Data processing and world wide data sharing

The data generated by the project are of high complexity and no longer manageable manually. This requires the application of innovative methods for data processing, data mining, and automatic data analysis. The isotopic fingerprints are spatial data of moderate dimension, whereby similarities between objects are not necessarily due to their similar isotopic ratios, but rather due to complex correlations with other data, e.g. geographical coordinates, biological features, grave goods etc. The majority of existing methods are dedicated to exact data, while bioarchaeological data are nearly always fuzzy data. The management of such data (“data uncertainty”) and the recognition of inconsistencies (“data consistency”) are of particular relevance for this project. Finally, a world wide web-based access portal with all primary and secondary data including selected methodologies will be generated. This platform will be administered by the Research Group “Archäoinformatik” at the LMU.

1. **Step 1: Cluster analysis**

   In the conventional bi-variate plot, individual isotopic data are seemingly randomly distributed.

   Cluster analysis reveals that the isotopic data of the red and blue population are in fact not randomly distributed but rather correlated non-linearly.

   Technologically, stable isotopic data appear intriguingly exact, but in terms of their biological information, they are rather approximations requiring fuzzy data analysis.

   Recognition of patterns in time and space.

2. **Step 2: Search for similarities and data mining**

   Integration of additional features and other external data:

   Discovery of existing relationships between the various data sets

   This allows for the recognition of spatial outliers and the identification of bioarchaeological finds which have an isotopic fingerprint that differs from the previously defined characteristic local isotopic value in a given small area (see Poster I: Isotopic mapping).

3. **Step 3: Search for similarities and data mining of „enriched“ isotopic data**

   Search for finds which exhibit similar multi-dimensional isotopic fingerprints, e.g.: „Given an animal bone x, find all skeletal finds with similar isotopic fingerprints within a radius of 20 km, which are of the same archaeological age, and which belong to the same species."

4. **IT-Infrastructure**

   - **ARCHBOOK** and **ANTHROBOOK** are databanks of the Bavarian State Collection of Anthropology and Paleoanatomy in Munich.

   - **Pattern 1**
   - **Pattern 2**
   - **Pattern 3**

   - **Recognition of patterns in time and space.**