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Stable lead (Pb) isotopes and concentrations - a useful independent dating tool for Baltic Sea sediments

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Due to the large uncertainties associated with 14C dating of Baltic Sea sediments, it is critical to apply alternative dating techniques to improve the chronological control in the basin. The aim of this study was to identify lead pollution isochrones in Baltic Sea sediments, which prior to this study have been identified in lake-sediment and peat deposits in Sweden and other regions in Europe, as well as ice cores from Greenland. Synchronous temporal changes in past atmospheric lead pollution deposition are associated with the increased lead production and mining during the Roman and Mediaeval period and more recently with the increased industrial emissions until around 1970. Based on lead concentration and stable lead isotope analyses (206Pb/207Pb ratios) of two Baltic Sea sediment sequences, we show that lead-pollution chronological markers have a great potential in the overall Quaternary research of the Baltic Sea, were they will advance age-relationships and allow synchronisation of paleoenvironmental records, both within the basin and with regional records. This is the first time as isochrones have been identified in Baltic Sea sediments and the application will be timely. For example, the identification of the Pb-pollution isochrones opens the opportunity to refine estimates of the total 14C reservoir influence on radiocarbon ages in the Baltic Sea.