

# CONTINENTAL CRUST

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## Summary

This article summarizes the structure, composition and evolution of continental crust. The major characteristic of continental crust is its thickness, which can vary from less than 20 km to more than 70 km. Seismic velocities in the crust increase with depth and at the base of the crust (the Moho) there is usually a pronounced jump to the upper mantle velocities. In some regions, high-velocity rocks underneath the seismic Moho may have originally been part of the crust; thus the idea of the petrologic Moho is introduced.

Continental crust is highly heterogeneous in three dimensions. However, it is useful to divide it into several layers, differing by seismic velocities and composition. The three-layer model, distinguishing the upper, middle and the lower crust, is the most common. The P-wave velocities in the layers are in the ranges 5.7-6.4 km s<sup>-1</sup>, 6.4-6.8 km s<sup>-1</sup> and 6.8-7.6 km s<sup>-1</sup>, correspondingly. The upper crust has felsic composition (granite/granodiorite), the middle crust - intermediate-to-felsic, while the lower crust of stable continents is mafic with the composition close to basalts. Bimodal distribution of seismic velocities and strong seismic reflectivity, observed in the lower crust in many regions, suggests that it can be formed by a layered sequence of felsic and mafic rocks.

Continental crust may be subdivided into crustal types, i.e. segments of the crust with similar geophysical and geologic characteristics. Such subdivision provides a useful tool for generalized models of the velocity structure and composition of the highly heterogeneous crust of the continents. The primary types of continental crust include shields, platforms, orogens, extended crust, and continental margins.

Continental crust is formed primarily at the continental magmatic arcs and oceanic island arcs, both of which are associated with subduction zones. The uneven age distribution of the juvenile continental crust is related to the secular changes in the mantle convection.

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