

SYNTHETIC ECOLOGY ACROSS SCALES: A GULF OF ALASKA CASE STUDY



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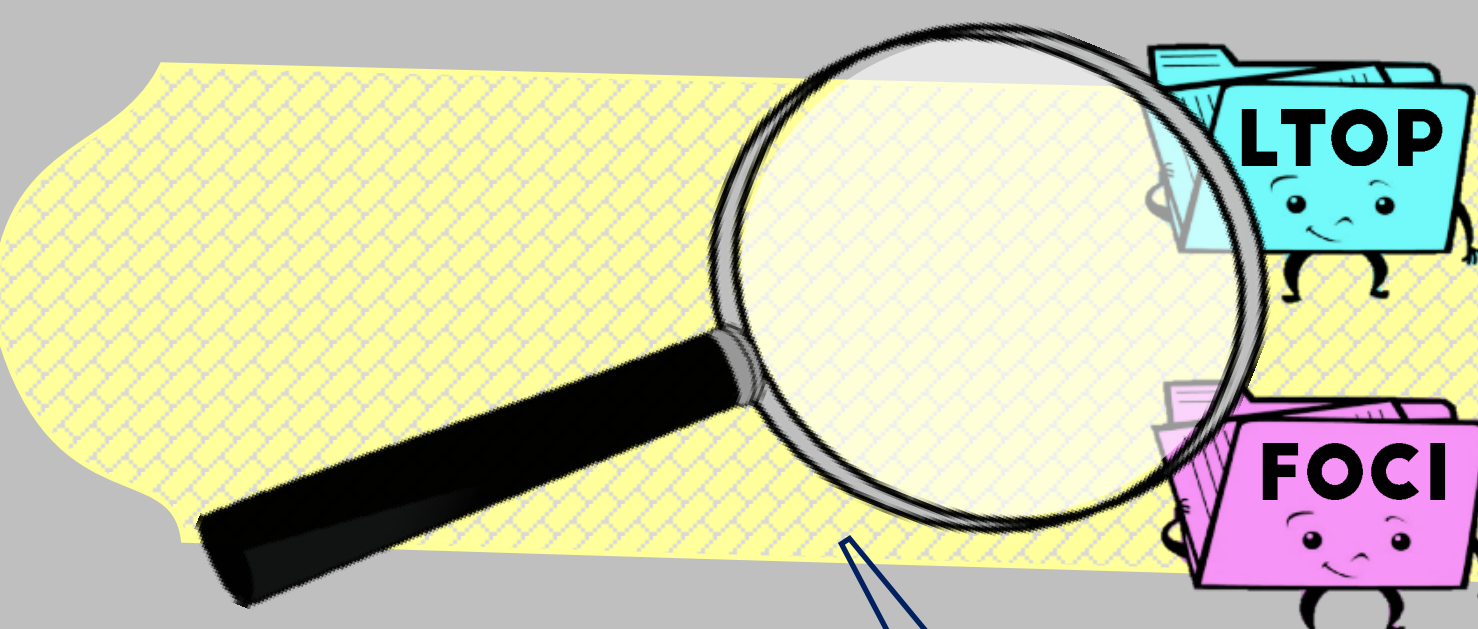
Does scale influence ecological synthesis?

- Spatial, taxonomic, temporal scales; 2 zooplankton datasets

Can a zooplankton community index be built using a taxa subset?

- Are there temporal correlations of abundance? Can we hind cast community abundance?

A tale of two datasets...



Difficulty discovering data:
web searches not complete, local knowledge often required

Solutions:

- searchable global repositories such as 
- knowledgeable people working in the system

LTOP dataset (community):

14 yrs ('98 – '12)
Whole community (56 – 140 taxa)
~250 km; shelf and pelagic (up-current)

FOCI dataset (taxa subset):

27 yrs ('85 – '12)
Only juvenile Pollock prey (56 taxa)
~50 km; shelf (down-current)

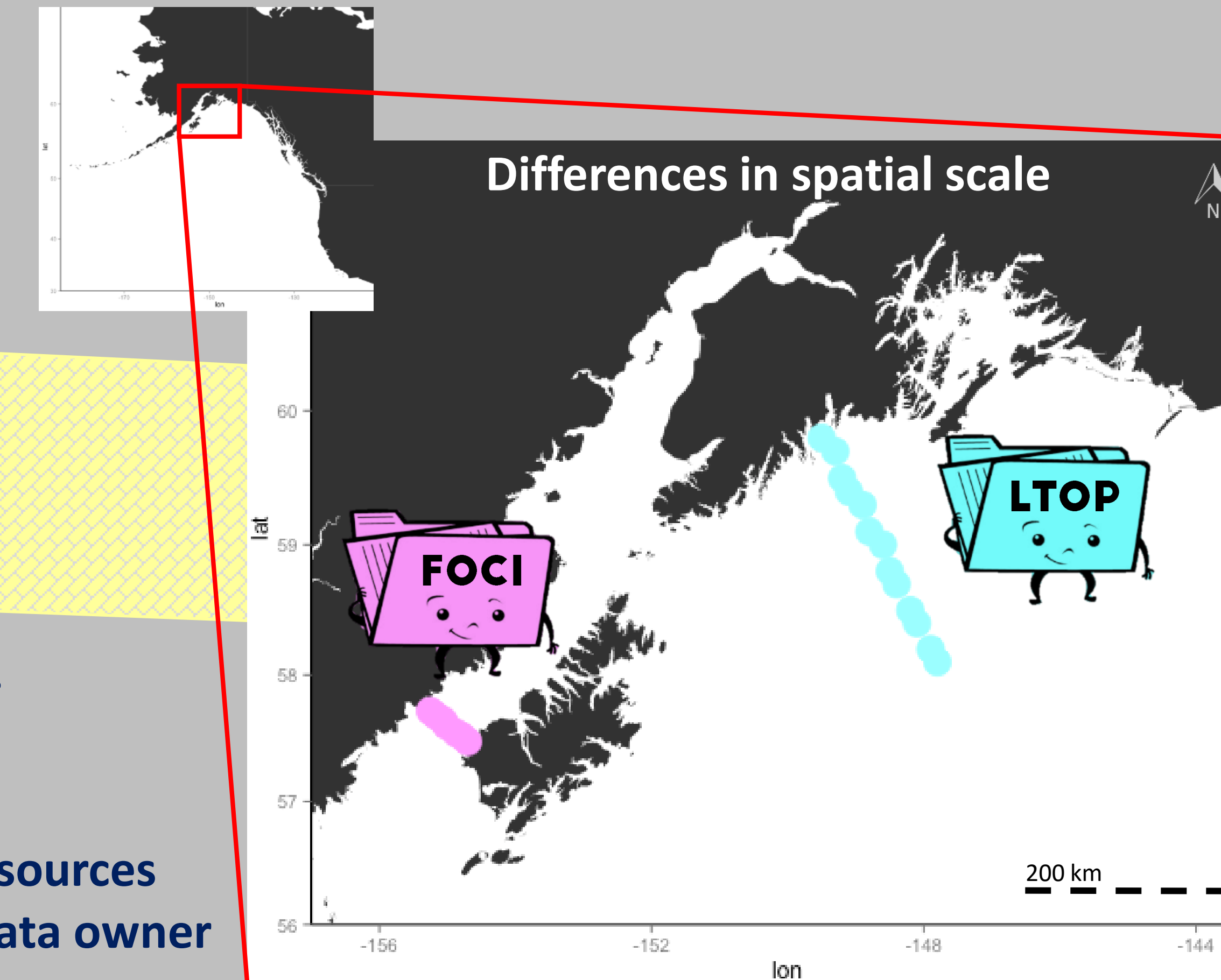
Difficulty acquiring data:
scientists don't respond, don't send data, etc.

Solutions: be persistent and creative

Data in inaccessible format:
old database format, locked PDF, etc.

Solutions:

- PDF/html - scraping, curl tools
- Old data formats - use institution resources
- Request more usable format from data owner




Poor or missing metadata:
column headings or units undefined

Solutions:

- contact data custodian for details
- search reports for metadata
- write complete metadata in EML 

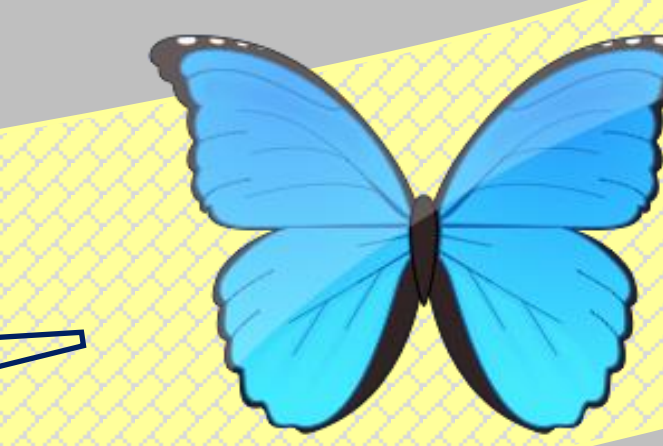
Incomplete data:
don't have all years or samples

Solutions:

- verify what *should* be included
- request missing data from custodian
- document complete dataset assembly in script 



Document work by
sharing and
versioning code online



Ecological Metadata
Language to construct
metadata



Online data
repository with
versioning



Open science tools:

Github - www.github.com
KNB - <https://knb.ecoinformatics.org/#data/page/0>
RStudio - <https://www.rstudio.com/>
DataONE - <https://www.dataone.org/>
Other tools - <https://knb.ecoinformatics.org/#tools>



Tips for overcoming data hurdles:

- Metadata, Metadata, Metadata!
- Know specifics of available data (completeness, format, source, etc.)
- Be the squeaky wheel (persistent and specific)!

Yes! Scale influences ecological synthesis.

- Spatial scale may not influence analysis techniques or synthesis results
- Temporal scale limits analysis and conclusions; longer term data better
- Taxonomic scale and resolution limit conclusions; influenced by targeted taxa

Thanks!

- Funding: Exxon Valdez Trustee Council grant to Matt Jones, NCEAS
- Janet Duffy-Anderson, NOAA; Cheryl Hopcroft, UAF; Stacy Rebich Hespanha, NCEAS; Matt Jones, NCEAS; Colleen Harpold, NOAA
- Fisheries-Oceanography Coordinated Investigations. 2015. EcoFOCI project, NOAA. http://www.afsc.noaa.gov/Publications/ProcRpts_intro.htm
- Hopcroft R., Coyle K. 2015. Long-Term Observation Program (LTOP) Seward Line ZOOPLANKTON data, Gulf of Alaska (1997-2009). <http://gulfwatch.nceas.ucsb.edu/#view/df35b.55.17>

Spatial or temporal differences between datasets:
conclusions limited by data mis-match

Solutions:

- find complementary data
- find data representative of locations or eras
- create index to represent missing data

Inconsistent units / reporting between datasets:
different taxonomic or other classification

Solutions:

- aggregate to comparable groups
- convert to comparable units

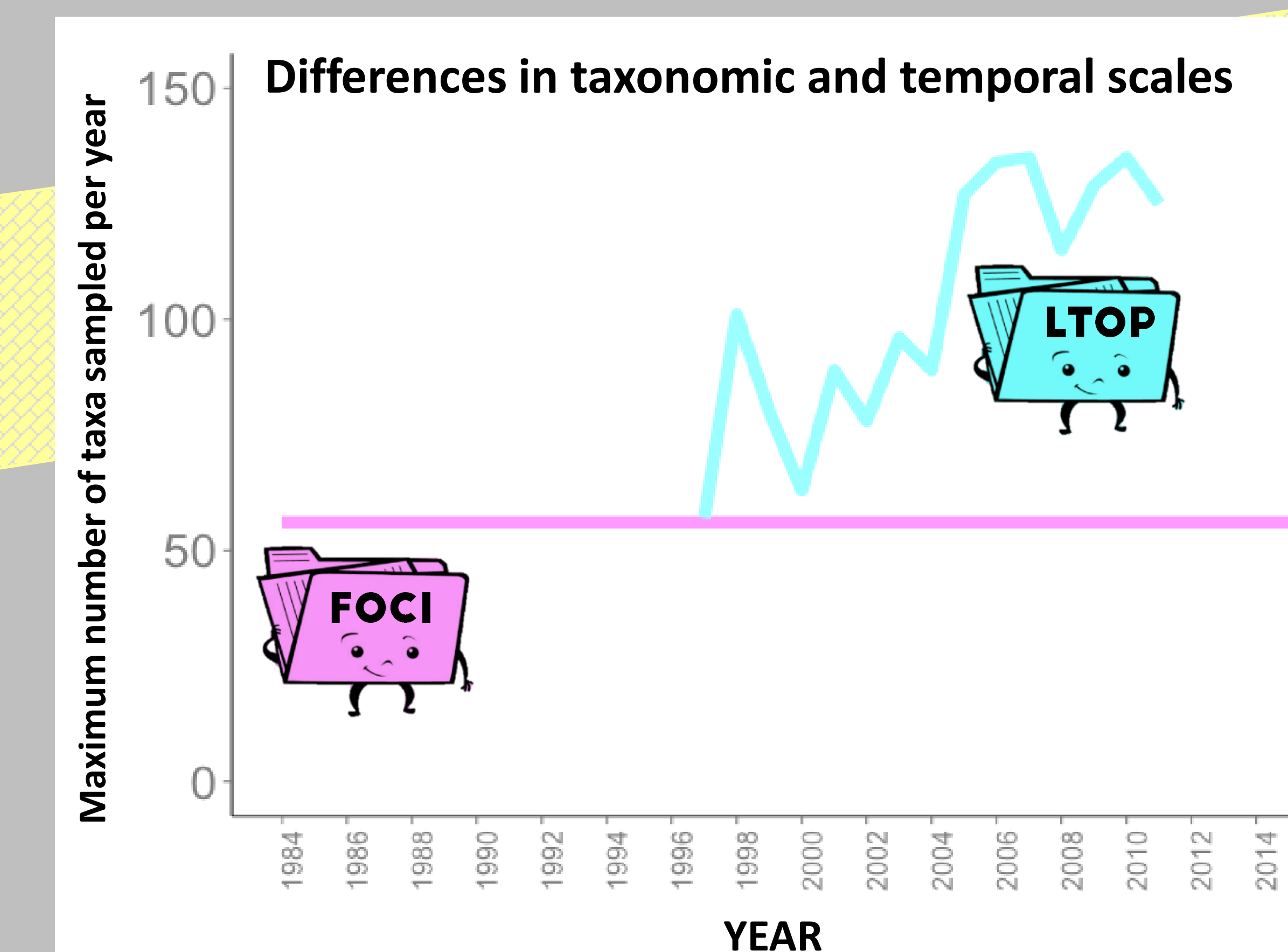
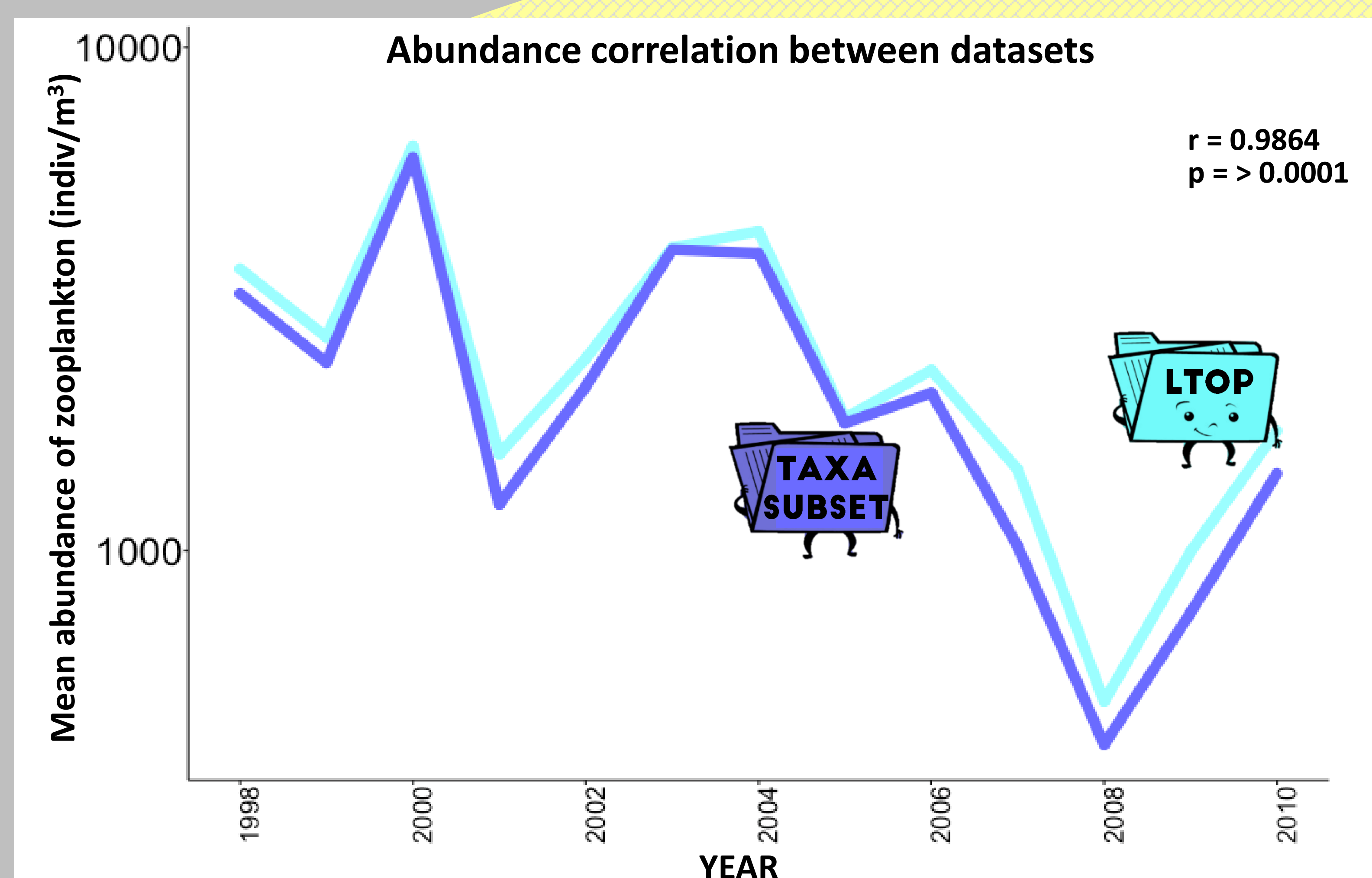
Incomplete data:
analysis limited by available data

Solutions:

- request additional data
- choose appropriate statistical analysis



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Maximum number of taxa sampled per year

YEAR