

OROGENIC STRUCTURE FROM COMPARISON OF DEEP REFLECTION PROFILES WITH SUBSEQUENT RECEIVER FUNCTION OBSERVATIONS

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A large number of national and international programs have now acquired deep seismic reflection profiles across many, if not most, of the world's major orogenic belts. Comparative analyses of such controlled source imagery against other geophysical data, especially collocated seismic refraction observations, have been a mainstay of discussion and debate for some time, especially within at symposia like this one. With the subsequent advent of large-scale seismic programs that focus on passive imaging techniques such as receiver functions, a complementary view of lithospheric structures has gained attention. Although there remains a substantial resolution gap between imagery conventionally extracted from controlled source versus passive source data, important insights into orogenic structure and evolution can be gained from their joint evaluation where sufficient co-located coverage is available. Here I will examine receiver function data across key orogenic structures previously probed by deep seismic reflection surveys to evaluate how the passive data have impacted the original geological interpretations of the usually much older controlled results. This evaluation intrinsically involves extending the interpretation of crustal architecture into the upper mantle depths where passive seismic results have been particularly intriguing as of late. Among the orogenic systems considered are the Wopmay (Archean), Grenville (Proterozoic), Appalachian (Paleozoic) and Himalayan (Cenozoic).