



Popular science summary of the PhD thesis

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Title of the PhD thesis	The biogeography of Scleractinian reef corals: evidence from beta diversity
PhD school/Department	DTU Aqua

Coral reefs are among the most diverse but also threatened ecosystems on Earth. Corals, the animals responsible for generating the reef structure itself, are highly sensitive to warming oceans, yet how they will respond to a rapidly changing environment is uncertain.

Studying beta diversity, i.e., how species composition varies between regions, sometimes separated by great distances or experiencing different environmental conditions, can improve our understanding of the most important factors shaping coral distributions and diversity and how they may respond in the future.

In order to investigate the key factors affecting coral beta diversity we collected global data of coral distributions and combined this information with environmental data (e.g. temperature, nutrients, salinity), spatial data, connectivity data (the strength of connections between regions) and traits (biological characteristics) of coral species across the Atlantic and Indo-Pacific Ocean.

Using statistical models we then demonstrated that environmental factors, in particular temperature and nutrient concentrations, influence coral composition, as did the amount of reef habitat available.

However, we were also able to show for the first time that difficulty in dispersing between regions can be more important in generating global coral beta diversity patterns. Furthermore, we showed that the traits of coral species affect this outcome. Specifically, reproducing by releasing eggs and sperm into the water results in larger range sizes and more similar communities across distances than reproducing by releasing fully developed larvae that settle in the vicinity of their parents.

Our findings regarding the key determinants of coral beta diversity should inform conservation, management and political action, especially since many of the variables that we find to be important for corals are changing in the Anthropocene.

Temperatures are increasing globally in response to greenhouse gas emissions, changes in land-use and poor management practices are leading to elevated nutrient runoffs and habitat destruction is reducing or degrading coral reefs. Failure to tackle these changes will further harm coral reef ecosystems and their unique biota.