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Vegetation Modeling in the Tropics

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The Models

- BGC-MAN:
 - Biogeochemical model based on a few dozen differential equations giving a mechanistic description of the Energy, Water, C and N cycles within a given ecosystem
 - Inputs:
 - Daily weather data ($T_{\min/\max}$, prcp, vpd, srad)
 - Site data (texture, elev., slope, aspect)
 - N-Deposition data

The Models (i)

- G4M
 - Global Forest Model
 - Biophysical Growth and Yield model
 - Growth and Yield may be scaled over large areas based on physical and climatological site conditions.
 - Productivity can be estimated from global maps, Satellite products (e.g. MODIS), local data (yield tables) or regionally adapted models (e.g. BGC-MAN)

The Models (ii)

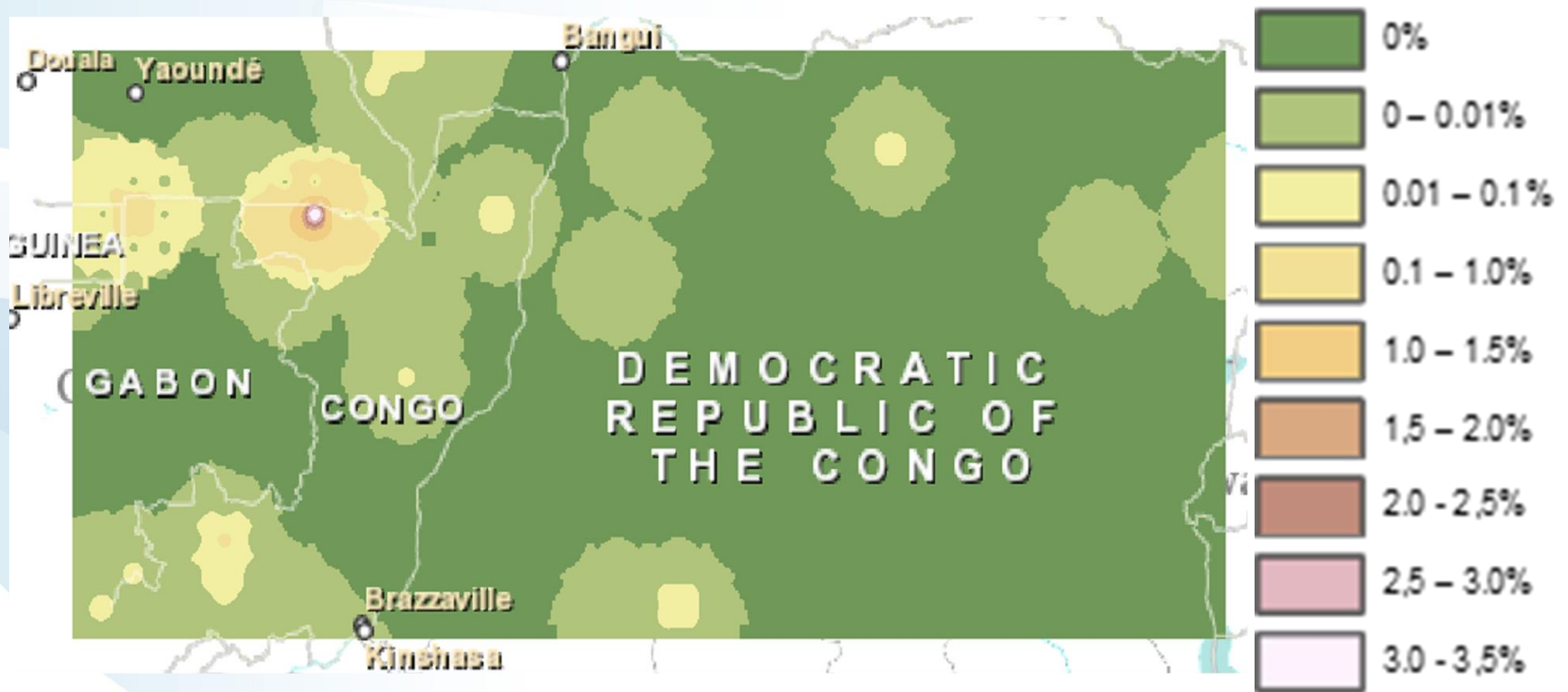
- EPIC
 - Environmental Policy Integrated Climate Model
 - Physiologically explicit model of agricultural productivity
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- BGC-MAN
 - BioGeoChemistry - MANagement Model
 - Physiologically explicit model for natural ecosystems

Examples (i)

- BGC-MAN:
 - Model Calibration & Validation:
 - TrEco data set of > 150 parcels: virgin forest refuges, exploited forests, open and wooded savannahs, shifting cultivation, forest fallows
 - Outputs:
 - C, N & H₂O stocks
 - C, N & H₂O fluxes
 - ~ 600 variables

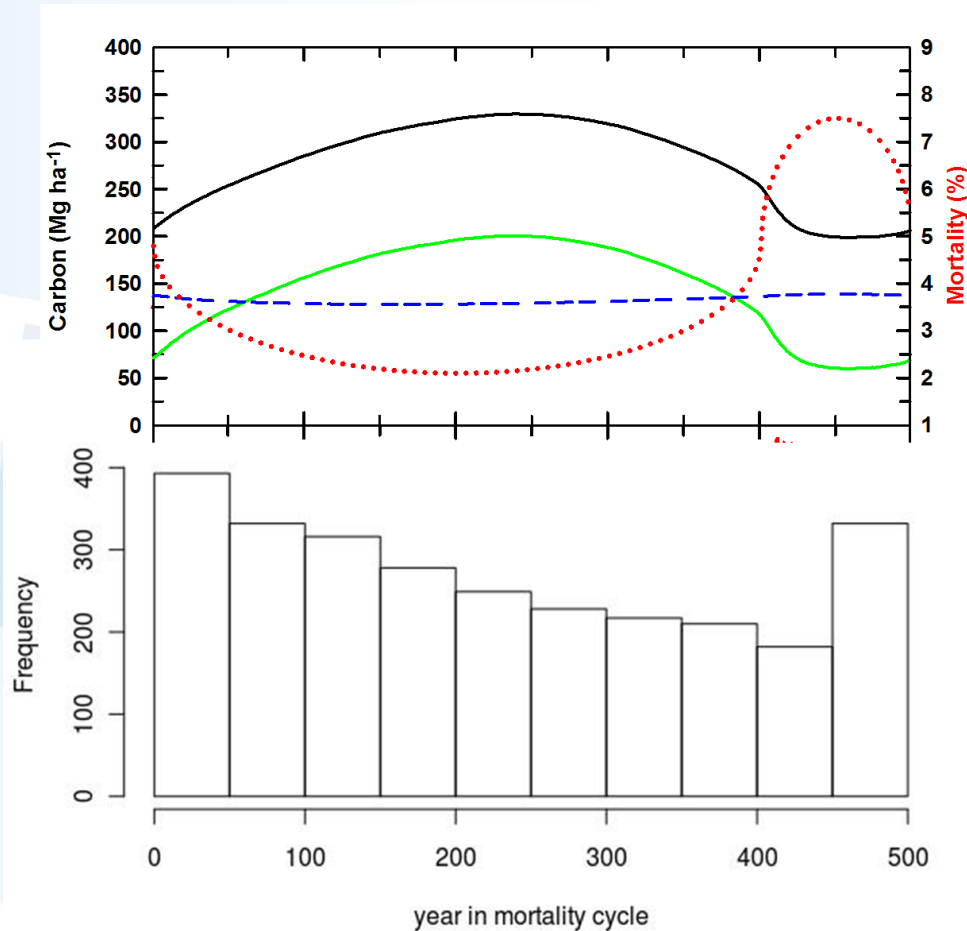
Examples (ii)

– Spatial Resilience Landscape



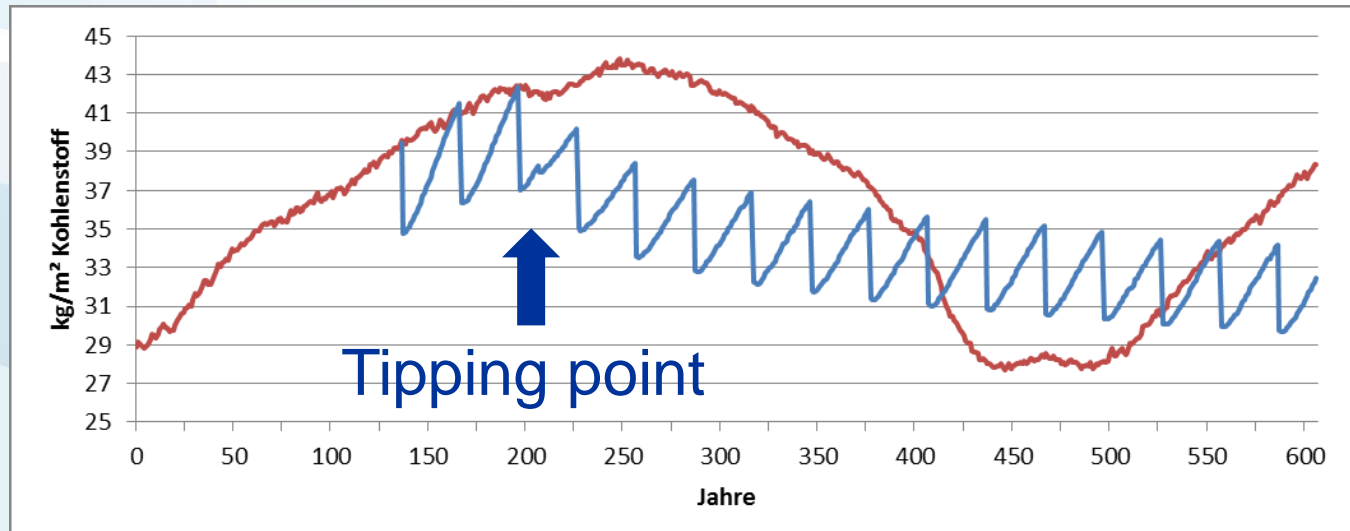
Examples (iii)

– Temporal Resilience Landscape



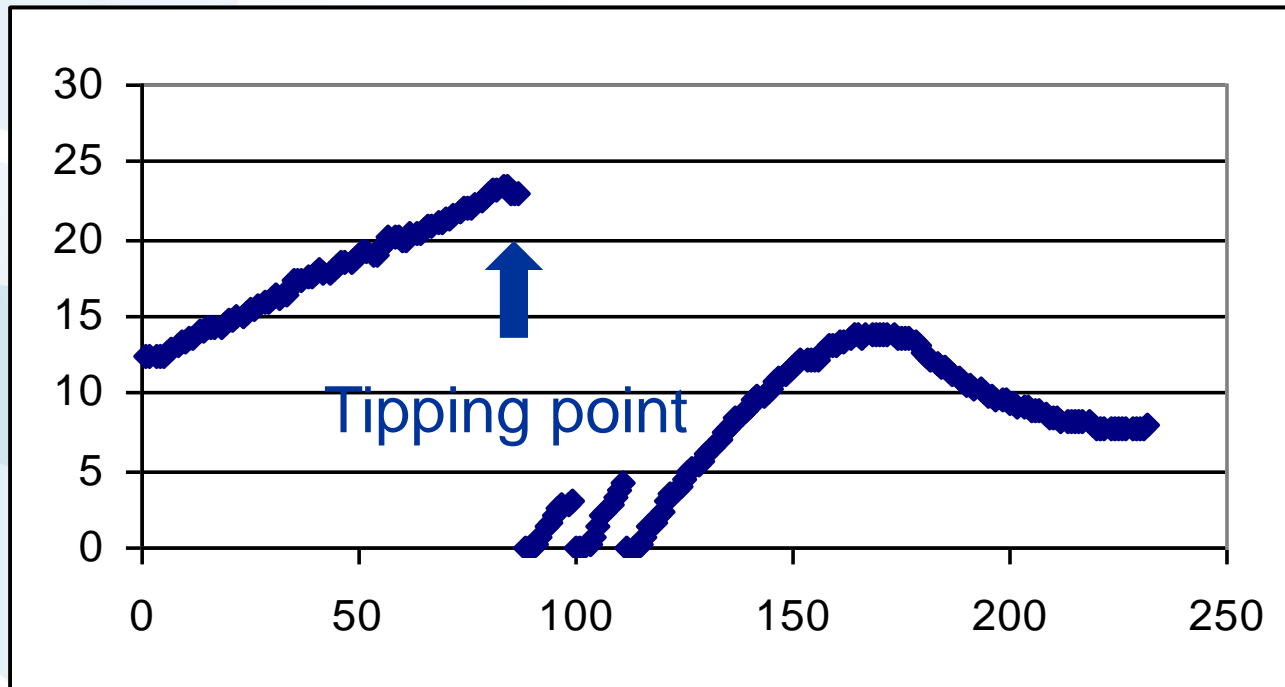
Examples (iv)

- Management tipping points I
- Forest Exploitation



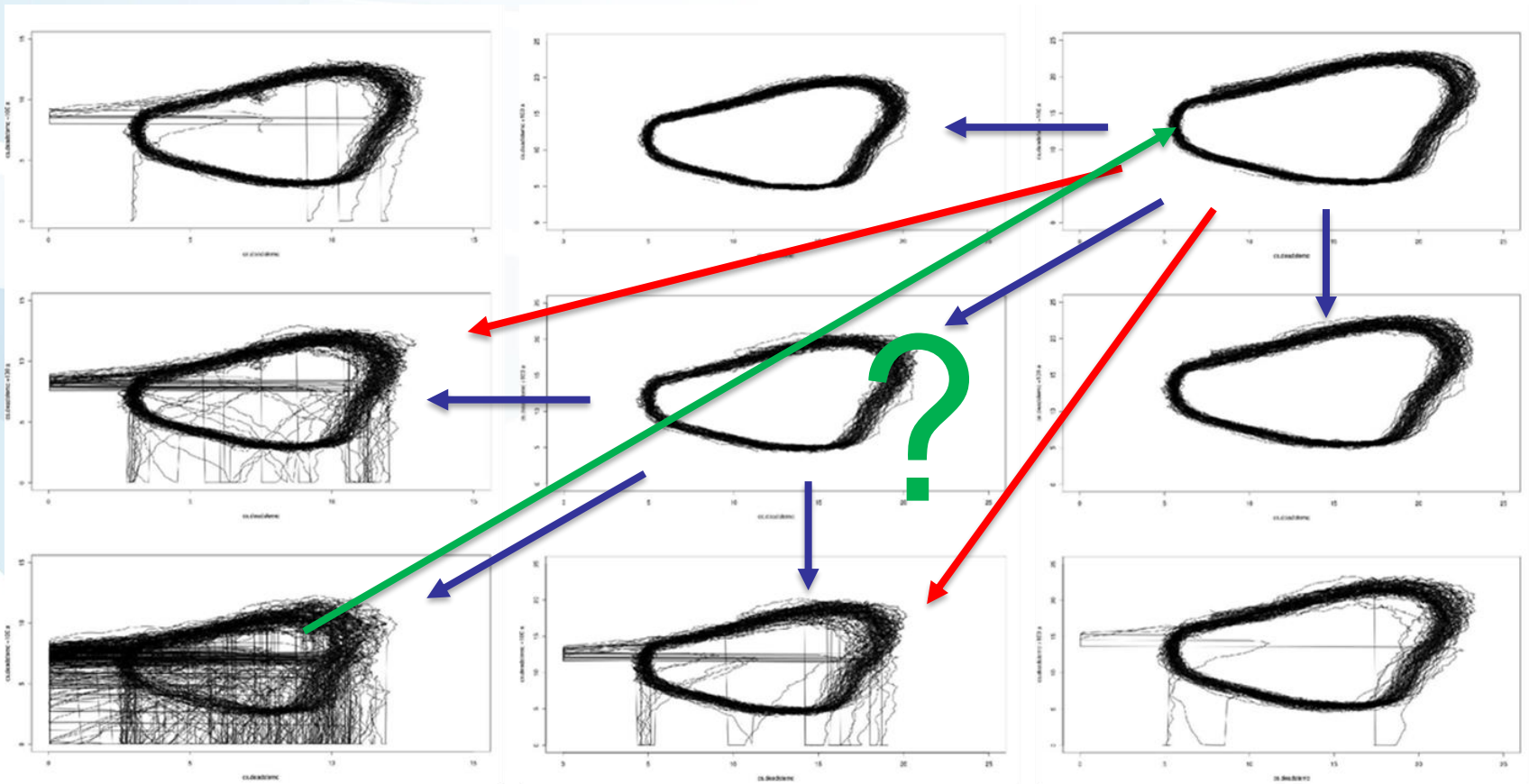
Examples (v)

- Management tipping points II
- Shifting cultivation



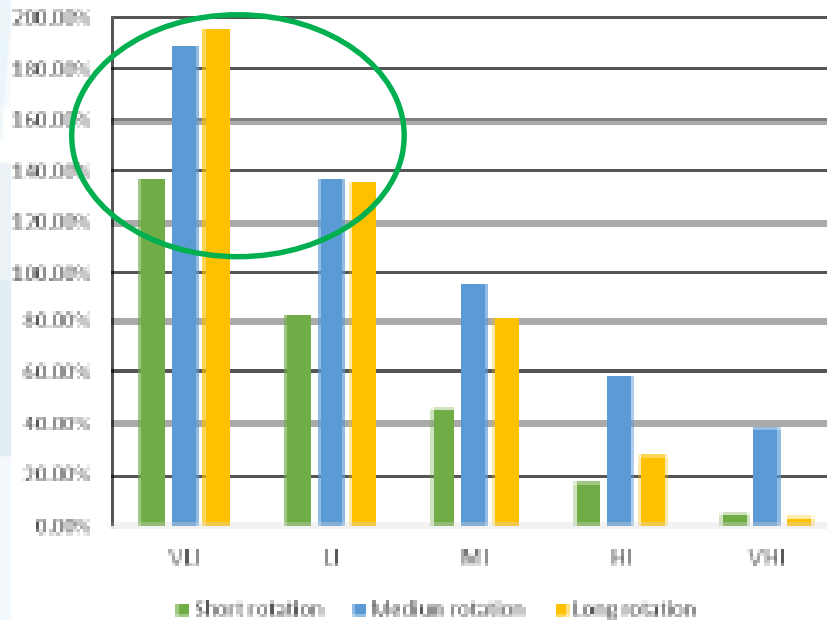
Examples (vi)

- Management = shift in stable states



Examples (vii)

- Restoration Options
- Smart Management





t.b.c.

EPIC