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FTIR on detrital quartz as a provenance tool: application in SE Alps

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In this study 80 detrital quartz grains coming from 4 sedimentary rocks samples of the Julian Basin (JB) have been analysed. Quartz can incorporate chemical impurities as defects in the crystal lattice, with substitution of Si^{4+} with H^{+} and Al^{+3} or B^{3+}, or by $4H^{+}$ and LiOH, forming specific infrared absorption bands. Fourier Transform Infrared spectroscopy of quartz was used to investigate the sample set with interest to its OH defect speciation and content. According to many recent studies, OH defects are correlated to petrogenetic condition and they may be used as a provenance tool. Polarized IR spectra can identify these different substitutions and allow to separate them from molecular water contained in fluid inclusions. Julian Basin is a sin-orogenetic basin in South-eastern Alps across Italian-Slovenian border developed in the Late Cretaceous-Early Eocene. Quartz from the oldest sample (JB1 Bovec; Maastrichtian) show a pattern suggesting a mixed source between igneous and non-igneous rocks, with a slight predominance of metamorphic material supply. Quartz from samples JB23 Nimis and JB26 Monte Candia (Ypresian) show a pattern of water-poor grains suggesting a mainly metamorphic rock type source. Grains from sample JB17 Monteaperta (Thanetian) show the greatest variability in both defects and water content amount. The great presence and the huge variability suggest a different and more complex source. The distinctness of JB17 is proved by many different previous studies based on heavy minerals and geochemistry which demonstrated a variation in the orogenesis with an increased volcanic activity.