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Stress Evolution of Upper Mantle beneath Penghu Archipelago, West Taiwan: Evidenced from the Miocene Peridotite Xenolith

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The anisotropic phenomenon is an important index to reveal what kind of deformation mechanisms happened underneath a region. One of them, many previous studies pointed out if the mantle had been influenced by stress or other tectonic activity, it would become anisotropy. For example, the orientation of seismic waves (Pn) would be not isotropic from the layers by layers.
For detecting the anisotropic phenomenon of rock samples, we can observe lattice preferred orientation (LPO). If the sample was impact by stress, the axes of crystal growths would show the same direction, the anisotropic characteristics. We can use the Electron Back-Scatter Diffraction (EBSD) to detect the lattice patterns of all crystals, and analyze whether the samples have LPO or not. Under SEM with EDS scanning, the EBSD enables rapid identifications with high spatial resolutions.
Minerals will be suffered from different crystal deformation and growing orientations when they were influenced by stresses. So we detect all minerals and combine whole sample's results to analyze the PLO and deformation mechanisms.
In this research, we use EBSD to observe the peridotites of basaltic xenoliths from Penghu Archipelago, west Taiwan. They were occurred by asthenosphere upwelling after continental rifted during Miocene in eastern Eurasia margin. Based on the data of olivine, orthopyroxene and clinopyroxene in peridotites, we can detect whether they have preferred orientation or not, and infer the mantle structures and deformation mechanism underneath the Taiwan Strait in Miocene. Accordingly, to understand the evolutions of mantle beneath the Taiwan Strait since 60 Ma by organizing previous studies and this result.