**ULTRA-DEEP DRILLING INTO ARC CRUST**
~genesis of continental crust in volcanic arcs~
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# SUBDUCTION INITIATION AND FOREARC MAGMATISM AS REVEALED BY PHANEROZOIC SUPRASUBDUCTION ZONE OPHIOLITES

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A close examination of the selected Phanerozoic suprasubduction zone (SSZ) ophiolites in different orogenic belts shows that their internal structure-stratigraphy and geochemical signatures indicate a seafloor spreading origin in forearc-incipient arc settings during the early stages of subduction. In general, there is a well developed magmatic stratigraphy in the extrusive sequences of these ophiolites from older MORB-like lavas at the bottom towards younger island arc tholeiite (IAT) and boninitic lavas in the upper parts. A similar progression of the lava chemistry also occurs in crosscutting dike swarms and sheeted dikes, indicating increased subduction influence in the evolution of ophiolitic magmas through time. Lherzolitic peridotites in structurally lower parts of the upper mantle sequences of these ophiolites represent the residue after MORB melt extraction. Harzburgite and harzburgite-dunite associations higher up in the mantle sequences and below the mafic-ultramafic cumulates (transitional Moho) are crosscut by networks of orthopyroxenite (opxt) veins, which include hydrous minerals (amphibole). These orthopyroxenite veins represent a reaction product between the host harzburgite (depleted, residual peridotite) and the migrating Si-rich (boninitic) melt. The harzburgite-dunite-opxt suites characterize melt-residue relationships and melt migration patterns in the mantle wedge during the initial stages of subduction and incipient arc construction. Thus, the SSZ ophiolites that we have examined display a lateral and vertical progression of melt evolution in their crustal and upper mantle components that traces different stages of subduction initiation-related magmatism, reminiscent of the forearc magmatism in some of the modern arc-trench rollback systems as in the Izu-Bonin-Mariana and Tonga-Kermadec subduction factories. The along-strike continuity for more than 1500 km of this well-documented chemostratigraphy and geochemical progression in different ophiolite belts is strong evidence for spontaneous subduction initiation followed by rapid slab rollback in ancient ocean basins.