

Mixfisheries analysis and data screening

22-06-2018

1) Introduction

This document presents the data used by EWG1809 to identify factors affecting vessels's efficiency and mix-fisheries levels of the trawl fleets operating in the Northwest Mediterranean.

2) Read and pre-process data

2.1) Catalonia

```
matDepth <- readRDS("../data/med_bath.sqlitebathy.rData")

catOrig <- read.csv("../data/final_210618.csv")
cat <- transform(catOrig, id = paste(ID, DATA, sep = ":"), vesid = factor(ID),
  LOAMP1 = cut(LOA, breaks = c(0, 12, 18, 24, 40)), LOAMP2 = cut(LOA, breaks = c(0,
    15, 26, 40)))
cat$Depth <- get.depth(mat = matDepth, x = cat$LON, y = cat$LAT, locator = FALSE)$depth

GSAs <- readShapePoly("../data/gsas.shp")
GSAP <- SpatialPolygons2PolySet(GSAs)
fp <- findPolys(events = data.frame(EID = 1:nrow(cat), X = cat$LON, Y = cat$LAT),
  polys = GSAP)

cat$GSA <- NA
cat[fp$EID, "GSA"] <- factor(as.numeric(substr(unique(GSAs$SMU_CODE)[fp$PID],
  1, 2)))
cat$MON <- unlist(lapply(strsplit(as.character(cat$DATA), "/"), "[", 1))
cat$Year <- unlist(lapply(strsplit(as.character(cat$DATA), "/"), "[", 3))

Season <- numeric(nrow(cat))
Season[which(cat$MON %in% c(12, 1, 2))] = 1
Season[which(cat$MON %in% c(3:5))] = 2
Season[which(cat$MON %in% c(6:8))] = 3
Season[which(cat$MON %in% c(9:11))] = 4
cat$Season <- Season
```

```

cat0 <- transform(cat, X = NULL, ID = NULL, DATA = NULL, SPEED = NULL, LAT = NULL,
  LONG = NULL, LOA = NULL, LOAMP2 = NULL, MON = NULL)
cat0 <- melt(cat0, id.vars = c("id", "vesid", "Year", "Season", "LOAMP1", "Depth",
  "GSA", "TOT"), variable = "Species")
cat0 <- transform(cat0, sppfrac = value/TOT, target = as.factor(c("No", "Yes"))[(1 *
  (value/TOT > 0.75) + 1)], slope = as.factor(c("<100", ">=100"))[(1 * (Depth >
  -100) + 1)]))
cat0 <- subset(cat0, sppfrac <= 1)

```

2.2) Italy

```

orig <- read.csv("../data/LB_ITA_LB_GSA9-11_2014_2017.csv")
df0 <- read.csv("../data/df0_LB_ITA_LB_GSA9-11_2014_2017.csv")
df0 <- transform(df0, id = paste(CFR, Date, sep = ":"), target = as.factor(c("No",
  "Yes"))[(1 * (sppfrac > 0.75) + 1)], slope = as.factor(c("<100", ">=100"))[(1 *
  (Depth > -100) + 1)]))
df0 <- subset(df0, LOAMP1 != "(0,12]")

```

3) Data screening

The data were provided by the Italian and Spanish/Catalonian authorities specifically for this EWG. The data does not constitute a complete snapshot. It was used to provide a preliminary view of the fleets and test cases for modeling.

The data screening was focused on showing the number of vessels and the CPUE, broken down by length-over-all (LOA) classes, depth classes, season and year.

3.1) Catalonia

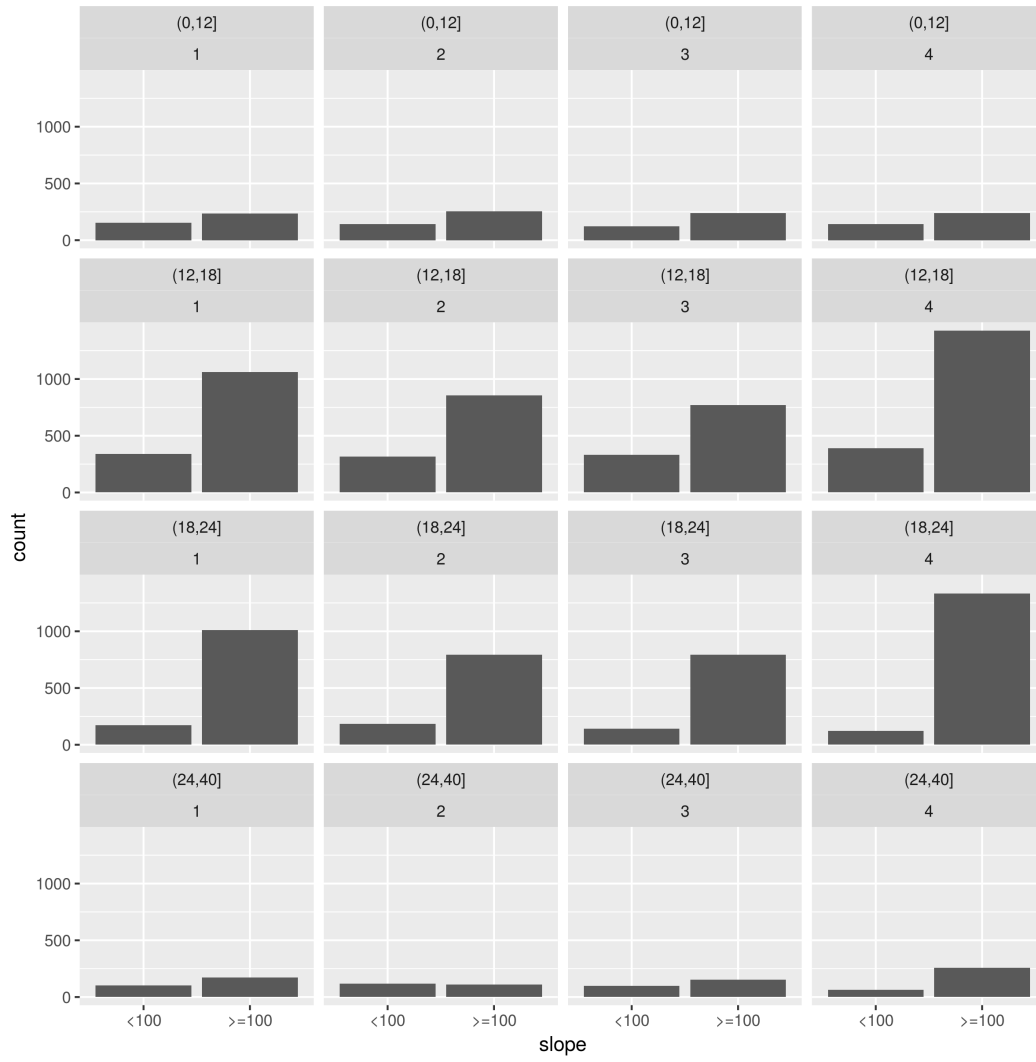


Figure 1: Fishing days at depth ranges (<100 m or ≥ 100 m) by LOA and Season

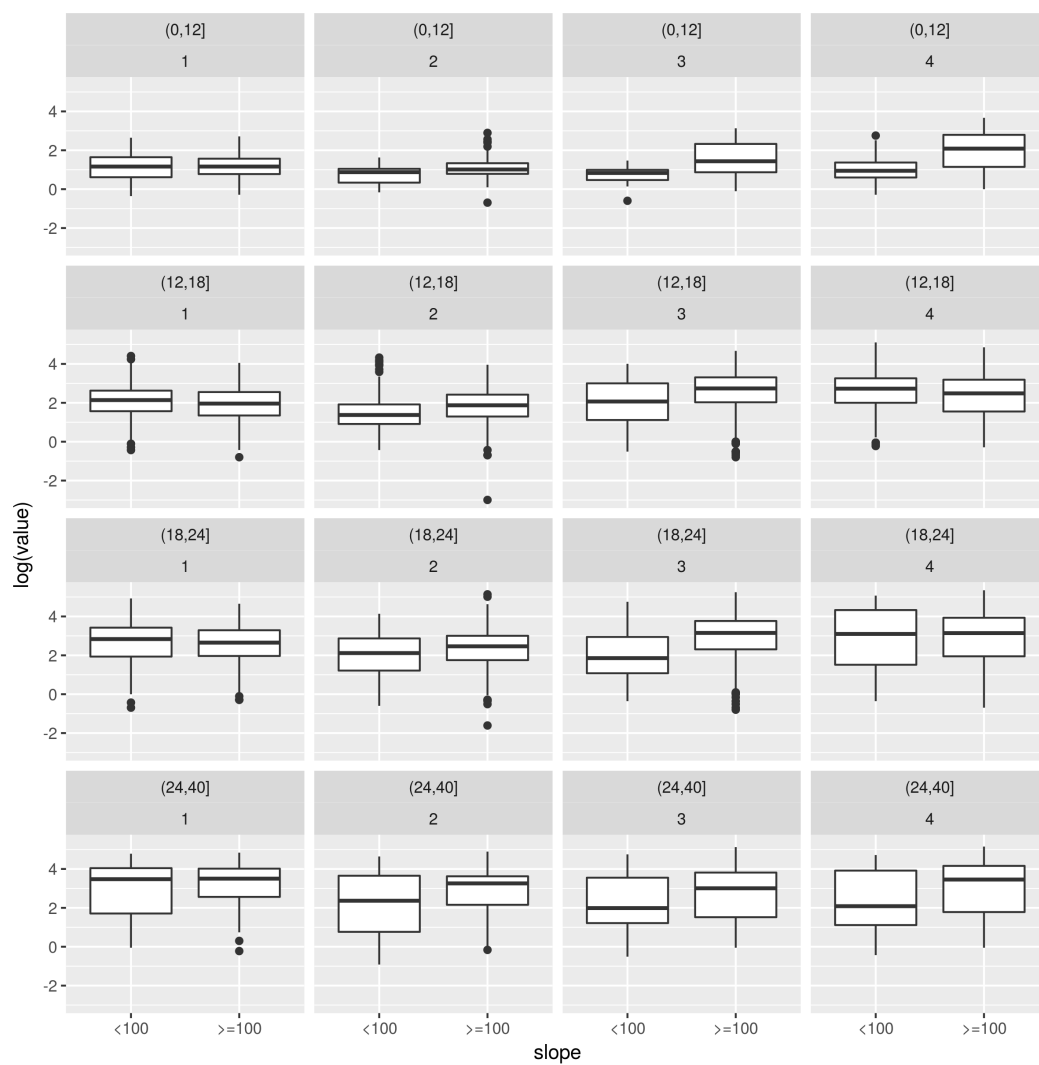


Figure 2: log(LPUE) operating at depth ranges (<100m or >=100m) by LOA and Season

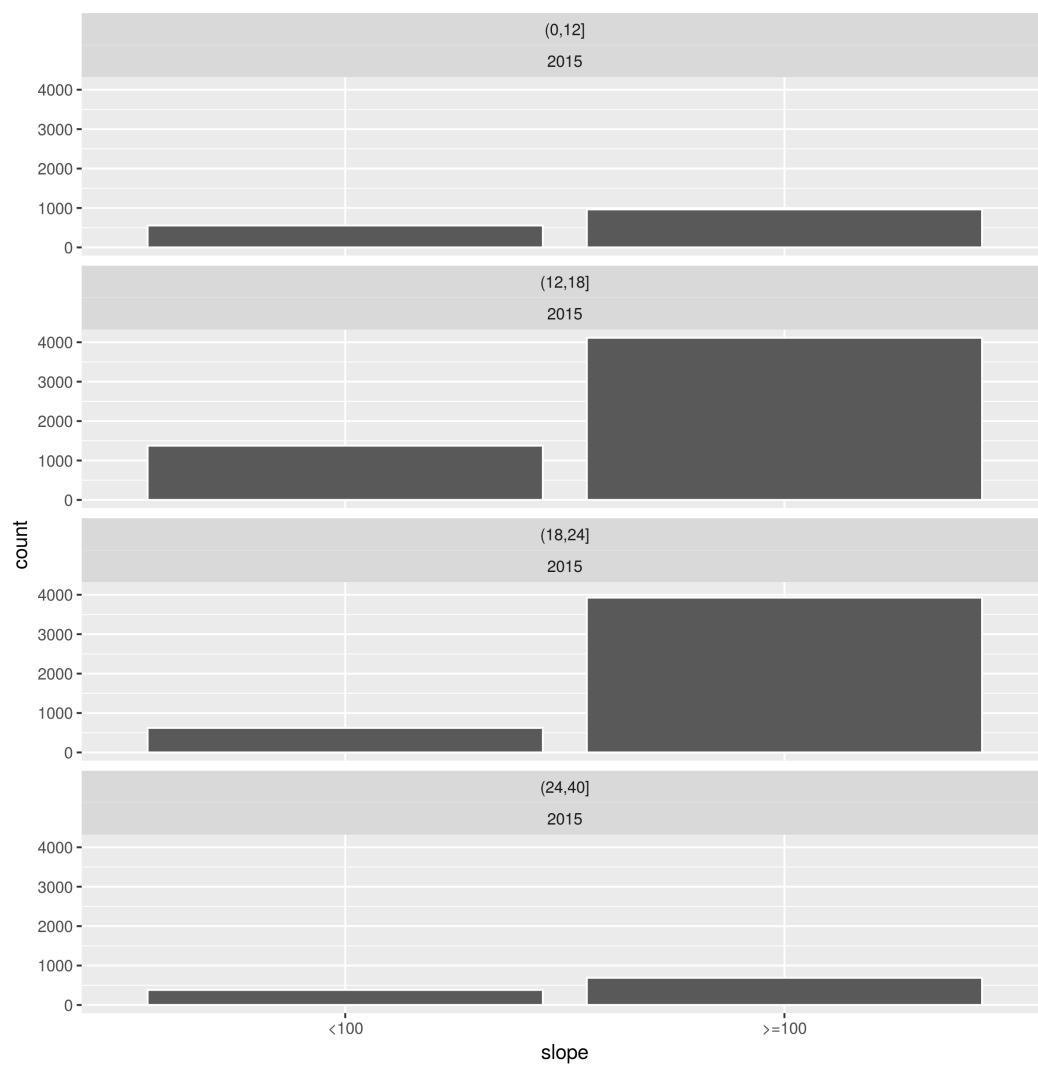


Figure 3: Fishing days at depth ranges ($<100\text{m}$ or $\geq 100\text{m}$) by LOA and Year

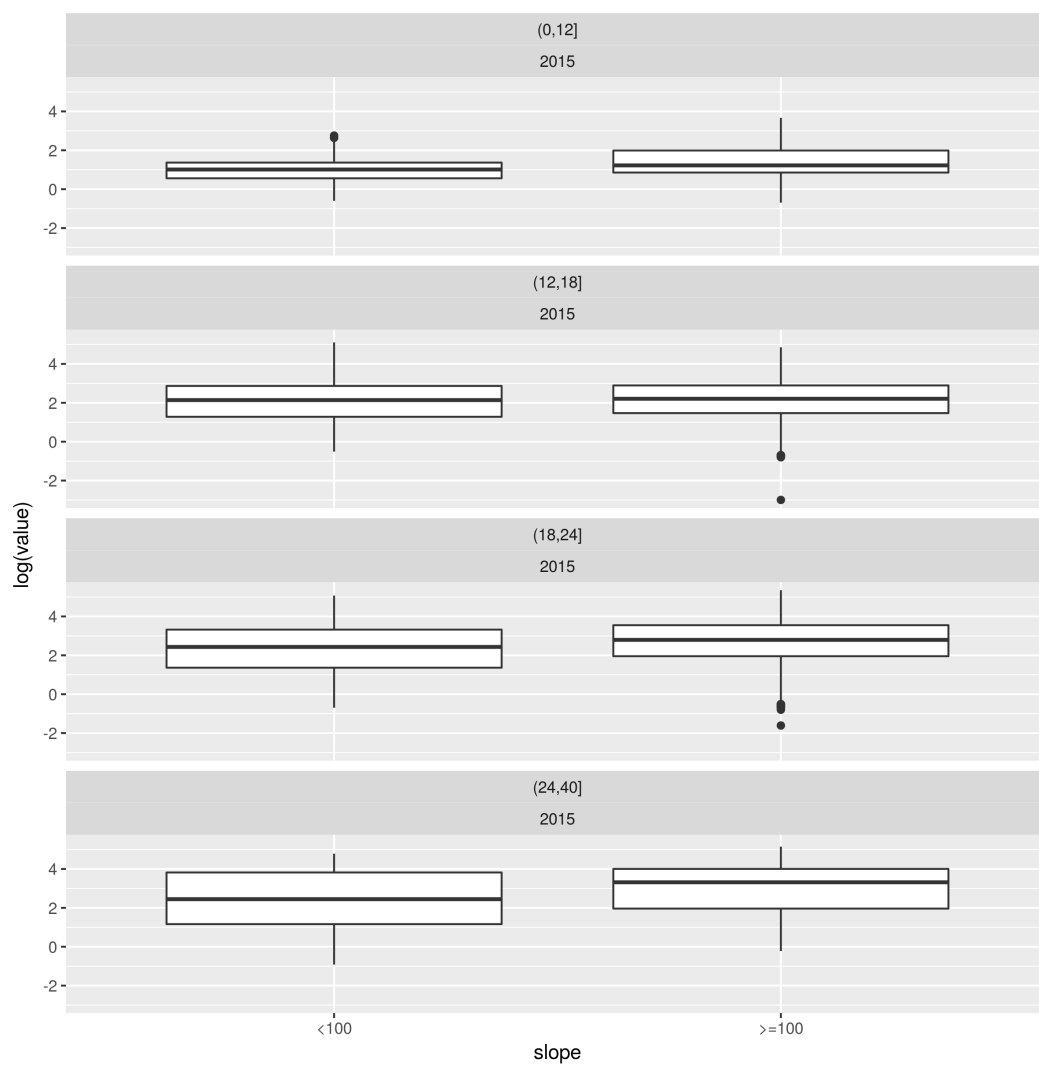


Figure 4: $\log(\text{LPUE})$ operating at at depth ranges (<100m or >=100m) by LOA and Year

2.2) Italy

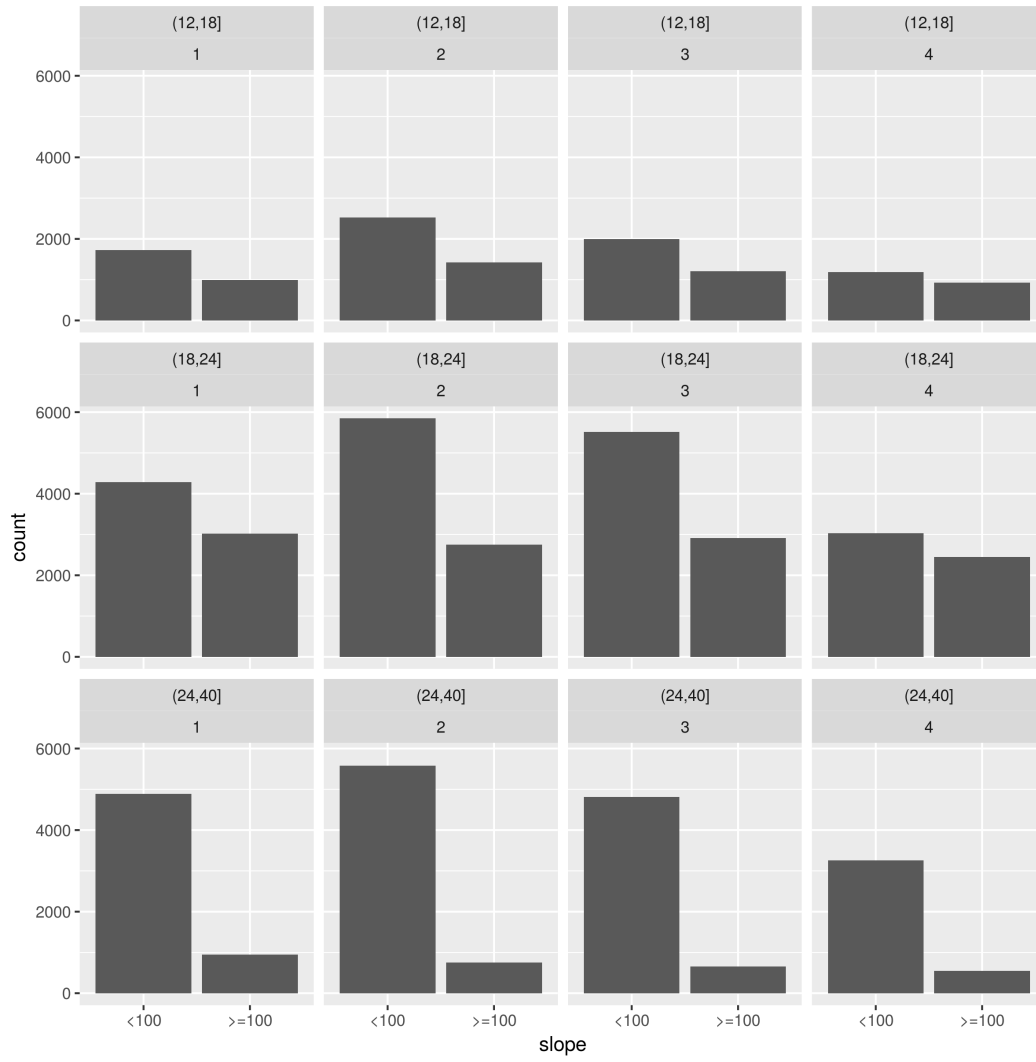


Figure 5: Fishing days at depth ranges (<100m or >=100m) by LOA and Season

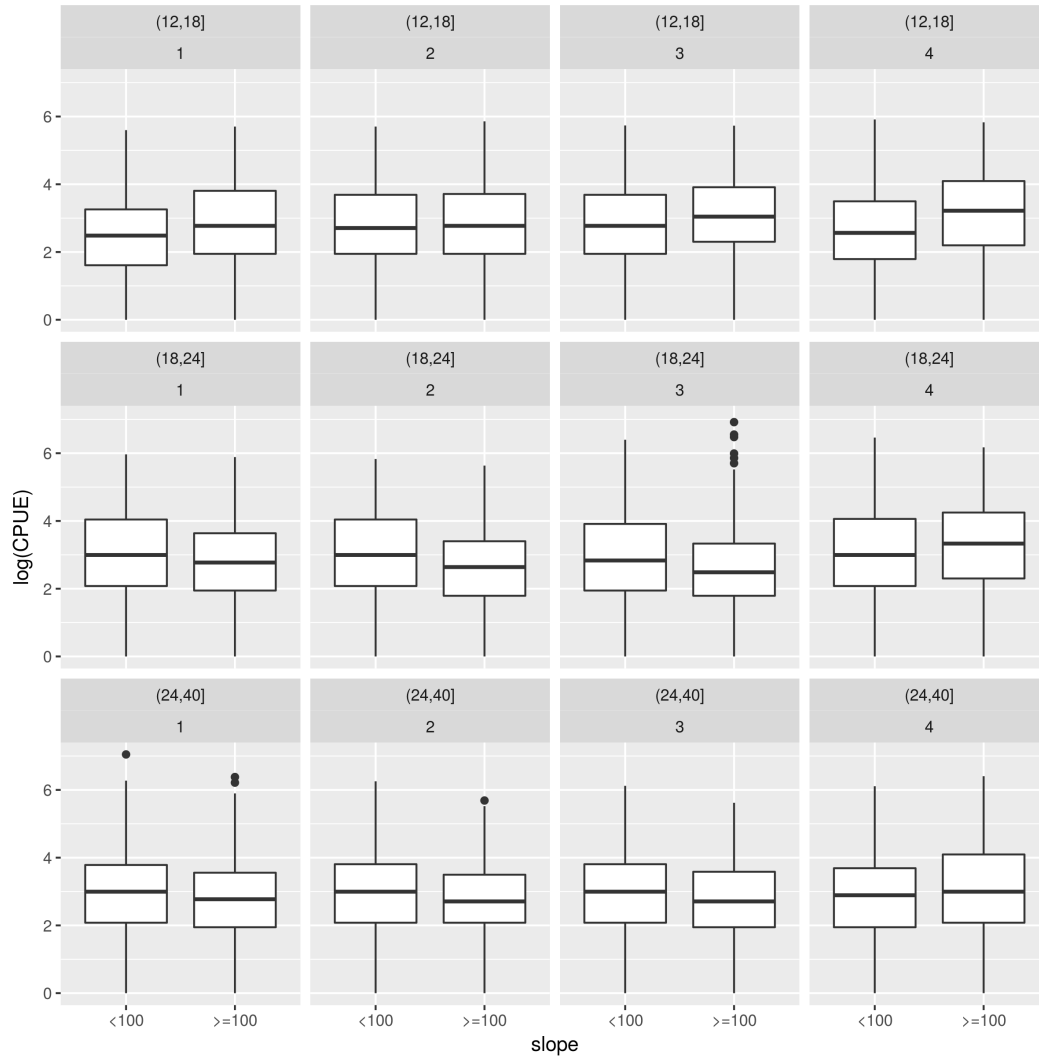


Figure 6: log(LPUE) operating at depth ranges (<100m or >=100m) by LOA and Season

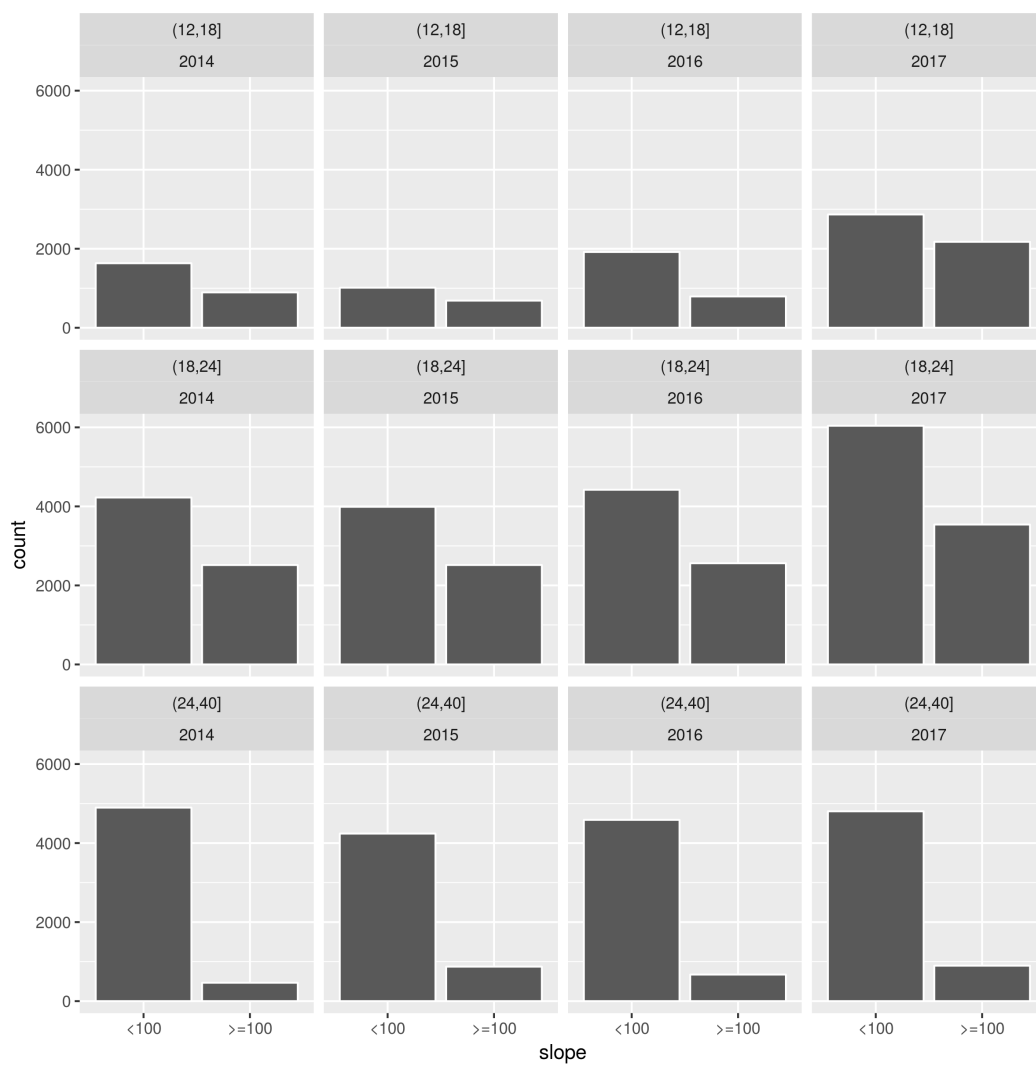


Figure 7: Fishing days at depth ranges (<100m or >=100m) by LOA and Year

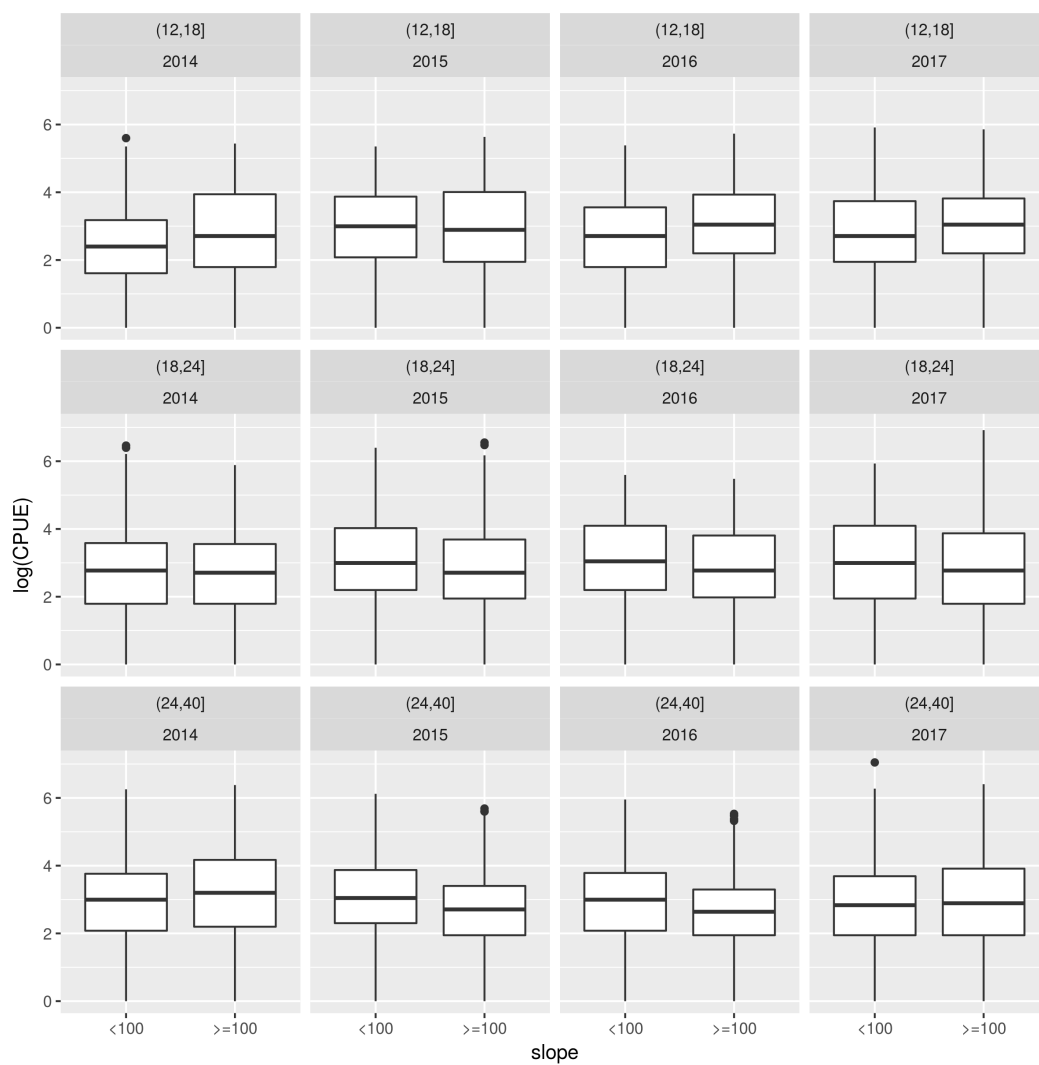


Figure 8: log(LPUE) operating at depth ranges (<100m or >=100m) by LOA and Year

3) Mixfisheries

The mix-fisheries analysis was performed to evaluate the level of “non-mix” in the fisheries and potential impact of choke species. The rationale is that if a number of hauls are “clean”, it means a certain level of specialization exists. Fleet’s specialization should be explored/fostered to increase the probability of the MAP’s success, since the species targeted by the MAP are not all in the same level of over-exploitation. On the other hand if a haul is mostly made of one species, limiting effects by other species are less important and can be avoided.

The analysis presented here is based on data aggregated by fishing day. Ideally, this analysis should be done on a haul-by-haul basis to allow a proper evaluation of the mixed-fisheries nature of the fishery.

The first part of the evaluates, at the trip level, the maximum fraction of the landings across the species in the MAP. The second part desaggregates by species, showing the fraction of the landings of each species in the MAP.

3.1) Italy

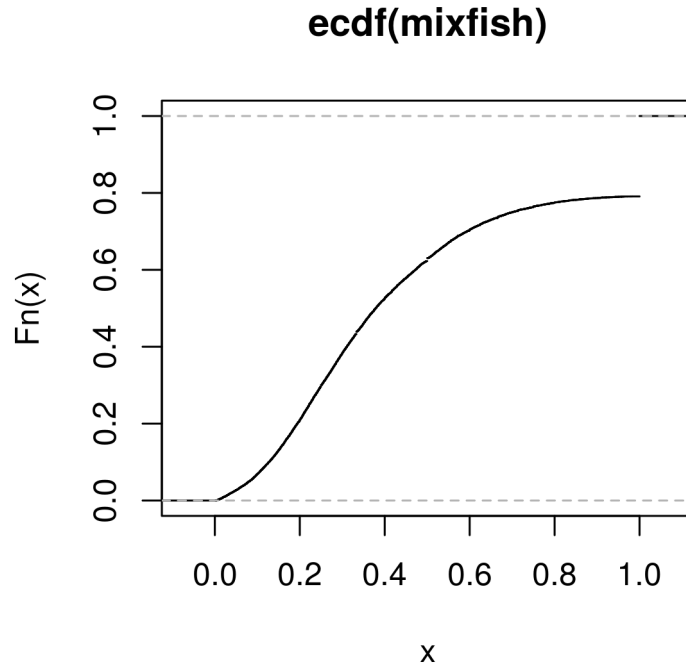


Figure 9: Cumulative distribution the maximum fraction of the landings by trip across the species in the MAP

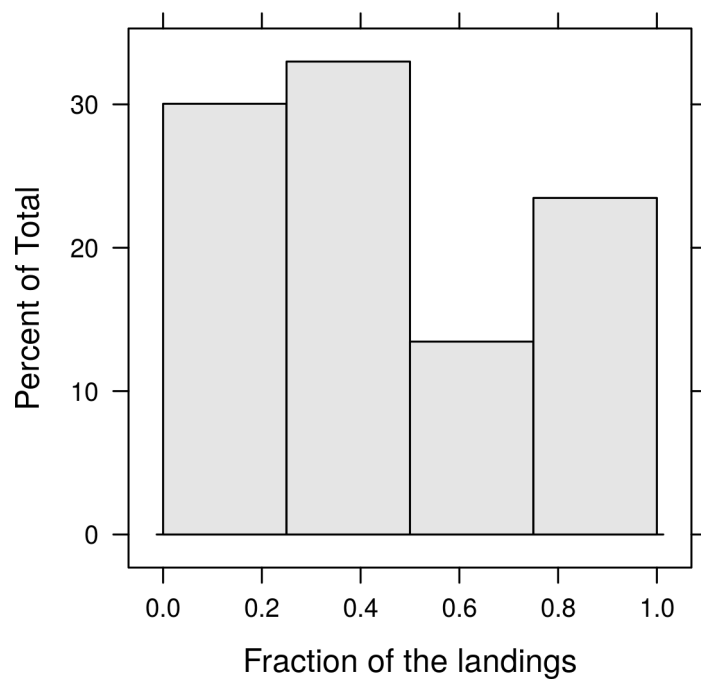


Figure 10: Trips by maximum fraction of the landings belonging to a single species, across the species in the MAP

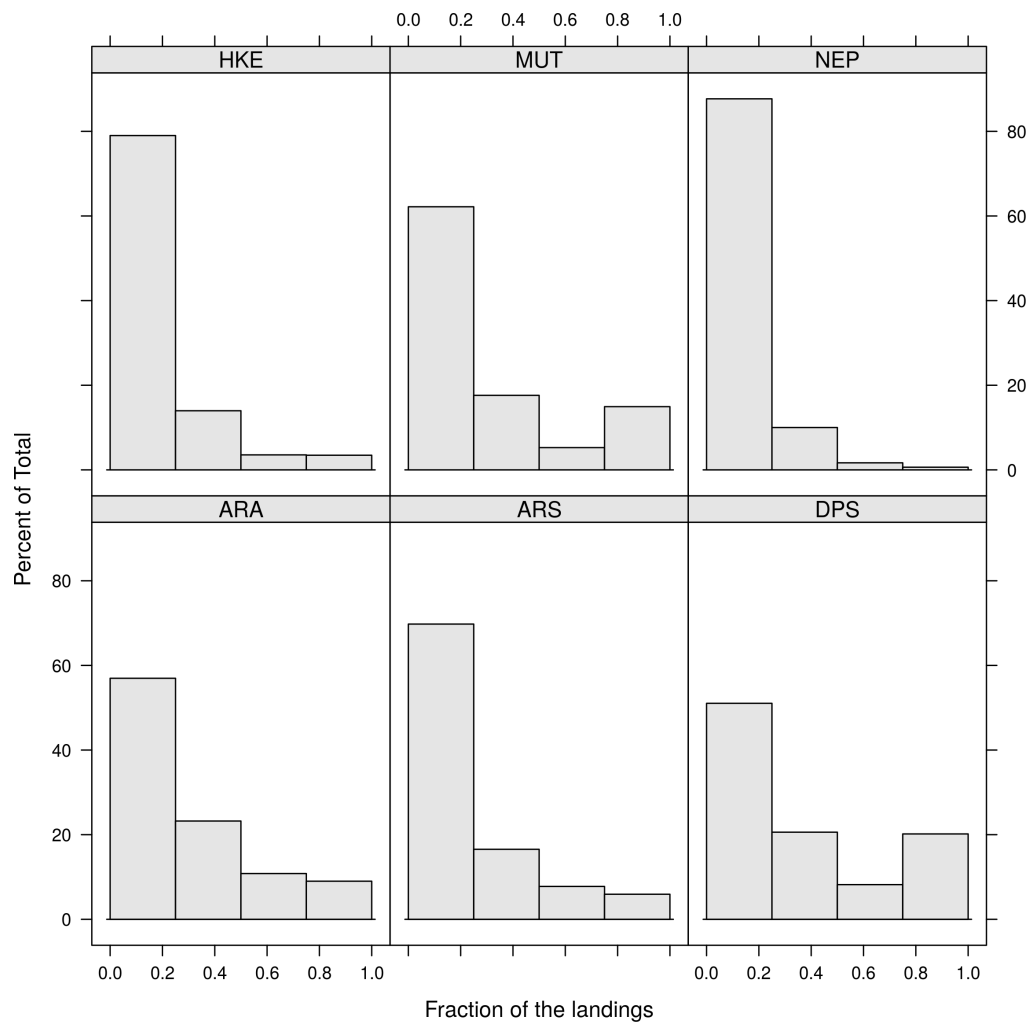


Figure 11: Trips by fraction of the landings belonging to a single species

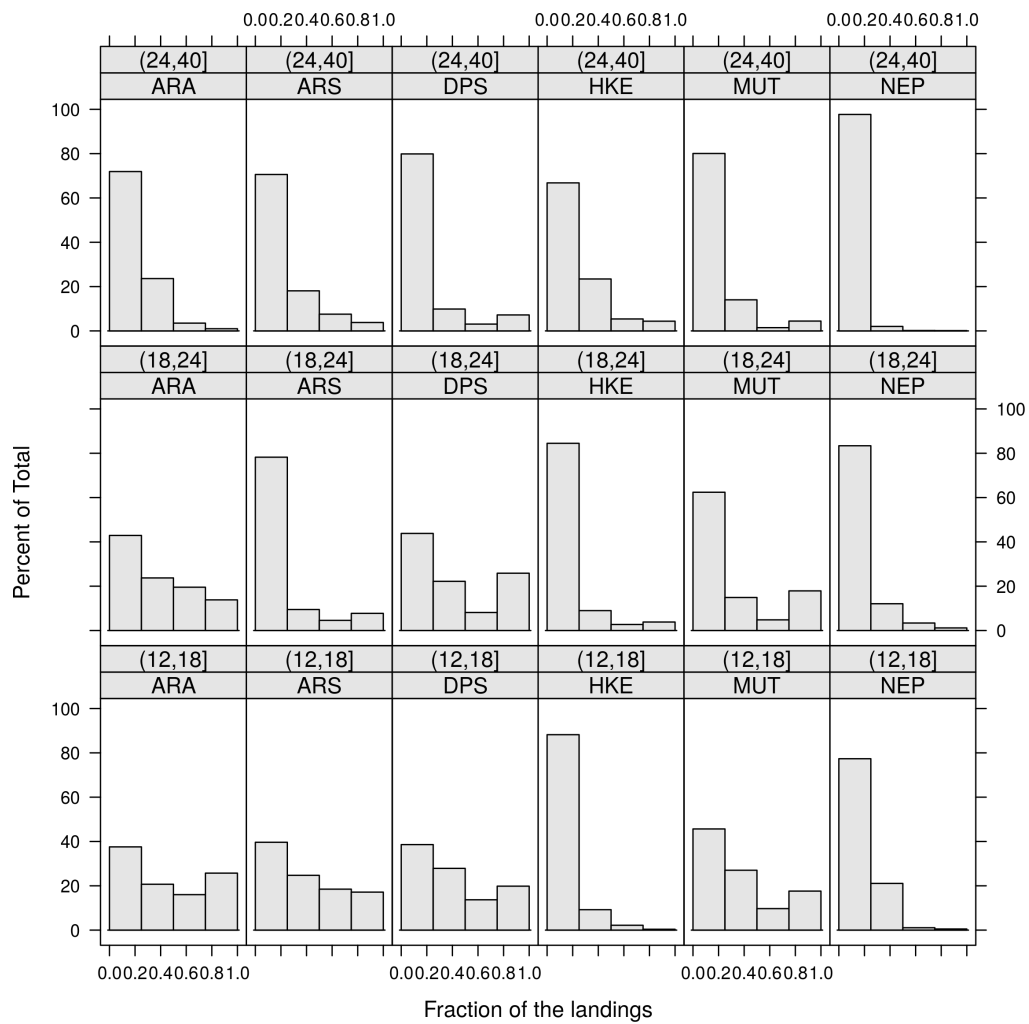


Figure 12: Trips by fraction of the landings belonging to a single species and LOA