An attempt to reveal the origin of deep-crustal fluid beneath concentrated deformation zone in island arc

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It has been proposed that the concentrated deformation zone in island arc is result of lower crustal weakened by a high water content (Iio et al., 2002). The origin of the deep-crustal fluid beneath the concentrated deformation zone, however, has been unclear. It has been difficult to get information about deep-crustal fluid from surface water samples such spring, because the deep-crustal fluid was very diluted by surface water during ascending. Lithium (Li), the lightest alkali metal, is a fluid-mobile element having two stable isotopes, ^{7}Li and ^{7}Li, with abundances of 92.5% and 7.5%, respectively. Amount of Li leached from rock to fluid drastically increases with the temperature, and once leached Li is kept in fluid while decreasing temperature (cooling). These features indicate that non-traditional Li isotopic tracer has a great potential to provide new insight on the origin of deep-crustal fluid beneath the concentrated deformation zone.

Iio et al., 2002, EPSL 203, 245-253.