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Subduction - accretionary processes in the Uralides: Insights into the growth and destruction of continental crust

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The Uralides was one of the main orogenic edifices built during the Paleozoic formation of Pangea. Its tectonic evolution began as intra-oceanic island arcs that had developed in the Uralian ocean collided with the margin of Baltica in the Late Devonian to Early Carboniferous. During this time, sub-continental subduction is thought to have been taking place along the margin of the Kazakhstan plate forming Andean-type arcs. Continent-continent collision began in the Late Carboniferous as the Uralian ocean basin closed and the Kazakhstan plate, followed by the Siberia plate, collided with Baltica. Deformation associated with this collision continued until the Early Triassic. The Paleozoic collisional architecture of the Uralides is still preserved within Eurasia and provides important insights into the growth and destruction of continental crust during orogenesis. Reflection and refraction seismic data, potential field data, and petrophysical modeling of crustal composition show that much of the Paleozoic island arc crust is still intact, indicating that the arc-continent collisions that took place in the Uralides resulted in a significant amount of new material being added to the continent at that time. Data from high pressure rocks preserved in the arc-continent collision accretionary complex indicates that at the same time as new arc crust was being added to the continent its margin was being subducted beneath the accreting arc to a depth of at least 60 km and perhaps as much as 120 km or more. Geophysical datasets indicate that the Eurasian continental crust currently reaches a maximum thickness of 53 km beneath the Uralides, with normal mantle P-wave and S-wave velocities below a well defined refraction Moho. This suggests that any of the Baltica margin that was subducted to current sub-Moho depths ($>$ 53 km) has been assimilated into the mantle and its identity as continental crust destroyed.