

From Texas to Tibet: 25 Years of COCORP Deep Seismic Profiling

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In the spring of 1975 COCORP carried out its first field experiment in deep crustal reflection profiling, ushering in a new era in the seismic exploration of the continental lithosphere. COCORP's success in adapting oil exploration technology to the systematic mapping of deep crustal structure stimulated a number of other national programs. Most recently, a number of international consortia have carried deep profiling to a more global level.

Among the COCORP scientific contributions which stand out most are: a) tracing the Wind River thrust to depth as a moderately dipping compressional fault; b) revealing the crustal scale of a regional decollement beneath the southern Appalachian mountains; c) tracing the Sevier Desert Decollement as a crustal-scale, low angle normal fault; d) revealing that the Moho is sometimes an active tectonic boundary, e.g., serving as a detachment between crust and mantle; f) discovery of deep "bright spots" marking fluids (magma?) in the mid-crust; and g) mapping of extensive Proterozoic layered sequences buried beneath the Paleozoic sedimentary rocks of the central North American craton.

Over the past decade, COCORP has evolved into a series of collaborative international initiatives. The INDEPTH program has succeeded in mapping key elements of the Asian collision zone, including a crustal-scale overthrust beneath the Himalayas and "bright spots" marking intracrustal melting beneath the Tibet Plateau. The URSEIS initiative completed a lithosphere scale transect of the southern Urals Mountains, detailing the nature of the Uralian crustal root and discovering the deepest (> 200 km) reflections ever recorded by multichannel, controlled source profiling.