

CLASSIFICATION AND CHEMICAL VARIATION OF GARNETS
IN METAPELITES FROM THE ÖTZTAL-STUBAI-COMPLEX

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Garnets of metapelites in the Ötztal-Stubai-Alt-kristallin (ÖAK) can be divided into two main groups: single-phase garnets and two-phase garnets.

Single-phase garnets are characterized by a continuous increase/decrease of the elements Fe-Mg-Mn-Ca. The most common type is the Typel (cf. VELTMAN, 1986) the so-called „bell shaped type“ which can be subdivided into three variations:

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|------------|---|
| TypelMnCa: | an increase of Mn and Ca with a decrease of Fe from rim to core (Mn- and Ca-bell shaped) |
| TypelMn: | an increase of Mn from rim to core with a decrease of Fe, Ca reaches a constant high level (Mn-bell shaped) |
| TypelCa: | an increase of Ca from rim to core with a decrease of Fe, Mn has a very low level (Ca-bell shaped) |

Possible explanations of the development of this type are growth zonation and diffusion zoning (e.g. SPEAR, 1993). Typel garnets appear in most parts of the ÖAK. Therefore an explanation of the appearance of Typel garnets in context with pressure, temperature and location is not possible.

Two-phase garnets are characterized by an abrupt change from almandine-rich cores to grossular-rich rims. Usually this type is explained by polymetamorphism (e.g. TRACY, 1982). If an inclusion-rich core can be seen under the microscope, this is an indication of the possible existence of two phases. This type of garnet is located in the Schneebergerzug and in the Alt-kristallin north of the Schneebergerzug. A connection between this type and the polymetamorphism in this area is highly probable.

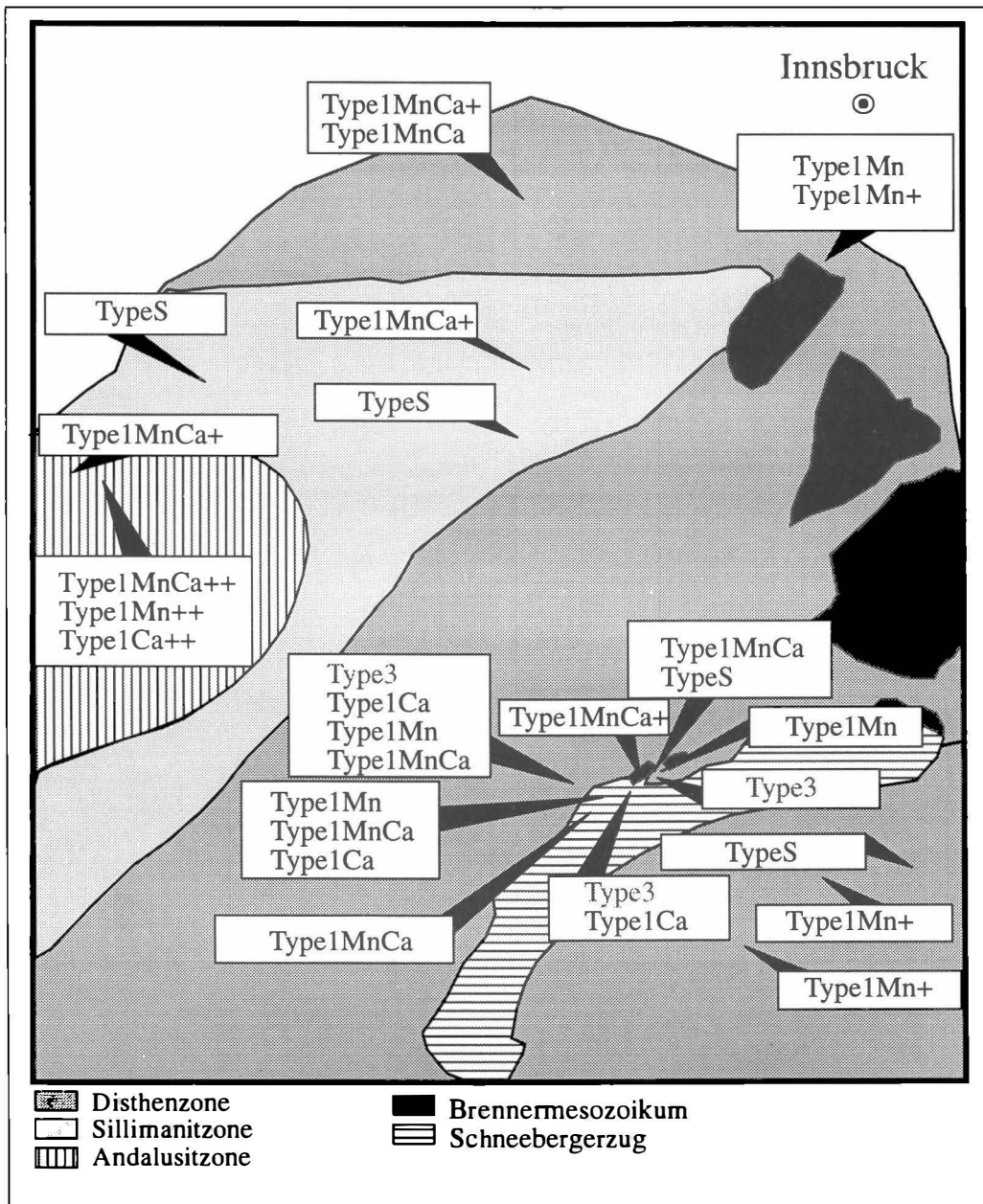


Fig. 1

Map of the ÖAK (cf. PURTSCHELLER, 1969).

The appearance of the garnet-types. A „+“: for the Mn-enrichment of the rims.

„Pseudo-two-phase garnets“ appear in the same region. They also have an inclusion-rich core and an inclusion free rim, but they do not have two chemical phases.

In the middle parts of the ÖAK, the so-called Sillimanitzone, some garnets have a zonation which is similar to that of two-phase garnets but not with such a sharp border between rim and inclusion-rich core. They have grossular-rich cores and almandin-rich rims.

There are a few garnets (TypeS) which cannot be assigned to the types mentioned above.

Another important aspect is the enrichment of the rims of garnets with Mn. This Mn-enrichment appears in the whole ÖAK but in the region of the highest alpidic metamorphism (the region around the Schneebergerzug) it can disappear. The highest enrichment can be found in the Andalusitzone. It seems that the enrichment depends on the size of garnets, the bigger they are the smaller is the enriched rim.

References

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