Value: The Production Practices of Pre-Columbian Gold Objects of Costa Rica in Cultural and Technological Context. *Metallography, Microstructure and Analysis*, 16. <https://doi.org/10.1007/s13632-025-01230-1>.

Müller, R., Klein, S., 2025. Ergebnisse von Bleiisotopenanalysen an Schleuderbleien und anderen Bleifunden vom Septimerpass. In: W. Zanier (ed.) *Septimer 3, Münchner Beiträge zur Vor- und Frühgeschichte* 70, 10.

Rose, T., Greifelt, T., Westner, K., Hsu, Y., Klein, S., 2025. Beteiligung der Fachöffentlichkeit beim Aufbau der Forschungsdateninfrastruktur TerraLID: ein Erfahrungsbericht. *Archäologische Informationen* 47, 177-190. <https://doi.org/10.11588/ai.2024.1.110402>.

Rose, T., Wittke, A., Klein, S., 2025. Comment on “Limitations in using the Cu isotopic composition of minerals from ancient copper mines for archaeometric purposes – a case study” by P. Penanes, M. Costas-Rodríguez, M. Moldovan, J. García Alonso, F. Vanhaecke, 2023. *Journal of Analytical Atomic Spectrometry*, 38, 1611-1617. *Journal of Analytical Atomic Spectrometry* 40, 2599-2603. <https://doi.org/10.1039/D4JA00260A>.

Steinboefel, G., Schmitt, L., Angerer, T., Kirnbauer, T., Klein, S., 2025. Preservation of Primary Si Isotope Signatures in Devonian Lahn-Dill-Type Iron Ores as Revealed by Femtosecond Laser Ablation. *Geochemistry, Geophysics, Geosystems* 26 (e2025GC012223), 17. <https://doi.org/10.1029/2025GC012223>.

2024

Gassmann, G., Klein, S., Schäfer, A., Welk, E., Wester, K., 2024. Investigating Pre-Columbian Gold and Copper in Costa Rica – Ores, Mines and Artefact Production, *METALLA* 27(2), 149–166. <https://doi.org/10.46586/metalla.v27.2023.i2.149-166>.

Klein S. It Came from Outer Space 2024.

Monterroso-Checa, A., Domergue, C., Rico, C., Zarzalejos-Prieto, M., Palero-Fernández, F., Klein, S., García-Magdaleno, I., Trincherini, P., Gasparini, M., Marchegiani, F., Moreno-Escribano, J., Nisi, S., Ruiz-Arebola, J., 2024. La sociedad Sisaponensis, los lingotes de Doña Rama-Belmez y la explotación minera de los montes de Corduba. *Journal of Roman Archaeology* 37(1), 148-187.
<https://doi.org/10.1017/S1047759424000035>.

Müller, R., Klein, S., Schreiner, K., Reid, J., 2024. Lead isotope analyses (LIA) on lead sling bullets from Pre-Roman and Roman context. *GFZ Data Services*. <https://doi.org/10.5880/fidgeo.2024.003>.

Schmitt, L., Kirnbauer, T., Angerer, T., Kraemer, D., Garbe-Schönberg, D., Fockenberg, T., Klein, S., 2024. Genesis of Devonian volcanic-associated Lahn-Dill-type iron ores – part II: trace element fractionation evidences diffuse fluid venting. *Mineralium Deposita* 59, 1803–1829.
<https://doi.org/10.1007/s00126-024-01307-x>.

2023

Domergue, C., Klein, S., 2023. Note sur deux lingots de cuivre romains trouvés en Méditerranée. *Revista Onoba*, 11, 29–41. <https://doi.org/10.33776/onoba.vi11.7414>.

Gassmann, G., Klein, S., Schäfer, A., Welk, E., Wester, K., 2023. Investigating Pre-Columbian Gold and Copper in Costa Rica – Ores, Mines and Artefact Production. *METALLA* 27, 149–166.
<https://doi.org/10.46586/metalla.v27.2023.i2.149-166>.

Hsu, Y., Klein, S., O’Sullivan, R., Zhushchikhovskaya, I., Popov, A., Klyuev, N., Nikitin, Y., Sidorenko, E., 2023. Provenance and distribution networks of the earliest bronze in the Maritime Territory (Primorye), Russian Far East. *The Journal of Island and Coastal Archaeology* 18 (2), 329-341.
<https://doi.org/10.1080/15564894.2021.1958110>.

Klein, S., 2023. Römische Schlacken- und Erzfunde vom Blöskopf – ein archäometrischer Beitrag. In: P. Heinrich, M. Scholz (Hrsg.): *Die frühkaiserzeitlichen Militäranlagen bei Bad Ems im Kontext des römischen Bergbaus: Ergebnisse der Feldforschungen 2016–2019. Berichte zur Archäologie an Mittelrhein und Mosel* 23, 260-264.

Klein, S., Berthold, C., Berger, D., Pernicka, E. (Hrsg.) 2023. Archäometrie und Denkmalpflege 2023. *Metalla Sonderheft* 12. <https://doi.org/10.46586/metalla.v.2023.i12>.

Klein, S., Fischer-Lechner, S., Berthold, C., Sessing, J., Kirnbauer, T., Zeiler, M., Essling-Wintzer, W., 2023. Lead-Glazed Ceramic Fragments: Intentional Glazing or Metallurgical Accident?. *Metallography, Microstructure and Analysis* 12, 246–261. <https://doi.org/10.1007/s13632-023-00944-4>.

Klein, S., Helfert, M., von Kaenel, H., Brey, G., 2023. Archäologie und Archäometrie an der Goethe-Universität Frankfurt a.M. (1994-2022). In: C. Pankau, H. Baitinger, A. Stobbe (Hrsg.), *Ein Schwabe in der Welt. Festschrift für Rüdiger Krause zu seinem 65. Geburtstag*. *Frankfurter Archäologische Schriften* 46, Habelt, Bonn, 203-218.

Klein, S., Zietsch, H., Sessing, J., 2023. A Karelian potter’s technique for black lustrous pottery: experiment and identification. *Experimentelle Archäologie in Europa* 22, 45-59.

Krause P., Klein, S., Domergue, C., Berthold, C., Jöns, N., 2023. Litharge from El Centenillo and Fuente Espi - a geochemical and mineralogical investigation of Spanish silver processing in the Sierra Morena,

Metallography, Microstructure and Analysis 12, 262-275.
<https://link.springer.com/article/10.1007/s13632-023-00940-8>.

Schmitt, L., Kirnbauer, T., Angerer, T., Volkmann, R., Roddatis, V., Wirth, R., Klein, S., 2023. Genesis of Devonian volcanic-associated Lahn-Dill-type iron ores — part I: iron mobilisation and mineralisation style. *Mineralium Deposita* 59(8), 1777-1801. <https://doi.org/10.1007/s00126-023-01218-3>.

2022

Gassmann, G., Klein, S., Körlin, G., Matthes, B., Westner, K., 2022. Antiker Silberausch am Amselfeld, *Der Anschnitt* 74, 4-24.

Iddan, N., Ashkenazi, D., Klein, S., Cvikel, D., 2022. Metallurgical analysis of a bronze powder chamber retrieved from an underwater excavation in Akko (Israel): an application of novel minimally destructive field multi-focal metallography. *Archaeological and Anthropological Sciences* 14(7), 131-16.
<https://doi.org/10.1007/s12520-022-01594-3>.

Klein, S., Jansen, M., Lichtenberger, A., Tal, O., 2022. Archaeometallurgical Analysis of Lead Weights and Sling Bullets from Seleucid Tell Izṭabba: More on Lead Origin in Seleucid Palestine. *Tel Aviv*, 49(2), 267-292. <https://doi.org/10.1080/03344355.2022.2102113>.

Klein, S., Rose, T., Westner, K., Hsu, Y., 2022. From OXALID to GlobalID: Introducing a modern and FAIR lead isotope database with an interactive application. *Archaeometry* 64 (4), 935-959.
<https://doi.org/10.1111/arcm.12762>.

Rafiei-Alavi B, Bahrololoumi F, Klein S., 2022. Three Women from Elam: A Revision of the Haft Tappeh Metal Plaque. *Bulletin of the American Society of Overseas Research* 387, 171–180.
<https://doi.org/10.1086/718800>.

Reid, J., Müller, R., Klein, S., 2022. The Windridge Farm Glandes Revisited: Clues to Conquest?. *Britannia* 53, 323-346. <https://doi.org/10.1017/S0068113X22000319>.

Rose, T., Klein, S., Westner, K., Hsu, Y., 2022. GlobalID: A new database and interactive web tool for provenancing archaeological metals. *Archaeomatica* 13(1), 10–12.

Westner, K., Klein, S., Rose, T., Hsu, Y., 2022. From OXALID to GlobalID: A substantial upgrade of a well-known data pool of lead isotopes for metal provenancing using R and Shiny App. Poster, 28th Annual Meeting of the European Association of Archaeologists (EAA), Budapest 2022.

Westner, K., Klein, S., Sergeev, D., Müller, M., 2022. Temperature estimates of historical Pb-Ag smelting slags: A multi-methodological approach, *Journal of Archaeological Science: Reports* 46, 103654-12. <https://doi.org/10.1016/j.jasrep.2022.103654>.

2021

Albarède, F., Blichert-Toft, J., de Callataÿ, F., Davis, G., Debernardi, P., Gentelli, L., Gitler, H., Kemmers, F., Klein, S., Malod-Dognin, C., Milot, J., Vaxevanopoulos, M., Westner, K., 2021. From commodity to money: the rise of silver exchange around the ancient Mediterranean (6th-1st century BCE). *Archaeometry* 63(1), 142–155. <https://doi.org/10.1111/arcm.12615>.

GlobalID Core Team. GlobalID web application V 1.0, database status: 15 November 2021. URL <https://globalid.dmt-lb.de/> (accessed 15.11.2021).

Greifelt, T., Klein, S., Wigg-Wolf, D., 2021. Geochemical and isotopic characterisation of the coin

metal of Roman denarii - A multifactorial application tool for numismatic, political, strategic and logistic contexts in the Republic and the Imperial Era. In: European Association of Geochemistry (Hrsg.) 2021. Goldschmidt2021 Virtual abstracts. <https://doi.org/10.7185/gold2021.7143>.

Greiffelt, T., Klein, S., Wigg-Wolf, D., 2021. Geochemical and isotopic characterisation of the coin metal of Roman denarii - a multifactorial application tool for numismatic, political, strategic and logistic contexts in the Republic and the Imperial Era. In: S. Greiff, F. Schlütter, A. Kronz, S. Klein (Hrsg.), 2021. Archäometrie und Denkmalpflege. Metalla Sonderheft 11, 26-27. <https://doi.org/10.46586/metalla.v.2023.i12>.

Greiff, S., Schlütter, F., Kronz, A., Klein, S. (Hrsg.), 2021, Archäometrie und Denkmalpflege. Metalla Sonderheft 11, 165. <https://doi.org/10.46586/metalla.v.2023.i12>.

Jansen, M., Hauptmann, A., Klein, S., Gabashidze, I., Jalilov, B., 2021. Geochemistry of gold from the prehistoric mine of Sakdrisi and Transcaucasian gold artefacts between the 4th and 2nd millennia BC. In: C. Marro, T. Stöllner (eds.), On Salt, Copper and Gold. The Origins of Early Mining and Metallurgy in the Caucasus. MOM Editions Archéologie(s) 5, Lyon, 181–200. <https://doi.org/10.4000/books.momeditions.12542>.

Jansen, M., Hauptmann, A., Klein, S., Zettler, R., 2021. Trace elements and isotopes – The origin of gold from Ur from a geochemical point of view. In: G. Frame, J. Jeffers, H. Pittman (eds.), Ur in the Twenty-First Century CE. Proceedings of the 62nd Rencontre Assyriologique Internationale, Penn State University Press, University Park, 273-292. <https://doi.org/10.5325/j.ctv1g80954.23>.

Klein, S., 2021. Element and Isotope Analysis of Olbian Coinage and Coin Equivalents. In: J. Fornasier, A. Bujskich (eds.), An den Ufern des Bug Ha Beperax Byry. Deutsch-Ukrainische Ausgrabungen in Olbia Pontike Im Kontext Internationaler Forschungen Zu Antiken Migrationsprozessen. Frankfurt Archaeological Studies 42, 301-312.

Westner, K., Rose, T., Klein, S., Hsu, Y., 2021. GlobalID – Global Lead Isotope Database. V. 1.0. GFZ Data Services. <https://doi.org/10.5880/fidgeo.2021.031>.

2020

Albarede, F., Bilchert-Toft, J., Gentelli, L., Milot, J., Vaxevanopoulos, M., Klein, S., Westner, K., Birch, T., Davis, G., de Callatay, F., 2020. A miner's perspective on Pb isotope provenances in the Western and Central Mediterranean. *Journal of Archaeological Science*, 121, 105-194. <https://doi.org/10.1016/j.jas.2020.105194>.

Birch, T., Klein, S., Seitz, H., Höfer, H., Kemmers, F., 2020. Silver for the Greek Colonies: Issues, Analysis and Preliminary Results from a Large-Scale Coin Sampling Project. In: K. Sheedy, G. (eds.), Mines, Metals, and Money: Ancient World Studies in Science, Archaeology and History. Metallurgy in Numismatics, Volume 6. Royal Numismatic Society Special Publication, London, 101-147.

Hanning, E., Rose, T., Klein, S., 2020. Reconstruction of Copper Smelting Processes: Possibilities and Limitations. *GeoAlp* 17, 41-42.

Hsu, Y., Sabatini, B., Bayarkhuu, N., Turbat, T., Giscard, P., Klein, S., 2020. Discerning social interaction and cultural influence in Early Iron Age Mongolia through archaeometallurgical investigation. *Archaeological and Anthropological Sciences*, 12(1), 11. <https://doi.org/10.1007/s12520-019-00952-y>.

Klein, S., Rose, T., 2020. Evaluating copper isotope fractionation in the metallurgical operational chain: An experimental approach. *Archaeometry* 62(1), 134-155. <http://doi.org/10.1111/arcm.12564>.

Klein, S., von Kaenel, H., 2020. Chemical and isotopic characterization and production technique of subferrate asses of the Lyons Altar series, Part I. Schweizer Münzblätter SM 70, 3-21. <https://www.e-periodica.ch/> (ab 2021).

Klein, S., von Kaenel, H., 2020. Chemical and isotopic characterization and production technique of subferrate asses of the Lyons Altar series, Part II. Schweizer Münzblätter SM 70, 43-56. <https://www.e-periodica.ch/> (ab 2021).

Paridaens, N., Salesse, K., Müller, R., Klein, S., Snoeck, C., Mattelli, N., 2020. Les balles de fronde en plomb découvertes sur l'oppidum de Thuin: caractérisation, origine et interprétation. Revue éditée par le Comité pour la diffusion de la recherche en archéologie gallo-romaine, Signa 9, 111-123.

Rose, T., Hanning, E., Klein, S., 2020. Smelting Experiments with Chalcopyrite Ore based on Evidence from the Eastern Alps. Metalla 25(2), 77–100. <https://doi.org/10.46586/metalla.v25.2019.i2.77-100>.

Rose, T., Klein, S., Hanning, E., 2020. Copper isotope fractionation during prehistoric smelting of copper sulfides: experimental and analytical data. GFZ Data Services. <http://doi.org/10.5880/fidgeo.2020.013>.

Rose, T., Télouk, P., Fiebig, J., Marschall, H., Klein, S., 2020. Iron and Oxygen isotope systematics during corrosion of iron objects: a first approach. Archaeological and Anthropological Sciences 12(6), 113. <https://doi.org/10.1007/s12520-020-01072-8>.

Rageth, J., Zanier, W., Klein, S., 2020. Crap Ses und Septimer: Archäologische Zeugnisse der römischen Alpeneroberung 16 / 15 v. Chr. aus Graubünden. Germania: Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts 88, 241-283. <https://doi.org/10.11588/GER.2010.71106>.

Westner, K., Birch, T., Kemmers, F., Klein, S., Höfer, H., Seitz, H., 2020. Rome's rise to power. Geochemical analysis of silver coinage from the Western Mediterranean (4th to 2nd centuries BCE). Archaeometry 62(3), 577-592. <http://dx.doi.org/10.1111/arcm.12547>.

Westner, K., Kemmers, F., Klein, S., 2020. A novel combined approach for the interpretation of compositional and Pb isotope data of (leaded) copper-based alloys and a case study on the development of bronze coinage in Magna Graecia and Rome from the 5th to 2nd centuries BCE. Journal of Archaeological Science 121, 105-204. <https://doi.org/10.1016/j.jas.2020.105204>.

2019

Ashkenazi, D., Misgav, I., Issachar, R., Klein, S., Cvikel, D., 2019. New insights into brass nails from the 19th-century Akko Tower Wreck (Israel): Metallurgical characterization. Journal of Alloys and Compounds 771, 614-628. <https://doi.org/10.1016/j.jallcom.2018.08.285>.

Birch, T., Westner, K., Kemmers, F., Klein, S., Höfer, H., Seitz, H., 2019. Retracing Magna Graecia's silver: Coupling lead isotopes with a multi-standard trace element procedure. Archaeometry 62(1), 81-108. <https://doi.org/10.1111/arcm.12499>.

Nicklisch, N., Knipper, C., Nehlich, O., Held, P., Rossbach, A., Klein, S., Schwab, R., Häger, T., Wolf, M., Enzmann, F., Birkenhagen, B., Alt, K., 2020. A Roman-period dental filling made of a hard tissue compound?, Archäologisches Korrespondenzblatt 49, 371-391.

Rodler, A., Klein, S., Artioli, G., Brons, C., 2019. Probing the provenance of archaeological glaze colorants: Polychrome faunal reliefs of the Ishtar Gate and the Processional Way of Babylon. *Archaeometry* 61(4), 837-855. <https://doi.org/10.1111/arc.12455>.

Rose, T., Hanning, E., Klein, S., 2019. Verhüttungsexperimente mit Chalkopyrit-Erz nach Vorbildern aus dem bronzezeitlichen Ostalpenraum und Nepal. *Experimentelle Archäologie in Europa* 18, 47-60. <https://doi.org/10.23689/fidgeo-3706>.

Rose, T., Hanning, E., Klein, S., 2019. DBM @ RGZM: Experimente zur prähistorischen Kupferverhüttung im Labor für Experimentelle Archäologie. *archäologie schweiz* 42(2019 1), 44-45.

Rose, T., Télouk, P., Klein, S., Marschall, H., 2019. Questioning Fe isotopes as provenance tool: insights from bog iron ores and alternative applications for archaeometry. *Journal of Archaeological Science* 101, 52-62. <https://doi.org/10.1016/j.jas.2018.11.005>.

Westner, K., Gassmann, G., Klein, S., 2019. Primary metal extraction or secondary metal production from re-smelting? A case study on samples from two excavated sites in Kosovo. In: C. Herm, S. Merkel, M. Schreiner, R. Wiesinger (Eds.), *Jahrestagung „Archäometrie und Denkmalpflege“* Wien, 11. bis 14. September 2019. *Metalla, Sonderheft* 9, 200–203. <https://doi.org/10.46586/metalla.v.2019.i9>.

2018

Cohen, M., Ashkenazi, D., Bijovsky, G., Inberg, A., Klein, S., Cvikel, D., 2018. Copper Alloy coins from the Byzantine-Period Ma'agan Mikhael B Shipwreck, Israel: Metallurgical Characterization. *Metallography, Microstructures and Analysis* 7(2), 542–560. <https://doi.org/10.1007/s13632-018-0476-8>.

Hauptmann, A., Klein, S., Paoletti, P., Zettler, R., Jansen, M., 2018. Types of Gold, Types of Silver: The Composition of Precious Metal Artifacts Found in the Royal Tombs of Ur, Mesopotamia. *Zeitschrift für Assyriologie und vorderasiatische Archäologie* 108 (1), 100-131. <https://doi.org/10.1515/ZA-2018-0007>.

Jansen M, Hauptmann A, Klein S, Seitz H. 2018. The potential of stable Cu isotopes for the identification of Bronze Age ore mineral sources from Cyprus and Faynan: results from Uluburun and Khirbat Hamra Ifdan. *Archaeological and Anthropological Sciences* 10 (6), 1485–1502. <https://doi.org/10.1007/s12520-017-0465-x>.

Jansen, M., Klein, S., Hauptmann, A., 2018. Zur Herkunft des Goldes aus den Königsgräbern von Ur. In: Ü. Yalcin (Hrsg.), *Anatolian Metal VIII – Eliten – Handwerk – Prestigegüter*. *Der Anschnitt Beiheft* 39, 123-137.

2017

Ashkenazi, D., Cvikel, D., Holtzman, M., Bershadski, D., Stern, A., Klein, S., Kahanov, Y., 2017. The Dor C shipwreck, Israel: metallurgical analysis and its contribution to the ship characterization. *Archaeological and Anthropological Sciences* 9(3), 431–445. <https://doi.org/10.1007/s12520-015-0296-6>.

Ashkenazi, D., Dvir, O., Kravits, H., Klein, S., Cvikel, D., 2017. Decorated floor tiles from the 19th-century Akko Tower Shipwreck (Israel): Analysis of pigments and glaze. *ScienceDirect: Dyes and Pigments* 147, 160-174. <https://doi.org/10.1016/j.dyepig.2017.08.005>.

Cvikel, D., Ashkenazi, D., Spiegelman, V., Stern, A., Klein, S., Rimer, G., 2017. Flintlock brass fittings from the 19th-century Akko 1 shipwreck, Israel. *Arms & Armour* 14(2), 138-164. <http://dx.doi.org/10.1080/17416124.2017.1388575>.

Cvikel, D., Cohen, M., Inberg, A., Klein, S., Iddan, N., Ashkenazi, D., 2017. Metallurgical characterization of brass sheet from the 19th-century Akko Tower Wreck (Israel). *Materials Characterization* 131, 175-187. <https://doi.org/10.1016/j.matchar.2017.06.036>.

Jansen, M., Hauptmann, A., Klein, S., Seitz, H., 2017. The potential of stable Cu isotopes for the identification of Bronze Age ore mineral sources from Cyprus and Faynan: results from Uluburun and Khirbat Hamra Ifdan. *Archaeological and Anthropological Sciences* 10(6), 1485–1502. <https://doi.org/10.1007/s12520-017-0465-x>.

Rodler, A., Artioli, G., Klein, S., Petschick, R., Fink-Jensen, P., Brons, C., 2017. Provenancing ancient pigments: Lead isotope analysis of the copper compound of Egyptian blue pigments from ancient Mediterranean artefacts. *Journal of Archaeological Science: Reports* 16, 1-18. <http://dx.doi.org/10.1016/j.jasrep.2017.09.008>.

Westner, K., Gassmann, G., Klein, S., Körlin, G., 2017. Technological changes in mining and metallurgy from Roman to Medieval times: Evidence from a Pb-Ag (-Cu) ore district in Central Kosovo. *Archaeometallurgy in Europe IV*, 249-257.

2016

Hauptmann, A., Klein, S., 2016. Golden artifacts from the Royal Tombs of Ur, Mesopotamia. *Metalla* 22(1), 84-88. <https://doi.org/10.46586/metalla.v22.2016.i1.84-88>.

Hauptmann, A., Klein, S., 2016. The Royal Tombs of Ur, Mesopotamia: New investigations, new results from the investigation of metal artifacts and other archaeological finds. An Introduction. Workshop, Deutsches Bergbau-Museum Bochum, May 2015. *Metalla* 22(1), 77-83. <https://doi.org/10.46586/metalla.v22.2016.i1.77-83>.

Hauptmann, A., Klein, S., Baumer, U., Bode, M., Dietemann, P., Zettler, R., 2016. Composition and provenance of pigments from the Early Dynastic Royal Tombs of Ur, Mesopotamia. *Metalla*, 22(1), 41-74. <https://doi.org/10.46586/metalla.v22.2016.i1.41-74>.

Hauptmann, A., Klein, S., Zettler, R., Baumer, U., Dietemann, P., 2016. On the Making and Provenancing of Pigments from the Early Dynastic Royal Tombs of Ur, Mesopotamia. *Metalla* 22(1), 41-74. <https://doi.org/10.46586/metalla.v22.2016.i1.41-74>.

Hauptmann, H., Klein, S., Zettler, R., La Niece, S., Benz, K., Armbruster, B., Jansen, M., Salzmann, E., 2016. The Royal Tombs of Ur, Mesopotamia. Collection of Contributions from a Workshop. *Metalla* 22(1), 77-146.

Jansen, M., Aulbach, S., Hauptmann, A., Höfer, H., Klein, S., Krüger, M., Zettler, R., 2016. Platinum group placer minerals in ancient gold artifacts – Geochemistry and osmium isotopes of inclusions in Early Bronze Age gold from Ur/Mesopotamia. *Journal of Archaeological Science* 68, 12-23. <https://doi.org/10.1016/j.jas.2016.02.004>.

Jansen, M., Hauptmann, A., Klein, S., 2016. Where does the gold from the cemetery of Ur come from? Provenancing gold sources using analytical methods. *Metalla* 22(1), 98-106. <https://doi.org/10.46586/metalla.v22.2016.i1.98-106>.

Klein, S., Hauptmann, A., 2016. Ur, Mesopotamia: The lead metal from Pit X. *Metalla* 22(1), 136-140. <https://doi.org/10.46586/metalla.v22.2016.i1.136-140>.

Klein, S., La Niece, S., Hauptmann, A., 2016. Objects from the Ur-collection at the British Museum. *Metalla* 22(1), 89-97. <https://doi.org/10.46586/metalla.v22.2016.i1.89-97>.

Salzmann, E., Klein, S., Hauptmann, A., 2016. Analytical investigations on silver, copper and the earliest tin bronzes from Ur. *Metalla* 22(1), 141-145. <https://doi.org/10.46586/metalla.v22.2016.i1.141-145>.

Westner, K., Klein, S., Gassmann, G., 2016. Roman to medieval precious and base metal smelting near Ulpiana (Kosovo): Evidence for complex multistage extraction of silver. In: G. Körlin, M. Prange, T. Stöllner, Ü. Yalcin (Hrsg.), *From bright ores to shiny metals: Festschrift for Andreas Hauptmann on the occasion of 40 years research in archaeometallurgy and archaeometry*. Marie Leidorf, Rhaden, 205–218.

Westner, K., Klein, S., Gassmann, G. 2016. Roman/Late Antique to medieval/early modern mining and metal production in the vicinity of the municipium Ulpiana (Kosovo): an attempt to chronological reconstruction of metallurgical processing and establishment of the Metalla Dardanica district. *Metalla Sonderheft* 8, 209-212.

2015

Ashkenazi, D., Cvikel, D., Holtzmann, M., Bershadski, D., Stern, A., Klein, S., Kahanov, Y., 2015. Archaeometallurgical analysis of metal remains from the Dor 2006 shipwreck: A clue to the understanding of the transition in ship construction. *Journal of Archaeological Science: Reports* 2, 321-332. <https://doi.org/10.1016/j.jasrep.2015.02.013>.

Cohen, M., Ashkenazi, D., Kahanov, Y., Stern, A., Klein, S., Cvikel, D., 2015. The Brass Nails of the Akko Tower Wreck (Israel): Archaeometallurgical Analyses. *Metallography, Microstructure and Analysis* 4, 188-206. <https://doi.org/10.1007/s13632-015-0203-7>.

Gassmann, G., Klein, S., Körlin, G., 2015. The Roman mines near Ulpiana, Kosovo. In: A. Hauptmann, D. Modarressi-Tehrani (eds.), *Archaeometallurgy in Europe*. *Der Anschnitt Beiheft* 26, 33-44.

Merkel, S., Bräutigam, B., Klein, S., Hauptmann, A., 2015. The Analysis of Slag from the Panjhir Mining Region, Afghanistan: An Investigation of (Medieval) Silber Production Technology. *Archäologische Mitteilungen aus Iran und Turan* 45, 231-249.

Müller, R., Brey, G., Seitz, H., Klein, S., 2015. Lead isotope analyses on Late Republican sling bullets. *Archaeological and Anthropological Sciences* 7(4), 473-486. <https://doi.org/10.1007/s12520-014-0209-0>.

Westner, K., Gassmann, G., Klein, S. 2015. Roman to medieval Pb-Ag (-Cu) smelting in central Kosovo: Reconstruction of a sophisticated multistage extraction process. *Metalla Sonderheft* 7, 225-227.

2014

Alt, K., Oelze, V., Lahaye, Y., Weix, J., Dörr, W., Klein, S., 2014. Identifizierung von Einheimischen und Ortsfremden in der Mehrfachbestattung Grab 244 aus Ergolding anhand standorttypischer Strontiumisotopie. In: H. Koch (Hrsg.) *Frühmittelalterliche Adelsgräber aus Ergolding*. Dr. Faustus, Büchenbach, 70-73.

Ashkenazi, D., Cvikel, D., Stern, A., Klein, S., Kahanov, Y., 2014. Metallurgical characterization of brass objects from the Akko shipwreck, Israel. *Materials Characterization* 92, 49-63. <https://doi.org/10.1016/j.matchar.2014.02.012>.

Gorecki, J., Klein, S., Bollingberg, H., Brey, G., Pearson, G., 2014. Metallkundliche und analytische Untersuchungen an den im Deposito Archeologico der Soprintendenza Archeologica di Pompei aufbewahrten Metallgefäßen. *Germania*, 161-336. <https://doi.org/10.11588/berrgk.2017.0.44434>.

Müller, R., Brey, G., Seitz, H., Klein, S. 2014. Lead isotope analyses on Late Republican sling bullets. *Archaeological and Anthropological Sciences* 7(4), 473-486. <https://doi.org/10.1007/s12520-014-0209-0>.

2013

Jansen, M., Hauptmann, A., Klein, S., Seitz, H., 2013. Die geochemische Charakterisierung von bronzezeitlichem Gold aus Vorderasien mittels LA-ICP-MS. *Metalla Sonderheft* 6, 67.

Westner, K., Gassmann, G., Körlin, G., Klein, S., 2013. The polymetallic Roman mining districts of Shashkoc/Šaškovac and Janjevë/Janjevo—Economic foundation of the municipium Ulpiana?. *Metalla Sonderheft* 6, 53-57.

2012

Jansen, M., Gambaschidze, I., Hauptmann, A., Klein, S., Kirchner, D., 2012. Gold in Georgien – Materialwissenschaftliche Studien zu Technologie und Herkunft. *Metalla Sonderheft* 5, 136-139.

Jansen, M., Hauptmann, A., Klein, S., Seitz, M., 2012. Kupfer aus Zypern, und welche Erze? Die Ochsenhautbarren von Uluburun im Vergleich zu Erzen auf Zypern auf Basis der Cu-Isotopie / Copper from Cyprus, but which Ores were used? The Oxhide Ingots of Uluburun in Comparison to Ores on the Basis of Cu Isotopy. *Metalla Sonderheft* 5, 118-121.

Klein, S., von Kaenel, H., Lahaye, Y., Brey, G., 2012. The Early Roman Imperial Aes Coinage III: Chemical and Isotopic Characterisation of Augustan Copper Coins from the Mint of Lyons/Lugdunum. *Schweizerische Numismatische Rundschau* 91, 63-110.

2011

Gassmann, G., Körlin, G., Klein, S., 2011. Römischer Erzbergbau im Umfeld der antiken Stadt Ulpiana bei Pristina (Kosovo). *Der Anschnitt* 63(H4-5), 157-167.

Jézégü, M., Klein, S., Rico, C., 2011. The copper ingots from the Roman wreck at the Plage de la Corniche 6 in Sete and the Hispanic copper trade in Western Mediterranean. *Revue Archeologique de Narbonnaise* 44, 57-70.

Nesta, A., Trincerini, P., Klein, S., Rico, C., Quarati, P., Domergue, C., 2011. Sobre el origen de los lingotes de chipiona. Aportación del método de los isótopos del plomo. About the origin of chipiona ingots. The contribution of lead isotope analyses. *Habis* 42, 191-207.

2010

Hauptmann, A., Bendall, C., Brey, G., Japarize, I., Gambasidze, I., Klein, S., Prange, M., Stöllner, T., 2011. Gold in Georgien. Analytische Untersuchungen an Goldartefakten und an Naturgold aus dem Kaukasus und dem Transkaukasus. In: S. Hansen, A. Hauptmann, I. Motzenbäcker, E. Pernicka (Hrsg.), *Von Majkop nach Trialeti – Gewinnung und Verbreitung von Metallen und Obsidian in Kaukasien im 4.-2. Jahrtausend v. Chr. Beiträge des Internationalen Symposiums in Berlin vom 1.–3. Juni 2006. Kolloquien zur Vor- und Frühgeschichte* 13. Habelt, Bonn, 139-160.

Klein, S., Brey, G.P., Durali-Müller, S., Lahaye, Y., 2010. Characterisation of the raw metal sources used for the production of copper and copper based objects with copper isotopes. *Archaeological and Anthropological Sciences*, 2(1), 45-56. <https://doi.org/10.1007/s12520-010-0027-y>

Rageth, J., Zanier, W., Klein, S., 2010. Crap Ses und Septimer: Archäologische Zeugnisse der römischen Alpeneroberung 16 / 15 v. Chr. aus Graubünden. *Germania* 88, 241-283.
<https://doi.org/10.11588/ger.2010.71106>.

2009

Hauptmann, A., Klein, S., 2009. Bronze Age Gold in Southern Georgia. *Revue d'archaéométrie* 33, 75-82. <https://doi.org/10.4000/archeosciences.2037>.

Klein, S., 2009. Untersuchungen von Schlackenfundten aus der Grabung Groß-Gerau. In: C. Wenzel (Hrsg.), *Groß-Gerau I. Der Römische Vicus von Groß-Gerau, „Auf Esch“: Die Baubefunde des Kastellvicus und der Siedlung des 2.-3. Jahrhunderts*. Frankfurter Archäologische Schriften 9, Habelt, Bonn, 331-336.

Klein, S., Domergue, C., Lahaye, Y., Brey, G., von Kaenel, H., 2009. The lead and copper isotopic composition of copper ores from the Sierra Morena (Spain) - Análisis de los isótopos de plomo y de cobre de los minerales de cobre de Sierra Morena (España). *Journal of Iberian Geology* 35(1), 59-68.

Klein, S., Domergue, C., Rico, C., Garnier, J., 2009. Sur la signature isotopique du plomb des lingots de cuivre romains découverts il y a trente ans dans le lit de la Garonne, à Golfech (Tarn-et-Garonne). *Aquitania* 25, 313-342. <https://doi.org/10.3406/aquit.2009.1192>.

2008

Klein, S., 2008. Das Kupfer der römischen Kaiserzeit und seine Rohstoffquellen. Habilitationsschrift, Goethe-Universität Frankfurt a.M., FB 11 Geowissenschaften/Geographie.

Barkai, O., Kahanov, Y., Klein, S., 2007-2008, The Tantura Shipwreck. Analysis of the Ceramic Material. *Skyllis*, 8/1-2, 30-32.

2007

Klein, S., 2007. Blei- und Kupferisotopen-Analyse einiger Bronzen mittels MC-ICP-MS. In: G. Lahusen, E. Formigli (Hrsg.), *Großbronzen aus Herculaneum und Pompeji*. Wernersche Verlagsgesellschaft, Worms, 169-170.

Klein, S., 2007. Dem Euro der Römer auf der Spur – Bleiisotopenanalysen zur Bestimmung der Metallherkunft römischer Münzen. In: G. Wagner (Hrsg.), *Einführung in die Archäometrie*. Springer, Heidelberg, 140-152. https://doi.org/10.1007/978-3-540-71937-3_8.

Klein, S., Lahaye, Y., Rico, C., von Kaenel, H., Domergue, C., Brey, G., 2007, Copper Ingots from West Mediterranean Underwater Sites. Chemical Characterisation and Provenance studies through Lead- and Copper Isotope Analyses. *Journal of Roman Archaeology* 20, 203-221.
<https://doi.org/10.1017/S1047759400005377>

2006 – 2000

Rico, C., Domergue, C., Rauzier, M., Klein, S., Lahaye, Y., Brey, G., von Kaenel, H., 2005-2006. La provenance des lingots de cuivre romains de Maguelone (Hérault, France). Étude archéologique et archéométrique. *Revue Archéologique de Narbonnaise* 38-39, 459-472.
<https://doi.org/10.3406/ran.2005.1170>.

Klein, S., Lahaye, Y., Brey, G. von Kaenel, H., 2004. The early Roman Imperial aes coinage II: Tracing the copper sources by lead- and copper-isotope analysis – copper coins of Augustus and Tiberius. *Archaeometry* 46(3), 469-480. <https://doi.org/10.1111/j.1475-4754.2004.00168.x>.

Klein, S., Lahaye, Y., Brey, G., von Kaenel, H., 2002. Blei- und Kupferisotopenanalysen an Kupfermünzen der römischen Kaiserzeit. Beiheft zu *European Journal of Mineralogy* 14, 84.

Hauptmann, A., Busz, R., Klein, S., Vettel, A., Werthmann, R., 2001. The Roots of Glazing Techniques: Copper Metallurgy? *Paléorient*, 26(2), 113-129. <https://doi.org/10.3406/paleo.2000.4714>.

Klein, S., von Kaenel, H., 2000. Metal Analysis and Numismatic Studies of Early Roman Imperial Bronze Coinage. Part 1: Chemical Characterisation of Copper Coins from Augustus to Claudius. *Schweizerische Numismatische Rundschau* 79, 53-106.

1999-1990

Hauptmann, A., Klein, S., 1999. Über die Bildung von Glasuren in alten Kupferschmelzöfen. In: R. Busz, P. Gercke, Staatliche Museen Kassel, Ballhaus Kassel, Schloss (Hrsg.), *Türkis und Azur: Quarzkeramik im Orient und Okzident*. Ed. Minerva, Wolfratshausen, 114-121.

Klein, S., Hauptmann, A., 1999. Iron Age Leaded Tin Bronzes from Khirbet edh-Dharih, Jordan, *Journal of Archaeological Science* 26(8), 1075-1082. <https://doi.org/10.1006/jasc.1999.0412>.

Lechtman, H., Klein, S., 1999. The Production of Copper-Arsenic Alloys (Arsenic Bronze) by Cosmelting: Modern Experiment, Ancient Practice. *Journal of Archaeological Science*, Vol. 26(5), 497-526. <https://doi.org/10.1006/jasc.1998.0324>.

Klein, S., 1998. Metallurgische Untersuchung der Schreibfeder aus Grab 2. In: R. Ambs, A. Faber, Ein Bestattungsort der 'provinzialischen Oberschicht' Raetiens an der Donausüdstraße bei Nersingen-Unterfahlheim. *Bericht der Römisch-Germanischen Kommission* 79, 470-473.

Klein, S., Hauptmann, A., Vandiver, P., 1996. Refractory Ceramics from an Iron Age Bronze Melting Workshop at Khirbet EdhDharih, Jordan. *Material Research Society* 462, 135-142. <https://doi.org/10.1557/PROC-462-135>.

Klein, S., 1993. Archäometallurgische Untersuchungen an frühmittelalterlichen Buntmetallfunden aus dem Raum Höxter/Corvey. *Frankfurter Geowissenschaftliche Arbeiten, Serie C: Mineralogie* 13. Institut für Geochemie, Petrologie und Lagerstättenkunde, Frankfurt.

Klein, S., Urban, H., Stephan, H., König, A., Bollingberg, H., 1993. Archäologische und metallurgische Untersuchungen zur mittelalterlichen Bunt- und Edelmetallverarbeitung in Höxter und Corvey. In: H. Steuer, U. Zimmermann (eds.), *Montanarchäologie in Europa. Archäologie und Geschichte, Freiburger Forschungen zum ersten Jahrtausend in Südwestdeutschland* 4. Thorbecke, Sigmaringen, 291-301.

Klein, S., Zereini, F., Urban, H., Schuster, M., König, K., 1991. Die Edelmetalle – Anreicherung, Selektion und Nachweis. *Forschung, Entwicklung, Projekte – Messe-Exponate der Uni Frankfurt*, Johann Wolfgang Goethe-Universität Frankfurt a.M. (Hrsg.) 51-59.

Klein, S., Zereini, F., Urban, H., Bachmann, H., 1990. *Berichte der Deutschen Mineralogischen Gesellschaft* Beiheft 2(1).

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