# UHP-UHT Metamorphism and Its Tectonic Implications

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**Abstract** The ultrahigh-pressure (UHP, >25-27 kbar) and ultrahigh-temperature (UHT, ~1000 ºC) metamorphism represents two types of important metamorphism associated with orogenic processes. The UHP metamorphism indicated by index minerals such as metamorphic diamond and/or coesite occurs at plate boundary (e.g. suture zone), as a result of continental deep subduction (to depth of >100 km), whereas the UHT metamorphism with index mineral assemblages of sapphirine/spinel +quartz or osumilite/orthopyroxene+sillimanite+quartz/cordierite in Mg-rich paragneiss often occurs in arc-related setting of high heat flow. This talk presents some study results about the representative UHP coesite-bearing eclogite samples from the Chinese Continental Scientific Drilling main hole (100-2000 m) in the Sulu UHP terrane in central China and the UHT sapphirine-bearing Mg-rich paragneisses from the Rauer Group in east Antarctica. Based on the mineral assemblages and textural relations, major metamorphic evolutionary stages are distinguished. Furthermore, combined with the determination of P-T conditions, the metamorphic P-T paths are constructed and possible tectonic implications are inferred. (1) The peak P-T conditions are estimated as ~850-910 ºC and ~35-37 kbar for the UHP eclogites from the Sulu terrane, and the inferred P-T paths show a clear increase in pressure and temperature from near-peak to peak UHP stage. This may be associated with subduction-related tectonism as a result of continental collision of the North China and Yangtze blocks, whilst rapid subduction and fast post-peak exhumation is likely responsible for preservation of some pre-peak inclusion assemblages and prograde mineral growth zoning. (2) The peak P-T conditions of ~12 kbar and ~1000 ºC are estimated for the UHT sapphirine-bearing Mg-rich paragneiss and Fe-rich paragneiss from the Rauer Group in east Antarctica, with an occurrence of kyanite as part of pre-peak assemblages. The constructed P-T path suggests that the Mg-rich paragneiss had a shared P-T history with the Fe-rich paragneiss, with prograde P-T stage evolving in the kyanite stability field. It is inferred that The prograde and peak UHT metamorphic event is probably related to the late Mesoproterozoic collision and arc accretion (~1100-1000 Ma) that was overprinted by decompression-cooling and retrograde metamorphism during the early Palaeozoic (~500 Ma) tectonic event.