

## Xenoliths reveal lower crustal deformation and metamorphism with no obvious surface expression

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Lower crustal xenoliths afford an opportunity to investigate the crustal architecture in 3D and to test whether deformational and metamorphic events in the lower crust are coupled to those known from outcrop studies.

Within the Iapetus Suture Zone (ISZ) in Ireland, where Laurentia and Avalonia collided obliquely during the c. 420 Ma Caledonian Orogeny, Carboniferous magmatism has transported granulite-facies lower crustal xenoliths at several localities. The xenoliths are predominantly metasedimentary and on seismic and geochemical grounds provide a near-perfect match with present-day lower crust [1, 2]. Thermobarometry indicates original depths of c. 22-33 km, and temperatures in the range 700 - 900 °C [1]. Ion microprobe U-Pb zircon dating of syn-tectonic granitic leucosomes in metasedimentary xenoliths indicates at least three discrete high-grade metamorphic events ( $382 \pm 2$  Ma,  $373 \pm 3$  Ma and  $360 \pm 3$  Ma), all younger than Caledonian. The oldest corresponds to an episode of Middle Devonian volcanism and may be related to syn-sedimentary extension. However, the younger events have no deformational or thermal effects known at outcrop. They demonstrate that ductile deformation and melting took place c. 25 km below the surface without significant surface expression suggesting significant mechanical and thermal decoupling of the lower and upper crust.

[1] Van den Berg *et al.* (2005) *Tectonophysics* **407**, 81-99. [2] Hauser *et al.* (2008) *Geophysical Journal International* **175**, 1254-1272.

## Pt-bearing metabasites from the East Sayan (Russia): Composition and origin

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Glaucofane-bearing metabasites in the East Sayan are known as Okinsky blueschist belt. In one of the small massifs PGE mineralization was established. This massif is presented by latitudinal strike body, which contained by greenschist strata. Basic and ultrabasic rocks are altered to amphibolites, epidote-actinolite-amphibolic rocks and serpentinites, which most fractured and rich by asbestos veinlets. Further small pyroxenite bodies, gabbro and lherzolite relics are detected. Amphiboles are presented by three varieties. At first has a dark-green to light-brown color diagnosed as ferrichermakite, at second has light-blue color – vinchite, ferribarruasite, at third presenting as violet-color margin is a magnoriebeckite. From the center to outside direction Na-content increases whereas Ca and Al contents are decrease. PGE is concentrated by extensive zones of pyrite-magnetite mineralized amphibolites and sulfidized garnet-diopside-chloritic rodingites. Ore minerals are presented by magnetite with rare ilmenite relics, hematite, rutile, cassiterite and sulfides which form single areas and presented by pyrite, chalcopyrite, zigenite, arsenopyrite, sphalerite, galena. Noble metal minerals are native gold, mercurian gold, Cu-bearing gold. Platinum-Group element (PGE) minerals are presented by sperrylite. Concentrations of noble metals in ores attain to Au – up to 1.47 ppm, Pt – up to 5.2 ppm, Pd – up to 0.55 ppm. Obtained P-T conditions of metabasite formation correspond to  $P > 8$  kbar,  $T = 250 - 300$  °C are indicate it's formation in the subduction zone or accretion wedge. Island-arc complexes are characterized by mercury and tin deposit presence, where ore-forming elements are entered from mantle fluids. These fluids also contain noble metal, incoming by the mantle ultrabasic rocks partial melting.