

超貧栄養亜熱帯太平洋における生元素地理： どの存在形態が重要なのか？

Geography of biogenic elements in the super oligotrophic subtropical Pacific Ocean: What form is most important?

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Supply and dynamics of biogenic elements such as N, P, Si are essential marine processes to consider ocean domain since they are main control factors of biological productivity, ecosystem structure and biological pump. In marine ecosystems, most nutrients are supplied from deep water and the biological productivity is high in subarctic and upwelling regions. On the other hand, most part of subtropical waters are recognized as oligotrophic ecosystem with lower nutrient concentration than "detection limit" of conventional method of the analysis, e.g., <100 nM for NO₃. In the oligotrophic subtropical waters, it has been suggested DOM contribute significant part of the supply of N and P supply and production, but the contribution of particulate matter is rarely studies. Recently, high-sensitive methods for nutrient measurement was developed (e.g., Hashihama et al., 2009) and found that the variations in nitrate and phosphate concentration were more than 3-order of magnitude in the western subtropical North Pacific. We developed the method of LWCC (Liquid Waveguide Capillary Cell) for nutrients into particulate forms of P and Si and also for DOP, and compared the inventory of each form in the Pacific Ocean. We found that variations in the concentrations of particulate N and P were within 2-order of magnitude and less variable than nutrients (5-order of magnitude). Our study suggests that particulate forms of P and N, including zooplankton, play important role as a source of biogenic elements in super-oligotrophic western subtropical gyre of the North Pacific. We will discuss contrastive biogenic elemental dynamics between subtropical and subarctic/upwelling ecosystems.

キーワード：亜熱帯太平洋、生元素、プランクトン

Keywords: subtropical North Pacific, biogenic elements, plankton