

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

WS 2019/20



UNIVERSITÄT
BAYREUTH

Donnerstag/Thursday

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12:00 in H6, GEO

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Ecosystem functional types and biome concepts

Assessment of ecosystem functioning and functional diversity are mainly done by definition of biodiversity variables, planetary boundaries or ecosystem services. We propose the use of satellite-derived Ecosystem Functional Types (EFTs, i.e., land surface patches with similar dynamics of matter and energy exchange between biota and physical environments) to incorporate ecosystem functional heterogeneity at regional scale in ecology and conservation. The concept of EFT is equivalent to the Plant Functional Types (PFT) but applied to a higher level of biological organization. Like plant species can be grouped based on functional features (e.g. growth rates, nitrogen fixation), ecosystems can be grouped based on their functional dynamics (e.g. productivity, seasonality and phenology). Empirically, EFTs have been identified using remote sensing mainly through spectral indices related to carbon dynamics but also considering evapotranspiration, surface temperature, and albedo. EFTs classify ecosystems according to their functioning, distinguishing classes of homogeneous annual dynamics in the relevant land surface spectral properties.

Thanks to their top-down characterization, EFTs have been used to, e.g., describe large-scale functional biogeographical patterns, to assess the effects of land-use changes on ecosystem functioning and diversity or to improve weather forecasting models. We are now evaluating the potential of EFTs to assess ecosystem functional diversity in the Arctic Tundra within the NASA's GEOBON program.