

Four presentations from Japan with shorter time slot

Stock assessment model in Japan:

- past to present (Momoko Ichinokawa)
- future perspective (Akira Hayashi)

Case studies of the local stock assessment in the Northwest Pacific

- Difficulties in the stock assessment for seamount bottom fisheries (Kota Sawada)
- Application of robust regression in estimating stock-recruitment relationship (Shin Fukui)

Stock assessment model in Japan: past to present

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Revolution of fisheries management in Japan

Key word by Fisheries Agency = International Standards

- Reference point: **From** Only use (empirical) limit RPs (B_{limit} as $B_{trigger}$) \Rightarrow
To MSY-based target RPs (F and B) to create Kobe plot
- Future projection: **From** Short-term & deterministic \Rightarrow
To stochastic and long-term for stakeholders to choice HCR
- Assessed species: **From** about 80 stocks are assessed to provide ABC \Rightarrow
To: almost all fisheries stocks (~200 species) should be assessed

What features are needed in "our" next generation model?

- (Tuned VPA)
- Estimate SR relationship with density-dependence (outside of VPA)
- Long-term and stochastic future projections to derive MSY-RPs (MSY=maximum average yield in stochastic simulation)

A spreadsheet application
with GUI (Excel[®])



Integrated package
(with R package, frasyr)

Structure of the R package: frasyr

(<https://github.com/ichimomo/frasyr>)



Hiroshi Okamura

http://nrifs.fra.affrc.go.jp/ResearchCenter/2_FM/index.html



Shota Nishijima

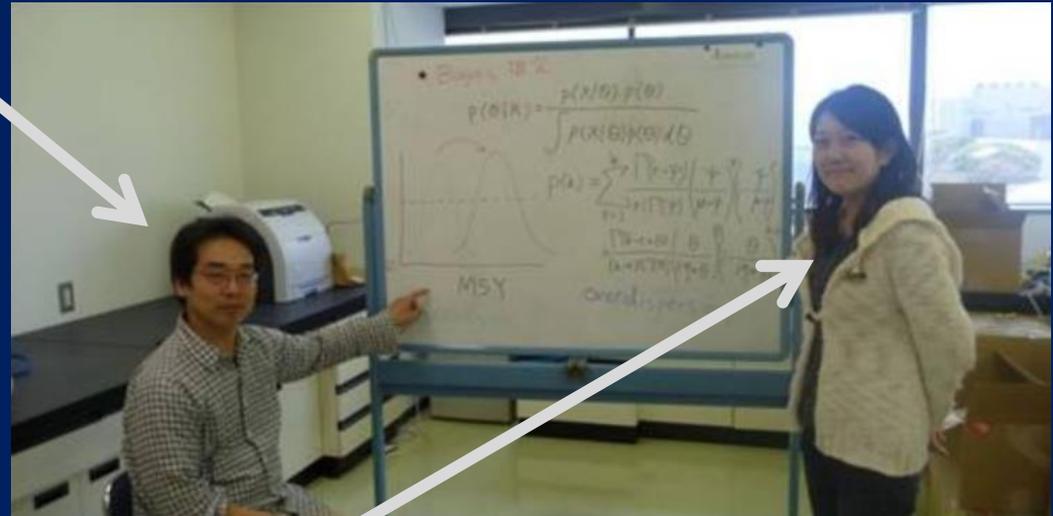


Photo 7 years ago

Momoko Ichinokawa

VPA

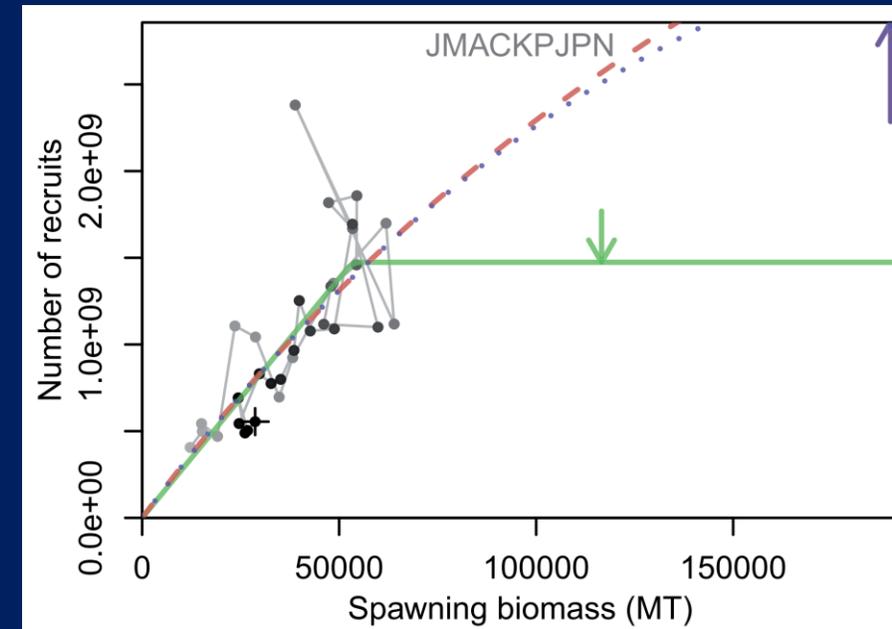


- VPA tuned with a variety of methods
- Reproduce almost all stock assessment done by with Excel, and have ben used double-check of Excel results (Ichinokawa et al. 2014, Bulletin of Japanese Society of Fisheries Oceanography)
- Ridge VPA (put penalty λ to achieve minimum retrospective bias) (Okamura et al 2017, ICES Journal)
- Parameter estimation with TMB (option)

Estimation of S-R relationship



- Beverton-Holt, Ricker, Hockey-Stick
- HS is frequently used
- Robust estimation (presented by Dr. Fukui)
- Auto-correlation of residuals

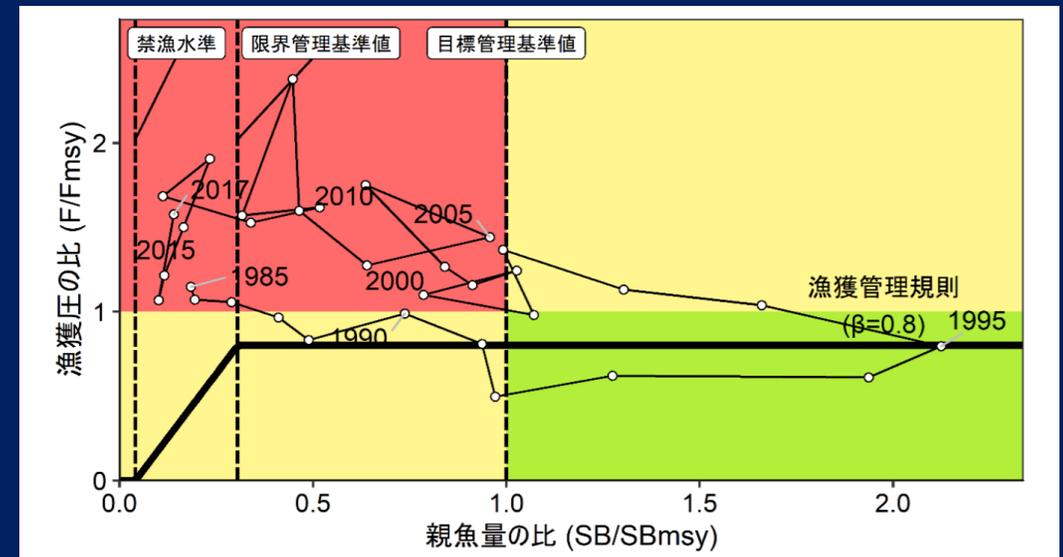


(Ichinokawa et al 2017, ICES Journal)

Future projections and RPs



- Stochastic future projections
- Average maximum yield (\sim MSY) is estimated by numerical optimization
- Target: MSY, Limit: PGY(60%), Ban: (PGY10%)
- Kobe plot & Kobe II table



Recent progress for software development process

- Go to github for co-working and version control (last year)
- Became R package named "frasyr" with test (this spring)
- Gradual shift to use tidyverse & ggplot (since last year)



Thanks to advices from real next generation's scientists
(e.g. Akira Hayashi, next presentation)

Many issues for the next generation

- No consideration of parameter uncertainty (!! 😞)
- Capacity building of stock assessment scientists
 - Long history of ignorance and blind criticism of MSY in Japan hinder next generation of stock assessment scientists (Japan's mainstream is Fisheries Oceanography)
- More user friendly & efficient systems should be developed
 - "frasyr" is only a group of R functions
 - We need structured system (work-flow with the R functions) to complete stock assessment and provide management advice to stakeholders (next presentation)

Thank for your attention!

Question ??

Please use clear English