Spatial Stock Assessment Methods: International Approaches and Advancements

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METADATA FOR SIMULATED DATASETS

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1. Overview

The SPM operating model applies catches, growth and movement within and across each grid cell (~5x5° bins) and time period (pseudo-years=quarters). For each fully spatial SPM simulation (1-100), we have provided the simulated:

- **Catches by fishery (not flag specific),**
- **CPUE (from a pelagic longline fishery),**
- **Length frequencies (from the purse seine fishery),**
- **Tag releases and recaptures (reported from the purse seine fishery only).**

These spatially explicit data output from SPM, were then **aggregated by regional scale (4 area or 1 area)** by summing catch, length frequencies, and tag release/recaptures by region. CPUE was standardized by cell and year with regional scaling applied (abundance-based weightings) following Hoyle & Langley (2020).

Fisheries included: Purse seine (ps), baitboat (bb), longline (ll), troll (trol), gillnet (gi), handline (hand), other (other)

Please refer to YFT OM description for more OM specific information.

2. Datasets provided to analysts

We provide 100 iterations of the spatially aggregated data (1 area), and 100 iterations of the spatially stratified data (4 areas) on the GitHub repository (as well as the fully spatially disaggregated by grid cell datasets).

Dataset name	Description	Github location
YFT_1area_observations_1-100.RData	Single area (panmictic population) YFT data	here
YFT_4area_observations_1-100.RData	Four area (four area aggregation) YFT data	here
YFT_221cell_observations_1-100.RData	Fully spatial (5x5 binned) YFT data	

3. Data structure

Dataset: YFT_1area_observations_1-100.Rdata

dat_1A_X (X: sim # 1-100)

For all platforms:

lencomp: (list) 1 area dataframe of aggregated length frequencies by age bin (purse seine only):

catch: (list) 1 area dataframe of catch by fishery, including pseudo-year, and season (=1).

CPUE/cpu: (list) 1 area cpue (longline only)

tag_releases: 1 area tag release data

tag_recaps: 1 area tag recapture data

Biol_dat: Biological data from Fu et al. (2018)

M: Age varying natural mortality

Linf: Length infinity (cm)

Lmin: Length minimum (cm)

Maturity: maturity ogive (pseudo-years)

K: age varying growth coefficients

a: scaling coefficient

b: shape parameter

age: first age to last age (pseudo-years)

L: Length (cms)

W: Weight (kgs)

Stock Synthesis: (Arguments to create 1 area Stock Synthesis data file (data.ss with r4ss for SS v3.24Z)
(sourcefile, type, SSversion, styr,endyr, nseas, months_per_seas, spawn_seas, Nfleet, Nsurveys, N_areas, fleetnames, surveytiming, areas, fleetinfo1, units_of_catch, se_log_catch, fleetinfo2, Ngenders, Nsexes, Nages, init_equil, N_catch, catch,

N_cpue, CPUEinfo, CPUE, N_discard_fleets, N_discard, N_meanbodywt, DF_for_meanbodywt,lbin_method, binwidth, minimum_size, maximum_size, N_lbinspop, lbin_vector_pop, comp_tail_compression, add_to_comp, max_combined_lbin, N_lbins, lbin_vector, N_lencomp, lencomp, N_agebins, N_ageerror_definitions, N_agecomp, Lbin_method, max_combined_age, N_MeanSize_at_Age_obs, N_environ_variables, N_environ_obs, envdat, N_sizefreq_methods, do_tags, N_tag_groups, N_recap_events, mixing_latency_period, max_periods, tag_releases, tag_recaps, morphcomp_data, fleetinfo, NCPUEObs)

Dataset: YFT_4area_observations_1-100.Rdata

dat_4A_X (X: sim # 1-100)

For all platforms:

lencomp: (list) 4 area dataframe of aggregated length frequencies by age bin (purse seine only):

catch: (list) 4 area dataframe of catch by fishery, including pseudo-year, and season (=1).

CPUE/cpu: (list) 4 area cpue (longline only)

tag_releases: 4 area tag release data

tag_recaps: 4 area tag recapture data

Biol_dat: Biological data from Fu et al. (2018)

M: Age varying natural mortality

Linf: Length infinity (cm)

Lmin: Length minimum (cm)

Maturity: maturity ogive (pseudo-years)

K: age varying growth coefficients

a: scaling coefficient

b: shape parameter

age: first age to last age (pseudo-years)

L: Length (cms)

W: Weight (kgs)

Stock Synthesis: (Arguments to create 4 area Stock Synthesis data file (in SS3.24Z) (sourcefile, type, SSversion, styr,endyr, nseas, months_per_seas, spawn_seas, Nfleet, Nsurveys, N_areas, fleetnames, surveytiming, areas, fleetinfo1, units_of_catch, se_log_catch, fleetinfo2, Ngenders, Nsexes, Nages, init_equil, N_catch, catch, N_cpue, CPUEinfo, CPUE, N_discard_fleets, N_discard, N_meanbodywt, DF_for_meanbodywt,lbin_method, binwidth, minimum_size, maximum_size, N_lbinspop, lbin_vector_pop, comp_tail_compression, add_to_comp, max_combined_lbin, N_lbins, lbin_vector, N_lencomp, lencomp, N_agebins, N_ageerror_definitions, N_agecomp, Lbin_method, max_combined_age, N_MeanSize_at_Age_obs, N_environ_variables, N_environ_obs, envdat, N_sizefreq_methods, do_tags, N_tag_groups, N_recap_events, mixing_latency_period, max_periods, tag_releases, tag_recaps, morphcomp_data, fleetinfo, NCPUEObs)

Dataset: YFT_221cell_observations_1-100.Rdata

Sim_X (X: sim # 1-100)
- obs: Simulated observations
  - simulated_ll_jpn_cpue_YYY:
  - simulated_XXX_lf_YYY:
- tagrel: Tag releases
  - process[tag_XXX]: tag release in a given pseudo-year
- tagrecs: Simulated tag recapture data
  - observation[tag_recapture_XXX_in_YYY]: tag recapture in a given pseudo-year from release cohort XXX
- layer
  - base: 1 = on the water, 0 = on land
  - cell: unique cell row and column numbers
  - constant: 1
  - latitude: latitude for each cell center
  - longitude: longitude for each cell center
  - region: IOTC YFT regions (R1a, R1b, R2, R3, R4, R5)
  - recruitment: NA
  - SSB: NA
  - sst: Sea Surface Temperature (see Dunn et al. 2020)
  - clo: Chlorophyll (see Dunn et al. 2020)
  - fishing_ff_YY: ff: fishery = ps, trol, bb, gill, ll, other, hand, YY = pseudo-year