# Chapter 2
# Data and Methodology

This chapter is based on multidisciplinary field data. A brief overview of the available data sets and the applied methodology is provided in this chapter. A description in greater detail is given in the specific chapters.

The 3D seismic survey analysed in Chaps. 3 and 4 is located in East Frisia and is the result of the merging of three individual data volumes acquired from 1995 to 2001. It covers an area of $\sim 293\ km^2$. In addition to the data set in the time domain, a depth converted volume was available. Analysis was mainly carried out in time domain due to the fact, that subtle information was lost during later stages of processing, filtering and smoothing. Volumes of amplitude dependent and amplitude independent seismic attributes were processed using standard seismic interpretation software packages.

Wireline logs from seven wells and core material from four of these wells were available from the East Frisia study area. Formation Micro Imaging/Formation Micro Scanner (FMS/FMI) data are available from one of the wells. Core analysis discussed in Chaps. 3 and 4 was carried out macroscopically. Differentiation between sedimentary environments is based on clay content and internal structures such as grain size distribution and internal geometries.

Ground resistivity measurements in the Panamint Valley in California, United States (Chap. 4) were carried out using a "Lippmann 4-point light" geoelectrical instrument. Data was processed with the Res2DInv software. Collected sediment samples were investigated by x-ray diffractometry analysis (XRD), glycol dehydration and optical microscopy. In addition to the field work, satellite images provided by the Google Earth Software [3] were taken into consideration. Earthquake data was available from the United States Geological Survey Northern California Seismic Network (USGS NCSN) Catalog (http://www.ncedc.org/).

Core material from four wells in northern central Germany (Chap. 5) was analysed macroscopically with the focus on the interpretation of the depositional sedimentary environment. Similar to the cores discussed in Chaps. 3 and 4, differentiation between sedimentary environments is based on differences in grain sizes and internal geometries.

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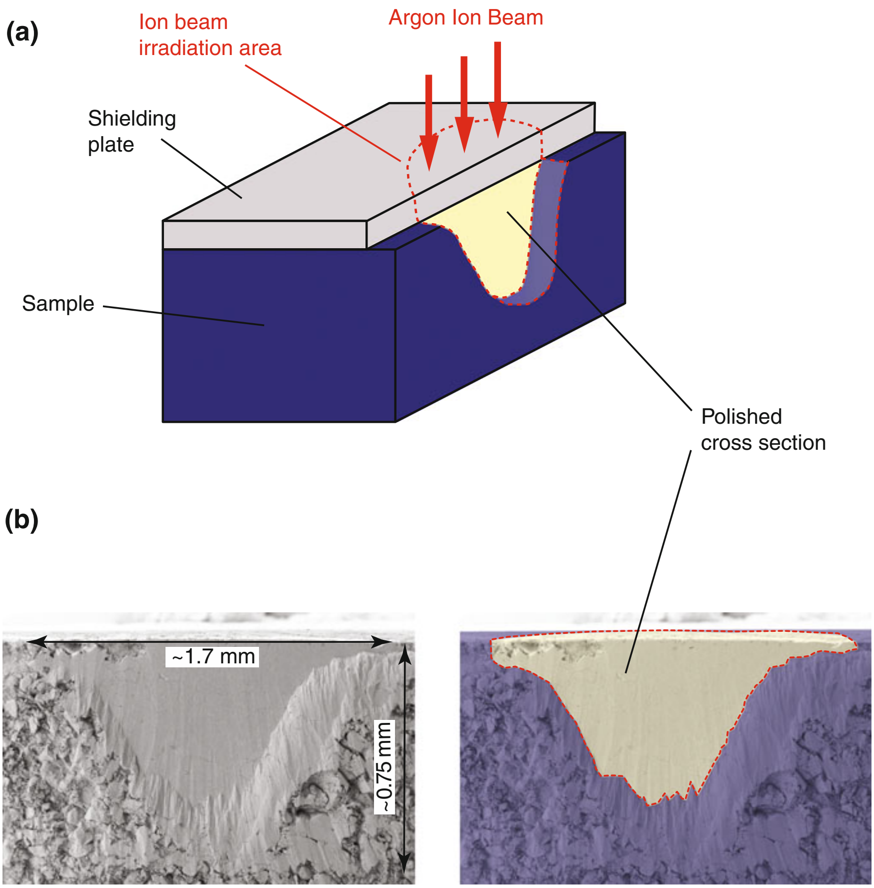


**Fig. 2.1** The principle of BIB cross-sectioning. **a** The ion beam irradiates the edge of sample un-masked by the shielding plate to create high quality polished cross-sections suitable for SEM imaging. **b** Overview of a typical cross section performed by BIB cross sectioning (A: modified after Desbois et al. [3]

As described in Chap. 6, SEM-BIB samples were polished using the JEOL SM-09010 [2]; Fig. 2.1) argon ion beam cross-section polisher and investigated with Zeiss-SUPRA 55 SEM microscope with secondary electron detector (SE), back-scattered electrons (BSE) and energy-dispersive X-ray (EDX) (EDAX-Apollo10 SDD) detectors [1]. Additionally, optical microscopy analysis was performed using a Leica DM 4500 polarisation microscope. SEM-BIB and thin section images were evaluated with the focus on mineral and porosity percentages with the JMicroVision software Version 1.2.7 [4].

# References

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