

Duration of UHP Tectonism

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There is considerable motivation to presume that ultrahigh-pressure (UHP) tectonic events are short lived—including the need to preserve coesite, and the desire to keep thin UHP sheets from being thermally overprinted. Indeed, geochronologic studies demonstrate that some UHP events *were* relatively short (e.g., 4 Myr for Dora Maira; [1] and 6 Myr for Tso Moriri [2]). Other studies, however, have shown *much longer* periods of UHP tectonism: 15–20 Myr for the Dabie–Sulu terrane of China [3]; and 20–40 Myr for the Western Gneiss region of Norway (Kylander–Clark et al., 2005).

The long durations of UHP tectonism in the giant UHP terranes of China and Norway are worthy of further investigation. Could a single terrane be subjected to UHP conditions for 15–20 Myr? This is unlikely if the terrane remains in the footwall of the subduction zone because even a relatively slow subduction rate of 50 mm/yr would lead to a pressure increase far in excess of that seen with petrology, and an even slower subduction rate of 20 mm/yr would cause most of the plate to reach mantle temperatures (the characteristic diffusion distance for 15 Myr is ~20 km). A more promising scenario for a lengthy period of recrystallization at UHP conditions involves underplating of the UHP terrane to the hanging wall, refrigeration by ongoing subduction, and then exhumation. Other possibilities include i) separate UHP events in discrete structural units (prosaic, but not recognized) or ii) multiple UHP events in a single structural unit (exotic, but possible).

References

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