Species distribution modeling of deep sea sponges in the North Pacific Ocean

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Abstract: Knowledge of deep-sea species and their ecosystems is limited due to the inaccessibility of the areas and the prohibitive cost of conducting large-scale field studies. My graduate research has used predictive modeling methods to map hexactinellid sponge habitat extent in the North Pacific, as well as climate-induced changes in oceanic dissolved oxygen levels and how this will impact sponges. Results from a Maxent model based on sponge presence data from the eastern Pacific, in conjunction with bathymetric terrain derivatives, closely mapped existing sponge habitats, and suggested a depth threshold around 3000 meters below which sponges are not found. Early results suggest that oxygen is another important predictor of sponge habitat, including this and a variety of other environmental predictors (e.g. based on ocean chemistry, physics and biology) and different model scales would improve model accuracy. The long-term goal of this research is to apply climate prediction data to the predictive modeling in order to assess the sensitivity of deep-sea sponge habitat to global climate changes.