

Volcanic nutrients and their impacts on the surface ocean biogeochemistry: A new SOLAS perspective

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Explosive volcanic eruptions can eject vast amounts of volcanic ashes, gases and aerosols into the atmosphere that are transported and deposited over areas of hundreds of kilometers in the oceanic environments (Fig.1). Volcanic particles itself and their surface contain soluble and metal rich components such as the salt-coatings in the form of sulphates and halides, which can be swiftly released during interaction with seawater. Upon deposition of volcanic ash in the ocean, elements most of those having environmental significance such as flouride, chloride, sulphate, nutrients like nitrate, phosphate, silica and a variety of key trace metals like iron, zinc, copper can be released into the seawater. A number of recent experimental, *in situ*, remote sensing and modelling studies evidenced that volcanic eruptions can significantly impact the seawater geochemistry and the phytoplankton growth and eventually the higher tropic levels in the marine environment (e.g. zooplankton, fish). However, several questions still remians under represented, which are involved in the new SOLAS reseach strategies, including the bioavailability and atmospheric processing of volcanic nutrients, deposition in the water coloumn and the long-term climatic effects of volcanic fertilization.

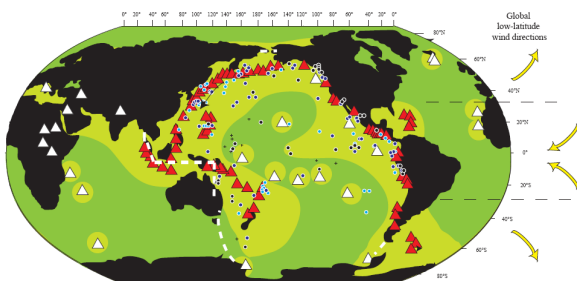


Figure 1: Areas of higher likelihood of volcanic fallout regions (indicated as yellow regions) in the global ocean, based on Olgun *et al.* [1]. Also shown is the distribution of active subaerial volcanoes on Earth.

[1] Olgun *et al* (2011) *Glob. Biogeochem. Cyc.*, **25**, GB4001