

Helium isotopic signature of the plate boundary suture in an active arc-continent collision setting, eastern Taiwan

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We report new noble gas signatures of groundwaters, hot springs, and bedrock samples from two major fault system that separates regional-scale blocks of accreted, continental and deep-sea alluvium materials in eastern Taiwan. The helium isotopic signatures, however, argue for significant mantle contamination in the same region, suggesting that the two active fault systems are deep-seated and connected in where marked “Christmas tree” suture. We speculate that mantle fluids are escaping along a crustal-scale fault and further accommodation structures such as secondary faults connected at depth to enhance the fluid migration. The correlation of the transition region from collision to subduction recognized by geophysical and geological methods with the surface trace of a major fault zone argues mantle helium involved in the suture in an active arc-continent collision using the crustal-scale fault as the primary conduit.