EcoTroph, a son of Ecopath to project global impact of climate change and fishing strategies
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EcoTroph is a powerful trophic-level based model,

- to project climate change impacts on the global ocean
- or to assess fishing strategies such as the balance harvest

EcoTroph, a son of Ecopath to project global impact of climate change and fishing strategies

Didier GASCUEL, Hubert DU PONTAVICE, Ilan PEREZ, Jennifer REHREN

EcoTroph (ET) is an oversimplified trophic-level-based model, based on two ideas:
- Ecosystem structure can be summarized using trophic spectra, i.e. the continuous distribution of the biomass, production, catch, fishing mortality, etc. across trophic levels
- Ecosystem functioning modeled as a flow of biomass surging up the food web, from primary producers to top-predators

Application 1: projection of climate change impact on the biomass of the global Ocean

METHOD: one EcoTroph model in each 1°x1° cell each year, forced by 3 earth system models (NPP & SST). Trophic transfer efficiency and residence time depend on SST

RESULTS: a global decrease in the total biomass by 2100 (-4% in RCP2.6 to -20% in RCP8.5) More impact for predators and in tropical ecosystems

Application 2: assessment of a Balanced Harvest management scenario in a virtual ecosystem

Balanced harvest (i.e. exploitation rates Y/P proportional to productivity P/R) induces:
- unbalanced trophic structure due to the cumulative effect of fishing
- very large catches of low TLs but no predators anymore

Realistically assuming a fraction of not exploitable at low TLs, balanced harvest implies:
- The sea is fulling up with not fishable species

Extra tables and figures

References:
- J. Rehren, D. Gascuel (in prep.)