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Geochronology of the Baltica crust in the Western Gneiss Region, Norway: Palaeoproterozoic augen gneisses, Sveconorwegian zircon neocrystallization and Caledonian zircon deformation

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The Western Gneiss Region, Western Norway, is dominated by Palaeoproterozoic to Mesoproterozoic felsic crust of Baltica ancestry (Baltican Basement), partly subducted to high- and ultrahigh-pressure (HP-UHP) conditions during the Caledonian (Scandian) orogeny between 415 and 395 Ma. The dominant felsic gneisses, in contrast with mafic rocks, carry little evidence for the HP-UHP history, but were affected by amphibolite-facies reworking during exhumation. LA-ICPMS and SIMS zircon U-Pb data were collected in augen orthogneiss samples to constrain the magmatic and metamorphic geochronology in this crust. Five samples from the eclogite-bearing HP-UHP basement near Molde yield intrusion ages ranging from 1644 +/-6 to 1594 +/-10 Ma. Two samples of the structurally underlying eclogite-free basement yield ages of 1685 $\pm$18 and 1644 +/-13 Ma, and a sample from the infolded Middle Allochthon Risberget Nappe yields an equivalent age of 1676 +/-18 Ma. Two samples of the eclogite-bearing basement contain low Th/U neocrystallized zircon with an age of 950 +/-26 Ma. This zircon provides the northernmost direct evidence for at least amphibolite-facies Sveconorwegian metamorphism in unquestionable Baltican crust, close to the known "Sveconorwegian boundary" in the Western Gneiss Region. The Western Gneiss Region characterized by 1686-1594 Ma magmatism, the Eastern Segment of the Sveconorwegian Orogen characterized by 1795-1640 Ma magmatism, and the Idefjorden terrane hosting the type Gothian active margin magmatism dated between 1659 and 1520 Ma, probably represent three distinct Proterozoic growth zones of Baltica into which Sveconorwegian reworking propagated. Samples of the eclogite-bearing basement lack Scandian neocrystallization of zircon, but show partial recrystallization of zircon. Paired CL and EBSD images indicate that zircon crystals underwent crystal-plastic deformation during the Scandian subduction-exhumation cycle. They illustrate a relationship between crystal-plastic deformation by dislocation creep, fading of oscillatory growth zoning and loss of radiogenic lead. No precise age for the Scandian reworking can be extracted from the data.