# Examining the reasonability of "upq2008" sensitivity scenario using historical fluctuation of nominal Japanese CPUE by age

日本延縄漁業における年齢別ノミナル CPUE の歴史的推移からみる
「upq2008」シナリオの妥当性

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## Summary

"Upq2008" scenario is one of the candidates of sensitivity run for the next stock assessment using the SBT operating model (OM), which assume that the 35% increase of the longline catchability in 2008. But the bubble plots of Japanese CPUE by age don't show the consistent upward shift of the CPUE level across age-classes after 2008. Rather the bubble plots probably indicate the existence of some strong year-classes in the late 2000s, which results recent higher CPUE for some cohort. This result suggests that the specification of "upq2008" scenario should be re-considered based on the CPUE trend and the recent recruitment level.

## 要約

感度分析の候補の一つである upq2008 では、2008 年に漁獲効率が 35%向上したと仮定している。しかし、年齢別 CPUE のバブルプロットからは、2008 年以降に全年齢で一貫している CPUE の上昇は明確にはみられない。むしろ 2000 年代後半に見られる一部のコホートの CPUE の上昇は、2000 年代後半に強い年級群の加入があったことを反映したものであるとも考えられる。加入状況と CPUE のトレンドを考慮し、より妥当な upq シナリオに改善すべきである。

## 1. Introduction

"Upq2008" was a robustness scenario for MP evaluation work in 2011, which assume an increase in catchability of 35%, using a step function, from 2008 onwards. This scenario was one of pessimistic scenario for the OM conditioning, and implemented in order to test the MPs to ensure that they are robust to uncertainty in the longline CPUE (CCSBT 2011). In 18th CCSBT Extended Scientific Committee (ESC) meeting, "upq2008" was listed as a candidate of sensitivity scenarios for the next stock assessment, but it was also required more examination to specify the catchability setting using nominal CPUE trend according to age (CCSBT 2013). For this reason, this document provides the bubble plots for the Japanese longline CPUE by age to examine the year effect and year-class strength.

## 2. Methods

Bubble plots were created to show the residuals of CPUE by age for CCSBT statistical area 4 –9. First, CPUE values (age 2 –10) were averaged over all years (from 1980 to 2013) by each area, and then calculated their residuals for the bubble plots. Data source of CPUE is "catch and effort" and "catch at size" data for Japanese longline vessels which is included on the "CCSBT data CD (ver. 2013)". Most recent three years' data is based on the officially submitted data under the CCSBT data exchange in 2014 ("JP-Catch and Effort (2011 –13)-Revised" and "JP-Catch at Length (2011 –13)"). From these data, the CPUE by length is calculated in each area, and converted to the CPUE by age using age-slicing method.

## 3. Results and Discussion

Bubble plots for area 4 –9 are shown in Fig. 1. In each plot, blue and red bubbles show the negative and positive residuals, respectively. Some years in late-1990s have higher CPUE across age-classes, which would relate to the increase of catchability as "year effect" rather than the increased abundance (e.g. 1997-98 of Area 5, 1994-97 of Area 6, etc.). However such clear increase across all age-classes is not found after late-2000s in any areas: There are some higher CPUEs after around 2006 except area 5, and these are not for all age-classes but for some specific cohort. This result suggests the existence of some strong year-classes in the late 2000s, probably after 2004. The CPUE pattern which probably indicates the strong cohort differs a little according to area. This may reflect the difference of distribution by age for juvenile-immature SBT.

ESC assumed the 35% increase of catchability after 2008 in "upq2008" scenario, but the result of the bubble plots doesn't support it. The result of the Shepherd Nicholson analysis also suggested the run of "upq2008" may not be needed (Pope 2014). Therefore, the "upq2008" scenario should be

re-considered and modified to more realistic specification based on the CPUE trend and recent recruitment indices.

## 4. Reference

CCSBT (2011) Report of the Sixteenth Meeting of the Scientific Committee. 19-18 July 2011. Bali, Indonesia.

CCSBT (2013) Report of the Eighteenth Meeting of the Scientific Committee. 7 September 2013. Canbera, Australia.

Pope, J. G. (2014) A note on the Shepherd-Nicholson fit to CPUE at age data with extensions to examine any 2008 anomaly. CCSBT/CPUE2014/05 8p.

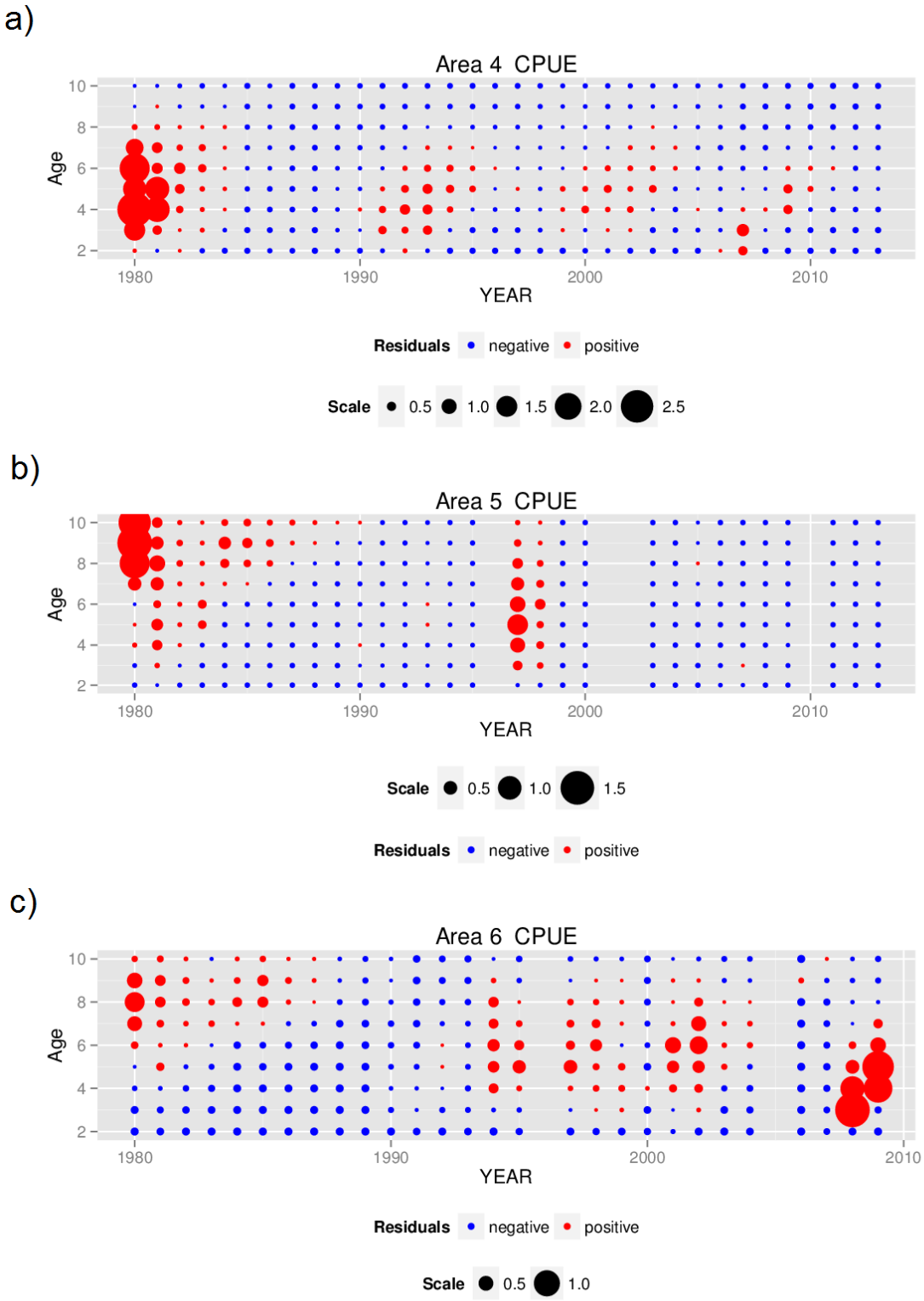


Fig.1. Bubble plots for the residuals of CPUE by age (CCSBT statistical area 4-6).

The red bubble shows the positive value.

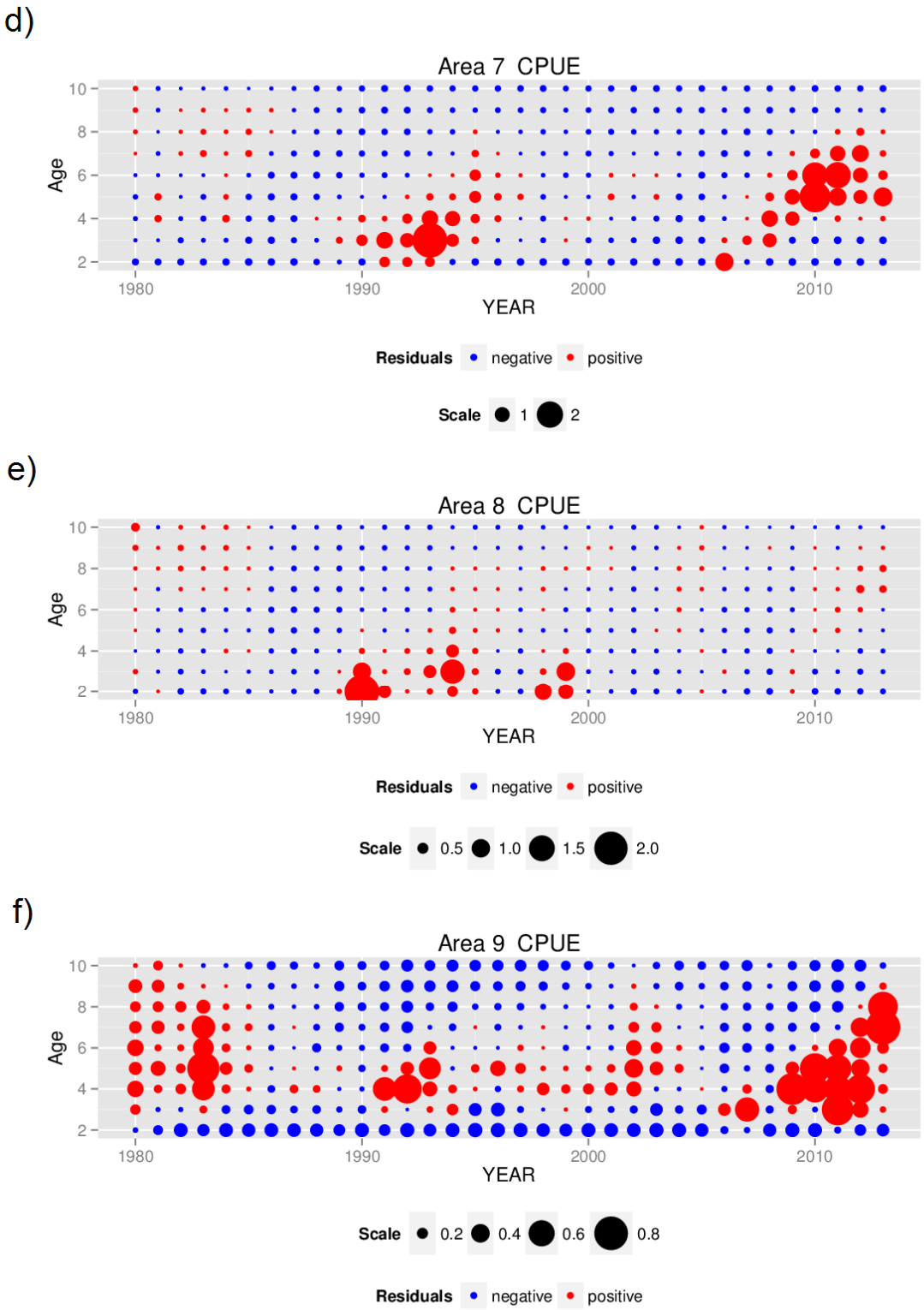


Fig.1. (cont.) Bubble plots for the residuals of CPUE by age (CCSBT statistical area 7-9).

The red bubble shows the positive value.