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Radiogenic Carbon Isotopes in Authigenic Carbonate from Lake Neusiedl, Austria

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Formation of authigenic carbonate in Lake Neusiedl, Austia, has been reported since the 1960ies. The reaction pathways resulting in carbonate precipitation (protodolomite and high magnesium calcite) have yet to be identified. Lake Neusiedl is a shallow lake without significant sediment accumulation but constant reworking of sediment due to its shallow depth (1.8m) and influence by wind. The sediments are water-saturated silts and clays that overly Neogene sediments. The age of Lake Neusiedl is unknown due to its low sedimentation rate and constant remixing of sediment. Dating of authigenic minerals is an alternative method to determine the minimum age of water present – even episodically - at the location.

We characterize the sediments mineralogy in different size fractions by X-Ray Diffractometry (XRD), Simultaneous Themo Analysis (STA) and Fourier Transform Infra Red Spectroscopy, stable carbon and oxygen isotopes as well as radiogenic carbon. To describe the authigenic carbonates and find the fractions with highest authigenic carbonate minerals we investigate the size fractions <4 μm, <3 μm, <2 μm, <1 μm, 0.5 μm and <0.2 μm. The “coarser” fractions (4 μm to 2 μm) contain detrital minerals such as chlorite, muscovite, quartz, feldspar, stoichiometric calcite and stoichiometric dolomite as well as authigenic high Mg calcite.

Radiogenic carbon ages increase with increasing grain size from 850 years before present to 2300 years before present and indicate a very slow growth rate or episodic growth of authigenic carbonate phases.