

Tittel: Kalsitt (CaCO₃) dannelse og biologisk produksjon i havet.

Studieretning: Mikrobiologi

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Beskrivelse av prosjektet:

Biogenic production and sedimentation of calcium carbonate in the ocean, referred to as the carbonate pump, has profound implications the ocean carbon cycle, and relate both to global climate, ocean acidification and the geological past. In marine pelagic environments coccolithophores, foraminifera and pteropods have been considered the main calcifying organisms. In a preliminary study we have observed the presence of an abundant, previously unaccounted fraction of marine calcium carbonate particles in seawater, presumably formed by bacteria or in relation to extracellular polymeric substances (Heldal et al 2012). The particles we have observed occur in a variety of different morphologies, in a size range from <1 to >100µm, and in a typical concentration of 10⁴-10⁵ particles L⁻¹. Quantitative estimates suggests that the calcium particles we counted in the 1-100µm size range account for 2-4 times more CaCO₃ than the dominating coccolithophoride *Emiliana huxleyi* and these CaCO₃ particles do thus contribute significantly to the CaCO₃ budget in surface waters.

The particles may be expected to have a relatively high density and sediment rapidly, and thus add to the export of carbon and alkalinity from surface waters. They may hence represent a significant but unrecognized process affecting ocean surface CO₂ concentration and ocean acidification. The main objective of the present project is to describe the nature of these particles and to study the biological and environmental factors affecting their formation.

Praksis:

Oppgaven kan inkludere feltarbeid, tokt og laboratorieeksperimenter (tilpasses etter studentens ønske og muligheter).

Arbeidet går ut på å beskrive og kvantifisere fordelingen av kalsittpartikler i transekter fra land og dybdeprofiler, og eventuelt i forbindelse med tokt (Barentshavet / Norskehavet?). Målingene sammenlignes med andre biologiske parametere (bakterietall, fytoplankton / klorofyll, aktivitet (oksygen forbruk/produksjon?). Den viktigste instrumenteringen inkluderer flowcytometer, lysmikroskopi og elektronmikroskopi.

Litteratur:

Daniels et al 2012 Limnol. Oceanogr. 57:145–153

Heldal et al 2012 PLoS ONE 7(10): e47887.doi:10.1371/journal.pone.0047887