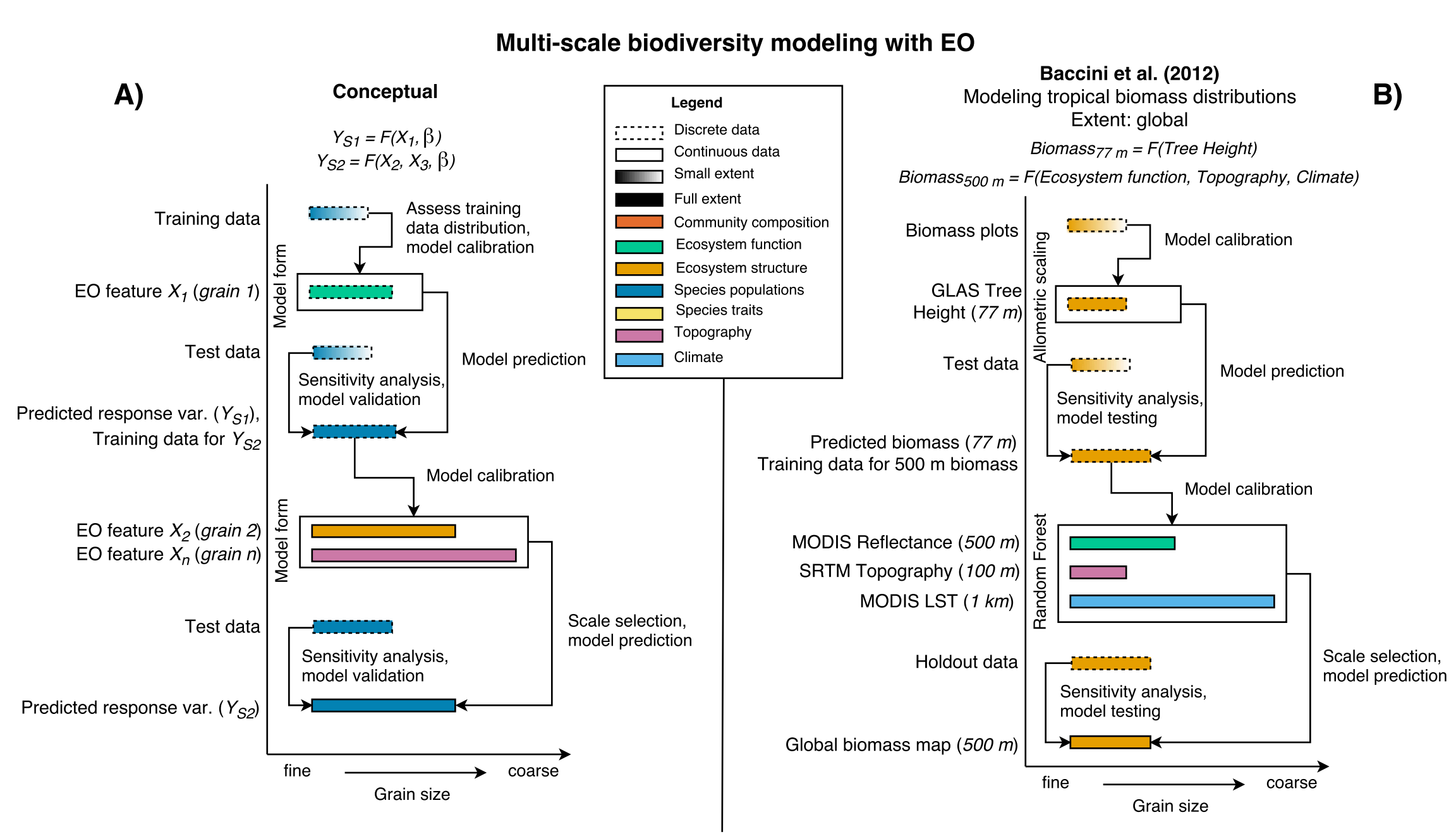
Multi-scale biodiversity modeling with EO
A)
Conceptual
$Y_{S1} = F(X_1, \beta)$
$Y_{S2} = F(X_2, X_3, \beta)$
Training data
Assess training data distribution, model calibration
EO feature X_1 (grain 1)
Model form
Test data
Model prediction
Sensitivity analysis, model validation
Predicted response var. (Y_{S1}), Training data for Y_{S2}
Model calibration
EO feature X_2 (grain 2)
EO feature X_n (grain n)
Model form
Test data
Scale selection, model prediction
Sensitivity analysis, model validation
Predicted response var. (Y_{S2})
fine
coarse
Grain size
Legend
Discrete data
Continuous data
Small extent
Full extent
Community composition
Ecosystem function
Ecosystem structure
Species populations
Species traits
Topography
Climate
Baccini et al. (2012)
Modeling tropical biomass distributions
Extent: global
B)
$Biomass_{77\ m} = F(Tree\ Height)$
$Biomass_{500\ m} = F(Ecosystem\ function, Topography, Climate)$
Biomass plots
Model calibration
Allometric scaling
GLAS Tree Height (77 m)
Test data
Model prediction
Sensitivity analysis, model testing
Predicted biomass (77 m)
Training data for 500 m biomass
Model calibration
MODIS Reflectance (500 m)
SRTM Topography (100 m)
MODIS LST (1 km)
Random Forest
Holdout data
Scale selection, model prediction
Sensitivity analysis, model testing
Global biomass map (500 m)
fine
coarse
Grain size