

sDiv Workshop Summary "sFDvent"

October 11-13, 2016

Hydrothermal vent communities fall into distinct biogeographic provinces based on their taxonomic composition. While some species may be very similar, others may differ markedly in their morphology, behavior, and ecology, and therefore play different roles in a community. Functional diversity metrics integrate the total variation in functional traits across all species within a community, providing a perspective on diversity that complements patterns identified using taxonomic diversity measures.

Functional trait methods have largely been developed using plant assemblages (although are presently being more widely applied), where characteristics that define species in terms of their ecological roles and interactions are direct indicators of ecological process and function. For instance, there is a strong link between leaf traits (e.g. size, dry matter content, etc.), plant growth, and primary production through photosynthesis. In a similar way, symbiont-hosting invertebrates are dependent on access to hydrothermal vent fluids, which deliver reduced compounds, such as hydrogen sulfide or methane, used by microorganisms as an energy source for the synthesis of organic molecules. Thus, hydrothermal vent ecosystems

provide animal-analogs for analyzing functional diversity patterns in both time and space.

The sFDvent working group is developing a functional trait dataset to offer a "common currency" with which to compare vent communities comprised of different species to answer fundamental ecological questions concerning dispersal limitation, environmental filtering, and competitive exclusion, as well as a means to assess which communities might be more vulnerable to the impacts of anthropogenic disturbances, such as deep-sea mining.



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Focal Areas of Discussion

1. *What are “functional” traits?*
2. *Which functions are important to capture with biological trait data?*
3. *Can we use functional traits to inform mining management plans?*
4. *What environmental driver data do we need for hydrothermal vent systems to understand emergent patterns?*
5. *Can we put forward a special edition on trait-based ecology and conservation for hydrothermal vent communities?*

sFDvent Trait Database

Our working group focused on identifying functional traits that we can include in a global analysis, and how to score trait modalities. We looked across different functional trait databases for consistency, and developed controlled terminology. We further built a google form for inputting trait data to be distributed to researchers following the meeting. The group tested the form, to assess whether the traits, modalities and formatting were intuitive to the user (to minimise input

errors). We also error-checked the current list of species for the global hydrothermal vent species pool.

Summary of Outputs

1. sFDvent Trait Database
2. Manuscripts
 - Database paper
 - Functional Biogeography paper
 - Trait-based vulnerability framework
3. Special Edition

Group Dynamic

Inclusive-but-earned strategy

Feedback of applicants

The support from iDiv was exceptional. We had a very dynamic and intense discussion that was open and productive.

Thank you to all participants for an engaging meeting that went beyond our initial expectations!