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Geochemical characterisation of northern Norwegian fjords sediments: A source to sink study

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To provide a better understanding of the weathering, transportation and sedimentation processes in a complex fjord system forty-four surface sediment samples plus three sediment cores were recovered from the Vestfjord, Ofotfjord and Tysfjord in northern Norway. We analysed the elemental composition, Corg, bulk mineral composition, $CaCO_3$, grain size and C, Nd, Sr and Hf isotopes. We found that the Vestfjord, Ofotfjord and Tysfjord can be characterised and separated by distinct geochemical signatures of the surface sediment samples e.g. in the distribution of REE and the relation between grain size and Ni, Fe and K. These variations are related to differences in the hinterland bedrock composition. The bedrock in the drainage area of these fjords consist mainly of para- and orthogneiss. Onshore soil and bedrock geochemistry data show that the orthogneiss can be distinguished from the paragneiss by the different content of Th, K, Mg, Ni and Fe. Moreover, a limestone formation rich in dolomite can be traced in the fjord system using the calcite/dolomite ratio. The investigation of the sediment cores shows that these parameters can be used as a geochemical fingerprint to trace the different rock types throughout the entire Holocene. This finding will also help to gain more knowledge about the timing of the past deglaciation and sea level variations in northern Norway.