

Plotting the future: monitoring biodiversity and species interactions in the changing world.

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ABSTRACT:

Climate change poses one of the greatest and least understood threats to global forest biodiversity. Changes in temperature and humidity regimes are predicted to cause shifts in species' geographical ranges, behaviour and phenology, all of which have significant implications for inter-specific interactions such as predation, herbivory and pollination. Long-term monitoring is needed to establish baseline data upon which we can monitor and predict how such ecosystem processes will respond to the global-scale anthropogenic disturbances. One way to assess the potential impacts of climate change is to use elevational gradients, which encompass changes in temperature and humidity regimes within a short geographic distance (as opposed to latitudinal differences which requires thousands of kilometres to observe similar environmental changes as observed along elevational gradients). Biodiversity data obtained from elevational transects provides insights into how organisms are distributed across different elevations under various climatic conditions. We present our progress on the studies of elevational changes in forest biodiversity and species interactions. Elevational gradient approach alone, however, cannot encapsulate the ecosystem level responses to global-scale disturbances due to its practicality of long-term research. ForestGEO (Forest Global Earth Observations) provides an international partnership to establish large-scale ecological monitoring plots where organisms and their interactions are monitored intensively following standardised protocols. Standardised designs ensure that data are fully compatible to other ForestGEO plots globally, enabling us to disentangle local-scale (forest fragmentation, and infestation of invasive species) and global-scale (climate change) anthropogenic disturbances. ForestGEO not only boosts scientific understanding of forest ecosystems and their responses to climate changes, but also provides a platform for training and education. ForestGEO plots have yet to be established in many countries of Asia Pacific regions, and we urge local stakeholders to join such an international partnership.

KEYWORDS:

Biodiversity; climate change; CTFS; elevation; pollination; species interactions.