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## Size classification of particulate organic carbon concentration and its link to the ecosystem based on Machine Learning techniques.

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Biogeochemical ocean models are usually based on two size classes for particulate organic matter: small classes (1-100  $\mu\text{m}$ ) and large classes (100-5000  $\mu\text{m}$ ). Based on the measurements of particulate organic carbon (POC) concentration from UVP5 profiles and observations of environmental and ecosystem conditions we estimated an optimal number of size classes for POC that can be introduced in biogeochemical ocean models.

We identified four size classes based on the correlation between POC concentration and environmental and ecosystem variables. It gives us information on the relationship between POC and surrounding temperature, chlorophyll-a concentration, nitrate, phosphate and oxygen levels as well as plankton functional types (PFTs).

Further, we applied Machine Learning methods to reconstruct size classes of POC concentration and identify the most important drivers for each class. We showed that the concentration of POC smaller than 0.3 mm mostly depends on environmental characteristics while concentration of POC bigger than 0.3 mm strongly depends on PFTs.