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# Graphical representations of the chemistry of garnets in a three-dimensional MATLAB based provenance plot

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A newly developed, MATLAB based garnet provenance plot allows a three-dimensional tetrahedral representation of the chemistry of garnets for the endmembers almandine, pyrope, spessartine and grossular. Based on a freely accessible database of Suggate & Hall (2013) and additional EPMA-data on the internet, the chemistry of more than 2500 garnets was evaluated and used to create various subfields that correspond to different facies conditions of metapelitic, metasomatic and metaigneous rocks as well as granitic rocks. These triangulated subfields act as reference structures within the tetrahedron, facilitating assignments of garnet chemistries to different lithologies. In comparison with conventional tenary garnet discrimination diagrams by Mange & Morton (2007), Wright/Preston et al. (1938/2002) and Aubrecht et al. (2009), this tetrahedral provenance plot enables a better assessment of the conditions of formation of garnets by reducing the overlapping of certain subfields. In particular, a clearer distinction between greenschist facies rocks, amphibolite facies rocks and granitic rocks can be achieved. First applications of the tetrahedral garnet plot provided new insights on sedimentary processes during the Lower Miocene in the pre-Alpine Molasse basin.

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