

## **Thallium behavior during a phytoplankton spring bloom: biotic vs. abiotic drivers**

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Thallium (Tl) is classified as a non-(bio)-essential and highly toxic element. Despite its active and passive involvement in bio-cycling processes it is considered as conservative type element in open ocean settings. However, studies from the coastal southern North Sea documented non-conservative Tl depletion during certain time periods, likely associated with the the burial of (phytoplankton-) organic matter into coastal sediments [1]. It was suggested that the resulting suboxic to anoxic porewaters are depleted in Tl and enriched in Mn and drain during ebb tide into the coastal ocean [1]. However, a direct involvement of Tl in biological processes or co-precipitation with manganese(hydr-)oxides within the water column could not be excluded.

The main objective of this study was to evaluate whether biological or abiotic processes are responsible for non-conservative behavior of Tl during bioproductive time periods (phytoplankton and bacteria blooms) in coastal ocean water masses. We conducted an indoor mesocosm experiment where artificial seawater was inoculated with a natural phytoplankton and bacteria community from the southern North Sea and incubated under natural light and temperature conditions. The incubation of six weeks covered two distinct phytoplankton blooms (diatoms followed by *Phaeocystis globosa*) as well as a time-delayed bacteria bloom.

Our results reveal a non-conservative behavior of Tl, which seemed to be induced by both, biological (active and passive) as well as abiotic processes. Our findings further suggest that the extent of Tl deviation from its theoretical conservative concentrations was dependent upon biomass availability (death and alive) as well as the phytoplankton community composition.

[1] Böning et al (2018), *GCA* 227, 143-155