CCSBT-ERS/1905/Info 10
(ERSWG Agenda item 2.1)

Spatio-temporal distributions of seabird bycaught by Korean tuna longline fisheries

Republic of Korea

Sung Il Lee, Doo Nam KIM and Du Hae An

National Institute of Fisheries Science (NIFS)
216 Gijanghaean-ro, Gijang-eup, Gijang-gun, Busan 46083, Republic of Korea

1. Introduction

The aim of this study is to analyze spatio-temporal distributions and bycatch per unit effort (BPUE) of seabird bycaught by Korea tuna longline fisheries. In addition, this paper describes a preliminary result on the effectiveness of weighted branch lines (lumo leads) on seabird bycatch mitigation in Korean tuna longline vessels.

2. Data and Methods

In this study, data of seabirds bycaught by Korean tuna longline fisheries ware collected by scientific observer programs, which span from 2012 to 2017. They include information on fishing date and position, effort (number of hooks), seabird bycatch by species, status (alive/dead), seabird bycatch mitigation measures used, etc. Using the data, we mapped the distributions of seabirds bycaught by space and time.

Sea trials of line weighting configurations were conducted onboard Korean tuna longline vessels in collaboration with BridLife South Africa and National Institute of Fisheries Science (NIFS) for 4 years, from 2013 to 2016. The trials were conducted by Korean scientific observers and a scientist of BirdLife South Africa. All hooks in a basket were configured as either a control or a treatment. In this study, control is the baskets that didn't have any weighted branch lines and treatment is the basket that had weighted branch lines (Fig. 1). In order to analyze whether the use of weighted branch lines (lumo leads) in Korean tuna longline fisheries would mitigate seabird bycatch, the comparison between BPUEs from the control and the

treatment was conducted.

And the data collected by scientific observer programs include data from sea trials as well.

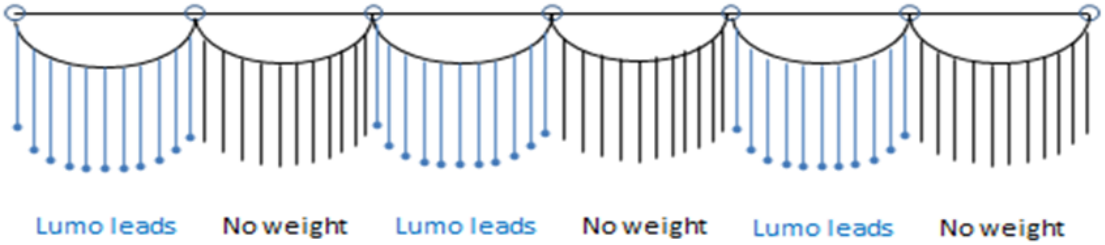


Fig. 1. Configuration of fishing gears for paired experiment.

3. Results and Discussion

1) Distributions of bycatch and BPUE of seabirds by scientific observer programs

Fig. 2 shows distributions of the number of hooks observed by scientific observers onboard Korean tuna longline fisheries from 2012 to 2017. They conducted the observations mainly in CCSBT statistical area 8 and 9, and in 2013 and 2014, observed in area 2 as well. For 2016 and 2017 they observed only in area 9, because Korean tuna longline vessels didn't operate in other areas for fishing for SBT in recent years.

The seabird BPUE by year and by area is shown in Fig. 3, which was highest in 2016 (Fig. 4).

2) A preliminary result of sea trials

Fig. 5 shows distributions of the number of hooks observed at sea trials from 2013 to 2016. The trials were conducted at the eastern Indian Ocean in 2013 and 2014, at the eastern and western Indian Ocean and the eastern Atlantic Ocean in 2015, and at the eastern Atlantic Ocean in 2016. During the periods of 2013 to 2015, a few seabirds were bycaught and we can't see the difference of BPUE between weighted and unweighted branch lines. However, in 2016 it shows that the BPUE of treatment (weighted line) is lower than that of control (unweighted line) ($P<0.05$) (Figs. 6 and 7). Therefore, it suggests that the use of weighted branch lines is effective in reducing seabird bycatch. And this is why the CPUE was highest in 2016 (Fig. 4).

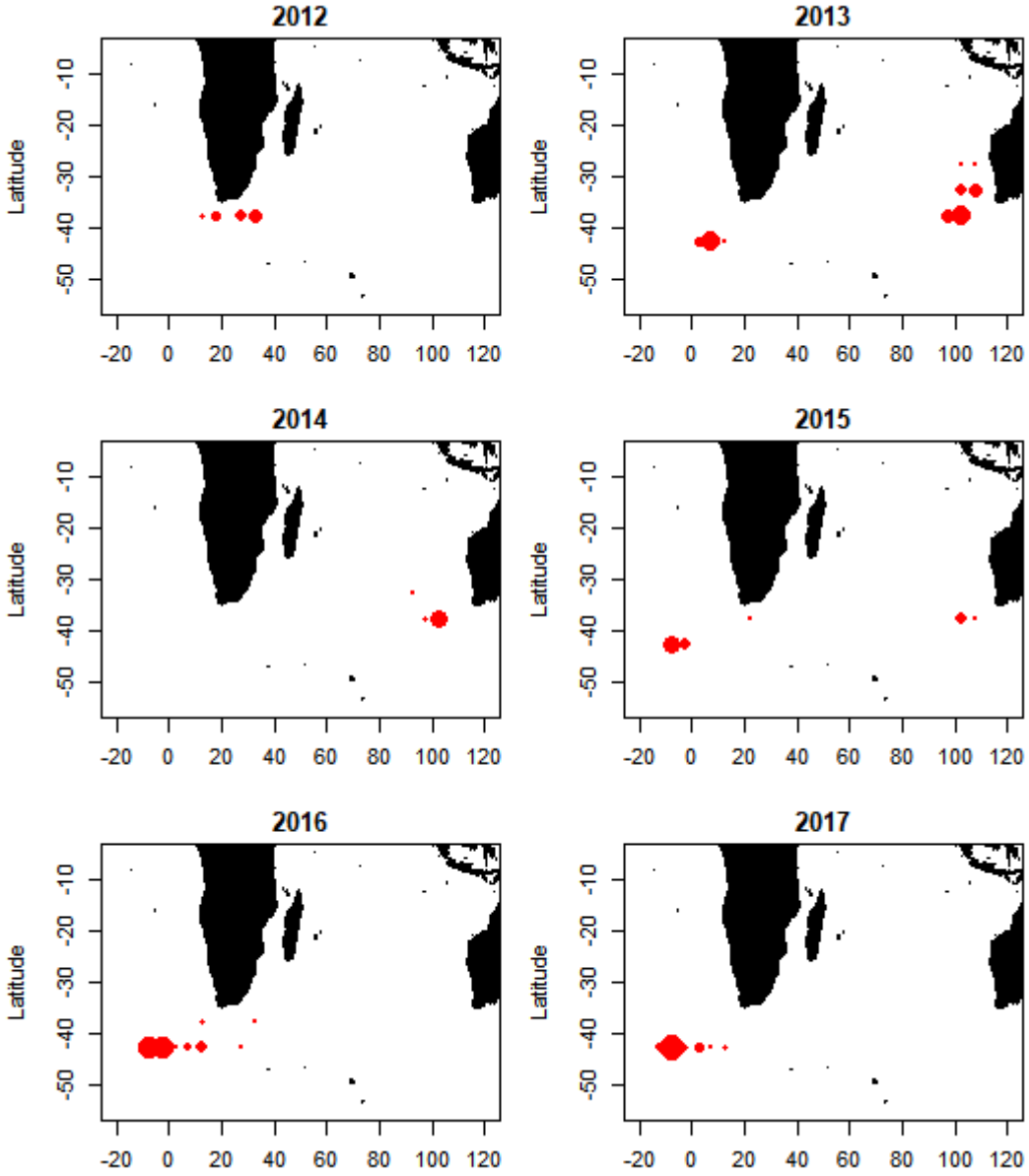


Fig. 2. Maps showing the distributions of hooks observed by scientific observer programs from 2012 to 2017.

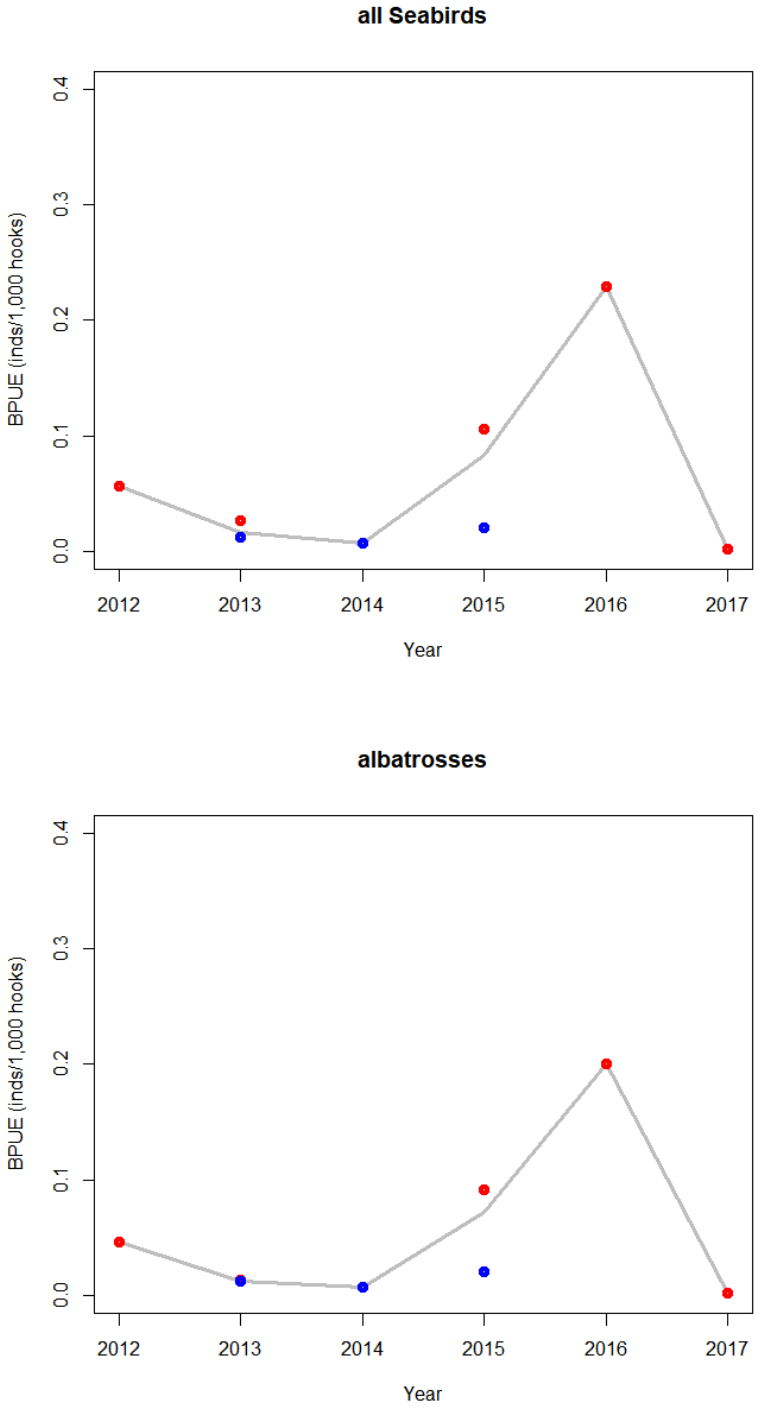


Fig. 3. The BPUE by scientific observer data from 2012 to 2017. Albatrosses include species of DCR, DCU, DIB, DIC, DIM, DIX, PHE, PHU and TQH.

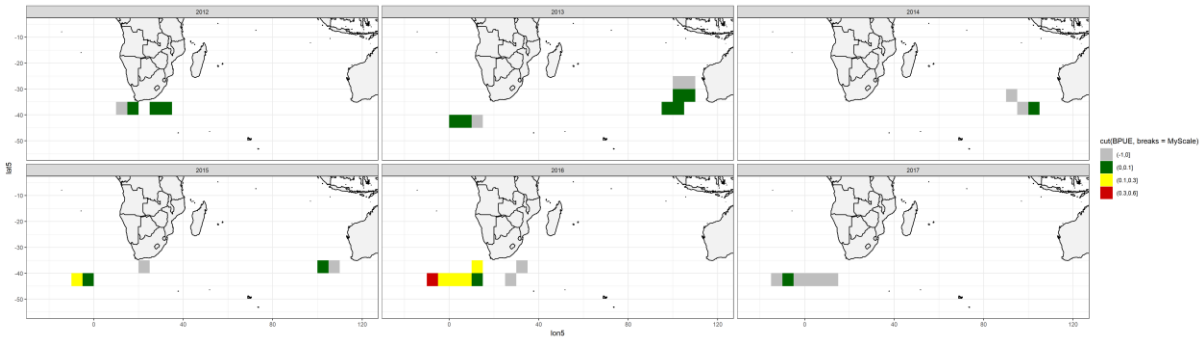


Fig. 4. Maps showing the distributions of BPUE by scientific observer programs from 2012 to 2017.

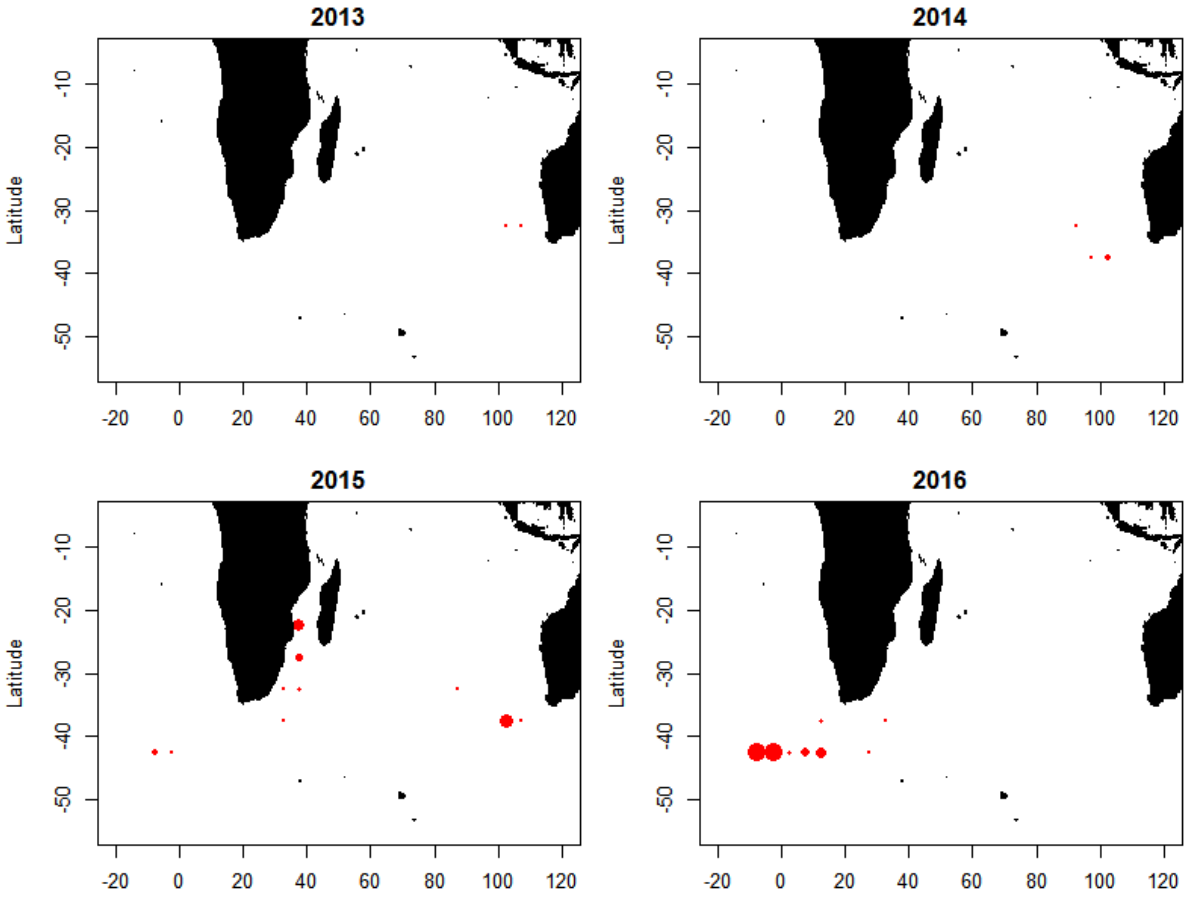


Fig. 5. Maps showing the distributions of hooks observed by sea trials from 2013 to 2016.

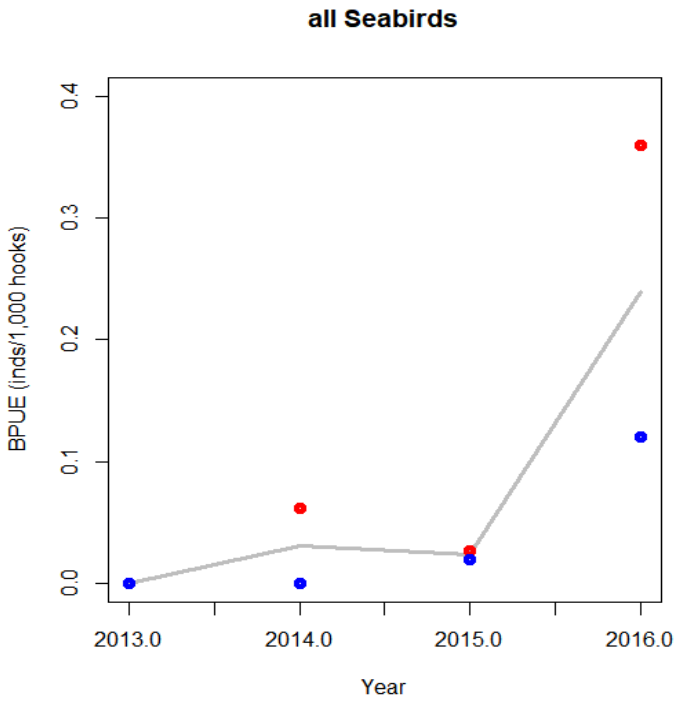
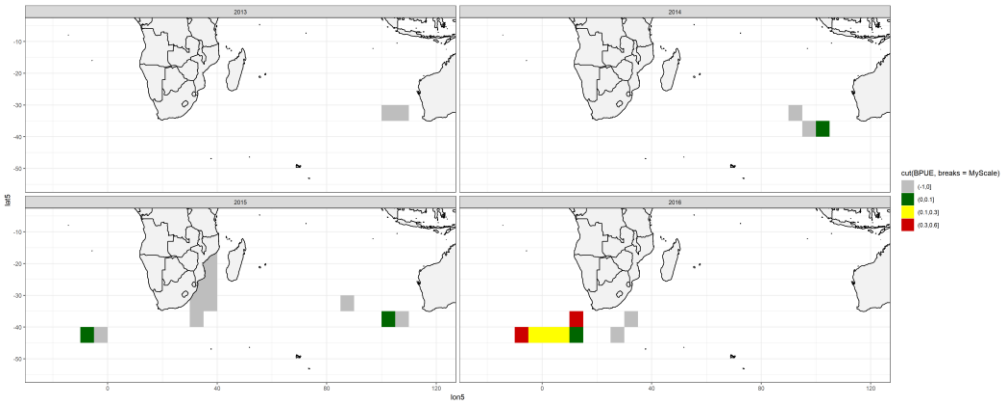
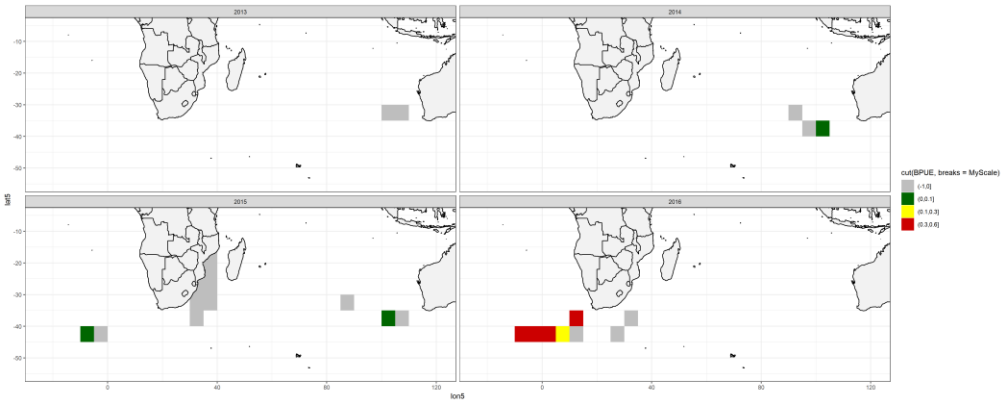


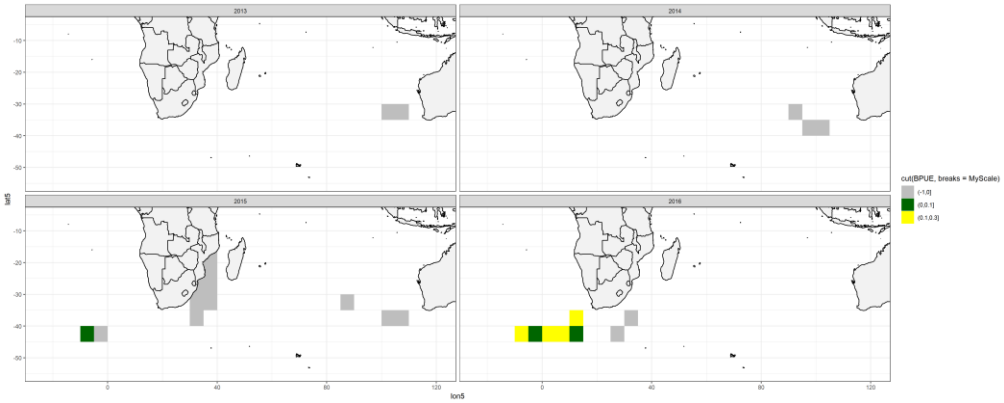
Fig. 6. The BPUE by sea trials data from 2013 to 2016.



(a) total



(b) unweighted



(c) weighted

Fig. 7. Maps showing the distributions of BPUE by sea trials from 2013 to 2016.