# A data-intensive assessment of the species-abundance distribution.

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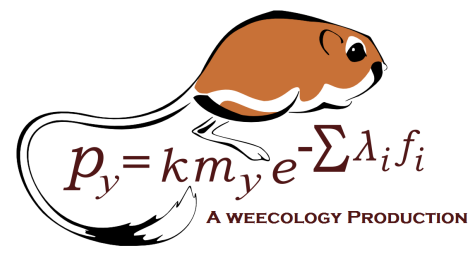


# Macroecology

One approach to studying ecological patterns and processes.

- Data intensive.
- Large scales
  - Spatial
  - Temporal
  - Taxonomic
- Search for generality.

# Macroecology

Criticisms of macroecology

- North American terrestrial bias.
- Lack of identification of pattern generating mechanisms.

# Macroecology

## Best practice recommendations

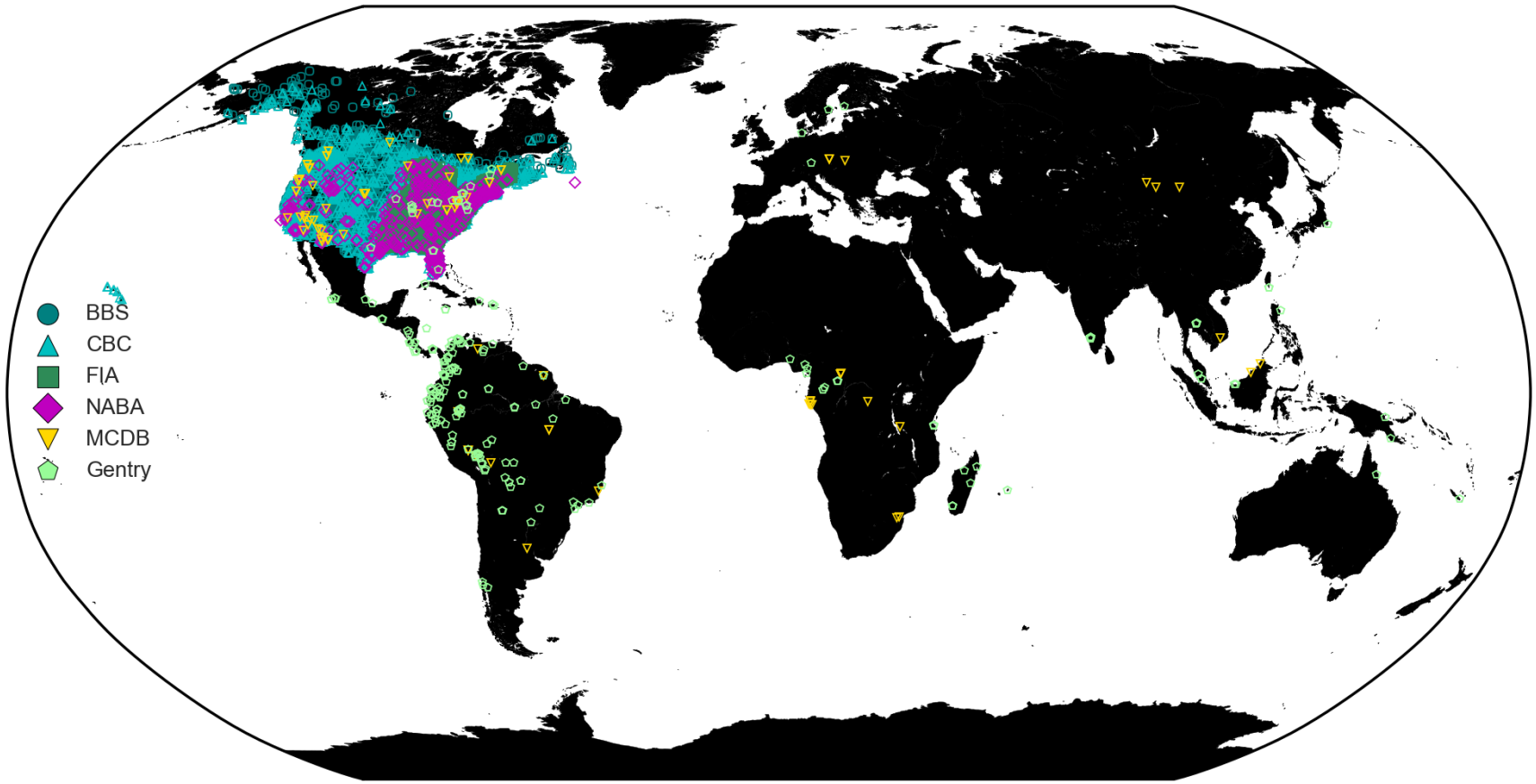
- Test patterns with multiple taxonomic groups/ecosystems.
- Simultaneous testing of competing models and model predictions with a consistent statistical approach.

# The Rules of Ecoinformatics

## Garbage in, garbage out.

- All data are good, not all data are appropriate.
- Fit the data to the question.

# Data



# Data

## Major macroecological datasets

- Largely terrestrial
- Largely North American
- Many publicly available, some not.

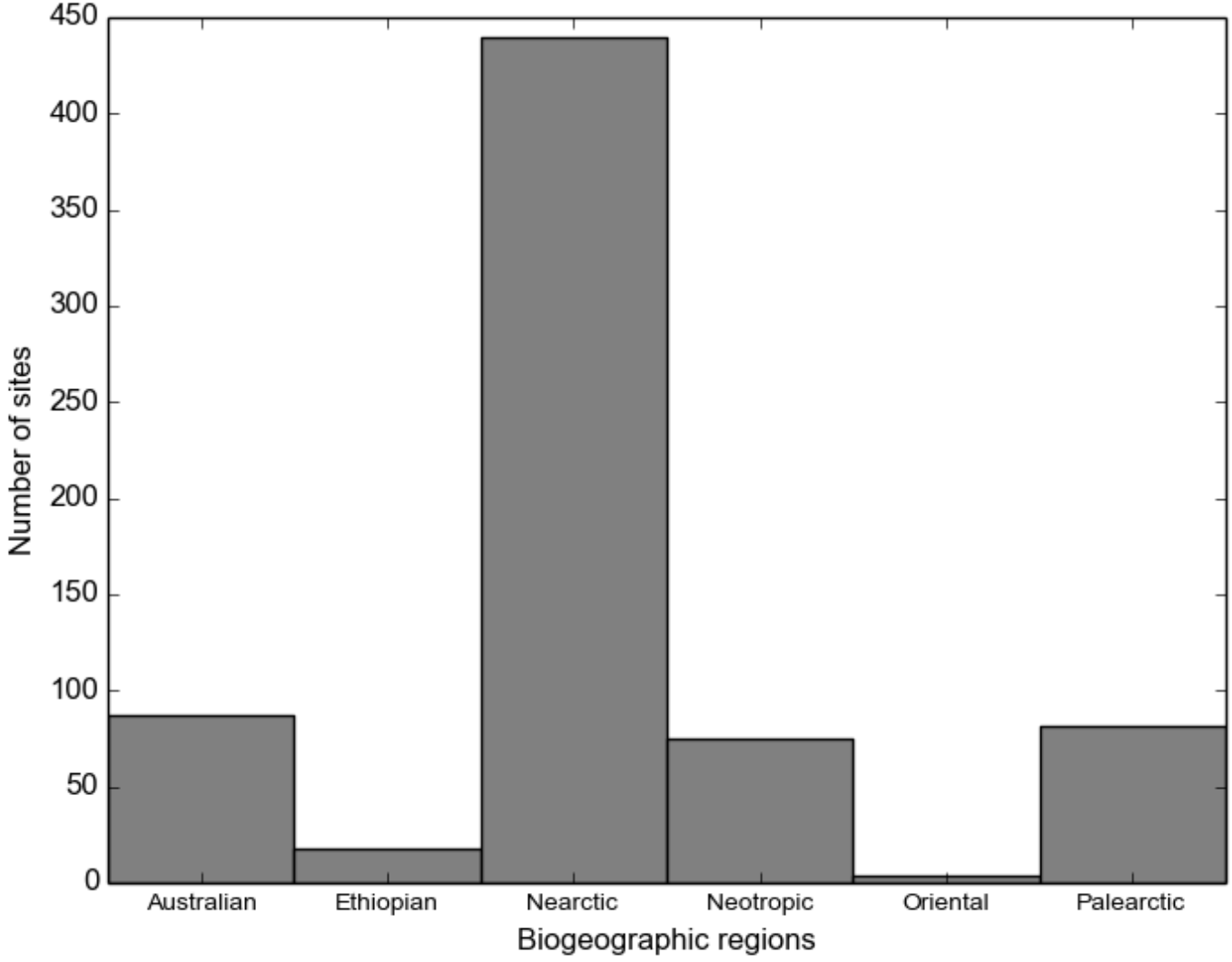
Lots of data in the literature.

# Data

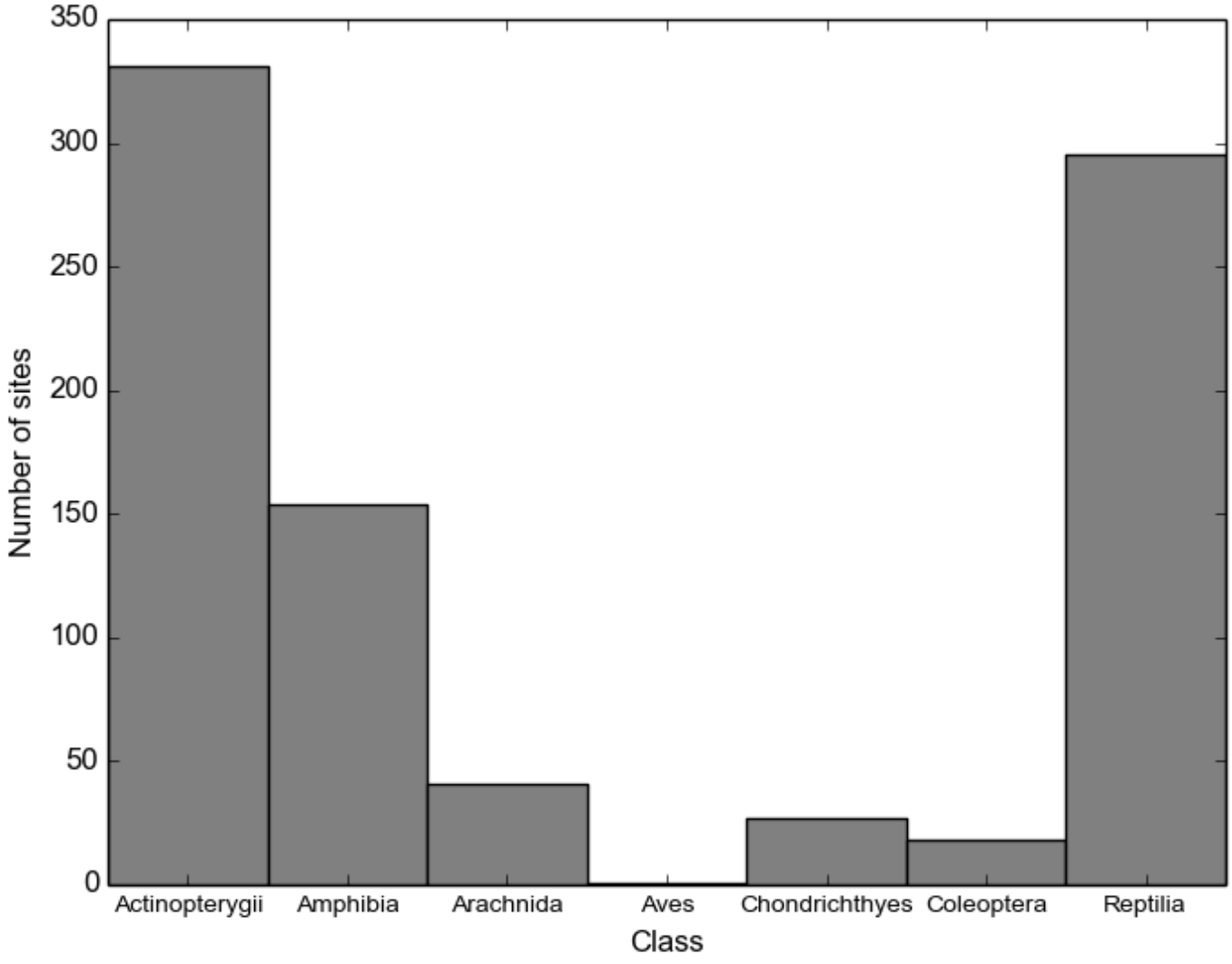
| Variable name | Variable definitions |
|---|---|
| Class | Taxonomic class of species |
| Family | Taxonomic family of species |
| Genus | Taxonomic genus of species |
| Species | Specific epithet of species |
| Relative_abundance | Relative abundance of species |
| Abundance | Abundance of species |
| Collection_Year | Start of collecting |
| End_Collection | End of collecting |
| Site_Name | Name/description of site |
| Biogeographic_region | Biogeographic region |
| Site_notes | Additional site information |

Table : List of variables collected.

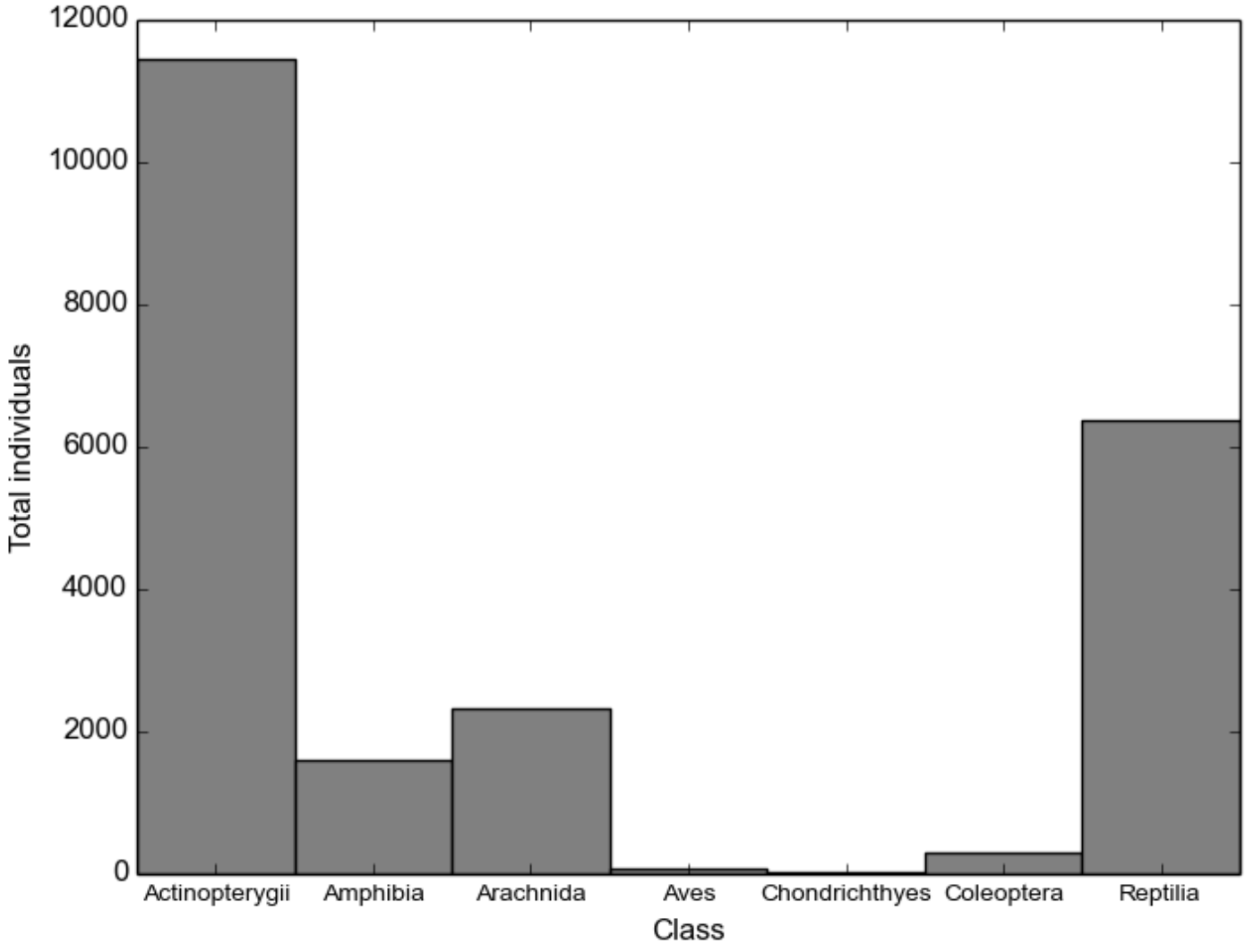
# Data


450
400
350
300
250
200
150
100
50
0
Number of sites
Australian
Ethiopian
Nearctic
Neotropic
Oriental
Palearctic
Biogeographic regions

# Data


350
300
250
200
150
100
50
0
Number of sites
Actinopterygii
Amphibia
Arachnida
Aves
Chondrichthyes
Coleoptera
Reptilia
Class

# Data

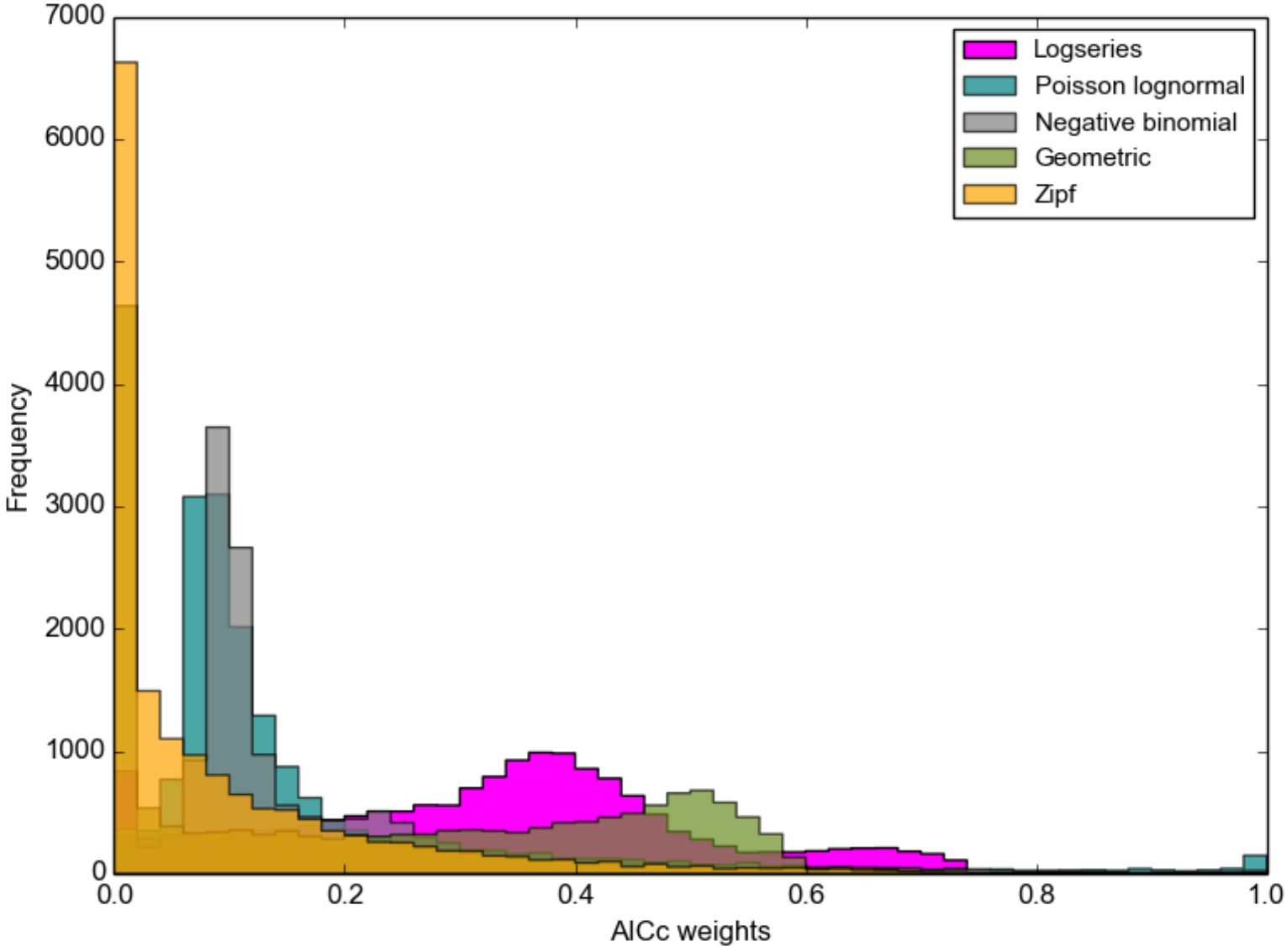

12000
10000
8000
6000
4000
2000
0
Total individuals
Actinopterygii
Amphibia
Arachnida
Aves
Chondrichthyes
Coleoptera
Reptilia
Class

# Commonness & rarity

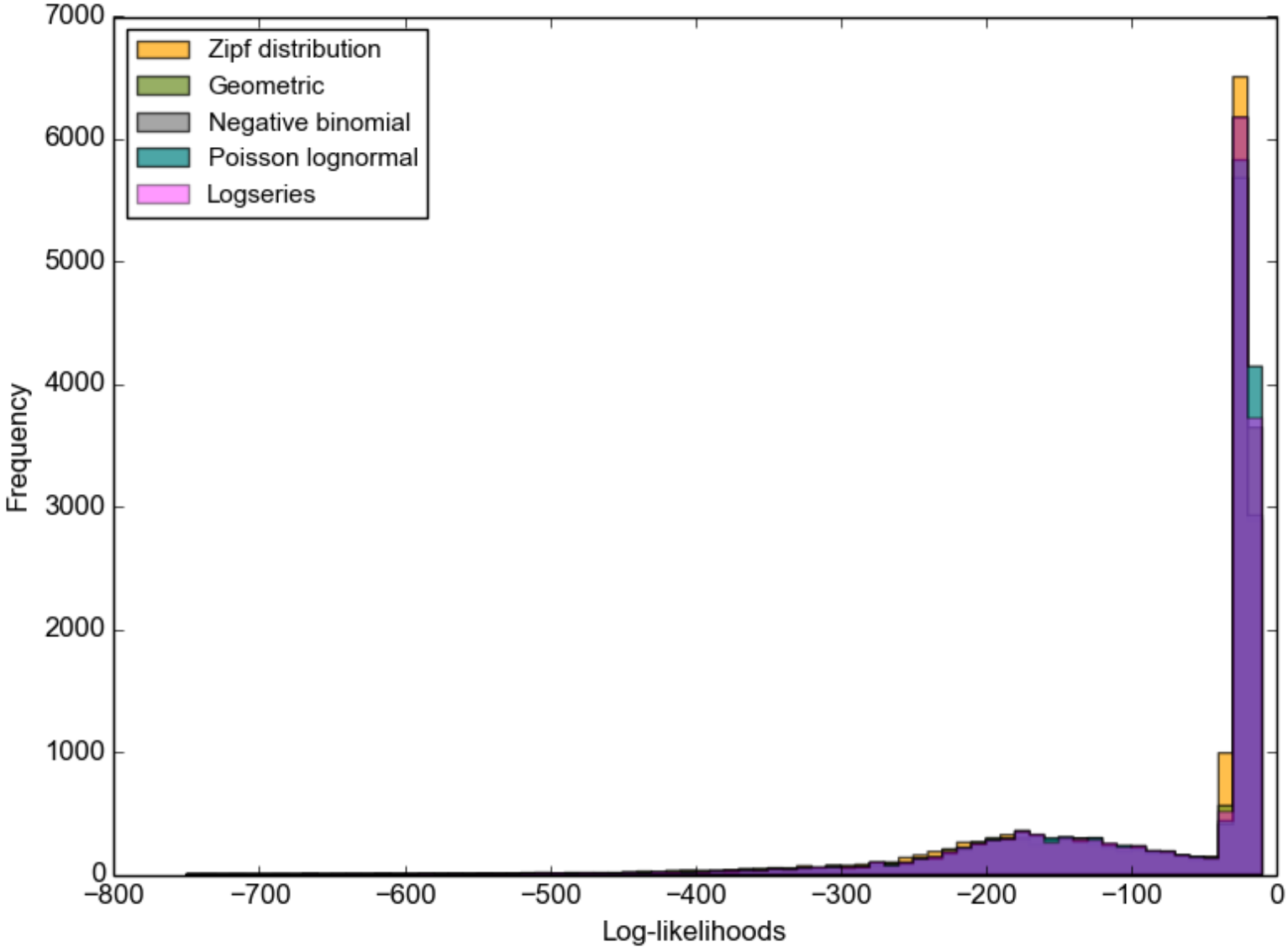
## The species abundance distribution:

- Describes the distribution of commonness & rarity of species.
- One of the most fundamental and ubiquitous patterns in ecology.
- Exhibits a hollow curve distribution.
  - Many rare species.
  - Few common species.
- Many forms of the species abundance distribution (SAD).

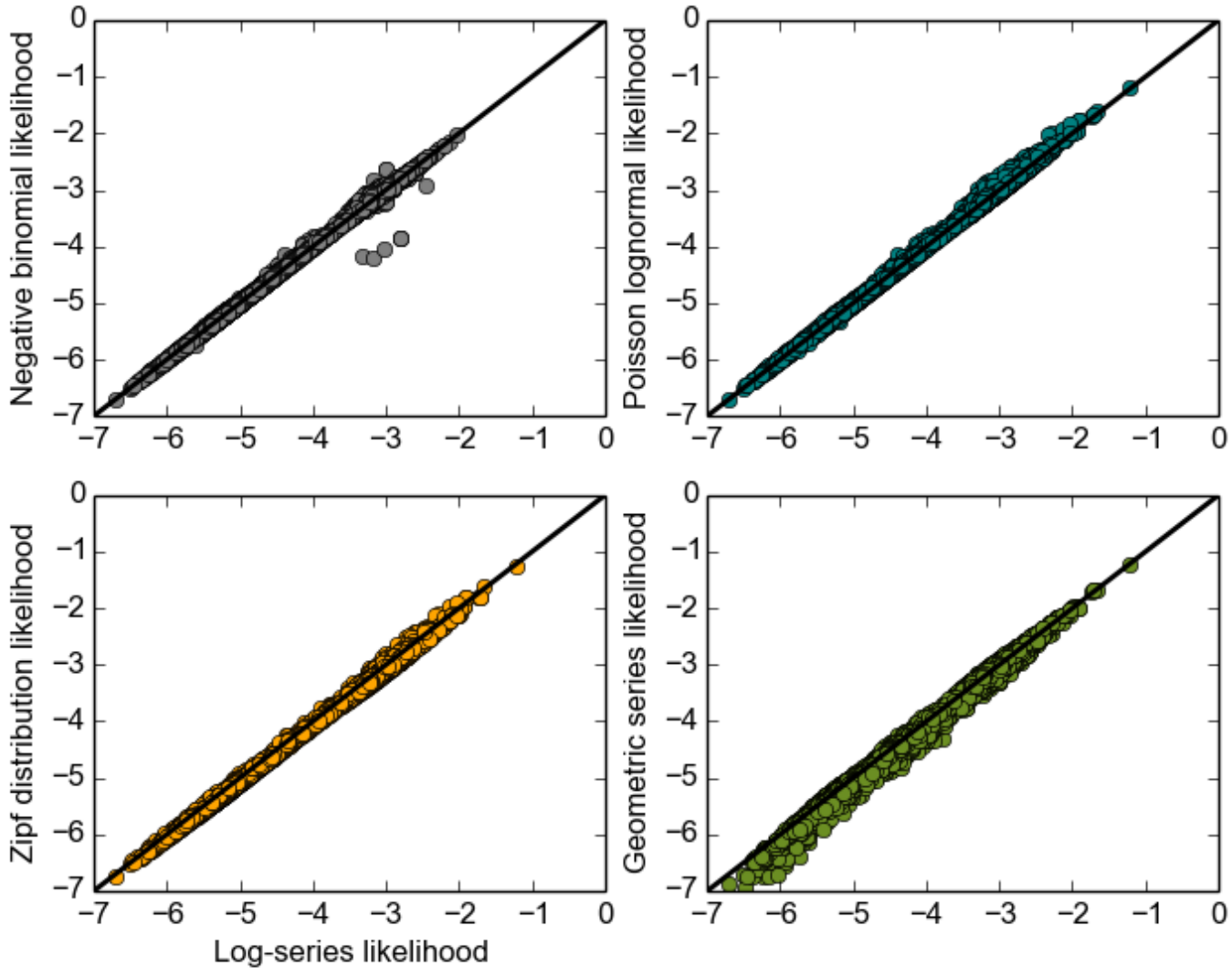
# SAD Comparisons



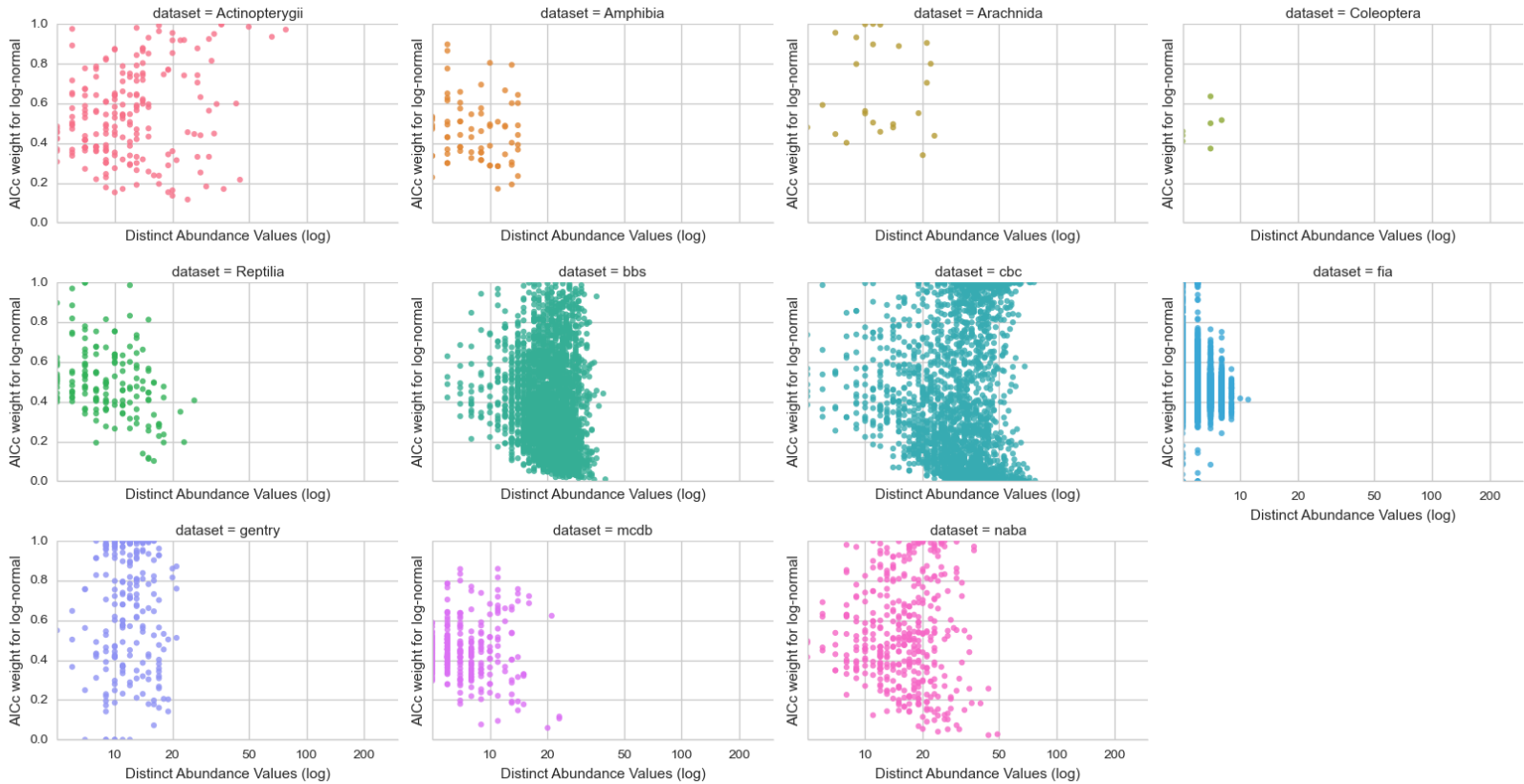
# SAD Comparisons



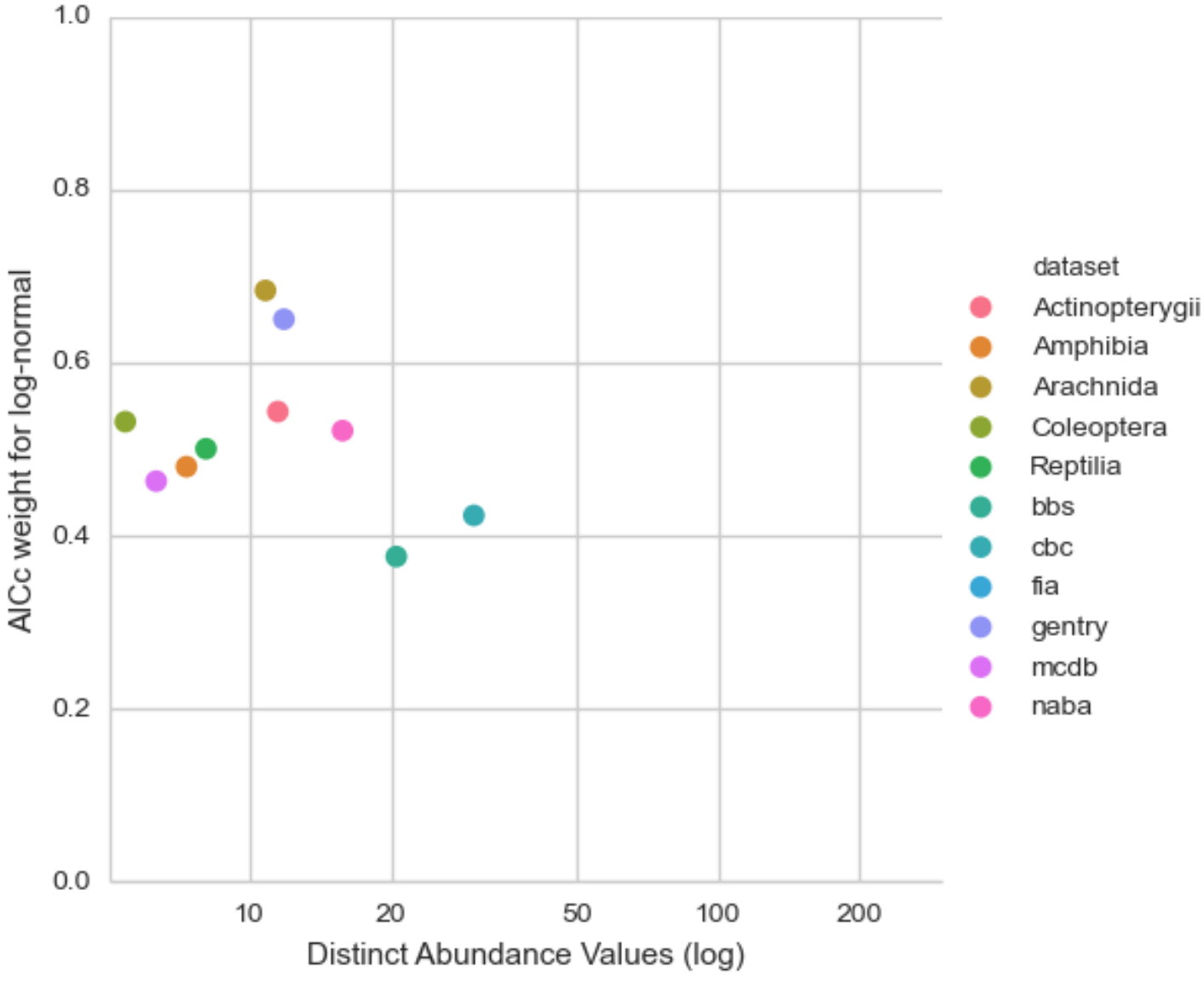
# SAD Comparisons



# Neutral Analysis



# Neutral Analysis



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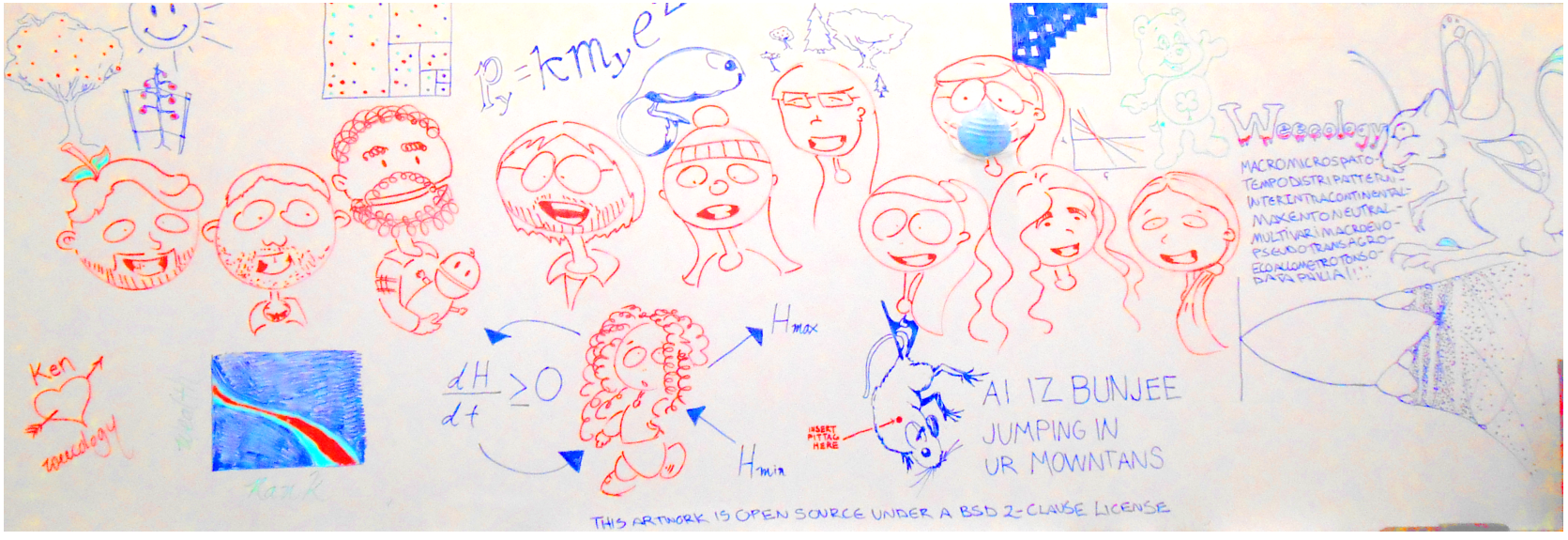


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