



A knot in a network: Residential mobility at the Late Iron Age proto-urban centre of Basel-Gasfabrik (Switzerland) revealed by isotope analyses

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ABSTRACT

The Basel-Gasfabrik site (Switzerland) is among the largest and best investigated proto-urban centres of the La Tène period (chiefly La Tène C2/D1; 200/150–80 BCE). Excavations revealed evidence of an urban lifestyle, crafts production as well as a multitude of imported goods. Human skeletal remains were recovered both from two cemeteries and from various settlement features. Strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) and oxygen ($\delta^{18}\text{O}_\text{p}$) isotope analyses aimed at an assessment of the role of residential changes in the makeup of the site's population, the positioning of Basel-Gasfabrik in local, regional, and long-distance networks, and the exploration of possible correlations between the complex mortuary practices and the individuals' residential history. The study involved 94 enamel samples from 54 human individuals, while archaeological animal teeth and modern vegetation and water samples provided baseline information. The $^{87}\text{Sr}/^{86}\text{Sr}$ and the $\delta^{18}\text{O}_\text{p}$ ratios of the human teeth varied widely between 0.70755 and 0.71655 and 14.7 and 19.3 ‰, respectively, with more variation among adult males and females than among juveniles. Both the archaeological setting and the isotope data attest to lively contacts of the central site to its hinterland, but also to distant regions, such as the Mediterranean. Differences in the isotope data of successively formed tooth crowns of some of the adult population point to residential changes in childhood. Possible explanations include fosterage as an important element in strengthening regional and inter-regional ties among Iron Age communities, settlement centralization, and mobile animal husbandry practices. However, areas of origin or patterns of mobility were not among the key factors which shaped the complex mortuary practices.

1. Introduction

Large, unfortified sites are an important component of the settlement landscape of the Middle and Late La Tène period (250–15 BCE) in Central Europe. The majority covered an area of 7 to 15 ha, were situated at major rivers and important trade routes and provided evidence for an urban lifestyle and specialized crafts production (Augstein, 2006). Indications of administrative function as well as regional and supra-regional trade, monetised economy, and ritual facilities denote

their role as central places. The combination of these characteristics is an important innovation of the second century BC and characterizes such sites as early urban centres (Rieckhoff, 2002). One of the most extensively studied examples is the site of Basel-Gasfabrik, named after a former gas factory, in Switzerland (Fig. 1). Numerous excavations since 1911 have documented an extensive settlement and two cemeteries (A and B) at the left bank of the Rhine River (Hecht and Niederhäuser, 2011; Pichler et al., 2013) (Fig. 2). The unfortified central place covered an area of approximately 15 ha, and its well-planned

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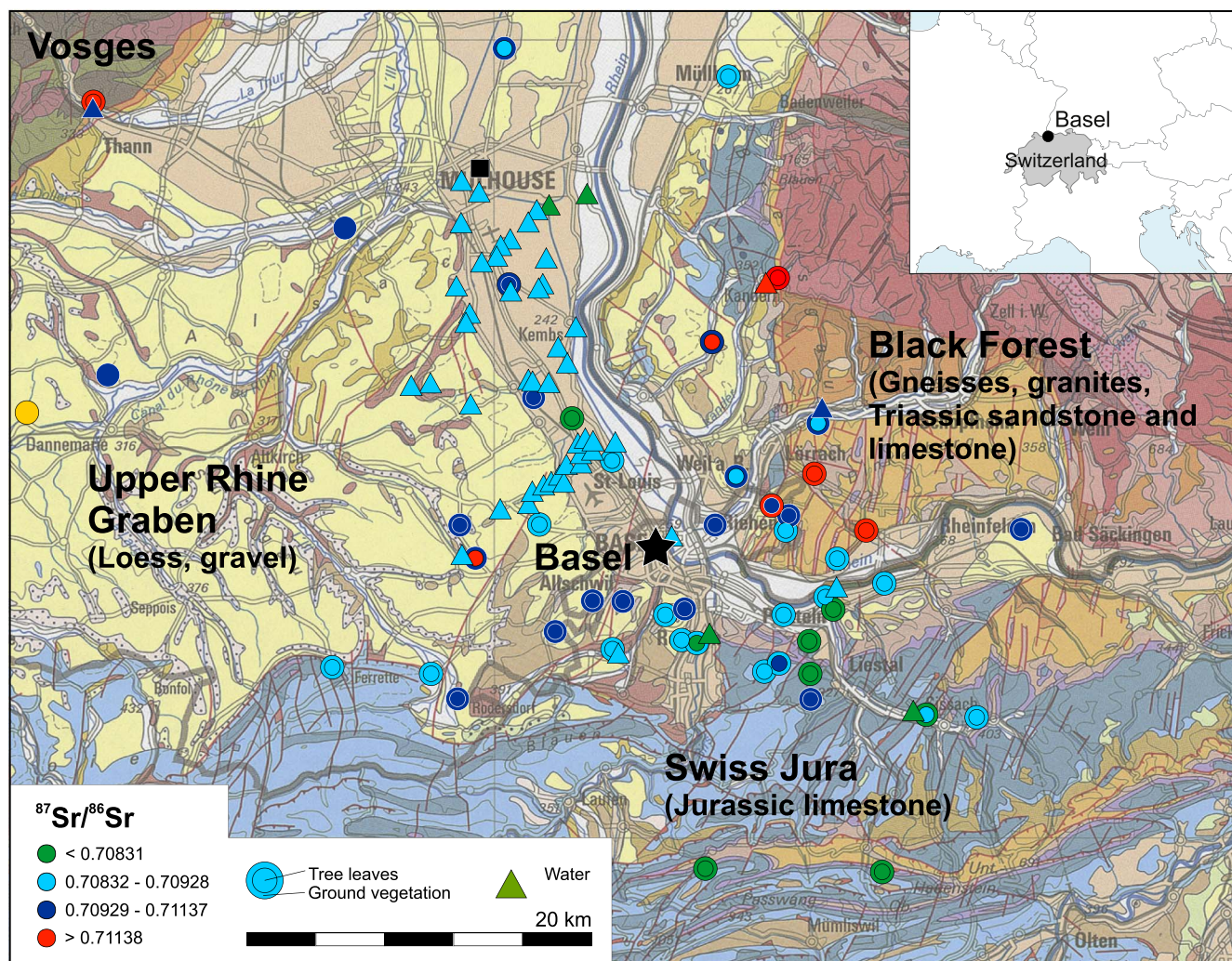


Fig. 1. Location of the Basel-Gasfabrik proto-urban centre on a geological map of the southern Upper Rhine valley and adjacent low mountain ranges with indication of the $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of modern vegetation and water samples. The data categories represent the local ranges I and II as outlined in Table 2 (Background map: Geology of Switzerland 1:500,000; Bundesamt für Landestopographie swisstopo. Data after: Brönnimann et al., 2018; Kloppmann, 2003; Kloppmann et al., 2013).

domestic and economic structures offered room for several hundred inhabitants.

Both cemeteries and the settlement were in use during the La Tène period (chiefly La Tène C2/D1; 200/150–80 BCE). Earlier evidence includes a sprinkling of artefacts in the settlement and some inhumations of the Middle La Tène period (La Tène C; 250–150 BCE). In the settlement, the Middle La Tène material is always associated with that of the Late La Tène period.

Regardless of whether the extensive settlement of the Late La Tène period had developed from a smaller predecessor or whether it was a new foundation, its sheer size can hardly be explained by natural population growth at the site itself. Instead, the overall context suggests that residential mobility played an important role in the accumulation of people. It also raises questions regarding the interaction of the proto-urban centre with its hinterland. The archaeological record of the southern Upper Rhine valley attests to numerous medium sized centres and smaller farmsteads around the Basel-Gasfabrik central site (Blöck et al., 2014). Most of these were probably rather short-lived, so that settlement shifts were common and may have been a source for people resettling into the larger, proto-urban centre.

In addition, the archaeological record points to well-established regional contacts and suggests supply with raw materials and goods produced in the near surroundings as well as further afield, from where

possible marriage partners or foster children may also have come to the settlement, as it has been discussed for Iron Age contexts based on written records (Karl, 2005; Parkes, 2006) and isotope data (Müller-Scheeßel et al., 2015). Resulting from such contacts, the community may have received agricultural products including cereals and meat from farmsteads in its perimeter. Regarding long-distance contacts, e.g. amphorae, *Campana* ware, and other luxury goods were of Italian or Mediterranean origin and most likely imported via the Rhône Valley and the Belfort Gap (Hecht and Niederhäuser, 2011). Trade and exchange of raw materials and finished goods certainly provided opportunities for travellers to get into contact with the inhabitants of the Basel-Gasfabrik settlement. Whether such contacts also added to the resident population cannot be disclosed by artefactual evidence alone.

In a different sphere, burial customs at Basel-Gasfabrik were highly variegated (Pichler et al., 2015; Pichler et al., 2013). In addition to inhumations in two cemeteries, numerous human remains were found in settlement features (Fig. 2). The latter include complete skeletons, but also isolated skulls and bones in pits, wells, and ditches, some of which exhibit signs of peri and post mortem manipulations and thus signal the practice of multi stage burial rites. The motives behind these highly differentiated mortuary practices are still little understood.

All in all, the rare combination of an extensive, well investigated settlement with large numbers of diverse archaeological finds and

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