# Pattern of SKS splitting across the Taiwan orogen controlled by double subduction, not collision

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To examine the concept of coherent deformation in the Taiwan orogeny we re-measured previously reported SKS splitting data and added new data. The evidence for geology-sensitive SKS delay times across central Taiwan proposed previously is largely dismissed by a rigorous quality control procedure. We examine the pattern of anisotropy manifested at various depths along the SKS path against a dynamic model in which collision and double subduction are considered. The best correlation of splitting pattern with that predicted from the dynamic model is found at 200-300 km, suggesting a deep-seated source of anisotropy. We quantified the vertical length scale for coherent deformation in the dynamic model using strain-rate tensors cross-correlation over depths. The vertical length scale increases from less than 50 km at crustal and lithosphere level to 100-150 km in the asthenosphere, which corroborates the notion that the apparent orogen-parallel, large-delay time SKS splitting are likely contributed from the coherent deformation in the asthenosphere. This deep-rooted dynamics is mainly driven by the double subductions at the Ryukyu and the Manila trenches.

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