

sFDvent working group meeting summary

” A functional trait perspective on the global biodiversity of hydrothermal vent communities”

In our first meeting (October 2016) we identified biological traits to form the basis for a global biogeographic analysis of hydrothermal vent fauna. We built a Google Form for experts to score these traits using standardized language, for populating by a number of experts before our second meeting (April 2017).

During our second meeting we conducted preliminary analyses with available data and discovered many bugs in the trait input files (due to entries made by different contributors) that we needed to overcome. Thus our time focussed on developing the methods and script to clean and compile the trait data from multiple expert inputs. We further developed the script to automate combining these data with occurrence data submitted by collaborators to allow us to compare traits of species collected from different ocean regions.

We found that occurrence data (to date) has been compiled from samples/cruises/video recorded at different spatial and temporal scales. As such, the first steps required to progress global analyses will be:

- 1) Subset occurrence data on scales appropriate to the specific questions of interest (e.g. one dataset compiled for any data we have on the vent field scale, and one dataset at a lower resolution, to incorporate data resolvable to ocean or regional scales).
- 2) Continue to compile environmental data to use as covariates in the biogeographic analysis (first, extracting for each vent field, and then extracting data only available on larger scales).
- 3) Continue to compile trait data received from collaborators.

We finalized our working plan for three major outputs from sFDvent:

1. Database Paper: Abbie Chapman will lead the database paper and present a poster at the 6th International Symposium on Chemosynthesis-Based Ecosystems (cbe2017.org) in WHOI from 27th August to 1st September, which will provide the opportunity to request input from the vent community to the trait database. We will aim to complete a draft of the database paper for submission to *Global Ecology and Biogeography* (GEB) in January 2018. Co-authors will include all contributors to the vent database.

2. Global Biogeography Paper: Abbie Chapman will lead the global biogeographic paper, with co-authors including the full working group. The aim will be a completed draft by March 2018. We discussed fundamental geological/physical layers for explaining/predicting global patterns during our second meeting.

3. Inter-ecosystem comparison of the contributions of rare and common species to functional distinctiveness:

Amanda Bates will lead a paper testing whether human activities have fundamentally altered the abundance and occupancy patterns of most species on Earth. Our aim will be to use vent systems and paleo datasets as “baselines” for direct comparison to patterns in more impacted ecosystems and across contemporary human impact gradients. Co-authors will include the full sFDvent working group and other data-contributors.

At the second meeting, several other analyses were formulated for development, including:

- Creating a vulnerability framework for vent species when affected by deep-sea mining, using a trait-based approach (project lead: Rachel Boschen)
- Developing a correlation index for categorical traits (leads: Jon Lefcheck)
- Network analyses using trophic traits (lead: Ana Colaço, with expertise sought from Jes Hines at iDiv)

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