

COLTO STUDY 2016-2017

DEPREDATION BY KILLER WHALES AND SPERM WHALES ON PATAGONIAN TOOTHFISH LONGLINE FISHERIES

EXPLORATORY ANALYSES

AREA: Chile

DATASET ID: BITACORAS AOBAC

DATASET PROVIDER: Renzo Tachieri (IFOP)

DATA SPAN: 5/09/2006 to 30/05/2014

ANALYSIS END DATE: 23/12/2016

AUTHOR: Paul Tixier

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GLOBAL INFORMATION

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Total number of Longline sets: 12,582

Total number of hooks: 58,341,558

Number of longline sets in presence of killer whales: 2,616

Number of longline sets in presence of sperm whales: 5,695

Number of vessels: 12

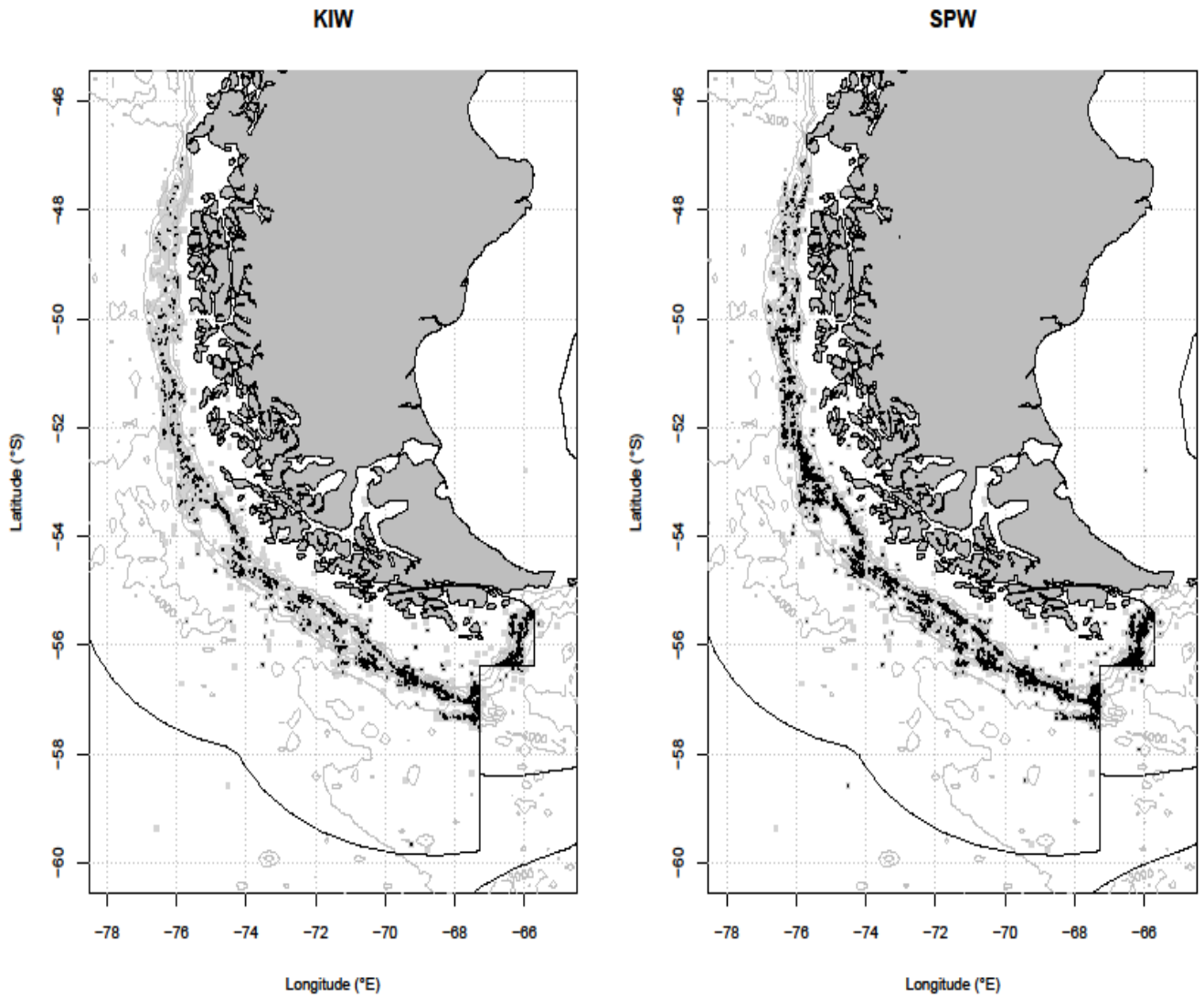


Figure 1. Distribution of longline sets hauled in presence of whales (black dots) between 2006-2014. Left: killer whales. Right: sperm whales. Positions of all longline sets (grey squares) and EEZ limits (black line) are depicted.

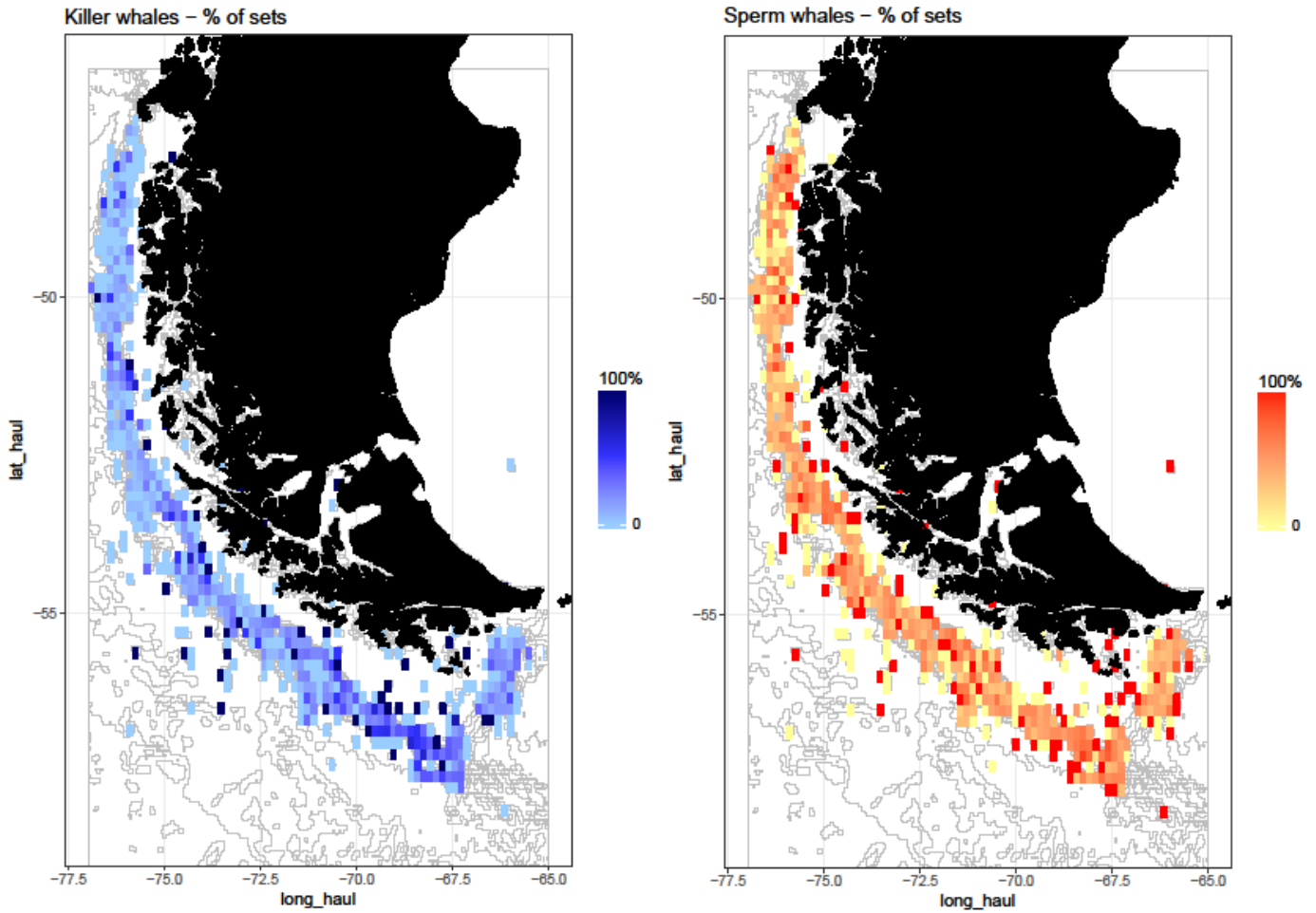


Figure 2. Distribution of interaction rates (in % of all longline sets) with killer whales (Left) and sperm whales (right) between 2006-2014.

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DEPREDATION BY KILLER WHALES AND SPERM WHALES ON PATAGONIAN TOOTHFISH LONGLINE FISHERIES

BETWEEN YEARS VARIATIONS

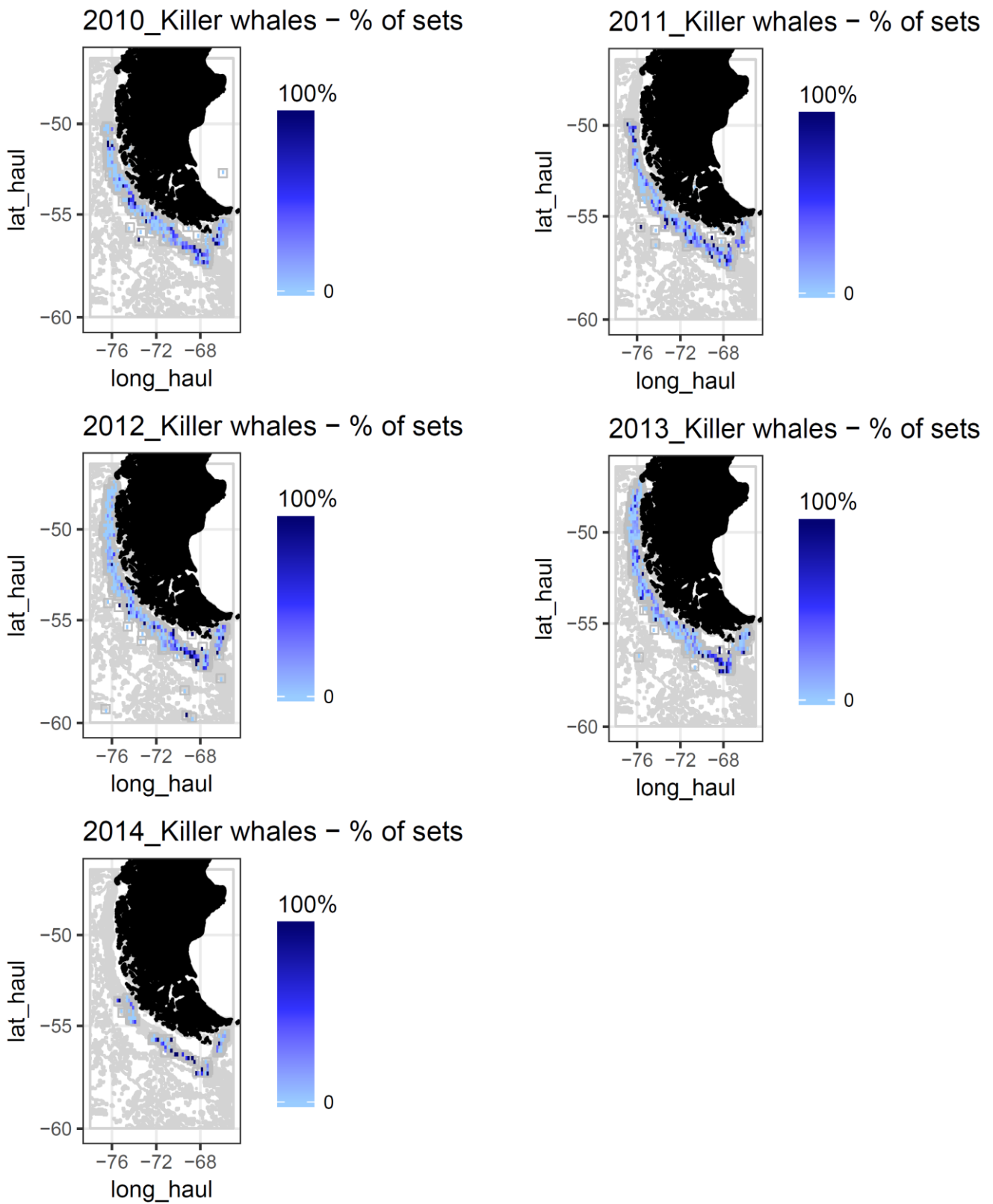
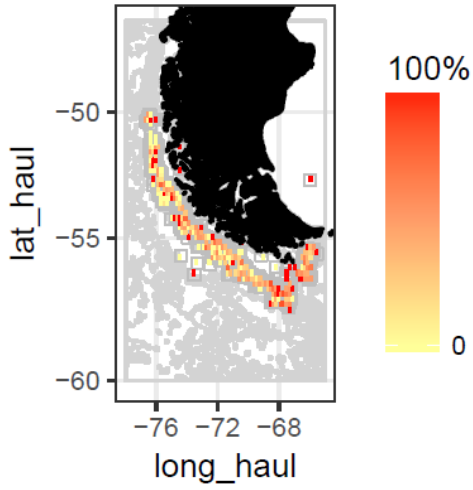
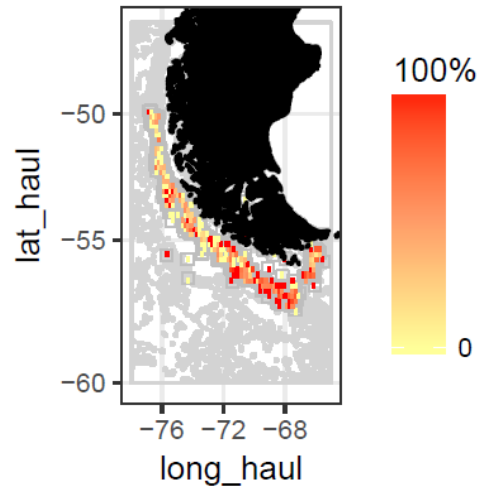


Figure 3. Distribution of interaction rates (in % of all longline sets) with killer whales per year from 2010 to 2014.

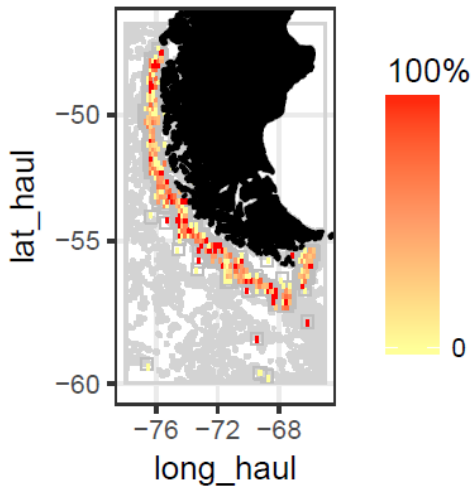
2010_Sperm whales - % of sets



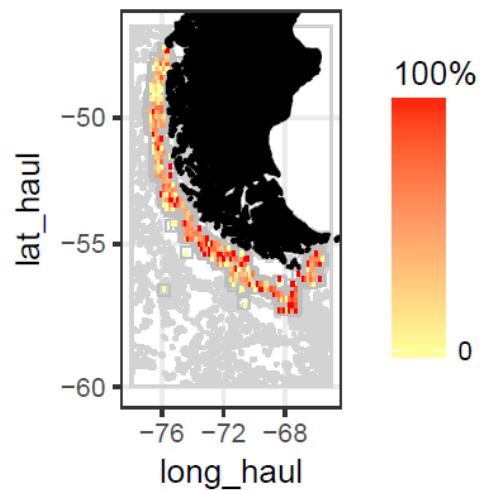
2011_Sperm whales - % of sets



2012_Sperm whales - % of sets



2013_Sperm whales - % of sets



2014_Sperm whales - % of sets

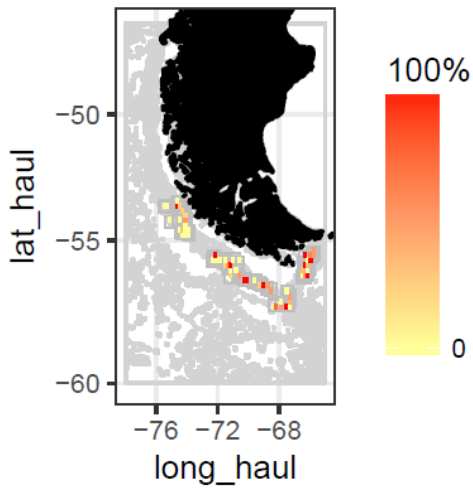


Figure 4. Distribution of interaction rates (in % of all longline sets) with sperm whales per year from 2010 to 2014.

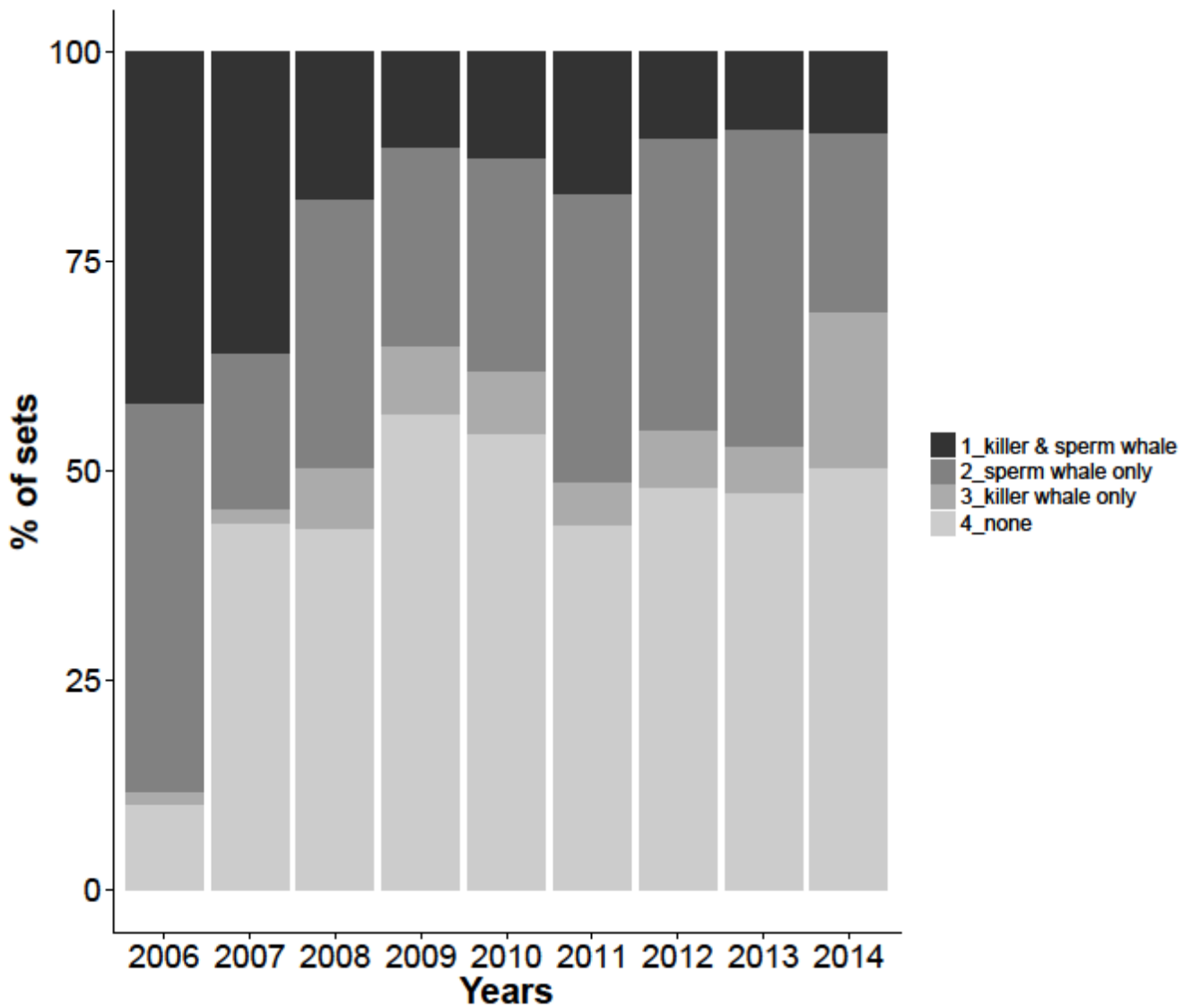


Figure 5. Proportions of longline sets hauled in absence of cetaceans, in presence of killer whales only, in presence of sperm whales only, or in presence of both species co-occurring per year. Data: 2006-2014.

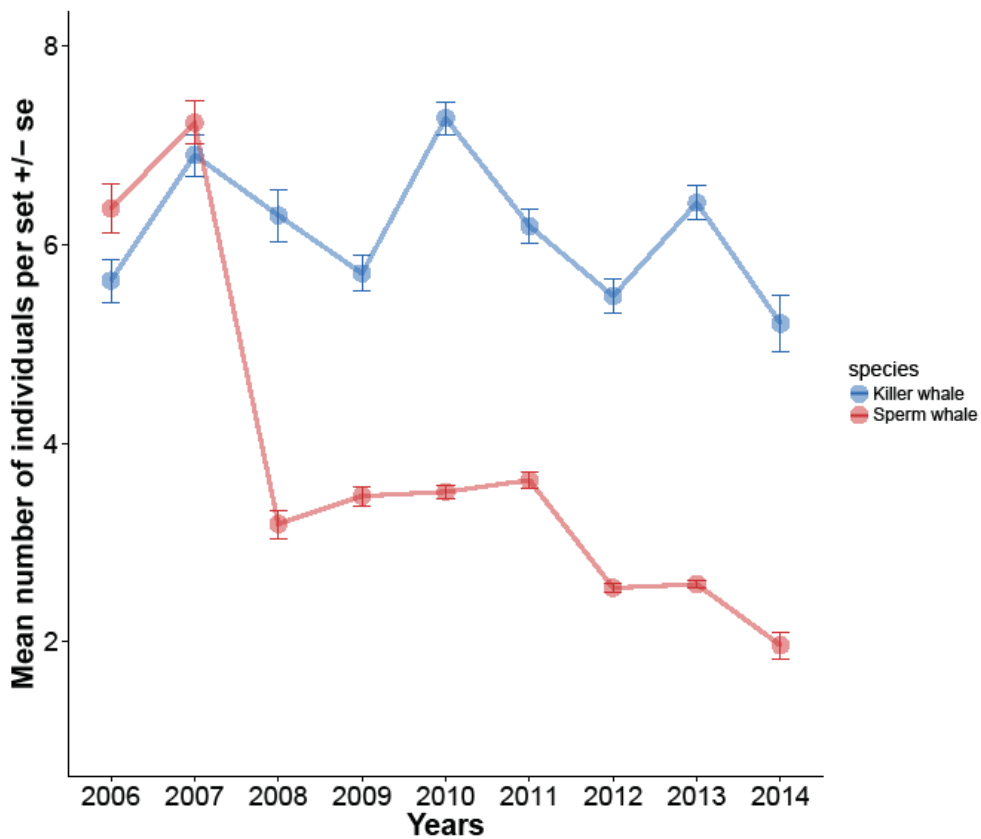
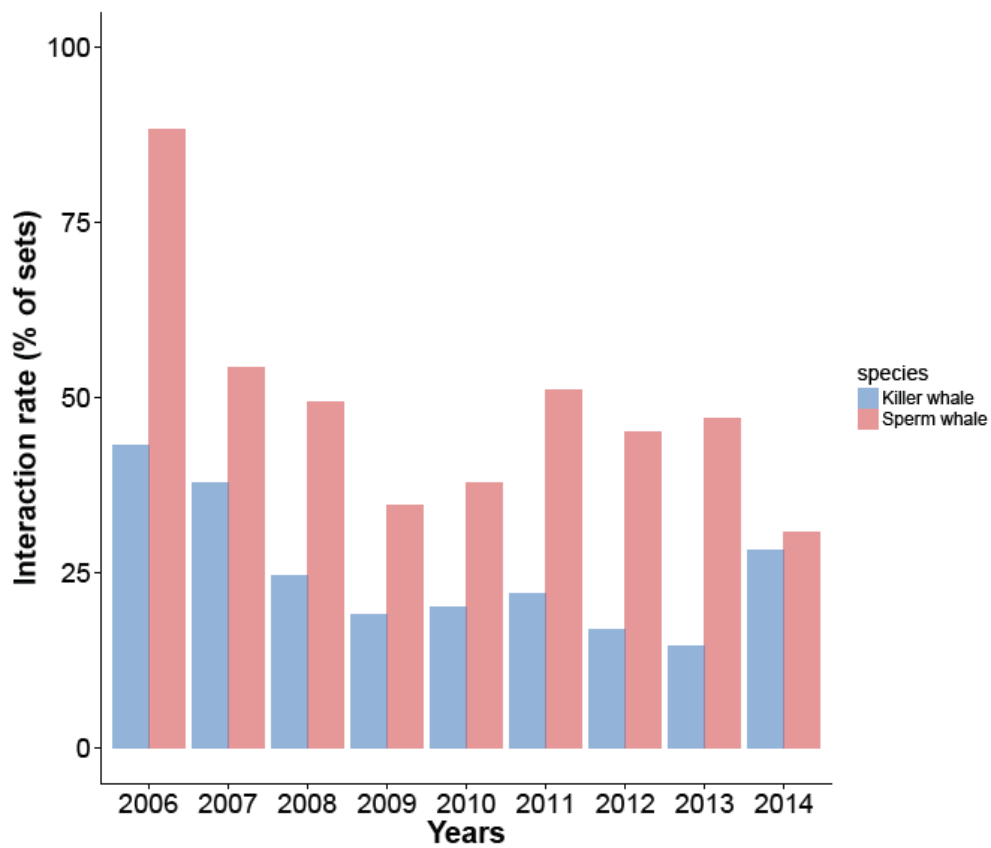


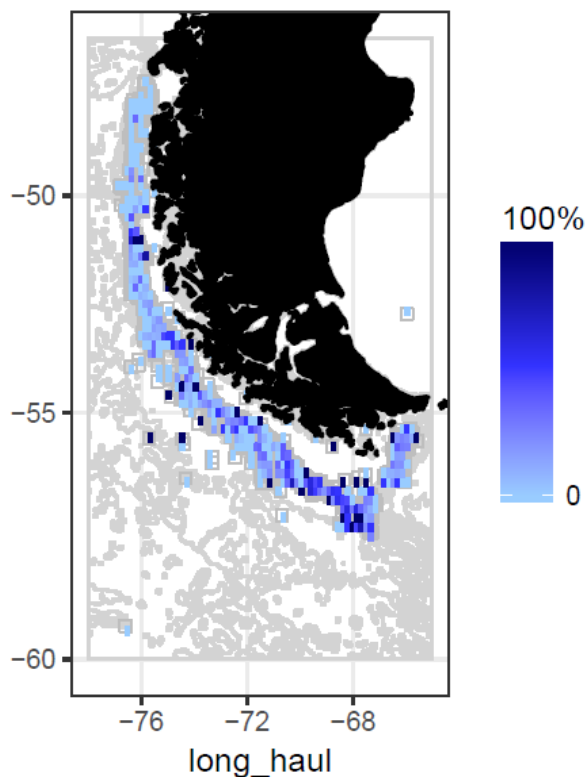
Figure 10. Top: Killer whale (blue) and sperm whale (red) interaction rate with vessels (% of all longline sets) per year. Bottom: Mean number of killer whale (blue) and sperm whale (red) depredating individuals per longline set per year. Data: 2006-2014.

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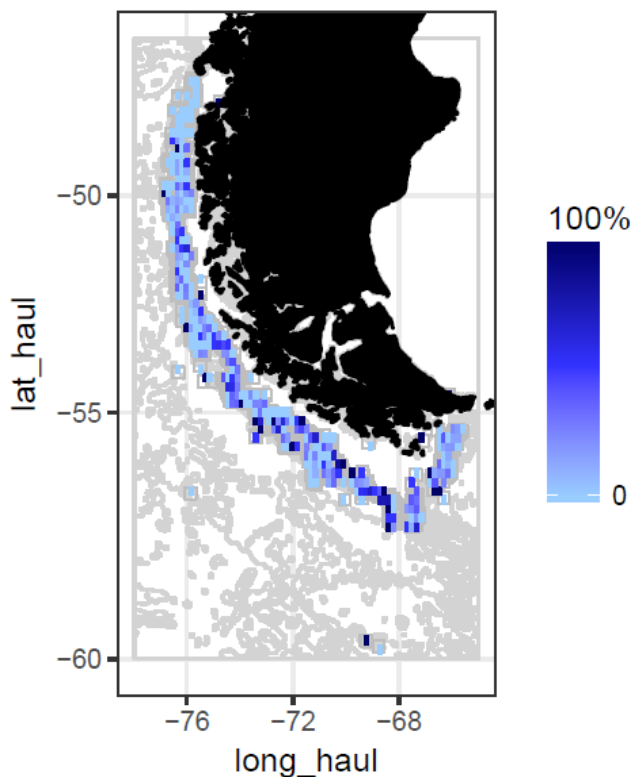
DEPREDATION BY KILLER WHALES AND SPERM WHALES ON PATAGONIAN TOOTHFISH LONGLINE FISHERIES

BETWEEN MONTHS/SEASONS VARIATIONS

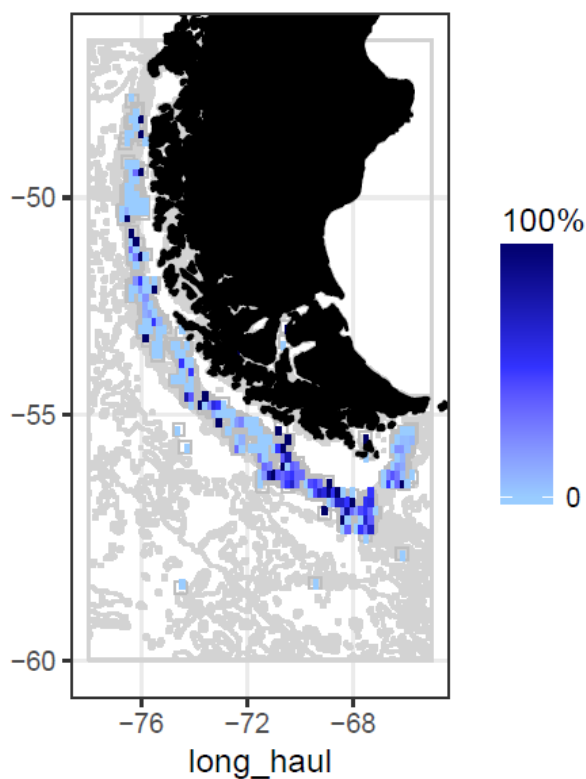
Summer_Killer whales - % of sets



Fall_Killer whales - % of sets



Winter_Killer whales - % of sets



Spring_Killer whales - % of sets

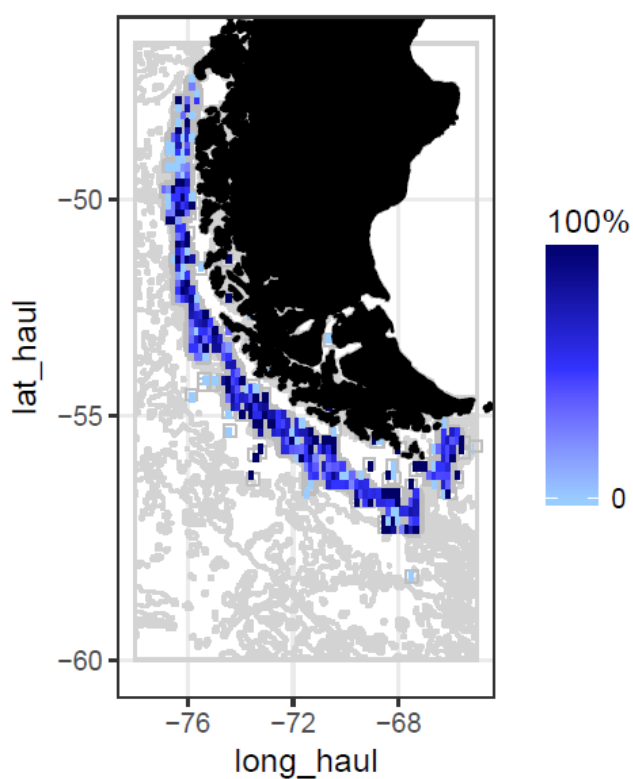
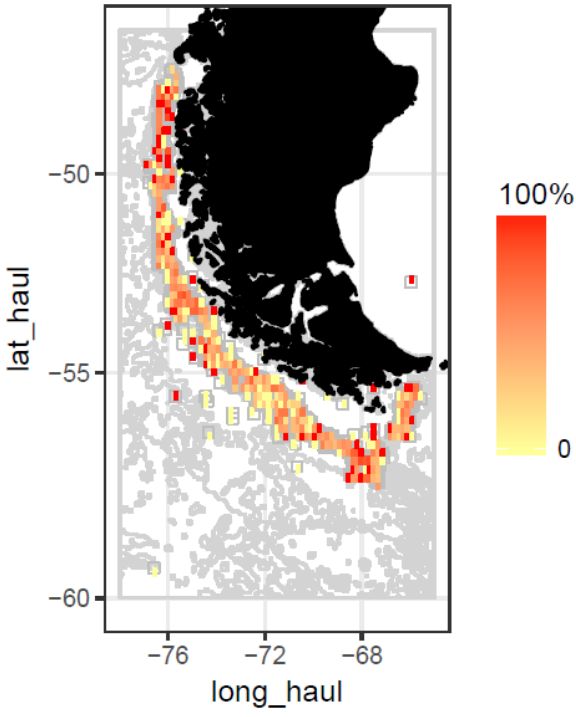
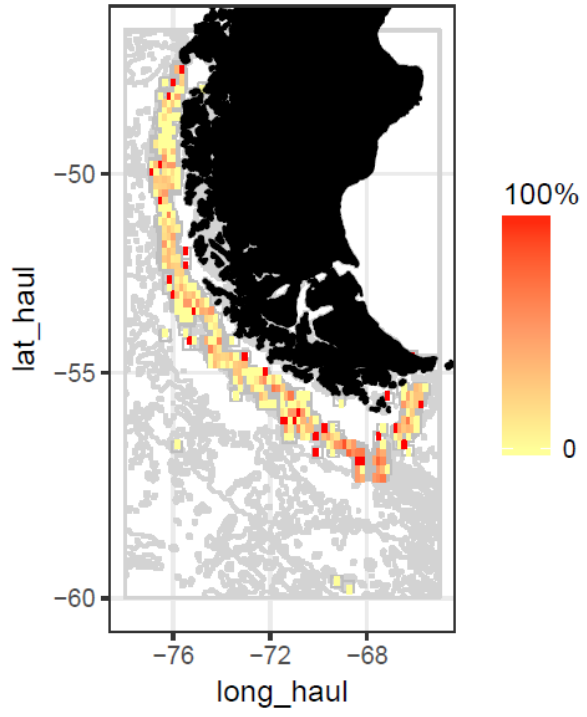


Figure 7. Distribution of interaction rates (in % of all longline sets) with killer whales per season. Data from 2006 to 2014

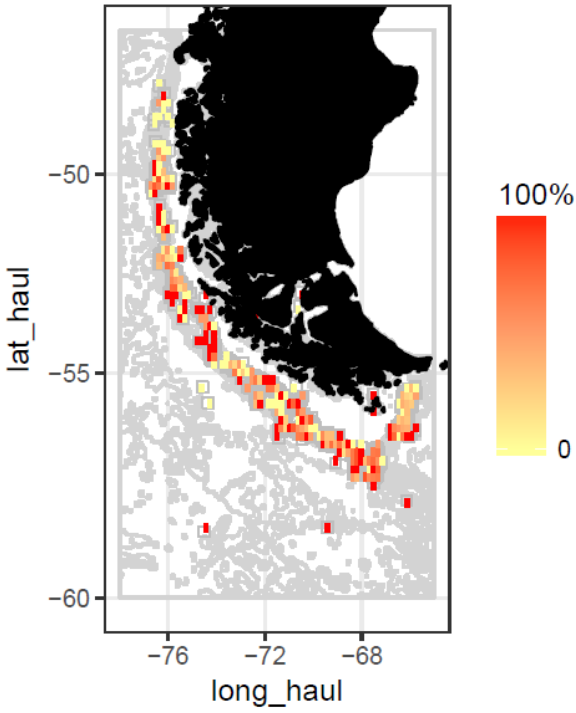
Summer_Sperm whales - % of sets



Fall_Sperm whales - % of sets



Winter_Sperm whales - % of sets



Spring_Sperm whales - % of sets

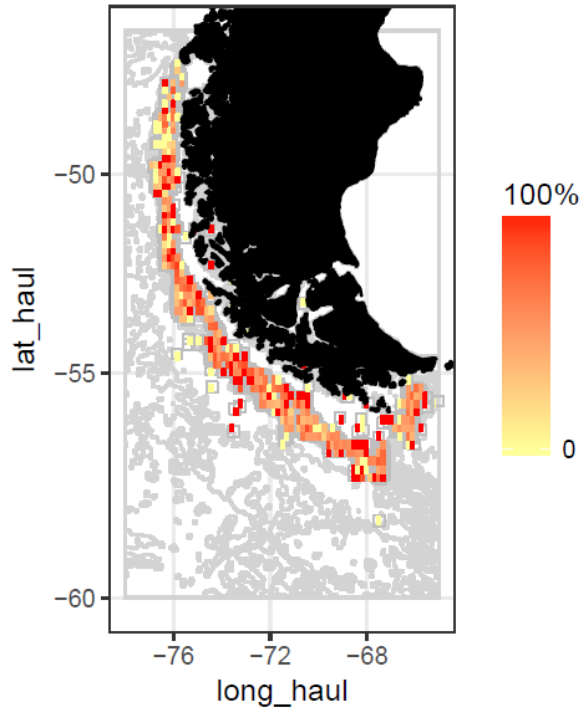


Figure 8. Distribution of interaction rates (in % of all longline sets) with sperm whales per season. Data from 2006 to 2014

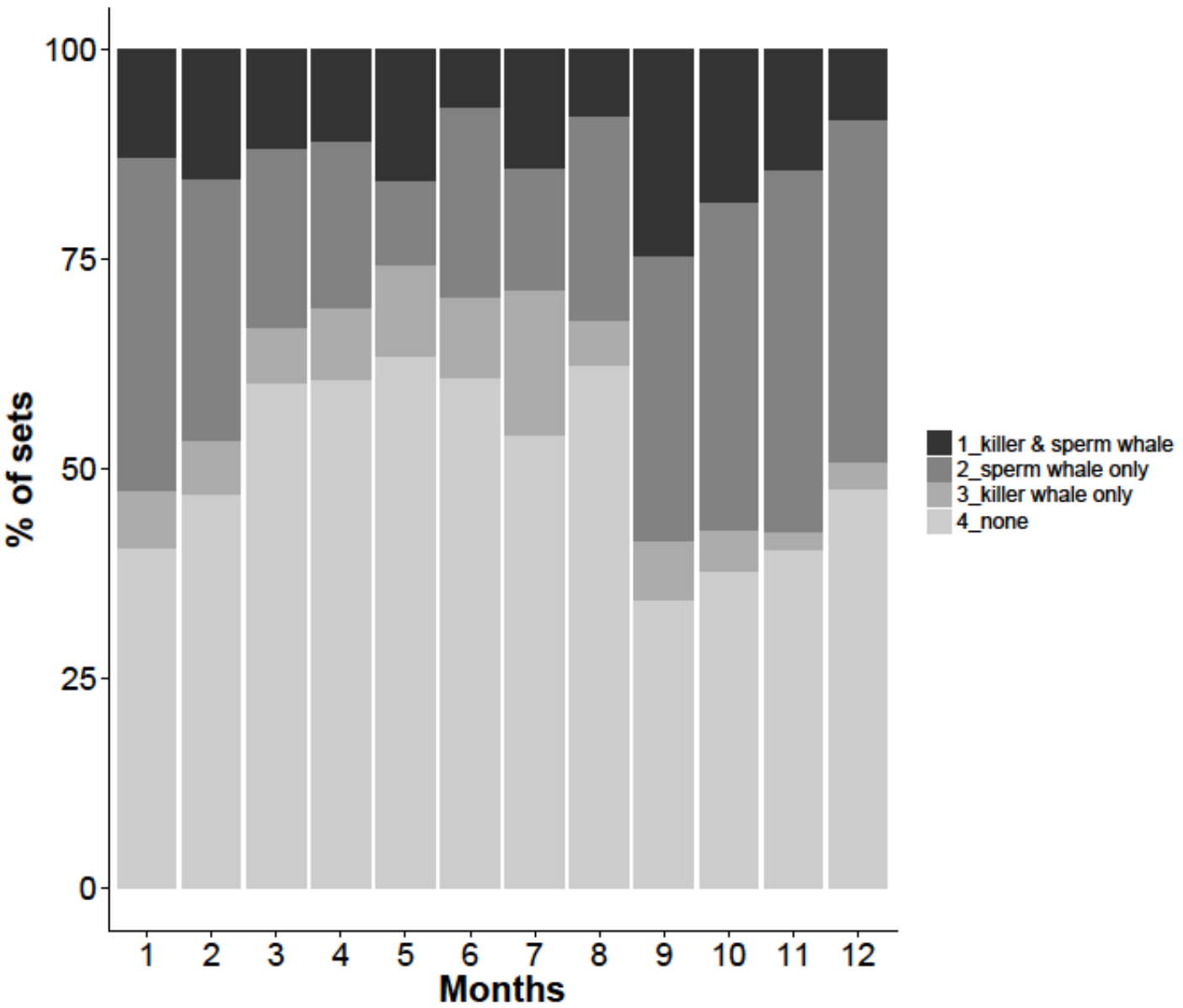


Figure 9. Proportions of longline sets hauled in absence of cetaceans, in presence of killer whales only, in presence of sperm whales only, or in presence of both species co-occurring per month. Data: 2006-2014.

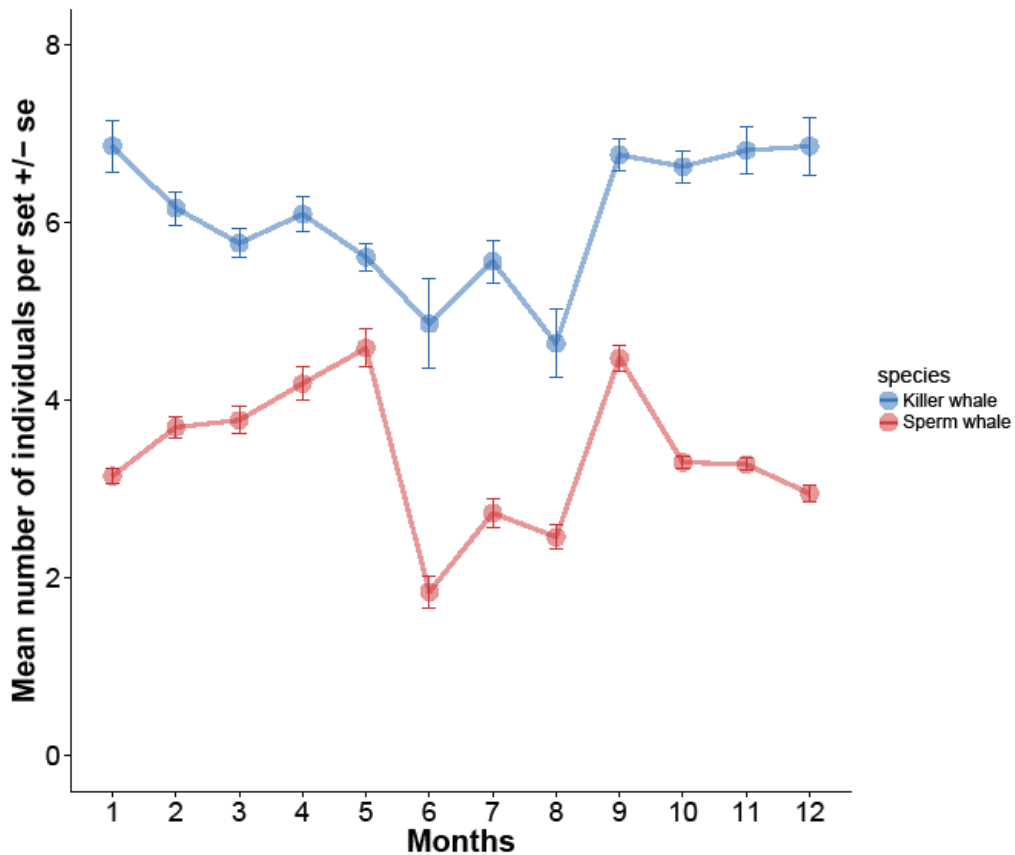
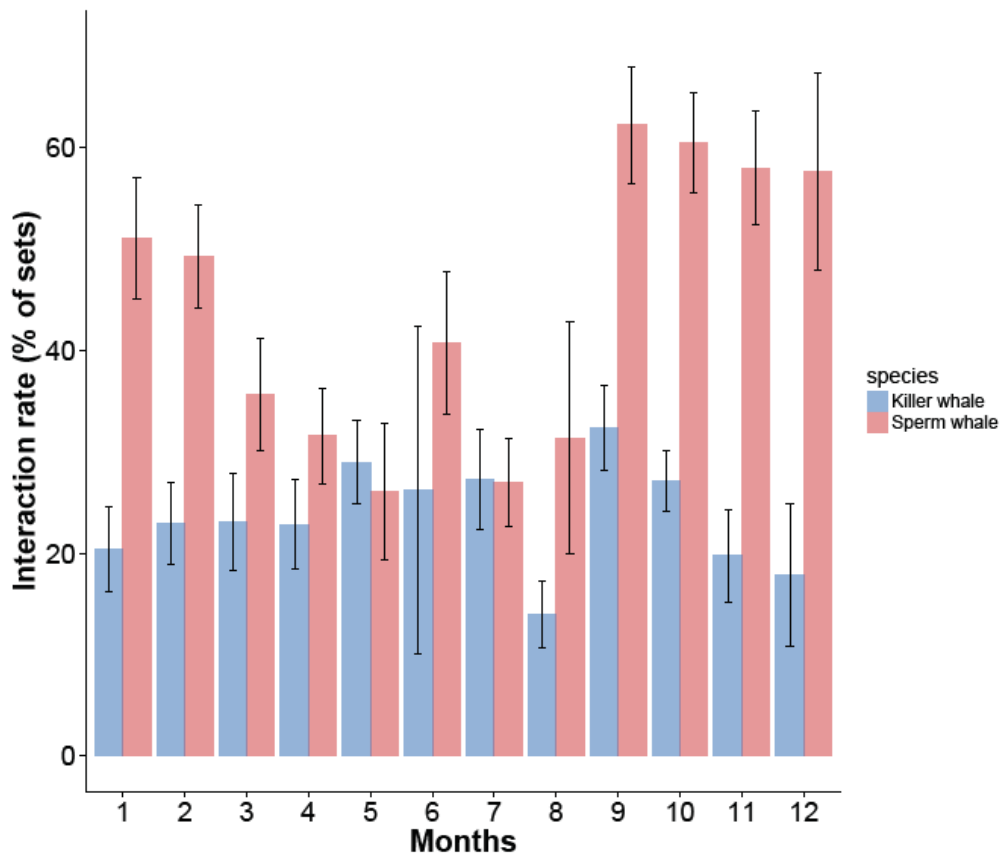


Figure 10. Top: Killer whale (blue) and sperm whale (red) mean interaction rate with vessels (% of all longline sets) per month (averaged between years; error bars are the se). Bottom: Mean number of killer whale (blue) and sperm whale (red) depredating individuals per longline set per month. Data: 2006-2014.

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BETWEEN VESSELS VARIATIONS

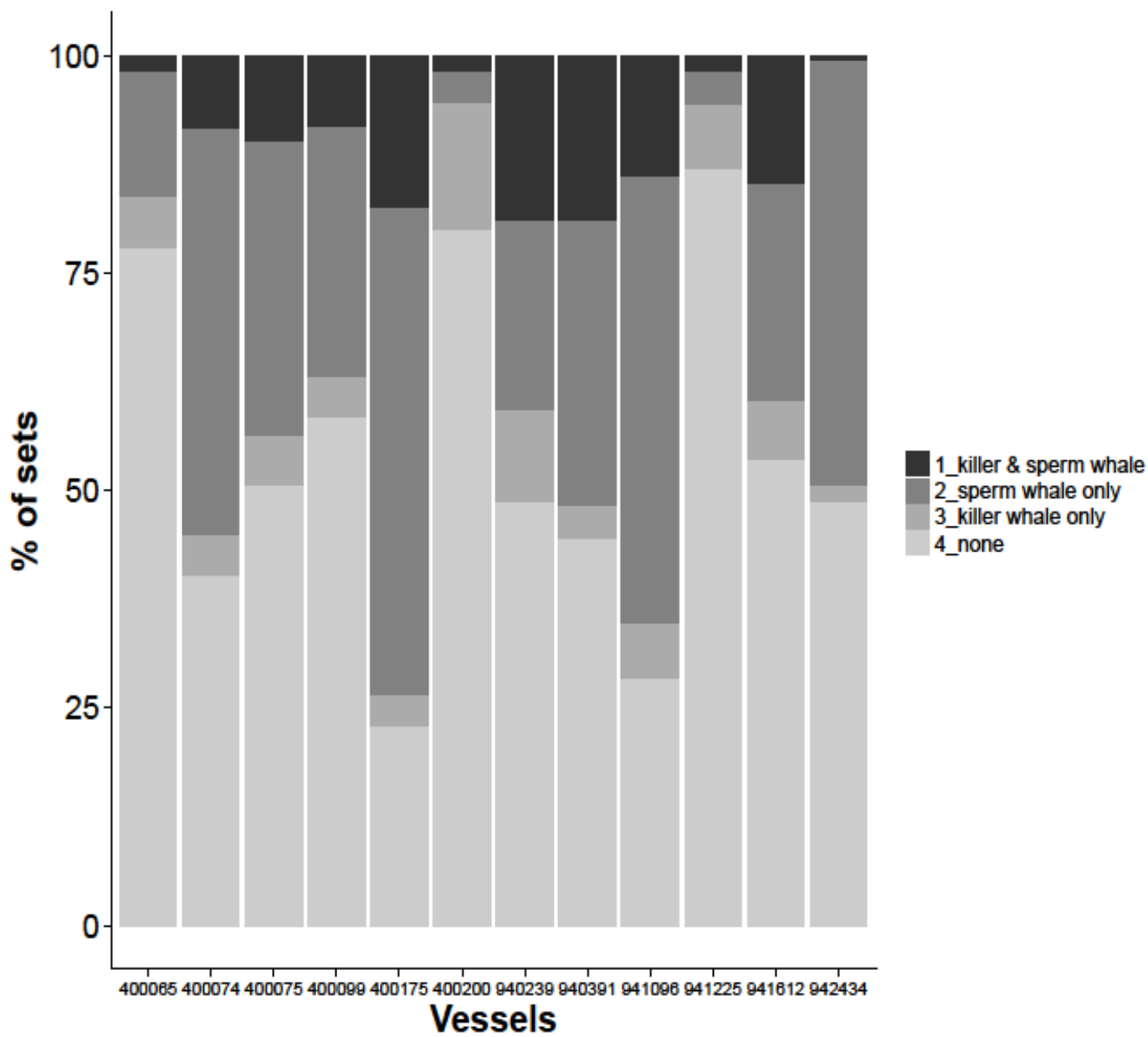


Figure 11. Proportions of longline sets hauled in absence of cetaceans, in presence of killer whales only, in presence of sperm whales only, or in presence of both species co-occurring per vessel. Data: 2006-2014.

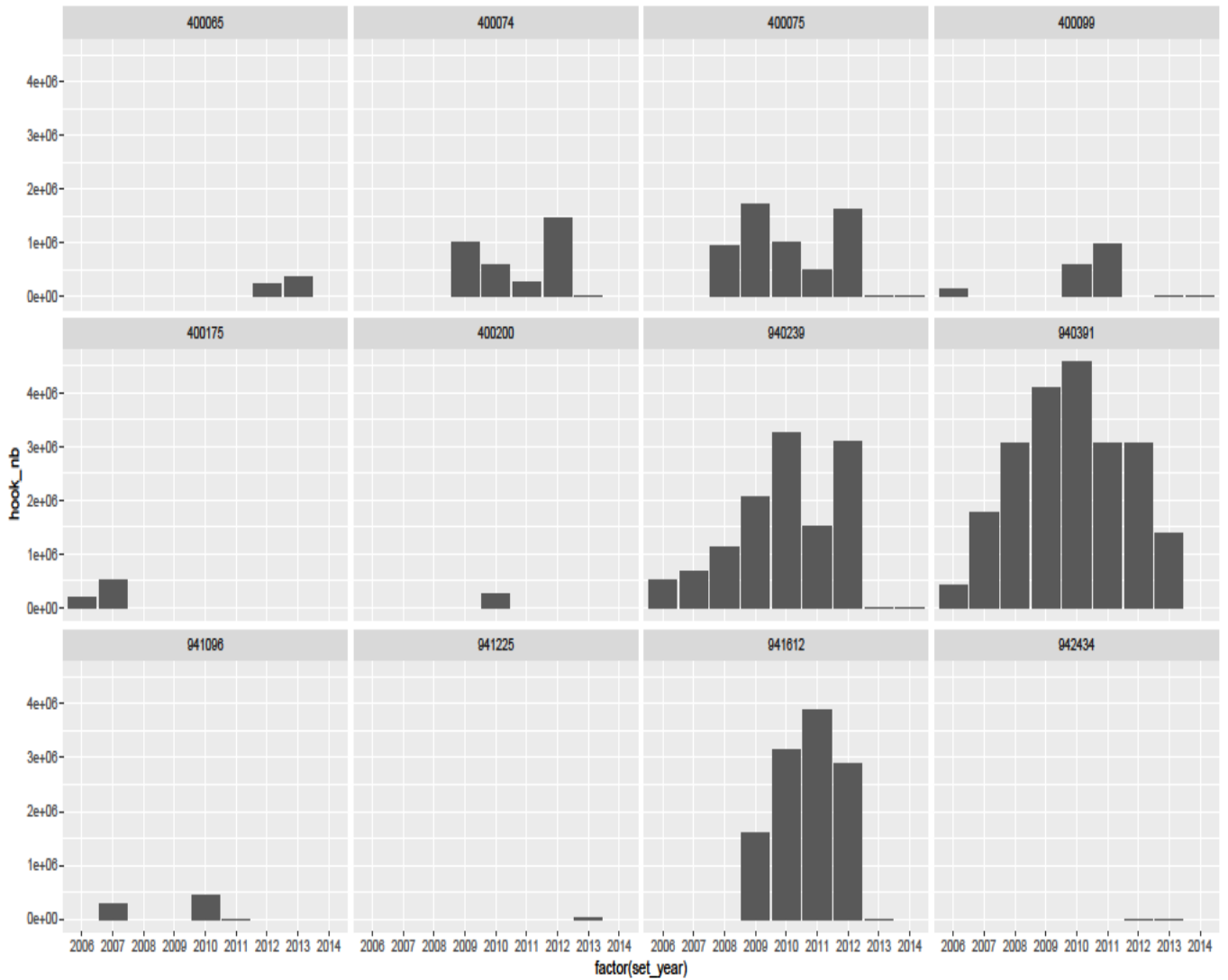
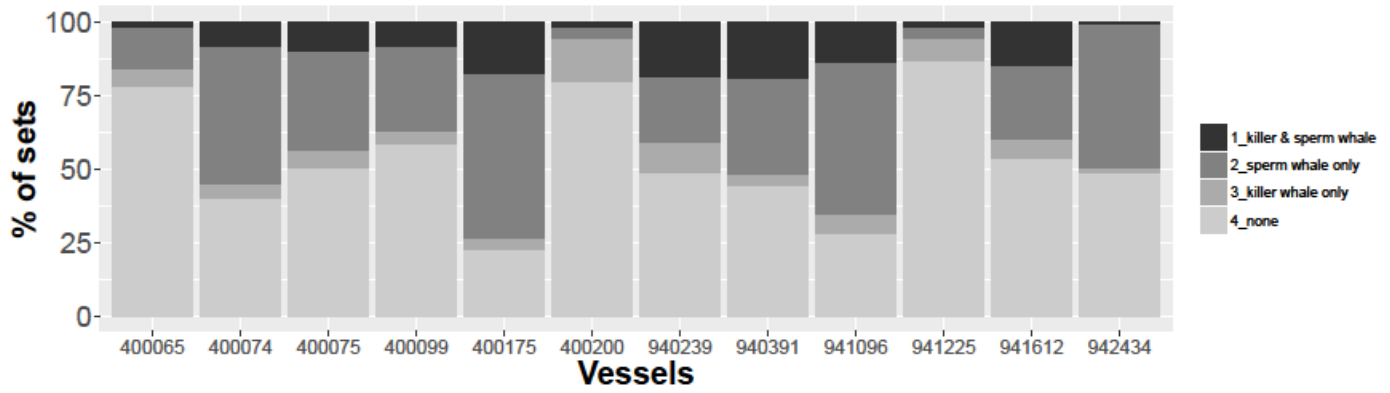


Figure 12. Top: between vessels variations of interaction rates with cetaceans. Bottom: Total number of hooks set by each vessel per year over the 2006-2014 period.

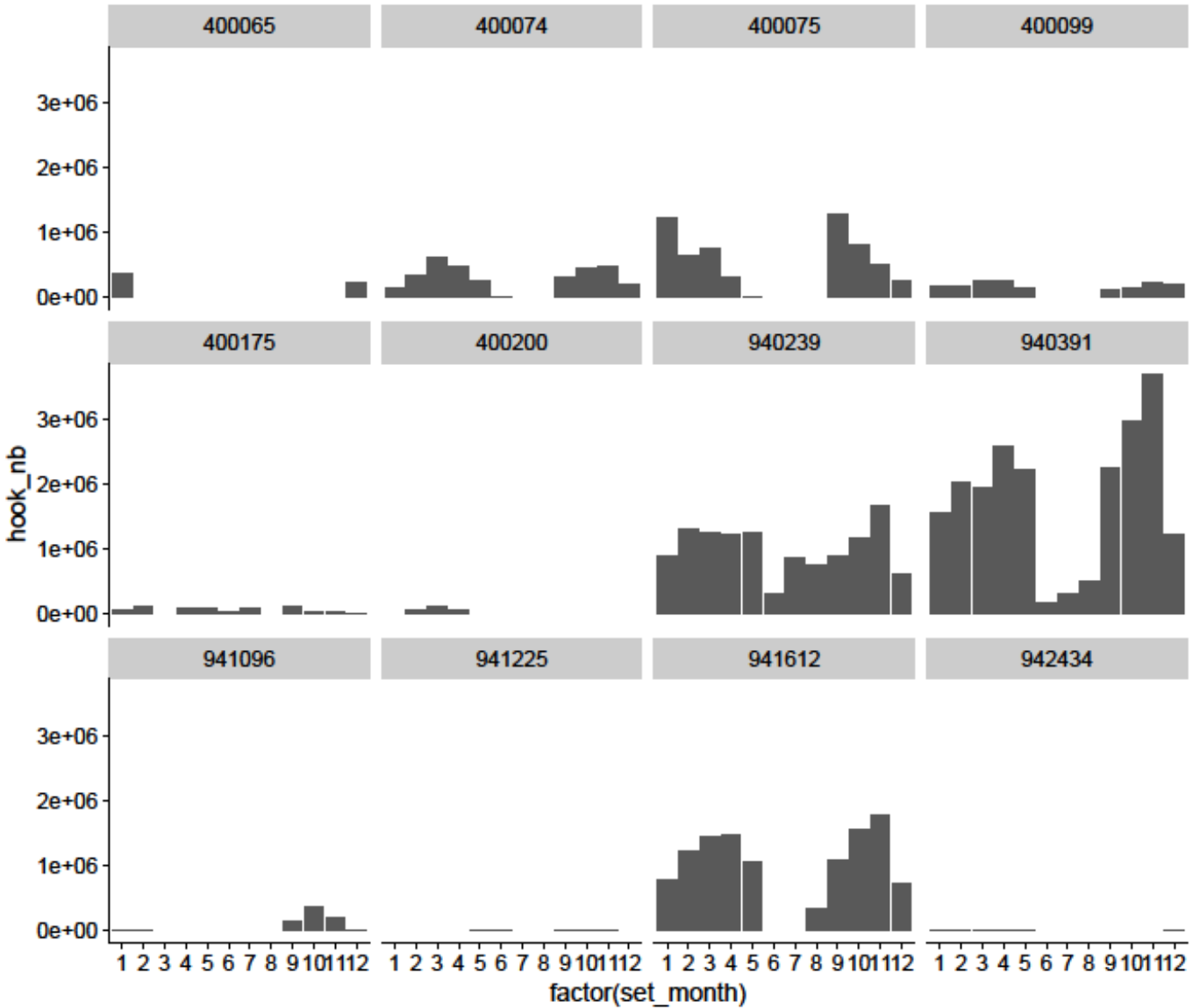
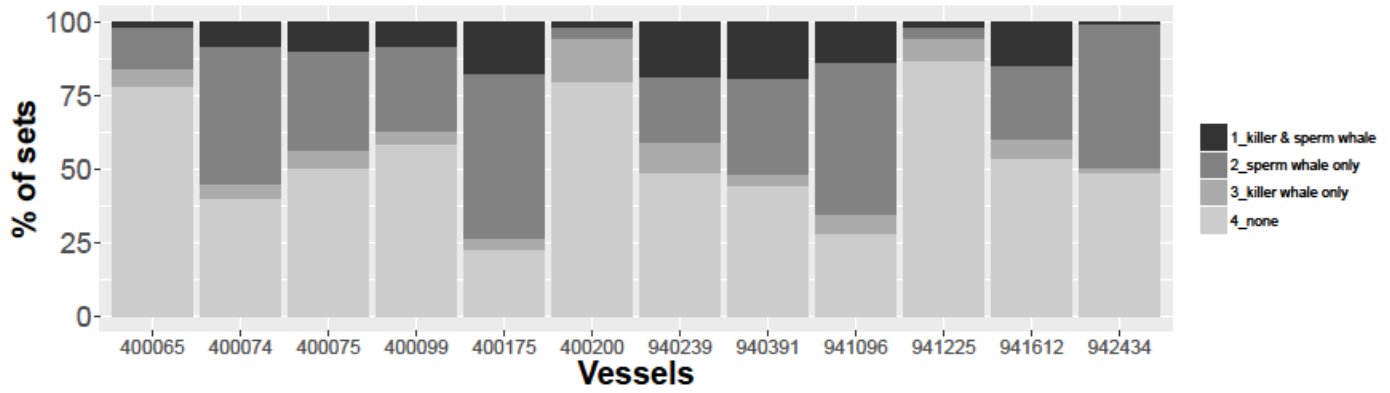


Figure 13. Top: between vessels variations of interaction rates with cetaceans. Bottom: Total number of hooks set by each vessel per month over the 2006-2014 period.

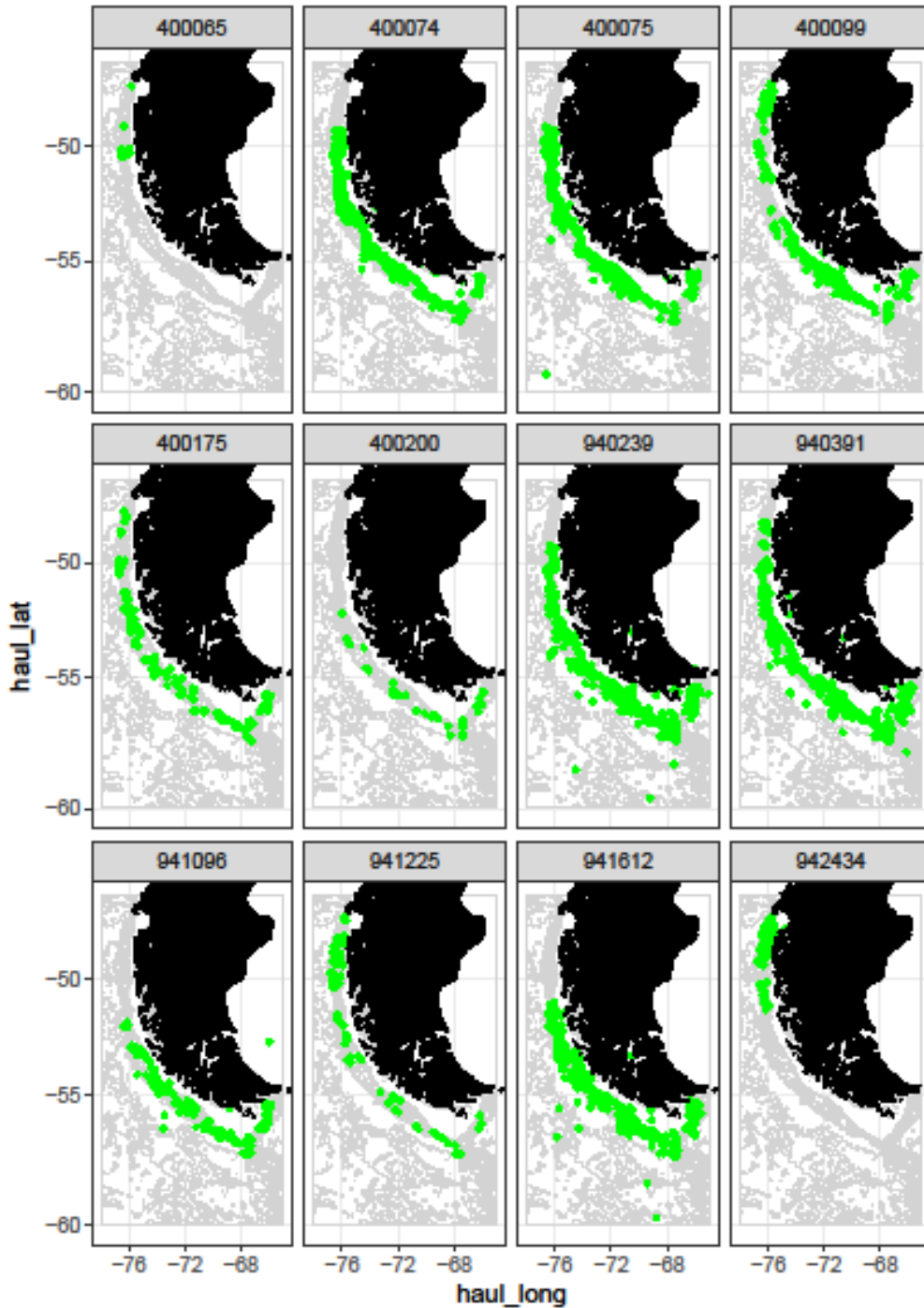
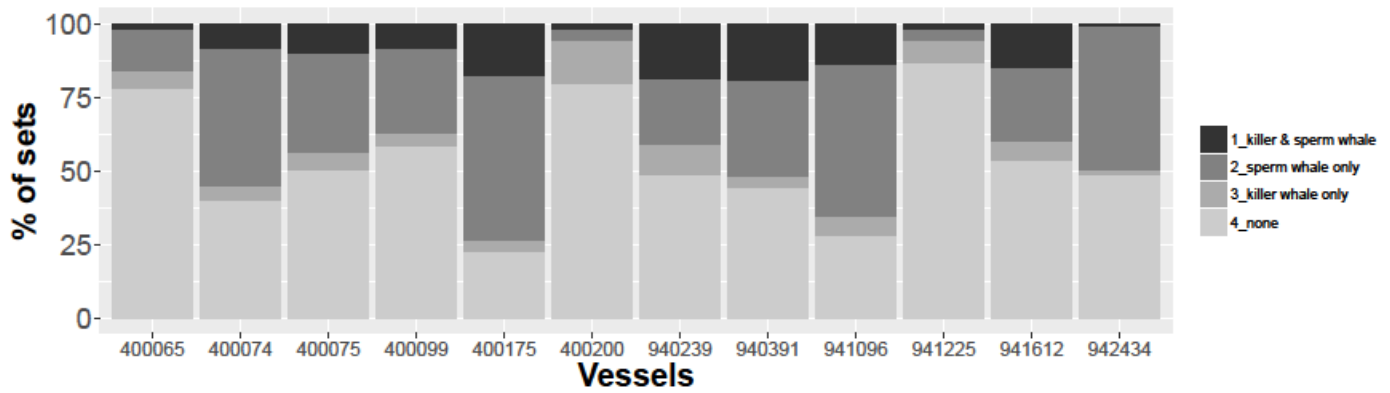


Figure 14. Top: between vessels variations of interaction rates with cetaceans. Bottom: Distribution of all longline sets of each vessel over the 2006-2014 period.

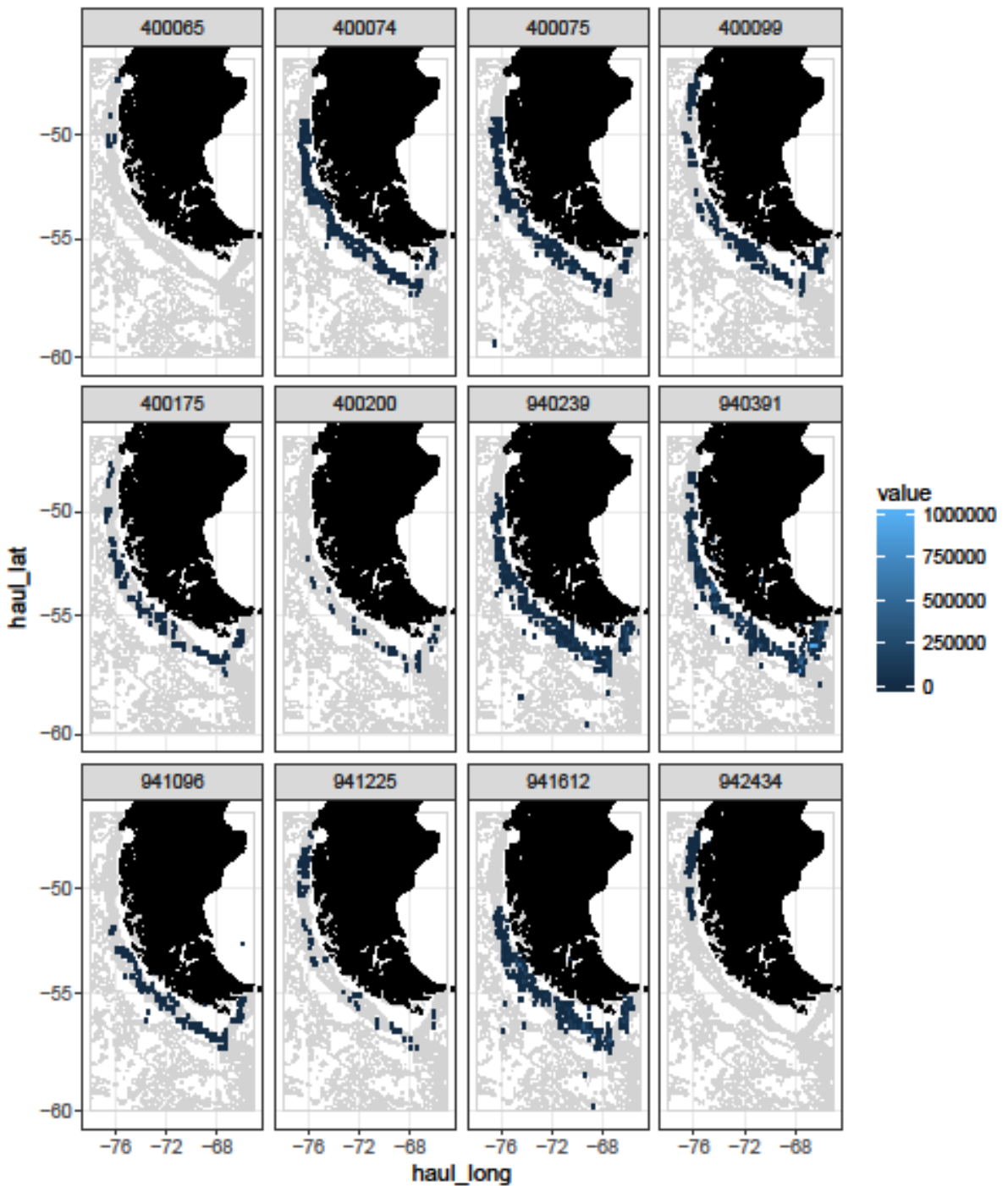
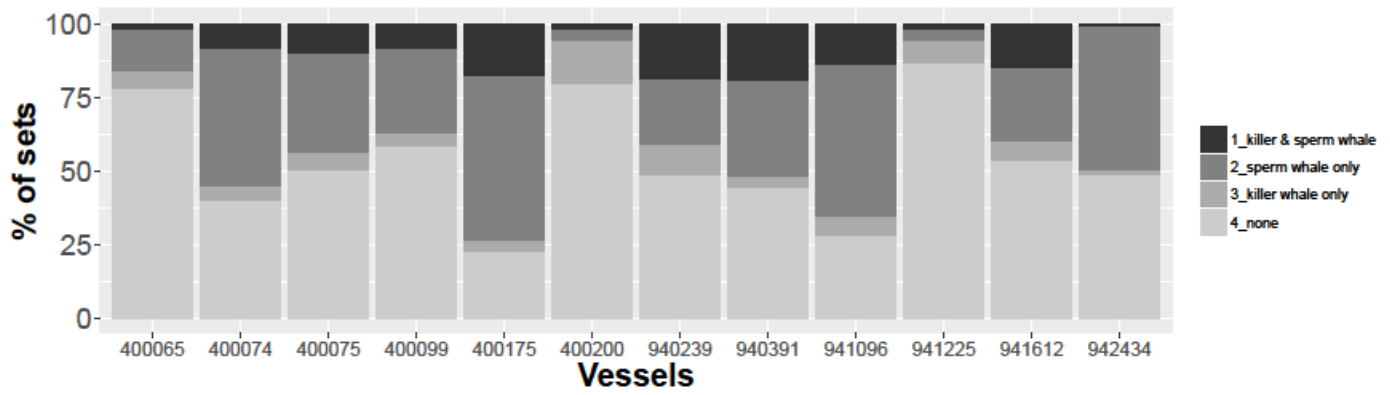


Figure 15. Top: between vessels variations of interaction rates with cetaceans. Bottom: distribution of the fishing effort (sum of all hooks set) by each vessel over the 2006-2014 period.