

T51G-08

Illumination of the Crustal Structure in the Southern Apennines using Teleseismic Receiver Functions, CAT/SCAN Project

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Field geology, well data and seismic imaging have illuminated the upper crustal structure of the Southern Apennines. However, lack of control of the deep structure allows viable competing thin-skin and thick-skin models of the orogen. In thin-skin models the detachment decouples a stack of rootless nappes from the basement. In thick-skin models, basement is involved in the most recent phase of thrusting. To examine the deep crustal structure, we use the teleseismic recordings from the CAT/SCAN array, deployed in southern Italy from Dec. 2003-Oct. 2005. We use receiver functions processed into a Common Conversion Point stack to generate images of the crust. We image three main westward-dipping seismic-velocity discontinuities where P-to-S conversions occur. They correspond to velocity jumps at the Moho, the upper-lower crust boundary and sedimentary interfaces resulting from the contrast between clastic and carbonate strata with basement. The CCP image matches features from both thin-skin and thick skin model. The lateral continuity of the converters favors thin skin, but consistent interpretation across the image favors the thick skin. Overall, the results provide a better fit to the thick-skin interpretation. This suggests a change in structural style as the collision with Apulia halted motion. This model also implies considerably less Plio-Pleistocene shortening across the Apennines and a SE motion of the Calabrian Arc subparallel to the southern Apennines rather than a radial expansion of the Arc.

7205 Continental crust (1219)

8038 Regional crustal structure

8102 Continental contractional orogenic belts and inversion tectonics

8170 Subduction zone processes (1031, 3060, 3613, 8413)

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