Are *Petit-spot* volcanoes a unique type of seamount?

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Thousands of seamounts are observed on the oceanic floor. Some of these seamounts are linked to off–axis volcanism at mid ocean ridges, other are associated with hot-spots, but many of them have no clear explanation for their formation or the type of local upper mantle melting anomalies required to produce them. Hirano and co-authors[1] provide a unique model for *Petit-spot* volcanoes by linking the formation of these small seamounts to tectonic stress associated with flexure of the Pacific plate in front of subduction zones. I will provide in this presentation a summary of the current knowledge on *Petit-spot* volcanoes and on the processes affecting the oceanic lithospheric mantle based on a *Petit-spot* xenolith record.

Petit-spot volcanoes (~50 m high) were discovered on the subducting Pacific plate 600 km east of the Japan trench. Their formation is interpreted as low-degree melts extracted from the mantle lithosphere in response to plate flexure. This demonstrates the presence of low-degree melts at the base of the lithosphere that is also supported by geophysical studies. Nevertheless, various arguments indicate that *Petit-spot* magmas do not represent the initial composition of low-degree melts from the top of the asthenosphere but melts modified by the percolation, interaction, and metasomatic enrichment during transport across the lithosphere. First, the unusual composition of high K_2O/Na_2O ratios and TiO_2 contents excludes *Petit-spot* alkaline lavas from being produced directly from a (E-)DMM type mantle. Second, multiple saturation experiments have shown that *Petit-spot* melts last equilibrate at lithospheric conditions[2]. Third, mantle xenoliths show evidence of metasomatic enrichment occuring at the base of the oceanic lithosphere similar to that observed in the cratonic lithosphere[3].

We conclude that the proposed model for the generation *Petit-spot* volcanoes maybe applicable in other oceanic or continental settings where small volume alkaline magmas are observed, magmas which may represent extraction of low degree melts from the base of the lithosphere in response to tectonic processes.

[1] Hirano *et al.* (2006) *Science* **313**, 1426-1428.

[2] Machida *et al.* (2017) *Nature Communications,* DOI: 10.1038/ncomms14302.

[3] Pilet *et al.* (2016) *Nature Geoscience* 9, 898-903.