



## **Geomagnetic and geoelectric prospection on a roman iron production facility in Hüttenberg, Austria (Ferrum Noricum).**

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The area of Hüttenberg, Carinthia has long been suspected to be a center of the roman iron production between the 1st and the 4th century AD. Parts of this ancient iron industry are located at the site Semlach-Eisner. Excavations following geophysical prospection have shown several melting furnaces, slag heaps and walls as well as relicts of administration buildings and settlements. Due to the amount of slag finds around the excavation area a larger expansion of the whole complex can be assumed.

For the limitation of this industrial zone a geomagnetic “walkmag” survey has been accomplished in a measurement field covering 400 m x 1000 m. Using a permanent recording proton magnetometer GEM 190H and a hand-held GPS System, 63,700 raw data of the total magnetic field intensity were observed. Data analysis and corrections included diurnal correction related to a local base station, reduction of data with low data quality and elimination of stations affected by technical disturbances or stations with equal coordinates due to the limited resolution of the GPS system.

Data transformations included trend analysis by means of calculation of regression surfaces based on North-South and East-West transects using Golden Software GRAPHER data fit. A strong quadratic North-South trend and a slight linear East-West trend has been reduced. The residuals of this calculation were used for the final presentation of the data.

The distribution of the magnetic anomalies shows, aside from the current excavation plane in the center, two additional zones in the North and the South of the investigation area, where subsurface archeological objects can be assumed. Slag finds near both anomaly-zones give a strong evidence for the presence of further relicts of the (roman?) iron production. The huge slag heap west of the excavated area can be tracked further towards the south. Further Anomalies are caused by geological borders and possible mineralisation.

The depth of the major slag body was determined with two multielectrode geoelectric profiles for the estimate of the slag volume. The North-South profiles with a length of 162m and an electrode distance of 2m indicate a high resistivity body of about 6m representing the slag heap. The thinning of this body to both ends of the profile is consistent with the magnetic data. With a good delimitation to the bedrock the results of the geoelectric survey fits well with the assumptive historical paleosurface.

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