Kartierungsmethoden am Beispiel des Tagebaues Welzow-Süd. Dabei wird besonders auf die makro- und mikropetrographische Charakteristik bedeutsamer Kohlenfazies, auf ihre Verbreitung in Abhängigkeit von der paläogeographischen Situation des Vermoorungsgebiets und auf petrographische Besonderheiten hinsichtlich der Produktion von Briketts und Braunkohlenstaub eingegangen. Abschließend wird die moderne Qualitätssteuerung im Lausitzer Braunkohlenrevier vorgestellt, bei der Kohlengeologen, Tagebautechnologen, Grubenbetriebs-führer, Leitstandsfahrer und Braunkohlenveredler die speziellen Kenntnisse des Flözmodells nutzen. Die Großbildwand in der zentralen Betriebsüberwachung des Tagebaus Welzow-Süd visualisiert das petrologische Flözmodell und demonstriert damit ein vorbildliches Beispiel angewandter Sedimentpetrographie.

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Radiocarbon dating and the multicomponent nature of sediments

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Paleogeographic and paleoclimatological investigations based on proxy data (e.g. carbon, oxygen and strontium isotopic ratios) derived from sediments, ranging from as old as the Precambrian to the Holocene, are a field of high geological interest. In „old" sediments, one important issue is whether they still yield the information that has been recorded when they were deposited some hundreds of millions of years ago, and considerable care has to be taken to only sample material not chemically altered during diagenesis (e.g. BRUHN et al. 1997). Furthermore, the accuracy of the age of those sediments is mainly restricted by the time resolution of the fossil-based time scale of the record which is typically relatively poor and rarely better than 0.5 Ma (VEIZER et al. 1999). In very „young" sediments, radiocarbon dating provides a precise dating tool for material of Late Pleistocene and Holocene age (i.e. the last 50,000 years or so), in which the problem of diagenetic alteration is minor and proxy data usually mirror directly the time of deposition. Mass spectrometric measurements of the ^{14}C concentration using an electrostatic accelerator (NADEAU et al. 1997) require only 1 mg of carbon, thus making the method amenable to high resolution dating of samples from sediment cores.
However, most sediments are multicomponent systems and the carbon that is used for age determination is usually not exclusively formed at the time of deposition. Some of it may be older, reworked (terrestrial) organic material, whereas younger material may have been introduced at a later stage, and marine carbonates can yield yet another different signal, often biased by reservoir effects. Consequently, though AMS-^{14}C measurements are very precise (1 s normally < 100 a for the Holocene, < 10 ka.), the dating of „young" sediments may yield different answers, depending on the age homogeneity of the sample. Simply measuring the total organic carbon (TOC) in the sediment thus may not yield meaningful information because it represents the average of the incorporated fractions and the measured age depends on their relative abundances. A meaningful age can only be obtained if different fractions are quantitatively separated and the fraction that is dated can be related to a discrete event in the evolution of a sediment.
Physical separation of different fractions from a sample is the first step of the routine sample preparation procedure for AMS-^{14}C dating. This helps to identify different macrofossils (stems, twigs, rootlets, seeds, leave fragments, pollen, carbonate shells etc.) and to discriminate recent rootlets that are often present in terrestrial sediments and can be detected even at considerable depth. However, once dead and partly decomposed, it may be difficult to detect their presence (GROOTES et al. 1998).
Chemical acid-alkali-acid extraction is applied to remove carbonates, fulvic and humic acids. Due to their mobility, the latter two are often introduced from shallow sections of the profile and can, if not completely removed, lead to younger measured ages. Yet, in the case of sediments with very low TOC concentrations (<1 %) there is the risk of a significant contribution from older, reworked carbon to the total carbon of the residue, resulting in higher ages. The older components are normally more stable and, therefore, contribute less to the more soluble „humic acid" fraction. In this special case, the humic acid fraction could yield more realistic values.
The comparison of the ages of organic fractions and carbonate material recovered from the same depth in the core profile can be applied to determine the age homogeneity of the sample material and thus the reliability of the ages obtained. Comparison of ages obtained on terrestrial organic materials and marine/limnic carbonates indicates the reservoir characteristics of the water body during the time of deposition.
Several case studies from the marine and terrestrial environment, investigated during routine operation of the Leibniz AMS laboratory, will be presented to demonstrate the importance of the above considerations to the meaningful application of radiocarbon dating.

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Geologische Kartierung im Hochschwabgebiet als Entscheidungshilfe zur Qualitätssicherung und Bewirtschaftung von Quellwässern

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Die beiden bevölkerungsreichsten Städte Österreichs, Wien und Graz, werden zu einem bedeutenden Teil über ein weitreichendes Leitungssystem aus dem obersteirischen Hochschwabgebiet mit hochwertigem Trinkwasser versorgt.
Detailierte Kenntnisse über die gefaßten Quellen und ihre Einzugsgebiete und somit des geologischen Aufbaues dieses Gebietes sind daher für die Qualitätssicherung und Bewirtschaftung dieser Wasservorkommen von entscheidender Bedeutung. Aus diesem Grund wurde 1992 im Rahmen der Bund- Bundesländerkooperation auf dem Gebiet der Rohstoff-Forschung (Bund, Steiermark, Wien) ein interdisziplinäres Forschungsprojekt begonnen und unsere Arbeitsgruppe an der Geologischen Bundesanstalt mit