

# **Biodiversity modeling for EBVs in the Asia-Pacific region: opportunities and challenges**

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**Jamie M. Kass**

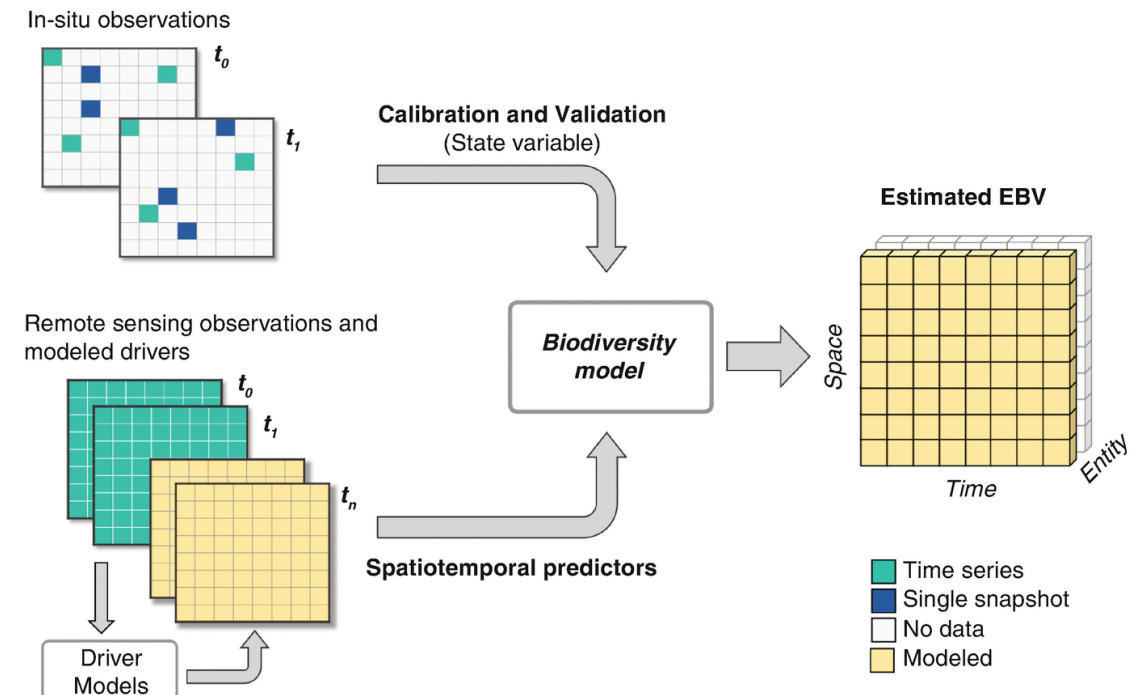
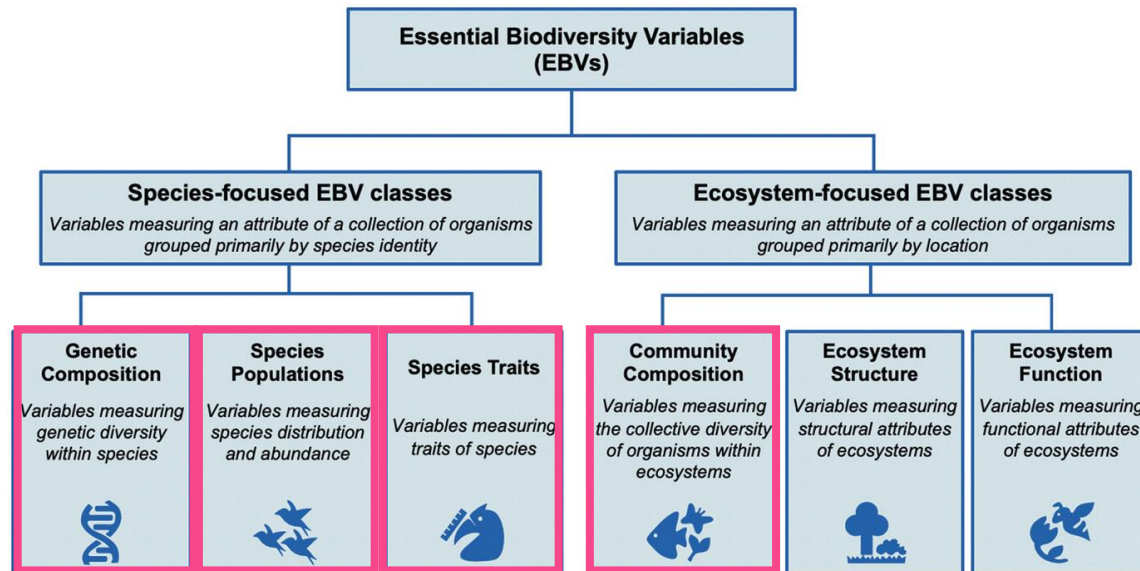
Associate Professor

Macroecology Lab

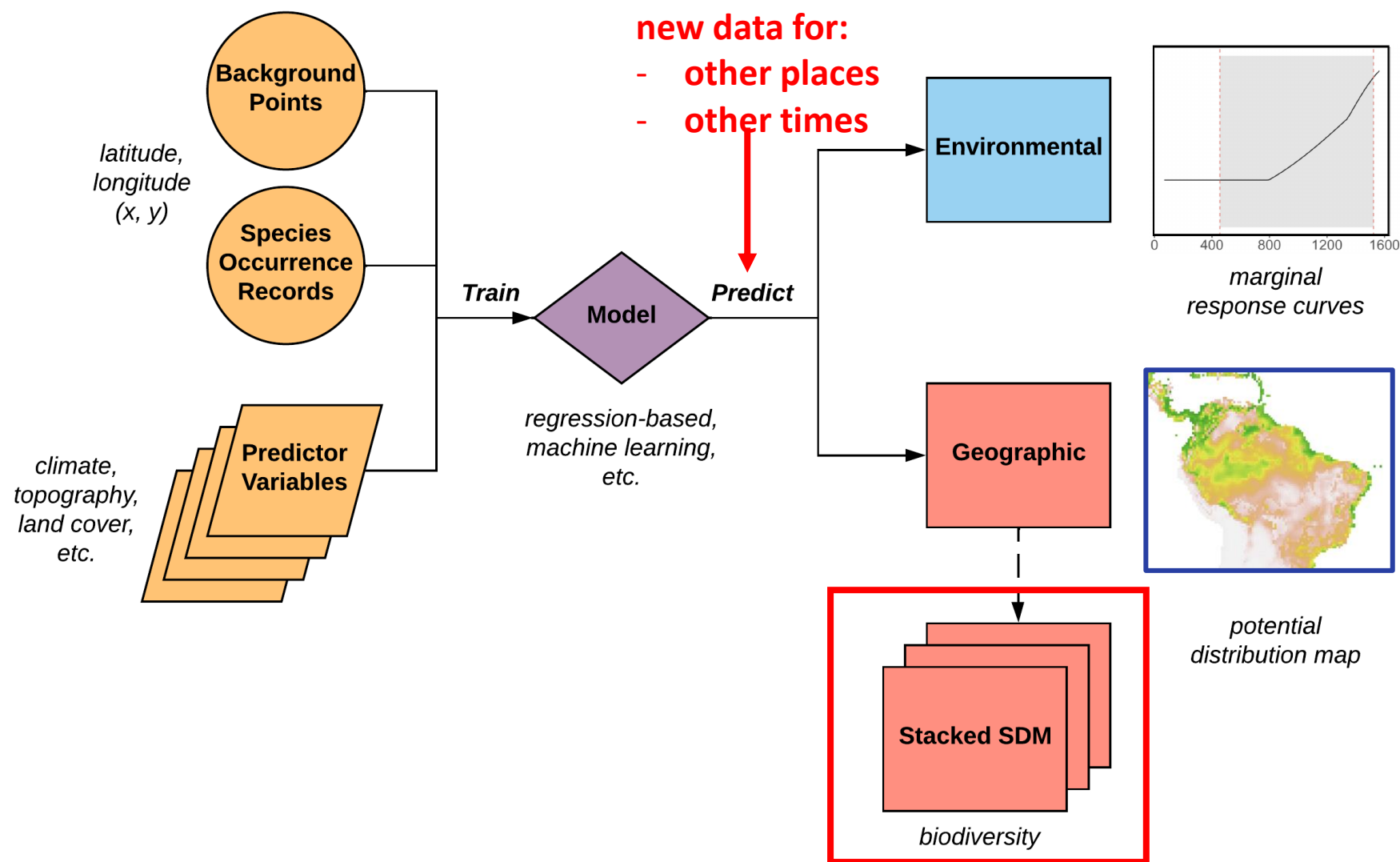
Graduate School of Life Sciences

Tohoku University

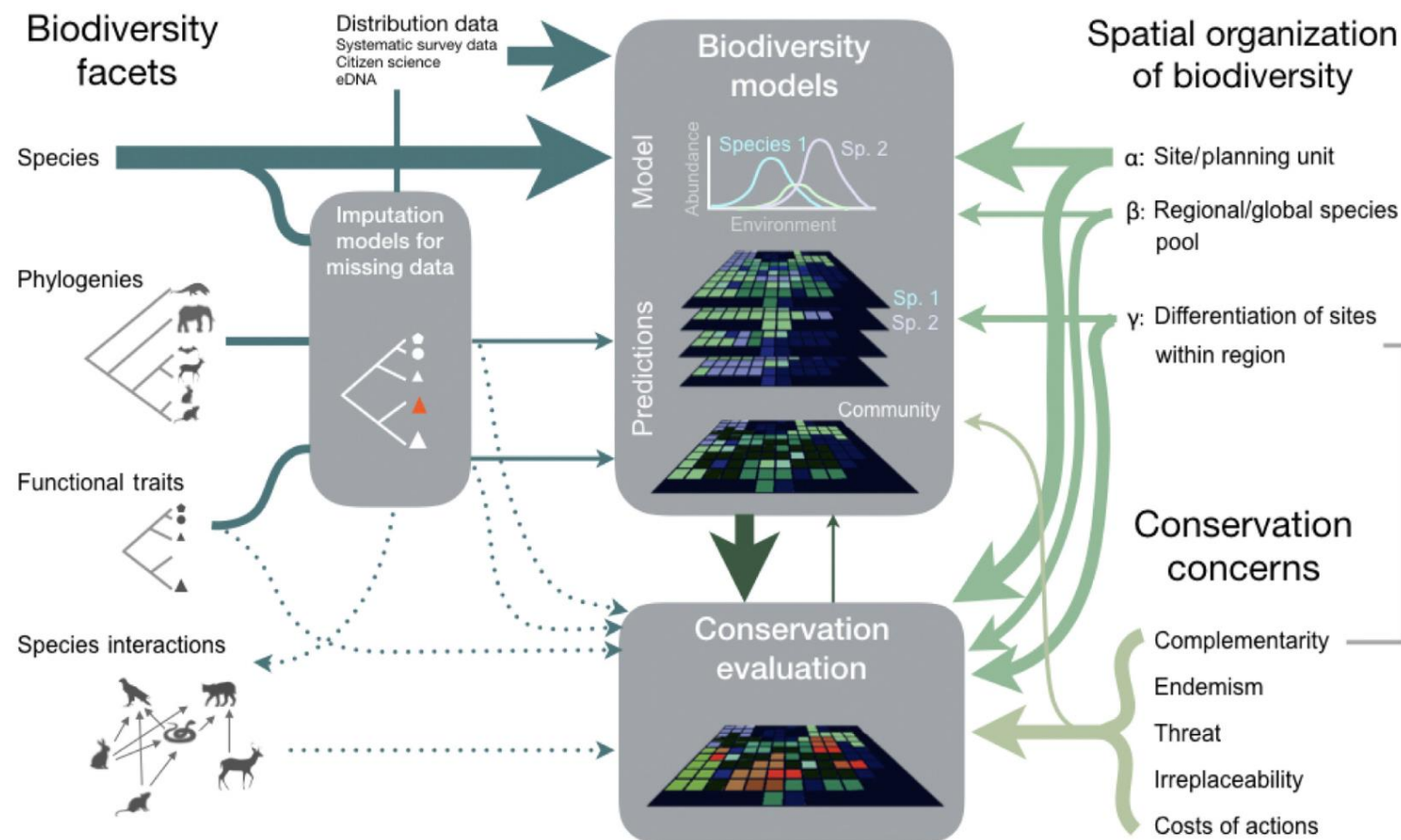
- Some EBVs can be estimated directly with remote sensing (RS) data
- But many need *in-situ* observation data on species / communities, though much of AP region is lacking
- Biodiversity models use observation data with RS variables to predict and map these EBVs over space and time



- Use binary species data: *presence / absence*, or just *presence*
- Model probability of occurrence / habitat suitability based on env. variables
- Many applications including climate change, invasive species, conservation
- Can be combined to estimate biodiversity



- Use biodiversity data: site inventories on species, morphology, genetics, etc.
- Model biodiversity directly based on env. variables
- Can predict and map richness / turnover of species, functional traits, phylogenetic uniqueness, genetic variation, interactions, etc.





# What can biodiversity models predict and map?

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## Species Populations

Variables measuring species distribution and abundance



Species distributions and habitat suitability: SDM

Species abundance patterns: GLM

## Genetic Composition

Variables measuring genetic diversity within species



## Species Traits

Variables measuring traits of species



Intraspecific genetic patterns: SDM

Intraspecific trait patterns: SDM

## Community Composition

Variables measuring the collective diversity of organisms within ecosystems



Species richness (alpha diversity): SDM, MEM

Community turnover (beta diversity): GDM

Community trait / genetic patterns: various

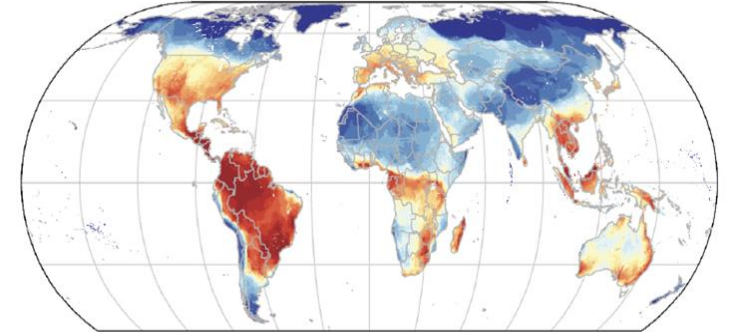
SDM: species distribution model

GLM: generalized linear model

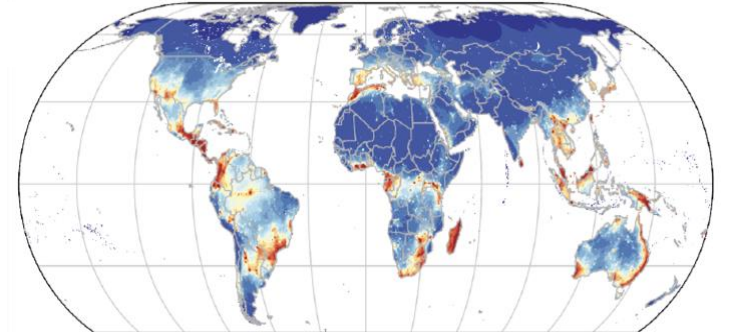
MEM: macroecological model

GDM: generalized dissimilarity model

Predicted ant richness (SDMs)



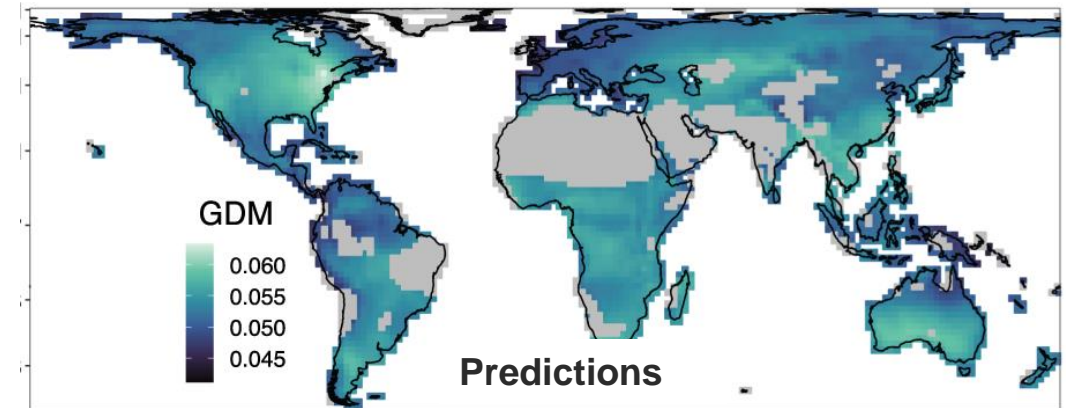
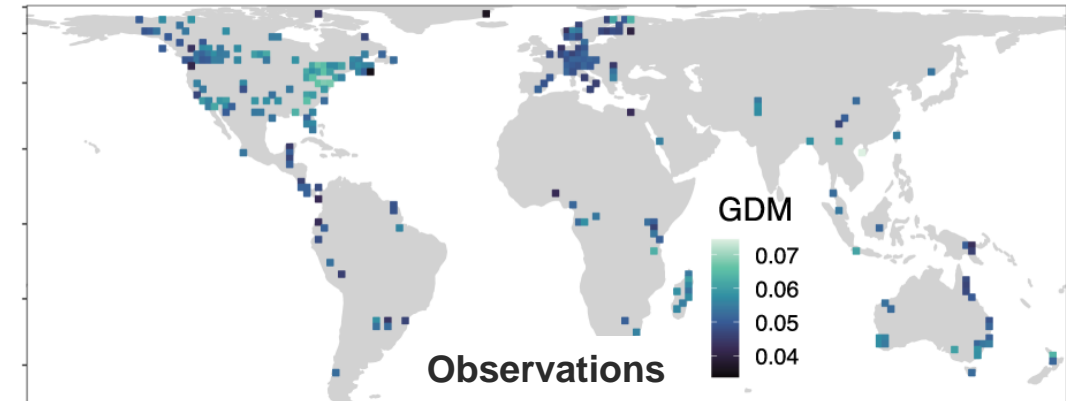
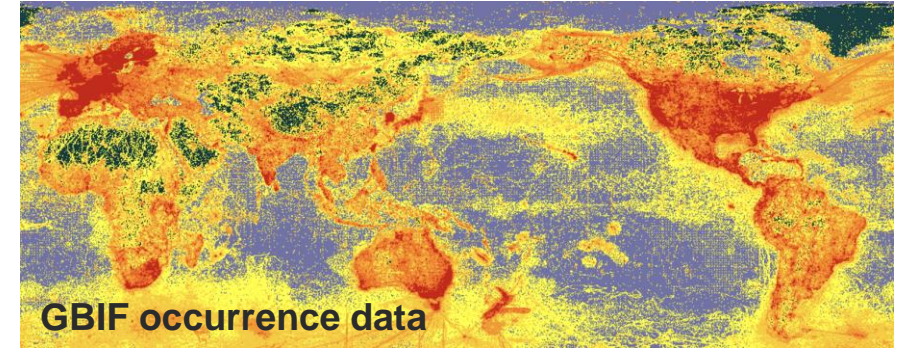
Predicted ant rarity (SDMs)



# Availability of data for AP region

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- Species occurrence data for some groups (e.g., tetrapods, some fish, vascular plants) available globally, but gaps exist for AP
- Occurrence data for other groups (most insects, marine inverts, many plants, fungi, etc.) lacking
- Species abundance data rarer, from population surveys and national monitoring datasets, though national efforts scarce in AP
- New databases host trait data, but geographic biases are strong
- Very few genetic data on species / populations
- Special considerations: less data is digitized, data sharing more difficult, less data available in English, still few international collaborations



**Thanks very much for listening.  
I am happy to take any questions.**



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