DISTINCTION OF POLYPHASE AND MULTIPHASE METAMORPHIC P-T-T PATHS.

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Metamorphic rocks with fully equilibrated mineral ass<!-- selection start --><!-- selection end -->emblages generally allow reliable estimation of the pressure-temperature (P-T) conditions of formation. However, this is only one point in P-T space and does not deliver any information on changes in conditions before that P-T point was reached or on those that led to the final exhumation of the rock to the present-day surface. In order to determine the changes in P-T conditions over time, the P-T-time(t) path, it is necessary to have samples showing disequilibrium i.e. with different stages of the history recorded in the form of partial mineral assemblages, compositional zoning or reaction textures. Petrographically-determined reaction sequences in a rock lie on a P-T path but it is not always clear, without detailed geochronological information, if the path between P-T points was direct i.e. both stages lie on a single metamorphic path, or if the reaction points are just 'snap-shots' of reaction during a polymetamorphic evolution where the path between the P-T points is much more complex. For example, many high pressure rocks show reaction textures formed at lower pressures that have been attributed to decompression. Without direct evidence of the timing of reaction, by isotopic dating or diffusion modelling, it is generally not possible to distinguish between a near isothermal decompression P-T-t path and a polymetamorphic path where a high-P stage followed by cooling and decompression (not recorded in mineral reactions) was followed much later by near isobaric heating. Examples of the latter scenario in Variscan metaeclogites will be shown.