Plot-based aboveground biomass estimates - TropiSAR sites

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NB. All aboveground biomass (AGB) estimates are in Mg ha-1. Calibration points with Area_code names including ‘h’, ‘q’ and ‘c’ represent 1ha, 0.25ha and 0.16ha, respectively.

Loading packages and datasets

```
# PARACOU: 15 plots 6.25ha (PAR01-15) + 1 plot 25ha (PAR16); ARB = PAR17 (6.25ha) NB. all plot
s surveyed in 2009 except PAR16 surveyed in 2010
## NB. "Each 9 ha plot contains a buffer zone 25 m wide. Trees are monitored inside the core z
one, i.e. in an area of 6.25 ha, while silvicultural treatments were applied to the whole plot
."
# NOURAGUES: NOU01 (Balenfois 2ha; 100x200m), NOU02 (Grand Plateau 10ha; 100x1000m), NOU03 (Pa
rare 6ha; 200x300m), NOU04 (Petit Plateau 12ha; 300x400m), NOU05 (Bas_Fond_1; 50x50m), NOU06 (
Bas_Fond_2; 50x50m), NOU07 (Lek; 50x50m), NOU08 (Lhor; 100x100m), NOU09 (Parare_Ridge; 100x100
m), NOU10 (Ringler; 100x100m), NOU11 (Wemomax; 50x50m)

# Packages
library(BIOMASS)
library(knitr)
library(kableExtra)
library(oce) # to compute Earth magnetic declination
library(lubridate) # convert ymd dates to decimal year
library(sp)

# Tree-level and botanical datasets
load("TropiSARstem.rdata")
load("TropiSARbota.rdata")
```

Getting wood density (WD) using names

```
TropiSARstem$Genus <- dfbota$genusCorr[match(TropiSARstem$Name, dfbota$ID)]
TropiSARstem$Species <- dfbota$speciesCorr[match(TropiSARstem$Name, dfbota$ID)]
TropiSARstem$FamilyAPG <- dfbota$familyAPG[match(TropiSARstem$Name, dfbota$ID)]
TropiSARstem$NameCorr <- paste(TropiSARstem$Genus, TropiSARstem$Species)

# Some trees (n=48) were identified at family level in the field; we fill the family column
TropiSARstem$FamilyAPG[which(is.na(TropiSARstem$FamilyAPG) & !(is.na(TropiSARstem$Info_fam)))]
 <- TropiSARstem$Info_fam[which(is.na(TropiSARstem$FamilyAPG) & !(is.na(TropiSARstem$Info_fam)
))]

dataWD <- getWoodDensity(genus=TropiSARstem$Genus, species=TropiSARstem$Species, family=TropiS
ARstem$FamilyAPG, stand=TropiSARstem$Plot_code)
```

```
## The reference dataset contains 16467 wood density values
```

```
## Your taxonomic table contains 1125 taxa
```

```
TropiSARstem$WD <- dataWD$meanWD
TropiSARstem$sdWD <- dataWD$sdWD
TropiSARstem$levelWD <- dataWD$levelWD
```

Refining permanent plot georeferencing

```
# Preliminary work in order to georeference the data
load("TropiSARplotcoord.rdata")

coordplot.nousp <- read.csv("PlotCoordNouSP.csv", sep=";", stringsAsFactors=T)
nousp.utm <- SpatialPoints(cbind(coordplot.nousp$X_utm,coordplot.nousp$Y_utm), proj4string=CRS
("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0"))
nousp.geo <- spTransform(nousp.utm, CRS("+proj=longlat +datum=WGS84"))

coordplot.nousp$Longitude <- nousp.geo@coords[,1]
coordplot.nousp$Latitude <- nousp.geo@coords[,2]

coordplot.trop$Longitude[which(is.na(coordplot.trop$Longitude))] <- coordplot.nousp$Longitude
coordplot.trop$Latitude[which(is.na(coordplot.trop$Latitude))] <- coordplot.nousp$Latitude

spgeo <- SpatialPoints(cbind(coordplot.trop$Longitude,coordplot.trop$Latitude), proj4string=CR
S("+proj=longlat +datum=WGS84"))
sputm <- spTransform(spgeo, CRS("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ell
ps=WGS84 +towgs84=0,0,0"))

coordplot.trop$X_utm <- sputm@coords[,1]
coordplot.trop$Y_utm <- sputm@coords[,2]

# Get "true" bearing
tropiplot <- as.character(unique(coordplot.trop$Plot_code))
coordplot.trop$Loc <- substring(coordplot.trop$Point, 6)
coordplot.trop$True_bearing <- NA

for (i in (1:length(tropiplot))) {
  swe.trop <- (atan2(coordplot.trop$X_utm[which(coordplot.trop$Plot_code == tropiplot[i] & coo
rdplot.trop$Loc == "b")] - coordplot.trop$X_utm[which(coordplot.trop$Plot_code == tropiplot[i]
 & coordplot.trop$Loc == "a")],
                     coordplot.trop$Y_utm[which(coordplot.trop$Plot_code == tropiplot[i] & coo
rdplot.trop$Loc == "b")] - coordplot.trop$Y_utm[which(coordplot.trop$Plot_code == tropiplot[i]
 & coordplot.trop$Loc == "a")])*180/pi)

  nwe.trop <- (atan2(coordplot.trop$X_utm[which(coordplot.trop$Plot_code == tropiplot[i] & coo
rdplot.trop$Loc == "c")] - coordplot.trop$X_utm[which(coordplot.trop$Plot_code == tropiplot[i]
 & coordplot.trop$Loc == "d")],
                     coordplot.trop$Y_utm[which(coordplot.trop$Plot_code == tropiplot[i] & coo
```

```
rdplot.trop$Loc == "c")] - coordplot.trop$Y_utm[which(coordplot.trop$Plot_code == tropiplot[i]
 & coordplot.trop$Loc == "d")])*180/pi)

  coordplot.trop$True_bearing[which(coordplot.trop$Plot_code == tropiplot[i])] <- round(mean(c
(swe.trop, nwe.trop)),1) + 270
}
coordplot.trop$True_bearing <- round((coordplot.trop$True_bearing) %% 360,1) # modulus operato
r %%

# Converting "true"" bearing in (1) radians, and then in (2) plot rotation
coordplot.trop$TB_rad <- (pi/2 - (coordplot.trop$True_bearing*pi/180)) %% pi # TB stands for t
rue bearing
coordplot.trop$RotAng_rad <- (coordplot.trop$TB_rad - pi/2)

TropiSARstem$TreeRad <- sqrt(TropiSARstem$X_rel^2 + TropiSARstem$Y_rel^2)
TropiSARstem$TreeAng_rel <- atan2(TropiSARstem$X_rel, TropiSARstem$Y_rel); range(TropiSARstem$
TreeAng_rel, na.rm=T) # seems OK; max TreeAng is pi/2 ie tree on the Y line
```

```
## [1] 0.000000 1.570796
```

```
# Assigning plot rotation to each stem
TropiSARstem$PlotAng <- coordplot.trop$RotAng_rad[match(TropiSARstem$Plot_code, coordplot.trop
$Plot_code)]

# Computing new stem coordinates after plot rotation
TropiSARstem$Xrot_rel <- TropiSARstem$X_rel * cos(TropiSARstem$PlotAng) - TropiSARstem$Y_rel *
 sin(TropiSARstem$PlotAng) # x' = x * cos(theta) - y * sin(theta)
TropiSARstem$Yrot_rel <- TropiSARstem$X_rel * sin(TropiSARstem$PlotAng) + TropiSARstem$Y_rel *
 cos(TropiSARstem$PlotAng) # y' = x * sin(theta) + y * cos(theta)

## Works because it selects the first value in the data.frame and that value is the one we nee
d (x=0; y=0)
TropiSARstem$X_abs <- coordplot.trop$X_utm[match(TropiSARstem$Plot_code, coordplot.trop$Plot_c
ode)] + TropiSARstem$Xrot_rel
TropiSARstem$Y_abs <- coordplot.trop$Y_utm[match(TropiSARstem$Plot_code, coordplot.trop$Plot_c
ode)] + TropiSARstem$Yrot_rel

# CHANGING COORDINATES AFTER VISUAL INSPECTION OF BIG TREES LOCATION AND LIDAR-DERIVED CHM
df.changcoord <- data.frame(plot = tropiplot,
                            modX = c(-5,-5,3,-2,0,0,0,0,0,0,0,-2,2,-1,-2,0,-3,0,3,-2,-1,3,4,0,
-1,-1,2,0),
                            modY = c(2,-3,3,-6,0,0,0,0,0,0,0,-5,-3,-4,-2,0,-3,-3,-1,-2,1,0,0,0
,-2,-1,-2,0),
                            stringsAsFactors=F)

TropiSARstem$X_absCORR <- TropiSARstem$X_abs + df.changcoord$modX[match(TropiSARstem$Plot_code
, df.changcoord$plot)]
TropiSARstem$Y_absCORR <- TropiSARstem$Y_abs + df.changcoord$modY[match(TropiSARstem$Plot_code
, df.changcoord$plot)]

coordplot.trop$X_utmCORR <- coordplot.trop$X_utm + df.changcoord$modX[match(coordplot.trop$Plo
t_code, df.changcoord$plot)]
coordplot.trop$Y_utmCORR <- coordplot.trop$Y_utm + df.changcoord$modY[match(coordplot.trop$Plo
```

```
t_code, df.changcoord$plot)]
```

Creating georeferenced sets of calibration points (at 1ha and 0.25ha)

```
site = c("NOURAGUES", "PARACOU")
scale = c(100, 50)
suffixe = c("h","q")
partplot = c("PAR01","PAR02","PAR03","PAR04","PAR05","PAR06","PAR07","PAR08","PAR09","PAR10","
PAR11","PAR12","PAR13","PAR14","PAR15","PAR17")

# Creating dataframe to georeference quarter hectare features
coord_orig_q <- coordplot.trop[which(coordplot.trop$X_rel == 0 & coordplot.trop$Y_rel == 0),]
coord_orig_q$full_lengthX <- coordplot.trop$X_rel[which(coordplot.trop$Loc == "b")]
coord_orig_q$full_lengthY <- coordplot.trop$Y_rel[which(coordplot.trop$Loc == "d")]
coord_orig_temp <- coord_orig_q
coord_orig_q <- coord_orig_q[-which(coord_orig_q$Plot_code == "NOU08"),] # Removing NOU08, a 1
00x100m plot without XY (so won't be able to dispatch trees in quarters)

# Creating dataframe to georeference hectare features (n=119)
coord_orig_h <- coord_orig_temp
coord_orig_h$X_rel[which(coord_orig_h$Plot_code %in% partplot)] <- 25
coord_orig_h$Y_rel[which(coord_orig_h$Plot_code %in% partplot)] <- 25
coord_orig_h$full_lengthX[which(coord_orig_h$Plot_code %in% partplot)] <- 200
coord_orig_h$full_lengthY[which(coord_orig_h$Plot_code %in% partplot)] <- 200

coord_orig_h$X_utmCORR[which(coord_orig_h$Plot_code %in% partplot)] <- coord_orig_h$X_utmCORR[
which(coord_orig_h$Plot_code %in% partplot)] + cos(coord_orig_h$RotAng_rad[which(coord_orig_h$
Plot_code %in% partplot)] + pi/4) * sqrt(25^2 + 25^2) # XX <-
coord_orig_h$Y_utmCORR[which(coord_orig_h$Plot_code %in% partplot)] <- coord_orig_h$Y_utmCORR[
which(coord_orig_h$Plot_code %in% partplot)] + sin(coord_orig_h$RotAng_rad[which(coord_orig_h$
Plot_code %in% partplot)] + pi/4) * sqrt(25^2 + 25^2) # YY <-

coord_orig_h <- coord_orig_h[-which(coord_orig_h$full_lengthX < 100),] # Removing 50x50m plots

scale.list <- list() # plot.df <- data.frame(); # Yet, plot.df already defined later in the lo
ops
for (j in (1:length(scale))) {
  if (j == 1) coord_orig = coord_orig_h else coord_orig = coord_orig_q
  plot.df <- data.frame()
  tempoplot <- as.character(coord_orig$Plot_code)

  for (k in (1:length(tempoplot))) {
    lengthX <- coord_orig$full_lengthX[which(coord_orig$Plot_code == tempoplot[k])]; lengthX
    lengthY <- coord_orig$full_lengthY[which(coord_orig$Plot_code == tempoplot[k])]; lengthY

    incrX_h <- cos(coord_orig$RotAng_rad[which(coord_orig$Plot_code == tempoplot[k])]) * scale
[j] # increment for X coordinates horizontally
    incrY_h <- sin(coord_orig$RotAng_rad[which(coord_orig$Plot_code == tempoplot[k])]) * scale
[j] # increment for Y coordinates horizontally
```

```
    incrX_v <- cos(coord_orig$RotAng_rad[which(coord_orig$Plot_code == tempoplot[k])] + pi/2)
* scale[j] # increment for X coordinates vertically; also equals (-incrY_h)
    incrY_v <- sin(coord_orig$RotAng_rad[which(coord_orig$Plot_code == tempoplot[k])] + pi/2)
* scale[j] # increment for Y coordinates vertically; also equals incrX_h

    nbptX <- length(seq(0, lengthX, scale[j]))
    nbptY <- length(seq(0, lengthY, scale[j]))
    incrX.mat <- matrix(rep(0:(nbptX-1),nbptY), nrow=nbptY, ncol=nbptX, byrow = T); incrX.mat
    incrY.mat <- matrix(rep(rev(0:(nbptY-1)),nbptX), nrow=nbptY, ncol=nbptX); incrY.mat

    XX <- coord_orig$X_utmCORR[which(coord_orig$Plot_code == tempoplot[k])] + incrX_h * incrX.
mat + incrX_v * incrY.mat
    YY <- coord_orig$Y_utmCORR[which(coord_orig$Plot_code == tempoplot[k])] + incrY_h * incrX.
mat + incrY_v * incrY.mat
    #plot(as.vector(YY) ~ as.vector(XX))

    XX_SW.mat <- XX[2:nbptY, 1:(nbptX-1)]; YY_SW.mat <- YY[2:nbptY, 1:(nbptX-1)]
    XX_NW.mat <- XX[1:(nbptY-1), 1:(nbptX-1)]; YY_NW.mat <- YY[1:(nbptY-1), 1:(nbptX-1)]
    XX_SE.mat <- XX[2:nbptY, 2:nbptX]; YY_SE.mat <- YY[2:nbptY, 2:nbptX]
    XX_NE.mat <- XX[1:(nbptY-1), 2:nbptX]; YY_NE.mat <- YY[1:(nbptY-1), 2:nbptX]

    XX_SW.vect <- as.vector(XX_SW.mat); YY_SW.vect <- as.vector(YY_SW.mat)
    XX_NW.vect <- as.vector(XX_NW.mat); YY_NW.vect <- as.vector(YY_NW.mat)
    XX_SE.vect <- as.vector(XX_SE.mat); YY_SE.vect <- as.vector(YY_SE.mat)
    XX_NE.vect <- as.vector(XX_NE.mat); YY_NE.vect <- as.vector(YY_NE.mat)

    for (l in (1:(nbptX-1))) {
      XX_SW.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(XX_SW.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      XX_NW.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(XX_NW.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      XX_SE.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(XX_SE.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      XX_NE.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(XX_NE.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
    }
    for (l in (1:(nbptX-1))) {
      YY_SW.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(YY_SW.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      YY_NW.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(YY_NW.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      YY_SE.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(YY_SE.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
      YY_NE.vect[((l-1)*(nbptY-1)+1):(l*(nbptY-1))] <- rev(YY_NE.vect[((l-1)*(nbptY-1)+1):(l*(
nbptY-1))])
    }

    templot.df <- data.frame(Site = as.character(rep(coord_orig$Site[which(coord_orig$Plot_cod
e == tempoplot[k])], (nbptX-1) * (nbptY-1))),
                             Area_code = paste(tempoplot[k], suffixe[j], c(1:((nbptX-1)*(nbptY
-1))), sep=""),
                             Plot_code = rep(tempoplot[k], (nbptX-1) * (nbptY-1)),
                             Scale = rep(paste(scale[j]^2/10^4,"ha", sep=""), (nbptX-1) * (nbp
```

```
tY-1)),
                              sw_x = XX_SW.vect, sw_y = YY_SW.vect,
                              nw_x = XX_NW.vect, nw_y = YY_NW.vect,
                              se_x = XX_SE.vect, se_y = YY_SE.vect,
                              ne_x = XX_NE.vect, ne_y = YY_NE.vect)
    plot.df <- rbind(plot.df, templot.df)
  }
  scale.list[[j]] <- plot.df
}
#scale.list

# Convert list of georef hectares/quarters into a single data.frame
df1ha <- as.data.frame(scale.list[[1]])
df0.25ha <- as.data.frame(scale.list[[2]])

georefeatures.df <- rbind(df1ha, df0.25ha)

nousp_sw.utm <- SpatialPoints(cbind(georefeatures.df$sw_x,georefeatures.df$sw_y), proj4string=
CRS("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0"))
nousp_sw.geo <- spTransform(nousp_sw.utm, CRS("+proj=longlat +datum=WGS84"))
georefeatures.df$Lon_sw <- nousp_sw.geo@coords[,1]; georefeatures.df$Lat_sw <- nousp_sw.geo@co
ords[,2]

nousp_nw.utm <- SpatialPoints(cbind(georefeatures.df$nw_x,georefeatures.df$nw_y), proj4string=
CRS("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0"))
nousp_nw.geo <- spTransform(nousp_nw.utm, CRS("+proj=longlat +datum=WGS84"))
georefeatures.df$Lon_nw <- nousp_nw.geo@coords[,1]; georefeatures.df$Lat_nw <- nousp_nw.geo@co
ords[,2]

nousp_se.utm <- SpatialPoints(cbind(georefeatures.df$se_x,georefeatures.df$se_y), proj4string=
CRS("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0"))
nousp_se.geo <- spTransform(nousp_se.utm, CRS("+proj=longlat +datum=WGS84"))
georefeatures.df$Lon_se <- nousp_se.geo@coords[,1]; georefeatures.df$Lat_se <- nousp_se.geo@co
ords[,2]

nousp_ne.utm <- SpatialPoints(cbind(georefeatures.df$ne_x,georefeatures.df$ne_y), proj4string=
CRS("+proj=utm +zone=22 +north +datum=WGS84 +units=m +no_defs +ellps=WGS84 +towgs84=0,0,0"))
nousp_ne.geo <- spTransform(nousp_ne.utm, CRS("+proj=longlat +datum=WGS84"))
georefeatures.df$Lon_ne <- nousp_ne.geo@coords[,1]; georefeatures.df$Lat_ne <- nousp_ne.geo@co
ords[,2]

georefeatures.df <- georefeatures.df[, -c(5:12)]
georefeatures.df$Lon_cnt <- rowMeans(georefeatures.df[, c(5,7,9,11)])
georefeatures.df$Lat_cnt <- rowMeans(georefeatures.df[, c(6,8,10,12)])
```

Assigning trees to hectares (1ha) and quarters (0.25ha) based on Plot_code and relative XY

```
## ATTRIBUTING TREES TO ONE HECTARE AREAS
partplot = c("PAR01","PAR02","PAR03","PAR04","PAR05","PAR06","PAR07","PAR08","PAR09","PAR10","
PAR11","PAR12","PAR13","PAR14","PAR15","PAR17")
```

```
TropiSARstem$plotnbH <- NA
TropiSARstem$plotnbH[which(TropiSARstem$Plot_code %in% partplot & TropiSARstem$X_rel >= 25 & T
ropiSARstem$X_rel <= 125 & TropiSARstem$Y_rel >= 25 & TropiSARstem$Y_rel <= 125)] <- 1
TropiSARstem$plotnbH[which(TropiSARstem$Plot_code %in% partplot & TropiSARstem$X_rel >= 25 & T
ropiSARstem$X_rel <= 125 & TropiSARstem$Y_rel > 125 & TropiSARstem$Y_rel <= 225)] <- 2
TropiSARstem$plotnbH[which(TropiSARstem$Plot_code %in% partplot & TropiSARstem$X_rel > 125 & T
ropiSARstem$X_rel <= 225 & TropiSARstem$Y_rel >= 25 & TropiSARstem$Y_rel <= 125)] <- 3
TropiSARstem$plotnbH[which(TropiSARstem$Plot_code %in% partplot & TropiSARstem$X_rel > 125 & T
ropiSARstem$X_rel <= 225 & TropiSARstem$Y_rel > 125 & TropiSARstem$Y_rel <= 225)] <- 4
TropiSARstem$plotnbH[which(TropiSARstem$Plot_code == "NOU08")] <- 1

TropiSARstem$hectX <- ifelse(TropiSARstem$X_rel == 0, 1, ceiling(TropiSARstem$X_rel/100))
TropiSARstem$hectY <- ifelse(TropiSARstem$Y_rel == 0, 1, ceiling(TropiSARstem$Y_rel/100))

TropiSARstem$full_lengthY4h <- coord_orig_h$full_lengthY[match(TropiSARstem$Plot_code, coord_o
rig_h$Plot_code)]

TropiSARstem$plotnbH <- ifelse(TropiSARstem$Plot_code %in% c(partplot, "NOU08"), TropiSARstem$
plotnbH,
                               (TropiSARstem$hectX-1)*(TropiSARstem$full_lengthY4h/100) + Trop
iSARstem$hectY)

ind4h <- which(is.na(TropiSARstem$plotnbH) & !(TropiSARstem$Plot_code %in% partplot))
TropiSARstem$plotnbH[ind4h[which(TropiSARstem$Plot_code[ind4h] == "NOU02")]] <- 20 - TropiSARs
tem$Info_loc[ind4h[which(TropiSARstem$Plot_code[ind4h] == "NOU02")]]

A <- as.numeric(substr(TropiSARstem$Info_loc[ind4h[which(TropiSARstem$Plot_code[ind4h] == "NOU
04")]],2,3))
B <- as.numeric(substr(TropiSARstem$Info_loc[ind4h[which(TropiSARstem$Plot_code[ind4h] == "NOU
04")]],3,3))
TropiSARstem$plotnbH[ind4h[which(TropiSARstem$Plot_code[ind4h] == "NOU04")]] <- floor(A/10)*4
+ B

TropiSARstem$Hect_code <- ifelse(is.na(TropiSARstem$plotnbH), NA, paste(TropiSARstem$Plot_code
,"h",TropiSARstem$plotnbH,sep=""))

## ATTRIBUTING TREES TO QUARTER HECTARE AREAS
TropiSARstem$quartX <- ifelse(TropiSARstem$X_rel == 0, 1, ceiling(TropiSARstem$X_rel/50))
TropiSARstem$quartY <- ifelse(TropiSARstem$Y_rel == 0, 1, ceiling(TropiSARstem$Y_rel/50))

TropiSARstem$full_lengthY4q <- coord_orig_q$full_lengthY[match(TropiSARstem$Plot_code, coord_o
rig_q$Plot_code)]

TropiSARstem$plotnbQ <- (TropiSARstem$quartX-1)*(TropiSARstem$full_lengthY4q/50) + TropiSARste
m$quartY
TropiSARstem$plotnbQ[which(TropiSARstem$Plot_code == "NOU07")] <- 1

TropiSARstem$Quart_code <- ifelse(is.na(TropiSARstem$plotnbQ), NA, paste(TropiSARstem$Plot_cod
e,"q",TropiSARstem$plotnbQ,sep=""))
```

Estimating H from Feldpausch H:D relationship

```
range(TropiSARstem$Diameter)
```

```
## [1]  10.0 200.5
```

```
dataHfeld <- retrieveH(D=TropiSARstem$Diameter, region ="GuianaShield"); range(dataHfeld) # H ranges from 5.3 - 42.8 m
```

```
## [1]  5.28500 42.76006
```

```
TropiSARstem$Hfeld <- dataHfeld$H
TropiSARstem$HfeldRSE <- dataHfeld$RSE
```

Developing local H:D relationships (3 in total: 1 per site for trees + 1 for palms)

```
# Load H:D dataset
load("TropiSARforHD.rdata")
TropiSARforHD <- TropiSARforHD[-which(TropiSARforHD$Family == "Arecaceae"),]

# Compute site-specific H:D models
HDmodelPerSite <- by(TropiSARforHD, TropiSARforHD$Site,
                     function(x) modelHD(D=x$Diameter,H=x$Height, method="michaelis",useWeight
 =T),
                     simplify=FALSE)
RSEmodels <- sapply(HDmodelPerSite,function(x) x$RSE)
Coeffmodels <- lapply(HDmodelPerSite,function(x) x$coefficients)
ResHD <- data.frame(Site=names(unlist(RSEmodels)),
                    a=round(unlist(sapply(Coeffmodels,"[",1)),3),
                    b=round(unlist(sapply(Coeffmodels,"[",2)),3),
                    RSE=round(unlist(RSEmodels),3))
kable(ResHD, row.names = F)

# Retrieve predicted height values in the database
# NB. HEIGHT VALUES SOMETIMES FROM SURVEYS OTHER THAN THOSE WHEN DBH WAS MEASURED... BUT THIS HAPPENS FOR RABI AS WELL
TropiSARstem$Hlocal <- TropiSARstem$Height # keeping directly measured trees
TropiSARstem$HlocRSE <- 1 # to be refined?! Assume a 1-m error on directly measured trees
TropiSARstem$levelHloc <- "FIELD"

Site=as.character(ResHD$Site)
for(i in 1:length(ResHD$Site)){
  filt<-TropiSARstem$Site==Site[i] & is.na(TropiSARstem$Hlocal)
  TropiSARstem$Hlocal[filt]<-retrieveH(D=TropiSARstem$Diameter[filt],model=HDmodelPerSite[[Sit
e[i]]])$H
  TropiSARstem$HlocRSE[filt]<-HDmodelPerSite[[Site[i]]]$RSE
  TropiSARstem$levelHloc[filt]<-Site[i]
}
```

Assigning mean plot coordinates to trees to get environmental factor E

```
longitude <- tapply(coordplot.trop$Longitude, coordplot.trop$Plot_code, mean)
latitude <- tapply(coordplot.trop$Latitude, coordplot.trop$Plot_code, mean)
meancoord <- data.frame(Plot_code=names(longitude), long=as.numeric(longitude), lat=as.numeric
(latitude))

TropiSARstem$long <- meancoord[match(TropiSARstem$Plot_code, meancoord$Plot_code),"long"]
TropiSARstem$lat <- meancoord[match(TropiSARstem$Plot_code, meancoord$Plot_code),"lat"]
```

Compute AGB at hectare/quarter/corner level using 3 different models

```
TropiSARstemTREE <- TropiSARstem[-which(TropiSARstem$FamilyAPG == "Arecaceae"),]
TropiSARstemTREE <- TropiSARstemTREE[with(TropiSARstemTREE, order(Site, decreasing = c(F), met
hod = "radix")),]
resolAGB <- c("Hect_code", "Quart_code")
coefmult <- c(1,4)
ordarea <- list(df1ha$Area_code, df0.25ha$Area_code)
```

AGB PALM

```
sort(table(TropiSARstem$Hect_code[which(TropiSARstem$FamilyAPG == "Arecaceae")]))
sort(table(TropiSARstem$Quart_code[which(TropiSARstem$FamilyAPG == "Arecaceae")]))

source("computeAGBpalm.R")
getWoodDensity("Oenocarpus", "bataua")
computeAGB(D=25.0, WD=0.6815, H=27.0)
computeAGBpalm(D=25.0)

TropiSARstemPALM <- TropiSARstem[which(TropiSARstem$FamilyAPG == "Arecaceae"),]

AGBpalmval <- computeAGBpalm(TropiSARstemPALM$Diameter)
tempPALM <- as.data.frame(matrix(rep(AGBpalmval, 1000), length(AGBpalmval), 1000))
Tropiprop_PALM <- cbind(TropiSARstemPALM, tempPALM)
```

AGB FELDPAUSCH (agb_fph)

```
AGB_fph.list <- list()

rm(resultMC_FeldFG); gc()
resultMC_FeldFG <- by(TropiSARstemTREE, TropiSARstemTREE[,"Site"],
                      function(x) AGBmonteCarlo(D=x$Diameter, WD=x$WD, errWD=x$sdWD, H=x$Hfeld
```

```
,
                                                errH=x$HfeldRSE, Dpropag="chave2004"), simplif
y=F)

tempNOU <- as.data.frame(resultMC_FeldFG$NOURAGUES$AGB_simu)
tempPAR <- as.data.frame(resultMC_FeldFG$PARACOU$AGB_simu)
tempTROP <- rbind(tempNOU,tempPAR)
Tropiprop_FELD <- cbind(TropiSARstemTREE, tempTROP)
Tropiprop_FELD <- rbind(Tropiprop_FELD, Tropiprop_PALM)

for (i in (1:length(resolAGB))) {
  tempocalc <- by(Tropiprop_FELD, Tropiprop_FELD[,resolAGB[i]],
                  function(x) list(meanAGB = mean(apply(x[,46:1045], 2, sum, na.rm = T)),
                                   #medAGB = median(apply(x[,46:1045], 2, sum, na.rm = T)),
                                   #sdAGB = sd(apply(x[,46:1045], 2, sum, na.rm = T)),
                                   credibilityAGB = quantile(apply(x[,46:1045], 2, sum, na.rm
= T), probs = c(0.025,0.975))))

  AGB_fph.list[[i]] <- data.frame(Area_code = names(tempocalc),
                                  agb_fph = round(as.numeric(sapply(tempocalc,"[",1))*coefmult
[i],1),
                                  cred_fph_2.5 = round(as.numeric(lapply(sapply(tempocalc,"[",
2), function(x) x[1]))*coefmult[i],1),
                                  cred_fph_97.5 = round(as.numeric(lapply(sapply(tempocalc,"["
,2), function(x) x[2]))*coefmult[i],1), stringsAsFactors = F)

  AGB_fph.list[[i]] <- AGB_fph.list[[i]][match(ordarea[[i]], AGB_fph.list[[i]]$Area_code),]
  rownames(AGB_fph.list[[i]]) <- NULL
}
#AGB_fph.list
AGB_fph.df <- Reduce(rbind, AGB_fph.list)
AGB_fph.df
```

Area_code	agb_fph	cred_fph_2.5	cred_fph_97.5
NOU01h1	473.2	428.1	528.0
NOU01h2	405.7	371.7	447.3
NOU02h1	297.5	266.1	336.6
NOU02h2	283.0	260.0	311.4
NOU02h3	346.0	316.2	380.8
NOU02h4	279.8	254.0	311.4
NOU02h5	301.5	270.1	341.6
NOU02h6	321.3	289.1	358.9
NOU02h7	395.1	357.8	439.8
NOU02h8	619.0	558.6	683.0
NOU02h9	478.1	435.4	524.9

NOU02h10	452.1	413.6	498.5
NOU03h1	504.6	454.3	567.1
NOU03h2	538.7	492.2	589.3
NOU03h3	458.0	417.0	509.7
NOU03h4	551.1	496.0	613.2
NOU03h5	536.9	484.0	592.6
NOU03h6	562.2	514.3	620.9
NOU04h1	446.7	410.9	488.4
NOU04h2	310.4	285.5	340.7
NOU04h3	423.0	390.0	460.8
NOU04h4	472.9	431.8	517.7
NOU04h5	437.0	401.5	477.3
NOU04h6	397.5	360.3	439.6
NOU04h7	464.7	428.8	506.1
NOU04h8	449.3	412.4	492.1
NOU04h9	546.7	502.4	593.7
NOU04h10	414.1	379.0	451.8
NOU04h11	511.1	472.3	557.2
NOU04h12	489.2	448.8	539.6
NOU08h1	522.9	479.1	565.5
NOU09h1	466.4	426.1	515.1
NOU10h1	401.7	368.5	437.4
PAR01h1	450.7	419.4	486.1
PAR01h2	307.6	287.6	328.2
PAR01h3	489.5	458.1	524.7
PAR01h4	364.2	338.4	391.4
PAR02h1	348.8	325.6	375.5
PAR02h2	345.0	323.3	369.5
PAR02h3	407.2	383.9	434.0
PAR02h4	350.0	329.6	374.2
PAR03h1	367.4	343.5	395.2

PAR03h2	343.2	321.9	365.8
PAR03h3	320.6	302.7	339.6
PAR03h4	316.8	299.2	334.0
PAR04h1	317.4	301.8	335.4
PAR04h2	339.9	319.9	363.1
PAR04h3	285.2	268.2	303.4
PAR04h4	308.2	291.8	326.3
PAR05h1	339.7	320.6	360.9
PAR05h2	326.6	307.5	346.6
PAR05h3	305.6	284.9	328.9
PAR05h4	324.1	304.9	344.6
PAR06h1	380.1	354.0	408.7
PAR06h2	508.0	471.9	544.2
PAR06h3	362.8	337.5	391.1
PAR06h4	456.8	426.7	492.9
PAR07h1	445.3	416.0	478.2
PAR07h2	434.5	405.7	467.6
PAR07h3	410.3	384.4	436.0
PAR07h4	463.0	433.8	495.5
PAR08h1	311.5	293.2	330.8
PAR08h2	280.6	263.7	299.7
PAR08h3	297.8	281.3	315.6
PAR08h4	266.8	250.4	283.7
PAR09h1	410.8	387.0	436.1
PAR09h2	371.4	346.4	400.4
PAR09h3	336.7	315.6	359.7
PAR09h4	352.9	331.6	375.1
PAR10h1	381.7	357.1	406.7
PAR10h2	300.9	282.4	320.7
PAR10h3	340.6	322.0	360.6
PAR10h4	314.7	297.8	334.0
PAR11h1	439.5	412.0	469.7

PAR11h2	407.1	382.9	432.9
PAR11h3	449.6	421.7	477.3
PAR11h4	412.2	388.3	438.5
PAR12h1	340.4	320.9	361.0
PAR12h2	321.2	303.3	340.8
PAR12h3	350.3	329.7	373.2
PAR12h4	331.5	313.0	352.3
PAR13h1	412.6	388.2	440.2
PAR13h2	402.7	378.6	429.2
PAR13h3	462.9	433.6	492.8
PAR13h4	417.0	390.6	445.0
PAR14h1	467.7	438.5	498.2
PAR14h2	467.9	438.4	499.3
PAR14h3	389.9	367.3	414.6
PAR14h4	405.1	379.7	432.6
PAR15h1	486.6	456.4	517.6
PAR15h2	402.5	375.1	432.3
PAR15h3	447.0	420.0	474.6
PAR15h4	464.4	435.7	494.3
PAR16h1	468.7	430.8	513.1
PAR16h2	460.1	422.9	503.0
PAR16h3	510.8	471.5	552.5
PAR16h4	398.3	368.5	426.9
PAR16h5	385.2	356.0	417.8
PAR16h6	421.7	388.8	453.5
PAR16h7	410.2	372.6	446.4
PAR16h8	388.3	358.9	421.2
PAR16h9	489.3	453.2	529.6
PAR16h10	450.1	413.1	491.2
PAR16h11	415.2	388.5	444.6
PAR16h12	418.5	382.8	457.5

PAR16h13	440.0	403.5	479.4
PAR16h14	408.8	379.4	441.9
PAR16h15	449.2	412.3	492.2
PAR16h16	415.3	386.9	446.2
PAR16h17	405.9	375.4	439.6
PAR16h18	420.2	385.7	463.4
PAR16h19	462.2	423.4	503.7
PAR16h20	425.4	391.1	461.1
PAR16h21	481.8	443.4	527.7
PAR16h22	457.2	427.5	490.0
PAR16h23	401.2	364.1	444.5
PAR16h24	427.7	394.3	464.1
PAR16h25	447.7	414.8	484.2
PAR17h1	136.1	130.3	142.2
PAR17h2	147.5	140.3	155.6
PAR17h3	158.4	151.6	165.1
PAR17h4	125.6	119.7	132.1
NOU01q1	372.4	320.2	435.9
NOU01q2	686.3	549.5	889.9
NOU01q3	231.9	195.2	277.2
NOU01q4	448.8	367.2	565.1
NOU01q5	478.4	417.4	556.2
NOU01q6	355.8	300.1	424.7
NOU01q7	476.2	400.3	570.0
NOU01q8	466.0	397.9	545.3
NOU02q1	365.0	294.6	468.5
NOU02q2	324.3	270.5	393.1
NOU02q3	253.9	194.7	347.3
NOU02q4	244.3	207.2	289.9
NOU02q5	247.0	214.7	283.5
NOU02q6	288.2	240.9	348.4

NOU02q7	211.3	177.2	256.2
NOU02q8	381.9	323.6	454.5
NOU02q9	216.3	182.7	260.2
NOU02q10	257.6	221.0	301.9
NOU02q11	442.8	368.8	532.9
NOU02q12	467.3	392.1	559.1
NOU02q13	182.2	156.6	214.9
NOU02q14	191.8	165.7	222.1
NOU02q15	383.3	307.2	492.3
NOU02q16	362.0	309.0	429.8
NOU02q17	342.7	287.2	417.2
NOU02q18	380.9	299.5	497.3
NOU02q19	275.1	225.4	340.4
NOU02q20	207.1	177.7	246.9
NOU02q21	291.1	252.3	336.0
NOU02q22	217.1	184.1	264.5
NOU02q23	408.3	336.3	496.4
NOU02q24	368.5	289.1	486.1
NOU02q25	465.2	374.4	579.8
NOU02q26	305.6	258.2	367.9
NOU02q27	452.7	371.4	554.7
NOU02q28	356.0	298.2	422.8
NOU02q29	802.5	660.0	977.2
NOU02q30	441.3	361.2	546.2
NOU02q31	661.8	551.4	803.6
NOU02q32	570.3	482.6	665.9
NOU02q33	431.7	363.8	516.1
NOU02q34	579.9	478.4	704.3
NOU02q35	433.1	356.8	520.8
NOU02q36	467.8	400.2	552.2
NOU02q37	473.7	388.0	590.2
NOU02q38	325.3	272.5	389.8

NOU02q39	545.4	472.2	644.8
NOU02q40	463.3	394.3	556.8
NOU03q1	338.1	288.5	397.4
NOU03q2	512.0	426.8	628.2
NOU03q3	668.9	559.1	804.2
NOU03q4	386.6	326.0	476.3
NOU03q5	352.0	309.6	402.1
NOU03q6	549.8	443.1	681.8
NOU03q7	414.5	362.3	480.6
NOU03q8	753.6	603.4	967.7
NOU03q9	630.3	536.8	748.8
NOU03q10	469.1	404.8	539.3
NOU03q11	426.5	361.1	509.1
NOU03q12	503.8	408.8	618.8
NOU03q13	475.5	388.0	582.5
NOU03q14	522.8	436.1	630.3
NOU03q15	704.7	583.7	860.8
NOU03q16	526.9	433.4	642.0
NOU03q17	491.6	426.5	568.4
NOU03q18	535.1	454.9	626.1
NOU03q19	788.6	652.0	956.7
NOU03q20	417.3	329.2	543.1
NOU03q21	499.6	418.1	607.3
NOU03q22	416.5	343.4	498.7
NOU03q23	660.1	534.3	835.8
NOU03q24	562.2	474.5	671.8
NOU04q1	474.0	406.2	561.3
NOU04q2	391.8	333.4	464.6
NOU04q3	268.6	227.7	317.4
NOU04q4	397.5	340.9	469.4
NOU04q5	468.0	398.8	550.6

NOU04q6	410.7	351.7	482.3
NOU04q7	482.0	413.8	560.4
NOU04q8	450.9	383.2	537.6
NOU04q9	437.3	377.9	509.9
NOU04q10	483.8	412.8	577.6
NOU04q11	248.7	210.6	303.4
NOU04q12	326.2	268.6	399.6
NOU04q13	413.4	357.5	477.6
NOU04q14	399.8	341.0	468.6
NOU04q15	477.6	409.0	557.4
NOU04q16	481.0	395.8	592.8
NOU04q17	623.2	540.2	728.0
NOU04q18	348.6	299.0	405.7
NOU04q19	381.9	322.4	452.8
NOU04q20	361.4	298.1	449.4
NOU04q21	500.7	431.4	579.0
NOU04q22	499.8	428.6	585.7
NOU04q23	402.8	343.3	476.5
NOU04q24	359.2	297.2	438.6
NOU04q25	416.3	352.3	497.6
NOU04q26	359.8	301.7	428.3
NOU04q27	362.3	311.4	426.1
NOU04q28	484.1	395.1	594.2
NOU04q29	439.7	374.1	519.2
NOU04q30	418.1	359.5	495.0
NOU04q31	468.9	405.9	536.5
NOU04q32	565.4	483.9	663.3
NOU04q33	645.5	553.4	754.7
NOU04q34	435.6	371.4	507.7
NOU04q35	361.3	313.3	423.7
NOU04q36	465.9	392.9	556.4

NOU04q37	545.7	471.0	636.8
NOU04q38	528.9	461.4	614.3
NOU04q39	527.1	463.2	599.0
NOU04q40	562.6	458.1	719.9
NOU04q41	518.5	445.9	605.0
NOU04q42	585.4	490.1	703.4
NOU04q43	452.9	377.3	537.4
NOU04q44	375.9	313.5	454.4
NOU04q45	512.6	433.8	621.1
NOU04q46	455.9	381.4	548.1
NOU04q47	390.0	334.9	461.7
NOU04q48	477.3	409.5	560.5
NOU05q1	244.5	209.2	291.8
NOU06q1	297.5	250.7	360.1
NOU07q1	329.0	301.6	360.2
NOU09q1	606.3	505.1	735.1
NOU09q2	339.3	291.1	401.9
NOU09q3	413.4	353.7	490.4
NOU09q4	506.6	423.5	613.1
NOU10q1	374.4	318.2	443.6
NOU10q2	415.9	351.7	510.2
NOU10q3	505.1	436.3	586.7
NOU10q4	311.3	274.6	353.1
NOU11q1	217.8	188.7	248.0
PAR01q1	372.3	322.1	431.6
PAR01q2	379.8	334.5	430.1
PAR01q3	271.0	235.0	312.4
PAR01q4	429.5	383.9	481.8
PAR01q5	437.4	386.5	495.5
PAR01q6	512.4	449.9	586.1
PAR01q7	475.3	415.1	547.8
PAR01q8	369.1	322.0	427.0

PAR01q9	267.5	237.4	303.1
PAR01q10	343.7	301.6	393.8
PAR01q11	535.4	454.3	628.5
PAR01q12	574.3	505.1	649.8
PAR01q13	448.7	393.7	516.0
PAR01q14	313.7	275.4	364.6
PAR01q15	353.1	311.2	398.7
PAR01q16	417.5	369.7	476.2
PAR01q17	433.3	386.3	489.0
PAR01q18	394.3	346.5	447.0
PAR01q19	349.5	302.9	406.5
PAR01q20	339.2	304.0	377.6
PAR01q21	424.4	373.8	475.8
PAR01q22	364.3	319.0	416.2
PAR01q23	383.8	337.8	432.2
PAR01q24	393.8	344.8	446.8
PAR01q25	274.3	240.8	312.5
PAR02q1	336.6	297.5	381.2
PAR02q2	246.3	215.4	282.4
PAR02q3	336.0	294.3	392.6
PAR02q4	316.0	277.3	363.1
PAR02q5	336.1	293.4	386.6
PAR02q6	378.0	328.6	442.1
PAR02q7	334.5	293.2	386.3
PAR02q8	359.6	315.6	415.6
PAR02q9	378.8	333.1	428.7
PAR02q10	341.0	305.0	382.6
PAR02q11	394.3	344.6	450.7
PAR02q12	343.0	300.0	393.0
PAR02q13	396.7	349.4	452.2
PAR02q14	390.5	348.0	441.4

PAR02q15	303.5	267.7	347.7
PAR02q16	429.8	382.7	483.8
PAR02q17	479.4	423.9	541.5
PAR02q18	438.7	389.5	493.6
PAR02q19	374.1	333.0	420.5
PAR02q20	283.2	250.7	322.8
PAR02q21	419.7	364.9	484.9
PAR02q22	513.0	430.5	627.2
PAR02q23	335.4	291.6	384.0
PAR02q24	372.7	326.1	430.2
PAR02q25	283.0	250.3	325.2
PAR03q1	402.9	361.1	445.7
PAR03q2	366.0	303.7	445.0
PAR03q3	312.4	273.3	357.2
PAR03q4	341.1	300.5	388.0
PAR03q5	233.4	203.2	268.9
PAR03q6	428.9	378.7	490.9
PAR03q7	412.0	359.4	469.1
PAR03q8	351.3	305.9	403.3
PAR03q9	435.5	383.7	500.2
PAR03q10	312.4	277.6	354.0
PAR03q11	343.1	308.9	383.6
PAR03q12	308.8	274.9	349.2
PAR03q13	382.3	343.3	430.3
PAR03q14	321.6	290.0	356.8
PAR03q15	326.8	290.8	370.7
PAR03q16	328.0	292.0	366.9
PAR03q17	294.1	266.5	325.5
PAR03q18	283.6	255.2	315.5
PAR03q19	335.3	301.6	370.7
PAR03q20	265.7	234.8	299.7

PAR03q21	299.6	269.2	335.6
PAR03q22	300.9	269.1	339.2
PAR03q23	251.7	227.6	280.3
PAR03q24	303.4	275.0	336.3
PAR03q25	409.0	363.6	457.1
PAR04q1	299.1	266.6	338.8
PAR04q2	289.2	257.2	323.4
PAR04q3	302.6	271.7	340.4
PAR04q4	412.5	366.2	467.6
PAR04q5	340.3	305.7	381.9
PAR04q6	274.0	247.1	308.5
PAR04q7	279.7	251.4	314.0
PAR04q8	374.8	339.7	414.3
PAR04q9	303.8	270.0	344.7
PAR04q10	273.0	241.3	307.4
PAR04q11	303.7	276.1	340.0
PAR04q12	309.4	279.9	343.1
PAR04q13	386.5	347.5	431.0
PAR04q14	255.5	228.5	283.4
PAR04q15	275.3	246.0	310.5
PAR04q16	277.7	249.8	309.5
PAR04q17	319.9	284.4	364.6
PAR04q18	291.8	259.4	326.3
PAR04q19	314.6	285.0	350.6
PAR04q20	440.1	391.8	496.4
PAR04q21	329.9	300.9	361.6
PAR04q22	239.6	213.8	268.3
PAR04q23	308.4	278.0	343.7
PAR04q24	283.2	250.2	319.8
PAR04q25	337.4	305.7	378.6
PAR05q1	295.4	265.6	329.2
PAR05q2	298.5	264.8	338.5

PAR05q3	354.2	318.7	395.2
PAR05q4	311.9	277.5	349.1
PAR05q5	318.9	284.4	361.7
PAR05q6	394.8	354.0	439.0
PAR05q7	304.2	270.2	339.8
PAR05q8	343.9	305.5	383.2
PAR05q9	279.6	246.8	315.1
PAR05q10	343.6	302.6	391.1
PAR05q11	350.3	313.3	390.5
PAR05q12	345.1	308.4	385.2
PAR05q13	471.1	408.2	553.3
PAR05q14	390.7	349.0	439.5
PAR05q15	378.9	338.8	427.1
PAR05q16	240.7	215.9	271.8
PAR05q17	260.0	231.1	292.9
PAR05q18	267.8	237.0	302.7
PAR05q19	297.2	266.9	332.7
PAR05q20	329.2	292.6	367.7
PAR05q21	280.6	252.6	310.6
PAR05q22	314.3	280.6	356.3
PAR05q23	253.6	227.4	287.6
PAR05q24	316.6	278.6	364.6
PAR05q25	365.3	328.9	407.8
PAR06q1	535.6	477.7	603.5
PAR06q2	431.5	385.3	486.0
PAR06q3	436.1	393.1	485.2
PAR06q4	487.1	430.6	552.3
PAR06q5	573.0	499.6	654.7
PAR06q6	335.0	293.7	384.0
PAR06q7	307.6	273.0	347.0
PAR06q8	446.7	380.0	523.8

PAR06q9	519.1	461.3	586.1
PAR06q10	534.0	469.0	615.9
PAR06q11	470.7	406.9	535.6
PAR06q12	414.0	361.6	478.6
PAR06q13	359.4	308.5	428.6
PAR06q14	405.9	354.2	467.1
PAR06q15	420.8	365.4	486.0
PAR06q16	367.2	317.2	425.5
PAR06q17	307.1	265.8	356.4
PAR06q18	435.2	381.6	507.8
PAR06q19	563.9	483.3	647.7
PAR06q20	445.5	393.4	503.2
PAR06q21	410.6	364.6	463.4
PAR06q22	371.3	319.2	436.7
PAR06q23	531.8	463.3	620.4
PAR06q24	515.7	459.1	582.2
PAR06q25	548.6	480.4	623.8
PAR07q1	429.1	372.8	502.1
PAR07q2	399.6	344.6	470.3
PAR07q3	436.6	379.7	505.0
PAR07q4	297.0	259.8	344.7
PAR07q5	356.3	306.3	421.4
PAR07q6	438.3	392.8	488.0
PAR07q7	376.2	334.9	419.8
PAR07q8	490.8	437.4	555.4
PAR07q9	455.1	394.3	529.2
PAR07q10	316.5	277.3	365.8
PAR07q11	396.7	347.8	452.7
PAR07q12	421.2	371.4	476.6
PAR07q13	518.1	451.0	590.7
PAR07q14	416.2	362.2	485.3

PAR07q15	384.6	340.4	437.0
PAR07q16	430.5	376.9	492.5
PAR07q17	348.4	303.1	401.0
PAR07q18	423.0	377.9	474.0
PAR07q19	505.6	444.5	574.0
PAR07q20	400.9	354.6	455.4
PAR07q21	463.4	408.9	530.8
PAR07q22	446.6	389.1	511.0
PAR07q23	346.1	304.3	395.2
PAR07q24	463.6	400.0	538.7
PAR07q25	419.9	373.9	474.2
PAR08q1	270.2	239.3	304.6
PAR08q2	192.1	168.7	219.6
PAR08q3	297.2	260.5	337.4
PAR08q4	212.1	188.1	240.2
PAR08q5	308.2	267.2	355.8
PAR08q6	315.4	278.5	355.9
PAR08q7	331.9	295.3	371.4
PAR08q8	282.1	252.3	312.8
PAR08q9	276.8	246.5	311.9
PAR08q10	280.2	249.8	312.3
PAR08q11	247.0	220.5	277.7
PAR08q12	293.1	261.6	328.9
PAR08q13	282.5	252.4	318.2
PAR08q14	303.7	267.6	354.1
PAR08q15	265.0	235.0	297.5
PAR08q16	308.3	276.5	346.0
PAR08q17	351.6	320.2	390.2
PAR08q18	282.3	257.4	311.9
PAR08q19	241.0	213.4	273.5
PAR08q20	297.8	264.6	335.7
PAR08q21	287.1	260.8	315.3

PAR08q22	245.8	218.7	275.9
PAR08q23	263.7	236.5	294.9
PAR08q24	298.4	266.3	336.5
PAR08q25	272.7	244.0	306.7
PAR09q1	384.2	340.4	428.7
PAR09q2	300.9	266.8	338.6
PAR09q3	396.5	354.9	448.1
PAR09q4	336.2	299.3	384.3
PAR09q5	266.7	236.0	300.5
PAR09q6	438.7	392.3	494.3
PAR09q7	450.6	400.4	512.5
PAR09q8	475.1	428.4	531.3
PAR09q9	336.1	291.0	389.9
PAR09q10	387.9	325.9	479.7
PAR09q11	422.6	370.9	479.5
PAR09q12	392.5	348.2	443.6
PAR09q13	352.8	313.5	398.1
PAR09q14	289.9	255.4	330.8
PAR09q15	363.7	325.8	406.1
PAR09q16	361.9	318.8	417.6
PAR09q17	368.6	327.2	420.8
PAR09q18	308.9	268.6	362.2
PAR09q19	295.9	257.7	338.9
PAR09q20	428.8	379.9	484.9
PAR09q21	278.2	248.9	315.8
PAR09q22	342.4	306.6	383.2
PAR09q23	344.5	306.2	389.3
PAR09q24	299.0	262.2	343.3
PAR09q25	492.2	435.6	557.4
PAR10q1	310.9	277.0	349.7
PAR10q2	319.8	281.8	365.5

PAR10q3	375.9	333.6	428.2
PAR10q4	274.4	242.9	311.9
PAR10q5	306.4	275.6	342.5
PAR10q6	435.5	388.1	483.9
PAR10q7	297.2	262.8	338.7
PAR10q8	289.7	252.7	332.9
PAR10q9	357.9	315.3	411.2
PAR10q10	227.7	203.1	255.4
PAR10q11	367.8	329.5	409.2
PAR10q12	379.7	334.1	429.4
PAR10q13	413.7	365.6	472.1
PAR10q14	267.4	237.3	302.0
PAR10q15	340.4	302.1	384.2
PAR10q16	388.7	346.8	435.2
PAR10q17	344.8	312.9	382.4
PAR10q18	277.9	246.8	315.1
PAR10q19	348.0	310.0	393.6
PAR10q20	303.1	273.9	336.7
PAR10q21	373.2	335.8	415.2
PAR10q22	261.3	235.3	290.3
PAR10q23	348.2	310.8	389.6
PAR10q24	355.6	317.4	396.7
PAR10q25	326.0	283.5	375.6
PAR11q1	342.7	302.5	391.8
PAR11q2	380.0	335.3	430.0
PAR11q3	428.9	381.3	480.5
PAR11q4	430.2	384.4	483.6
PAR11q5	406.3	365.5	453.8
PAR11q6	507.0	447.9	579.3
PAR11q7	354.6	310.8	405.5
PAR11q8	499.6	452.0	554.5

PAR11q9	319.8	278.6	365.8
PAR11q10	489.9	435.8	555.3
PAR11q11	565.9	503.4	637.2
PAR11q12	431.9	384.0	481.5
PAR11q13	386.0	339.4	438.4
PAR11q14	473.9	429.1	524.7
PAR11q15	473.8	411.9	554.1
PAR11q16	376.7	335.2	424.3
PAR11q17	448.1	403.0	504.1
PAR11q18	399.6	352.3	454.0
PAR11q19	449.9	400.7	508.7
PAR11q20	345.1	301.3	395.8
PAR11q21	460.7	408.6	521.8
PAR11q22	414.9	361.8	478.1
PAR11q23	428.8	378.8	483.9
PAR11q24	379.4	327.6	437.6
PAR11q25	458.2	401.1	523.8
PAR12q1	275.4	244.3	310.7
PAR12q2	294.4	262.2	331.1
PAR12q3	405.4	356.7	460.5
PAR12q4	356.7	318.7	399.2
PAR12q5	326.5	293.6	366.3
PAR12q6	378.3	336.4	425.9
PAR12q7	325.5	293.3	364.5
PAR12q8	350.3	315.7	388.5
PAR12q9	324.9	286.7	369.2
PAR12q10	315.4	281.6	352.7
PAR12q11	291.0	258.3	329.2
PAR12q12	251.3	224.1	288.1
PAR12q13	334.9	302.6	373.4
PAR12q14	315.3	283.2	355.2
PAR12q15	385.4	340.7	433.0

PAR12q16	293.3	262.3	330.6
PAR12q17	349.5	311.2	393.8
PAR12q18	394.9	353.1	440.2
PAR12q19	321.6	291.0	357.3
PAR12q20	332.1	296.7	375.8
PAR12q21	299.1	266.3	336.7
PAR12q22	330.4	293.5	374.8
PAR12q23	379.5	341.3	426.1
PAR12q24	342.3	307.9	377.1
PAR12q25	356.5	319.7	397.3
PAR13q1	471.9	416.1	533.4
PAR13q2	499.1	442.5	567.6
PAR13q3	516.6	460.8	581.9
PAR13q4	444.4	402.0	495.1
PAR13q5	470.5	412.8	538.2
PAR13q6	354.9	303.1	419.6
PAR13q7	339.7	296.0	392.2
PAR13q8	377.4	327.7	434.7
PAR13q9	381.0	336.6	434.5
PAR13q10	413.3	365.8	468.6
PAR13q11	423.9	373.7	481.4
PAR13q12	470.5	421.5	525.8
PAR13q13	414.3	372.1	462.7
PAR13q14	409.7	359.2	466.2
PAR13q15	349.6	307.5	405.0
PAR13q16	466.0	422.4	516.9
PAR13q17	417.8	368.1	483.8
PAR13q18	483.7	433.8	536.1
PAR13q19	358.6	319.4	402.6
PAR13q20	467.1	411.0	530.3
PAR13q21	506.0	444.2	580.7

PAR13q22	490.5	428.5	565.2
PAR13q23	399.0	343.4	468.2
PAR13q24	239.4	205.5	281.2
PAR13q25	459.7	402.7	527.8
PAR14q1	477.1	412.5	546.5
PAR14q2	517.7	457.6	585.7
PAR14q3	423.5	375.3	478.9
PAR14q4	411.0	368.9	459.4
PAR14q5	488.9	429.2	559.5
PAR14q6	537.3	474.5	613.4
PAR14q7	378.7	330.7	434.4
PAR14q8	468.4	411.6	538.7
PAR14q9	480.4	426.7	538.7
PAR14q10	496.3	441.1	560.1
PAR14q11	428.8	383.9	479.0
PAR14q12	394.4	350.2	444.5
PAR14q13	373.3	335.0	417.7
PAR14q14	391.3	342.1	450.7
PAR14q15	595.5	531.8	670.0
PAR14q16	386.9	341.6	439.0
PAR14q17	332.1	296.3	369.7
PAR14q18	408.7	365.2	462.3
PAR14q19	399.3	349.5	463.1
PAR14q20	412.4	356.2	478.9
PAR14q21	400.0	354.2	454.6
PAR14q22	327.0	285.9	372.1
PAR14q23	446.8	391.4	510.0
PAR14q24	470.8	417.2	536.5
PAR14q25	380.5	337.0	430.4
PAR15q1	496.6	441.3	555.3
PAR15q2	483.9	428.9	545.4

PAR15q3	394.8	337.1	473.9
PAR15q4	462.6	408.0	531.6
PAR15q5	518.6	461.0	584.9
PAR15q6	441.5	395.6	493.3
PAR15q7	524.3	463.3	589.3
PAR15q8	401.9	345.5	469.1
PAR15q9	338.4	291.3	394.3
PAR15q10	324.2	284.3	369.7
PAR15q11	451.8	401.8	510.2
PAR15q12	455.5	406.9	510.6
PAR15q13	485.3	431.6	543.3
PAR15q14	526.1	458.8	604.2
PAR15q15	274.0	237.7	315.8
PAR15q16	394.1	345.4	449.1
PAR15q17	544.2	477.3	616.2
PAR15q18	449.3	406.7	498.9
PAR15q19	364.9	324.0	415.8
PAR15q20	429.2	386.9	480.8
PAR15q21	454.9	405.2	512.1
PAR15q22	456.5	409.4	509.5
PAR15q23	444.9	396.3	498.3
PAR15q24	553.5	496.1	618.9
PAR15q25	420.1	374.6	472.7
PAR16q1	423.1	362.0	499.7
PAR16q2	588.8	506.5	693.0
PAR16q3	707.8	603.6	835.1
PAR16q4	408.9	358.9	465.3
PAR16q5	513.3	443.4	607.4
PAR16q6	496.4	426.6	572.9
PAR16q7	477.9	419.4	543.6
PAR16q8	387.0	333.7	448.9
PAR16q9	501.4	436.5	573.7

PAR16q10	312.1	259.6	379.5
PAR16q11	522.2	441.6	623.2
PAR16q12	340.8	289.5	405.5
PAR16q13	370.3	313.3	437.6
PAR16q14	353.5	311.5	404.5
PAR16q15	570.8	490.4	669.1
PAR16q16	462.9	404.7	531.8
PAR16q17	415.8	361.9	476.1
PAR16q18	312.4	270.7	361.1
PAR16q19	282.7	241.1	334.3
PAR16q20	444.7	389.3	515.5
PAR16q21	445.6	385.2	513.8
PAR16q22	364.0	308.6	429.1
PAR16q23	310.3	260.9	368.9
PAR16q24	402.5	324.9	495.6
PAR16q25	320.4	272.1	383.2
PAR16q26	327.9	287.6	378.3
PAR16q27	605.3	515.3	718.7
PAR16q28	477.2	415.2	547.4
PAR16q29	412.8	355.0	493.3
PAR16q30	346.4	299.0	406.2
PAR16q31	376.4	325.8	440.2
PAR16q32	500.9	430.1	590.5
PAR16q33	355.7	306.5	416.4
PAR16q34	572.4	485.1	677.6
PAR16q35	366.7	314.9	432.8
PAR16q36	538.1	464.2	619.2
PAR16q37	407.7	353.2	471.6
PAR16q38	466.8	410.8	530.9
PAR16q39	539.8	466.4	627.7
PAR16q40	501.2	418.7	599.9

PAR16q41	441.5	386.7	510.4
PAR16q42	377.7	328.2	437.8
PAR16q43	341.2	300.5	391.0
PAR16q44	458.1	390.9	533.6
PAR16q45	535.4	450.6	636.1
PAR16q46	415.8	358.3	485.2
PAR16q47	408.0	354.4	465.9
PAR16q48	389.2	338.0	450.0
PAR16q49	502.0	439.5	573.9
PAR16q50	408.5	345.9	491.0
PAR16q51	448.0	393.3	508.4
PAR16q52	393.6	349.1	448.5
PAR16q53	505.4	426.1	594.7
PAR16q54	369.4	303.3	458.3
PAR16q55	408.8	339.5	491.6
PAR16q56	400.2	344.9	465.5
PAR16q57	410.3	359.8	474.1
PAR16q58	427.8	375.1	492.1
PAR16q59	521.9	436.7	628.7
PAR16q60	364.5	307.1	439.5
PAR16q61	514.8	446.4	596.5
PAR16q62	268.4	235.9	305.5
PAR16q63	370.7	314.6	434.2
PAR16q64	353.2	304.8	408.8
PAR16q65	386.5	328.0	464.8
PAR16q66	257.0	224.5	296.9
PAR16q67	529.7	455.8	623.1
PAR16q68	410.9	358.2	477.9
PAR16q69	433.1	372.5	502.9
PAR16q70	365.2	309.9	437.5
PAR16q71	474.9	416.4	539.7

PAR16q72	403.2	352.6	458.4
PAR16q73	482.6	413.6	563.1
PAR16q74	417.1	363.2	481.4
PAR16q75	436.1	367.4	519.4
PAR16q76	601.4	504.5	723.3
PAR16q77	428.1	355.2	527.8
PAR16q78	480.2	407.4	575.0
PAR16q79	443.8	384.3	513.7
PAR16q80	459.5	392.0	548.1
PAR16q81	513.3	453.9	580.8
PAR16q82	316.4	275.3	367.9
PAR16q83	473.5	417.2	551.0
PAR16q84	444.0	388.0	511.3
PAR16q85	348.7	297.2	418.8
PAR16q86	350.8	298.0	412.6
PAR16q87	376.8	325.0	440.2
PAR16q88	515.5	442.2	606.8
PAR16q89	485.3	413.9	574.2
PAR16q90	416.6	355.4	486.9
PAR16q91	548.2	465.4	656.0
PAR16q92	549.4	461.5	675.0
PAR16q93	480.5	425.4	549.1
PAR16q94	430.9	377.0	499.7
PAR16q95	492.9	390.8	638.6
PAR16q96	412.4	348.1	492.6
PAR16q97	412.7	351.9	486.5
PAR16q98	406.0	344.9	476.3
PAR16q99	436.0	374.0	513.6
PAR16q100	452.9	387.0	528.0
PAR17q1	129.5	117.9	143.7
PAR17q2	152.6	133.0	183.4
PAR17q3	182.5	167.4	197.7

PAR17q4	172.2	156.3	189.9
PAR17q5	179.6	165.9	194.3
PAR17q6	129.1	118.6	140.1
PAR17q7	127.8	117.4	139.0
PAR17q8	145.4	133.4	160.2
PAR17q9	132.0	119.9	145.4
PAR17q10	146.7	131.0	165.0
PAR17q11	142.5	132.0	153.4
PAR17q12	131.2	120.3	142.9
PAR17q13	151.0	140.3	163.0
PAR17q14	145.0	131.0	162.6
PAR17q15	137.8	124.9	153.1
PAR17q16	150.0	137.8	162.6
PAR17q17	180.5	164.0	197.7
PAR17q18	179.8	167.5	193.7
PAR17q19	91.4	83.2	100.6
PAR17q20	138.9	127.3	150.9
PAR17q21	129.4	118.6	142.1
PAR17q22	139.4	127.1	151.7
PAR17q23	129.1	118.6	140.9
PAR17q24	130.3	118.0	145.1
PAR17q25	170.6	152.8	191.7

AGB USING ENVIRONMENTAL FACTOR E (agb_chv)

```
AGB_chv.list <- list()

rm(resultMC_ChavFG); gc()
resultMC_ChaveFG <- by(TropiSARstemTREE, TropiSARstemTREE[,"Site"],
                       function(x) AGBmonteCarlo(D=x$Diameter, WD=x$WD, errWD=x$sdWD, coord=cb
ind(x$long,x$lat),
                                                 Dpropag="chave2004"), simplify=F)

tempNOU <- as.data.frame(resultMC_ChaveFG$NOURAGUES$AGB_simu)
```

```
tempPAR <- as.data.frame(resultMC_ChaveFG$PARACOU$AGB_simu)
tempTROP <- rbind(tempNOU,tempPAR)
Tropiprop_CHAV <- cbind(TropiSARstemTREE, tempTROP)
Tropiprop_CHAV <- rbind(Tropiprop_CHAV, Tropiprop_PALM)

for (i in (1:length(resolAGB))) {
  tempocalc <- by(Tropiprop_CHAV, Tropiprop_CHAV[,resolAGB[i]],
                  function(x) list(meanAGB = mean(apply(x[,46:1045], 2, sum, na.rm = T)),
                                   credibilityAGB = quantile(apply(x[,46:1045], 2, sum, na.rm
= T), probs = c(0.025,0.975))))

  AGB_chv.list[[i]] <- data.frame(Area_code = names(tempocalc),
                                  agb_chv = round(as.numeric(sapply(tempocalc,"[",1))*coefmult
[i],1),
                                  cred_chv_2.5 = round(as.numeric(lapply(sapply(tempocalc,"[",
2), function(x) x[1]))*coefmult[i],1),
                                  cred_chv_97.5 = round(as.numeric(lapply(sapply(tempocalc,"["
,2), function(x) x[2]))*coefmult[i],1), stringsAsFactors = F)

  AGB_chv.list[[i]] <- AGB_chv.list[[i]][match(ordarea[[i]], AGB_chv.list[[i]]$Area_code),]
  rownames(AGB_chv.list[[i]]) <- NULL
}
AGB_chv.list
AGB_chv.df <- Reduce(rbind, AGB_chv.list)
AGB_chv.df
```

Area_code	agb_chv	cred_chv_2.5	cred_chv_97.5
NOU01h1	468.2	410.1	547.5
NOU01h2	395.6	352.9	448.2
NOU02h1	287.9	250.3	334.4
NOU02h2	269.6	241.6	302.1
NOU02h3	332.1	296.6	376.7
NOU02h4	269.3	237.5	310.1
NOU02h5	293.8	257.6	338.1
NOU02h6	313.5	275.5	360.0
NOU02h7	385.7	343.6	437.4
NOU02h8	628.6	558.4	718.4
NOU02h9	465.6	418.5	519.6
NOU02h10	439.4	391.7	491.6
NOU03h1	509.9	445.4	597.5
NOU03h2	528.0	472.2	596.4
NOU03h3	457.0	400.6	525.1

NOU03h4	558.9	488.2	638.0
NOU03h5	540.9	476.7	616.9
NOU03h6	559.3	494.5	641.3
NOU04h1	427.1	386.2	476.5
NOU04h2	295.1	264.6	331.3
NOU04h3	400.8	365.2	444.9
NOU04h4	464.9	413.0	523.4
NOU04h5	418.4	377.0	466.2
NOU04h6	386.5	342.6	437.9
NOU04h7	445.3	401.8	491.7
NOU04h8	432.6	387.9	483.3
NOU04h9	528.0	476.5	585.9
NOU04h10	397.6	353.5	445.6
NOU04h11	490.3	444.3	547.4
NOU04h12	472.9	424.3	535.4
NOU08h1	510.2	458.7	567.8
NOU09h1	462.1	409.9	523.1
NOU10h1	379.4	343.5	423.3
PAR01h1	414.8	382.4	457.0
PAR01h2	278.9	257.3	302.0
PAR01h3	448.7	413.0	486.6
PAR01h4	332.2	305.6	363.9
PAR02h1	319.6	295.1	348.8
PAR02h2	312.1	289.6	338.1
PAR02h3	369.6	340.2	401.7
PAR02h4	317.5	292.9	343.5
PAR03h1	336.4	309.5	367.2
PAR03h2	312.2	289.9	337.5
PAR03h3	288.4	269.6	308.9
PAR03h4	285.2	266.7	307.1
PAR04h1	284.5	266.0	305.0

PAR04h2	306.5	283.9	332.4
PAR04h3	257.4	240.6	277.7
PAR04h4	276.6	258.0	296.0
PAR05h1	305.0	285.2	326.7
PAR05h2	293.6	272.3	315.9
PAR05h3	278.7	256.1	308.7
PAR05h4	291.1	271.4	312.8
PAR06h1	345.6	317.8	374.8
PAR06h2	467.1	428.0	512.3
PAR06h3	334.8	305.1	366.6
PAR06h4	419.9	382.0	457.8
PAR07h1	409.3	376.4	445.9
PAR07h2	397.2	363.9	437.3
PAR07h3	374.7	344.3	409.6
PAR07h4	421.7	389.2	455.5
PAR08h1	280.6	260.5	302.2
PAR08h2	252.3	234.1	271.6
PAR08h3	267.8	250.4	285.7
PAR08h4	242.6	225.0	261.7
PAR09h1	371.2	343.5	401.2
PAR09h2	341.8	313.4	379.8
PAR09h3	304.1	281.1	330.7
PAR09h4	318.4	295.0	346.5
PAR10h1	347.3	322.3	378.2
PAR10h2	273.1	252.6	295.3
PAR10h3	305.8	285.3	329.2
PAR10h4	282.9	264.6	303.0
PAR11h1	400.3	369.3	436.8
PAR11h2	367.9	339.6	396.8
PAR11h3	409.2	378.2	443.2
PAR11h4	371.8	343.4	400.7
PAR12h1	306.3	283.8	328.8

PAR12h2	289.1	269.5	310.5
PAR12h3	315.4	292.1	340.9
PAR12h4	296.0	277.4	317.5
PAR13h1	377.0	346.1	411.0
PAR13h2	367.6	338.9	397.2
PAR13h3	422.7	385.6	460.4
PAR13h4	378.9	350.3	411.8
PAR14h1	427.9	396.2	465.0
PAR14h2	425.6	392.7	460.7
PAR14h3	351.3	324.5	382.4
PAR14h4	369.1	339.2	401.6
PAR15h1	442.8	409.8	479.0
PAR15h2	368.7	338.0	404.2
PAR15h3	404.0	376.3	435.9
PAR15h4	422.3	389.0	456.5
PAR16h1	444.2	399.3	495.4
PAR16h2	432.5	393.3	476.9
PAR16h3	480.9	437.1	528.8
PAR16h4	368.2	336.1	405.6
PAR16h5	362.7	329.1	401.8
PAR16h6	393.1	354.9	433.4
PAR16h7	390.1	348.1	437.3
PAR16h8	360.7	328.5	397.1
PAR16h9	458.7	418.0	507.9
PAR16h10	424.6	380.7	466.7
PAR16h11	378.6	347.8	412.5
PAR16h12	394.5	354.9	440.6
PAR16h13	418.4	373.0	470.6
PAR16h14	378.6	346.7	411.2
PAR16h15	426.9	383.7	475.7
PAR16h16	380.4	349.0	415.5

PAR16h17	375.5	340.8	414.2
PAR16h18	401.0	360.1	453.0
PAR16h19	437.2	394.3	483.9
PAR16h20	399.1	362.2	441.9
PAR16h21	458.5	410.7	516.9
PAR16h22	419.4	384.6	456.1
PAR16h23	384.7	339.0	446.1
PAR16h24	402.4	360.3	446.0
PAR16h25	423.3	381.2	471.0
PAR17h1	123.1	116.4	130.3
PAR17h2	133.7	124.7	143.6
PAR17h3	143.2	135.6	151.7
PAR17h4	113.8	107.3	121.2
NOU01q1	352.8	295.4	420.6
NOU01q2	725.9	545.6	1020.5
NOU01q3	217.1	177.2	267.3
NOU01q4	441.6	349.2	585.1
NOU01q5	453.6	381.2	538.9
NOU01q6	340.6	279.0	422.0
NOU01q7	472.9	383.8	574.0
NOU01q8	450.7	376.2	549.9
NOU02q1	355.4	279.2	475.0
NOU02q2	306.7	252.5	380.5
NOU02q3	256.2	186.2	394.0
NOU02q4	230.8	193.5	282.8
NOU02q5	228.0	196.8	265.5
NOU02q6	279.2	223.6	357.9
NOU02q7	201.3	163.2	257.4
NOU02q8	366.5	304.1	449.9
NOU02q9	205.5	168.8	259.4
NOU02q10	235.5	201.6	278.9

NOU02q11	430.2	353.1	530.3
NOU02q12	457.1	371.7	575.6
NOU02q13	167.5	142.5	198.8
NOU02q14	178.9	153.5	211.0
NOU02q15	386.2	294.0	520.2
NOU02q16	344.5	283.4	418.5
NOU02q17	330.5	273.8	410.4
NOU02q18	387.1	295.7	546.2
NOU02q19	264.9	211.6	338.2
NOU02q20	192.8	160.6	232.4
NOU02q21	273.1	234.9	325.3
NOU02q22	205.4	169.8	256.6
NOU02q23	398.5	324.6	497.3
NOU02q24	377.1	282.8	514.4
NOU02q25	462.3	365.0	592.0
NOU02q26	291.4	236.6	358.1
NOU02q27	448.2	357.2	564.9
NOU02q28	340.0	278.7	414.2
NOU02q29	847.6	673.0	1090.6
NOU02q30	437.5	342.7	561.5
NOU02q31	671.4	528.8	843.7
NOU02q32	558.0	458.0	695.6
NOU02q33	416.2	343.6	510.9
NOU02q34	576.5	470.8	715.2
NOU02q35	420.8	347.4	537.5
NOU02q36	449.0	369.8	542.9
NOU02q37	474.7	374.1	608.8
NOU02q38	307.1	254.5	370.8
NOU02q39	523.8	438.8	632.5
NOU02q40	451.4	369.6	548.1
NOU03q1	324.8	267.3	389.4
NOU03q2	505.8	407.5	645.4

NOU03q3	676.9	552.7	852.0
NOU03q4	369.8	303.7	460.1
NOU03q5	327.3	284.0	379.7
NOU03q6	574.6	441.9	766.2
NOU03q7	390.2	331.3	460.5
NOU03q8	818.8	612.5	1126.0
NOU03q9	620.6	508.0	766.8
NOU03q10	444.6	376.2	533.4
NOU03q11	411.2	344.0	497.1
NOU03q12	514.8	400.0	669.9
NOU03q13	466.0	372.4	587.3
NOU03q14	513.6	414.0	628.5
NOU03q15	719.6	577.1	918.5
NOU03q16	532.7	430.4	670.7
NOU03q17	471.5	397.0	562.1
NOU03q18	517.3	425.4	622.5
NOU03q19	831.4	653.1	1072.3
NOU03q20	424.5	324.2	573.8
NOU03q21	497.4	405.5	613.4
NOU03q22	413.8	329.3	527.5
NOU03q23	695.4	529.1	993.0
NOU03q24	553.0	450.5	680.3
NOU04q1	453.6	375.1	547.8
NOU04q2	369.7	306.5	455.0
NOU04q3	253.2	213.8	303.3
NOU04q4	377.8	312.9	474.2
NOU04q5	446.6	376.5	548.7
NOU04q6	387.3	329.0	465.5
NOU04q7	466.9	389.6	558.8
NOU04q8	436.1	362.3	543.8
NOU04q9	411.0	349.0	495.2

NOU04q10	474.1	392.3	596.9
NOU04q11	234.5	195.6	291.0
NOU04q12	314.1	252.3	395.1
NOU04q13	385.3	328.9	453.8
NOU04q14	383.9	322.5	469.7
NOU04q15	464.6	390.3	562.3
NOU04q16	491.7	385.0	649.6
NOU04q17	597.2	503.7	721.0
NOU04q18	331.7	278.3	404.9
NOU04q19	366.1	302.1	454.4
NOU04q20	355.1	278.3	467.7
NOU04q21	475.8	396.6	576.6
NOU04q22	485.7	408.0	593.5
NOU04q23	385.2	319.9	461.3
NOU04q24	352.4	283.9	455.1
NOU04q25	402.3	328.6	492.4
NOU04q26	342.4	282.6	417.5
NOU04q27	344.1	288.3	411.1
NOU04q28	480.5	381.9	608.3
NOU04q29	423.8	347.8	511.0
NOU04q30	395.7	335.1	478.3
NOU04q31	437.0	372.5	513.1
NOU04q32	555.0	457.5	678.7
NOU04q33	619.0	522.9	746.4
NOU04q34	417.8	348.5	503.4
NOU04q35	339.7	290.0	400.8
NOU04q36	454.9	370.9	562.0
NOU04q37	529.0	446.5	633.2
NOU04q38	500.9	429.5	584.3
NOU04q39	494.3	422.8	572.0
NOU04q40	564.6	439.9	765.0

NOU04q41	491.8	411.5	591.4
NOU04q42	581.7	470.9	734.7
NOU04q43	441.1	360.9	543.3
NOU04q44	354.7	293.5	444.9
NOU04q45	487.6	402.1	605.3
NOU04q46	442.6	360.7	549.5
NOU04q47	374.7	310.6	458.2
NOU04q48	457.9	384.5	549.7
NOU05q1	234.6	196.2	286.4
NOU06q1	288.1	238.4	357.4
NOU07q1	302.6	274.6	335.7
NOU09q1	616.9	485.7	797.5
NOU09q2	326.1	267.5	403.7
NOU09q3	400.0	329.5	483.8
NOU09q4	505.3	413.6	631.1
NOU10q1	356.2	297.6	444.5
NOU10q2	402.0	330.1	515.0
NOU10q3	474.0	400.2	561.9
NOU10q4	285.3	246.1	331.8
NOU11q1	199.8	173.3	230.8
PAR01q1	343.0	290.1	403.6
PAR01q2	344.4	299.0	397.2
PAR01q3	247.7	211.7	287.8
PAR01q4	387.4	342.4	437.8
PAR01q5	396.2	346.9	455.0
PAR01q6	473.0	409.5	550.6
PAR01q7	436.6	377.3	507.1
PAR01q8	339.6	289.4	401.4
PAR01q9	242.4	210.9	276.8
PAR01q10	312.9	268.8	363.4
PAR01q11	508.5	423.8	619.6
PAR01q12	533.3	458.3	619.5

PAR01q13	412.2	351.6	495.8
PAR01q14	288.7	245.2	340.5
PAR01q15	317.3	278.2	362.9
PAR01q16	377.4	329.6	433.7
PAR01q17	391.5	338.4	448.9
PAR01q18	357.9	309.9	414.8
PAR01q19	321.0	272.4	379.5
PAR01q20	304.4	269.1	345.1
PAR01q21	385.7	337.2	439.7
PAR01q22	329.3	283.6	382.6
PAR01q23	343.9	301.0	398.3
PAR01q24	355.8	306.2	414.4
PAR01q25	246.3	214.7	285.5
PAR02q1	306.4	266.9	351.9
PAR02q2	221.7	190.1	262.2
PAR02q3	304.0	262.5	354.8
PAR02q4	286.2	248.0	334.3
PAR02q5	308.4	268.9	360.7
PAR02q6	350.0	297.7	415.9
PAR02q7	304.6	262.8	353.9
PAR02q8	327.7	284.4	385.4
PAR02q9	340.5	295.9	391.2
PAR02q10	309.1	272.7	355.1
PAR02q11	363.5	309.7	430.2
PAR02q12	314.0	268.8	362.2
PAR02q13	359.1	308.7	416.6
PAR02q14	351.9	308.5	398.9
PAR02q15	275.3	239.7	320.4
PAR02q16	389.3	341.5	448.3
PAR02q17	438.8	380.2	506.3
PAR02q18	397.3	348.4	454.5

PAR02q19	343.0	298.5	393.5
PAR02q20	253.8	221.8	292.4
PAR02q21	387.3	329.1	457.6
PAR02q22	494.5	400.6	626.5
PAR02q23	306.6	264.3	358.2
PAR02q24	343.4	293.3	399.9
PAR02q25	253.4	218.9	293.4
PAR03q1	369.0	327.2	418.7
PAR03q2	347.0	281.3	446.8
PAR03q3	285.0	244.1	330.7
PAR03q4	310.6	269.3	361.9
PAR03q5	212.5	181.1	248.1
PAR03q6	393.7	336.3	458.6
PAR03q7	378.6	328.3	437.4
PAR03q8	319.7	271.9	378.7
PAR03q9	402.7	349.3	466.8
PAR03q10	283.3	248.7	325.4
PAR03q11	307.1	273.3	343.3
PAR03q12	277.1	245.0	317.2
PAR03q13	343.7	303.2	386.5
PAR03q14	288.2	252.9	324.6
PAR03q15	296.4	259.0	342.6
PAR03q16	294.0	259.0	332.7
PAR03q17	264.8	237.3	294.6
PAR03q18	255.5	226.7	287.6
PAR03q19	300.9	269.0	342.1
PAR03q20	240.6	211.2	274.0
PAR03q21	269.7	240.0	303.2
PAR03q22	272.8	240.7	314.7
PAR03q23	225.2	199.4	254.1
PAR03q24	271.1	240.6	305.5

PAR03q25	369.5	324.8	417.0
PAR04q1	269.3	237.6	306.4
PAR04q2	260.5	229.7	297.6
PAR04q3	271.7	241.1	305.8
PAR04q4	377.2	326.3	447.9
PAR04q5	307.7	274.2	348.3
PAR04q6	245.2	218.3	280.2
PAR04q7	253.9	224.6	289.9
PAR04q8	336.1	301.9	376.9
PAR04q9	272.6	240.1	312.5
PAR04q10	247.7	215.9	287.1
PAR04q11	272.0	243.4	306.3
PAR04q12	275.5	247.4	304.8
PAR04q13	348.1	309.3	391.7
PAR04q14	227.3	202.0	253.9
PAR04q15	247.0	217.7	279.7
PAR04q16	249.2	222.0	281.2
PAR04q17	289.2	251.3	331.3
PAR04q18	263.9	232.1	302.7
PAR04q19	283.5	254.0	317.4
PAR04q20	400.8	352.8	455.6
PAR04q21	293.9	266.0	326.3
PAR04q22	215.6	191.0	242.3
PAR04q23	276.7	245.8	310.0
PAR04q24	252.4	218.7	289.3
PAR04q25	303.0	269.7	342.0
PAR05q1	264.2	235.0	299.4
PAR05q2	268.1	236.2	308.2
PAR05q3	318.8	279.9	360.5
PAR05q4	280.6	248.2	316.6
PAR05q5	286.5	253.6	325.6
PAR05q6	352.1	313.4	397.2

PAR05q7	271.7	240.1	307.2
PAR05q8	309.4	273.3	352.3
PAR05q9	253.3	222.1	287.9
PAR05q10	309.1	270.1	355.8
PAR05q11	314.2	278.3	355.5
PAR05q12	309.8	274.1	354.5
PAR05q13	439.2	373.0	540.0
PAR05q14	351.7	313.0	398.1
PAR05q15	339.3	294.3	389.0
PAR05q16	216.1	190.6	244.4
PAR05q17	235.1	204.8	271.8
PAR05q18	241.9	210.4	276.6
PAR05q19	266.5	236.1	303.1
PAR05q20	293.5	259.1	334.3
PAR05q21	251.5	224.9	279.6
PAR05q22	283.5	247.1	322.8
PAR05q23	228.6	201.3	263.5
PAR05q24	290.4	252.4	345.0
PAR05q25	326.7	291.0	369.5
PAR06q1	488.1	427.9	558.0
PAR06q2	389.3	338.4	443.7
PAR06q3	391.4	346.2	442.7
PAR06q4	447.6	386.5	527.2
PAR06q5	529.6	452.0	622.8
PAR06q6	301.5	261.6	353.7
PAR06q7	275.8	242.2	316.7
PAR06q8	415.5	350.0	498.4
PAR06q9	469.8	411.9	534.2
PAR06q10	492.8	422.6	575.5
PAR06q11	438.8	372.1	520.7
PAR06q12	377.4	323.9	442.8

PAR06q13	335.9	277.2	410.6
PAR06q14	374.3	319.0	444.7
PAR06q15	384.2	331.9	448.8
PAR06q16	335.7	287.1	393.3
PAR06q17	278.5	237.4	326.8
PAR06q18	399.2	341.9	471.8
PAR06q19	526.5	443.4	623.0
PAR06q20	403.5	350.1	466.8
PAR06q21	372.7	328.4	427.0
PAR06q22	345.8	285.2	416.5
PAR06q23	493.8	415.2	583.0
PAR06q24	471.1	409.3	541.3
PAR06q25	504.4	436.7	585.4
PAR07q1	397.2	335.9	489.5
PAR07q2	372.7	315.6	439.3
PAR07q3	401.3	342.5	464.7
PAR07q4	268.0	231.2	311.4
PAR07q5	328.3	274.7	396.4
PAR07q6	396.0	346.0	447.7
PAR07q7	339.7	297.9	384.9
PAR07q8	448.1	390.6	515.3
PAR07q9	423.6	355.3	500.1
PAR07q10	288.5	248.2	337.5
PAR07q11	360.3	311.0	420.9
PAR07q12	383.1	331.8	441.1
PAR07q13	472.0	407.8	550.4
PAR07q14	380.9	324.0	449.4
PAR07q15	347.8	301.3	401.6
PAR07q16	394.1	339.5	461.9
PAR07q17	321.5	274.6	382.4
PAR07q18	381.1	336.8	434.3

PAR07q19	463.7	402.3	544.7
PAR07q20	363.3	316.3	417.3
PAR07q21	422.8	368.1	489.4
PAR07q22	412.8	353.9	480.4
PAR07q23	314.8	275.0	365.6
PAR07q24	430.4	367.9	510.8
PAR07q25	379.8	332.5	437.3
PAR08q1	243.8	215.6	279.9
PAR08q2	173.4	152.4	195.7
PAR08q3	268.6	234.8	309.6
PAR08q4	190.7	167.0	218.9
PAR08q5	280.4	241.8	326.1
PAR08q6	285.7	251.8	324.6
PAR08q7	298.1	263.4	339.3
PAR08q8	251.7	224.7	282.8
PAR08q9	250.1	221.1	286.8
PAR08q10	250.8	219.8	284.7
PAR08q11	223.2	197.1	255.2
PAR08q12	264.0	233.0	298.6
PAR08q13	254.5	224.2	291.2
PAR08q14	279.1	241.0	327.5
PAR08q15	239.1	212.8	271.7
PAR08q16	278.8	248.7	315.0
PAR08q17	314.1	280.0	350.1
PAR08q18	253.3	229.5	281.4
PAR08q19	219.7	189.0	255.1
PAR08q20	271.0	235.7	309.9
PAR08q21	259.5	231.3	287.8
PAR08q22	222.7	196.8	251.3
PAR08q23	237.2	209.9	268.9
PAR08q24	269.8	241.4	306.2
PAR08q25	246.0	215.8	278.3

PAR09q1	347.8	305.2	395.0
PAR09q2	270.2	238.9	308.9
PAR09q3	359.5	317.8	411.6
PAR09q4	305.5	266.1	350.8
PAR09q5	238.6	208.7	275.1
PAR09q6	394.7	351.3	446.6
PAR09q7	411.1	358.3	480.3
PAR09q8	425.2	375.6	477.9
PAR09q9	311.0	266.4	371.9
PAR09q10	366.6	300.1	475.7
PAR09q11	386.1	333.5	445.0
PAR09q12	353.3	310.1	404.0
PAR09q13	318.0	278.2	361.6
PAR09q14	264.7	228.2	307.0
PAR09q15	329.7	291.0	376.0
PAR09q16	329.0	284.0	381.6
PAR09q17	332.9	289.3	389.7
PAR09q18	285.0	240.8	336.9
PAR09q19	269.0	232.0	313.8
PAR09q20	385.1	334.8	445.7
PAR09q21	250.2	218.6	286.4
PAR09q22	307.1	268.8	348.9
PAR09q23	308.0	270.1	350.2
PAR09q24	270.4	230.7	315.5
PAR09q25	446.0	389.7	514.3
PAR10q1	280.2	248.7	319.4
PAR10q2	289.7	252.2	334.2
PAR10q3	339.8	301.1	385.4
PAR10q4	245.4	217.0	276.8
PAR10q5	274.9	243.3	310.5
PAR10q6	391.1	345.0	440.8

PAR10q7	267.3	232.6	308.8
PAR10q8	266.6	227.7	314.9
PAR10q9	328.3	284.0	384.9
PAR10q10	205.2	182.5	232.9
PAR10q11	329.7	290.2	375.7
PAR10q12	345.5	301.4	393.2
PAR10q13	377.9	327.9	441.6
PAR10q14	241.3	212.9	275.8
PAR10q15	306.3	269.3	351.5
PAR10q16	351.7	311.2	404.6
PAR10q17	310.3	279.0	347.5
PAR10q18	248.3	219.5	283.2
PAR10q19	312.1	272.8	356.0
PAR10q20	272.6	244.0	305.4
PAR10q21	335.9	297.2	382.1
PAR10q22	234.8	207.3	265.5
PAR10q23	314.4	278.8	356.0
PAR10q24	319.7	284.8	362.1
PAR10q25	299.2	256.3	356.3
PAR11q1	312.2	268.6	360.9
PAR11q2	342.3	297.1	399.0
PAR11q3	386.0	338.9	442.4
PAR11q4	389.5	342.6	447.2
PAR11q5	366.0	321.0	416.5
PAR11q6	467.9	399.5	546.3
PAR11q7	320.4	276.2	373.7
PAR11q8	447.1	398.9	500.9
PAR11q9	291.7	250.0	338.1
PAR11q10	446.7	395.3	512.1
PAR11q11	517.8	453.2	596.8
PAR11q12	390.6	346.1	444.5

PAR11q13	349.6	301.7	402.9
PAR11q14	425.9	374.7	479.9
PAR11q15	435.9	367.7	532.7
PAR11q16	341.4	299.2	396.8
PAR11q17	406.4	355.9	466.0
PAR11q18	361.9	317.3	413.0
PAR11q19	403.8	352.4	465.5
PAR11q20	314.7	268.6	367.3
PAR11q21	421.3	367.9	483.9
PAR11q22	381.2	328.5	444.8
PAR11q23	391.4	345.3	451.0
PAR11q24	350.8	298.3	411.7
PAR11q25	418.9	362.7	484.9
PAR12q1	250.4	218.9	290.1
PAR12q2	265.9	233.8	302.6
PAR12q3	371.2	321.4	428.3
PAR12q4	320.4	283.5	361.9
PAR12q5	293.6	261.6	338.9
PAR12q6	340.9	298.3	390.5
PAR12q7	292.5	260.1	329.4
PAR12q8	315.6	280.5	354.3
PAR12q9	293.6	255.9	337.1
PAR12q10	283.8	252.0	322.0
PAR12q11	260.6	231.5	296.3
PAR12q12	227.1	198.2	261.7
PAR12q13	299.4	267.7	334.8
PAR12q14	282.8	251.5	322.1
PAR12q15	347.6	302.7	399.2
PAR12q16	263.2	232.4	299.1
PAR12q17	314.3	275.5	361.5
PAR12q18	353.2	312.9	398.4
PAR12q19	285.3	255.2	317.6

PAR12q20	298.7	261.4	342.1
PAR12q21	269.0	235.2	306.8
PAR12q22	298.3	261.5	340.5
PAR12q23	340.8	300.9	387.3
PAR12q24	304.4	272.2	341.2
PAR12q25	319.1	281.6	357.8
PAR13q1	432.0	378.5	500.0
PAR13q2	453.9	399.0	519.0
PAR13q3	470.5	407.9	542.9
PAR13q4	399.8	354.5	451.9
PAR13q5	431.0	374.4	500.6
PAR13q6	331.3	277.8	400.9
PAR13q7	312.7	267.0	365.9
PAR13q8	351.6	298.3	418.7
PAR13q9	348.2	303.6	405.9
PAR13q10	372.9	321.5	431.9
PAR13q11	386.0	334.6	450.2
PAR13q12	422.7	369.0	480.0
PAR13q13	371.4	329.5	419.4
PAR13q14	370.6	321.7	427.3
PAR13q15	320.9	277.4	374.7
PAR13q16	418.4	375.2	476.0
PAR13q17	384.6	329.3	459.1
PAR13q18	433.1	381.2	491.5
PAR13q19	321.1	282.3	363.6
PAR13q20	425.6	372.0	493.5
PAR13q21	464.6	398.7	545.7
PAR13q22	454.4	390.3	531.6
PAR13q23	371.5	310.3	439.3
PAR13q24	216.9	183.4	255.2
PAR13q25	426.3	365.8	499.9

PAR14q1	441.4	378.2	521.3
PAR14q2	468.8	412.3	537.6
PAR14q3	385.5	332.1	450.1
PAR14q4	371.4	327.7	421.6
PAR14q5	446.2	386.4	519.6
PAR14q6	494.3	423.6	575.3
PAR14q7	343.0	296.6	402.9
PAR14q8	434.4	368.1	508.6
PAR14q9	433.8	376.4	497.6
PAR14q10	453.2	395.2	518.3
PAR14q11	389.4	342.8	448.7
PAR14q12	357.7	314.4	406.9
PAR14q13	338.0	298.6	379.9
PAR14q14	354.8	305.8	415.9
PAR14q15	541.1	472.5	622.4
PAR14q16	350.8	306.7	402.9
PAR14q17	295.7	263.4	338.3
PAR14q18	365.0	315.1	419.6
PAR14q19	363.2	308.8	422.6
PAR14q20	383.6	326.8	454.4
PAR14q21	362.1	312.1	418.5
PAR14q22	293.8	253.0	338.0
PAR14q23	407.7	350.1	473.9
PAR14q24	430.6	370.5	500.6
PAR14q25	341.3	299.8	393.9
PAR15q1	449.7	394.4	511.1
PAR15q2	437.9	381.2	502.3
PAR15q3	370.6	308.0	452.7
PAR15q4	426.0	364.2	502.9
PAR15q5	473.4	415.4	540.9
PAR15q6	399.0	351.2	452.9

PAR15q7	479.5	417.2	555.0
PAR15q8	373.5	313.2	441.1
PAR15q9	305.3	263.2	359.3
PAR15q10	293.6	252.2	340.6
PAR15q11	409.6	356.1	470.0
PAR15q12	409.8	363.3	462.6
PAR15q13	439.8	384.7	506.9
PAR15q14	482.8	412.6	569.7
PAR15q15	246.7	214.0	287.1
PAR15q16	360.2	309.8	419.1
PAR15q17	493.4	430.7	567.7
PAR15q18	404.1	359.3	453.1
PAR15q19	329.5	286.1	382.0
PAR15q20	386.4	340.1	442.1
PAR15q21	408.6	357.5	462.6
PAR15q22	412.9	359.8	472.6
PAR15q23	401.4	349.1	460.9
PAR15q24	505.5	439.7	570.7
PAR15q25	378.0	330.4	429.2
PAR16q1	395.9	329.2	483.0
PAR16q2	562.0	464.5	688.6
PAR16q3	683.8	572.5	826.1
PAR16q4	374.3	322.4	431.5
PAR16q5	486.6	405.4	581.9
PAR16q6	459.6	392.6	539.0
PAR16q7	441.6	377.3	516.1
PAR16q8	359.9	308.0	428.1
PAR16q9	469.2	402.2	552.5
PAR16q10	299.8	237.3	385.3
PAR16q11	496.1	404.2	604.0
PAR16q12	322.8	266.4	400.1
PAR16q13	345.4	279.9	421.1

PAR16q14	326.3	279.9	381.3
PAR16q15	546.0	454.4	657.5
PAR16q16	431.3	367.6	511.1
PAR16q17	384.9	328.0	455.7
PAR16q18	286.4	242.7	343.2
PAR16q19	263.3	220.1	323.0
PAR16q20	418.4	353.8	494.4
PAR16q21	413.9	348.0	485.7
PAR16q22	339.8	280.6	402.1
PAR16q23	290.3	239.3	358.2
PAR16q24	398.7	312.9	514.4
PAR16q25	299.6	247.9	363.0
PAR16q26	296.7	256.8	346.1
PAR16q27	591.8	489.7	737.5
PAR16q28	439.5	374.7	517.7
PAR16q29	387.0	321.0	468.5
PAR16q30	319.4	269.4	389.7
PAR16q31	350.7	295.0	417.4
PAR16q32	467.9	389.5	567.3
PAR16q33	328.3	275.9	395.6
PAR16q34	543.2	450.1	660.0
PAR16q35	344.1	287.3	424.5
PAR16q36	502.2	428.7	593.8
PAR16q37	375.8	319.5	441.0
PAR16q38	427.6	364.0	502.8
PAR16q39	502.6	435.2	590.6
PAR16q40	489.5	393.3	614.7
PAR16q41	402.8	344.8	471.3
PAR16q42	344.3	289.4	405.7
PAR16q43	309.8	269.1	362.9
PAR16q44	425.7	358.4	511.9

PAR16q45	522.0	421.7	645.9
PAR16q46	393.5	332.3	470.4
PAR16q47	377.4	319.5	442.1
PAR16q48	360.0	305.4	425.5
PAR16q49	464.7	395.5	553.5
PAR16q50	394.0	321.9	491.3
PAR16q51	410.4	352.4	480.9
PAR16q52	357.0	309.7	412.3
PAR16q53	484.6	397.7	586.8
PAR16q54	357.9	282.7	466.1
PAR16q55	388.3	313.2	490.7
PAR16q56	369.6	312.0	445.0
PAR16q57	380.4	325.1	444.7
PAR16q58	396.7	339.5	464.5
PAR16q59	506.0	408.7	633.2
PAR16q60	342.7	282.6	426.2
PAR16q61	478.3	404.3	555.1
PAR16q62	242.7	211.4	284.9
PAR16q63	344.5	283.6	422.8
PAR16q64	324.6	272.8	388.3
PAR16q65	370.4	301.5	471.9
PAR16q66	232.9	200.3	272.1
PAR16q67	501.3	421.9	594.1
PAR16q68	379.9	316.0	444.9
PAR16q69	401.1	337.5	482.5
PAR16q70	347.6	288.9	429.9
PAR16q71	433.4	373.3	504.0
PAR16q72	367.2	315.9	429.2
PAR16q73	450.0	379.8	550.2
PAR16q74	382.7	329.0	451.0
PAR16q75	412.5	341.2	502.0

PAR16q76	588.2	480.5	730.1
PAR16q77	413.2	325.3	528.7
PAR16q78	454.6	373.6	566.7
PAR16q79	411.1	348.5	480.2
PAR16q80	436.4	363.9	531.4
PAR16q81	468.8	407.4	542.5
PAR16q82	287.1	247.8	336.8
PAR16q83	433.8	374.0	514.6
PAR16q84	404.9	350.5	473.6
PAR16q85	324.9	268.5	403.5
PAR16q86	332.0	276.1	401.8
PAR16q87	346.2	294.2	413.6
PAR16q88	493.8	410.4	601.5
PAR16q89	466.5	387.1	563.8
PAR16q90	393.3	330.3	480.6
PAR16q91	537.3	435.6	686.3
PAR16q92	540.7	436.7	702.5
PAR16q93	437.0	378.9	501.6
PAR16q94	401.8	340.9	478.8
PAR16q95	495.5	375.2	706.9
PAR16q96	386.3	316.8	475.7
PAR16q97	385.9	320.5	464.0
PAR16q98	383.6	314.1	467.4
PAR16q99	411.1	343.3	496.6
PAR16q100	422.4	352.1	512.8
PAR17q1	117.4	105.8	131.8
PAR17q2	140.5	119.6	171.3
PAR17q3	165.2	151.1	181.4
PAR17q4	154.9	139.5	173.0
PAR17q5	162.0	147.8	176.9
PAR17q6	116.2	106.2	128.5
PAR17q7	115.5	104.7	125.8

PAR17q8	130.9	117.1	145.6
PAR17q9	119.3	107.6	133.7
PAR17q10	133.8	118.5	155.1
PAR17q11	129.5	119.5	140.8
PAR17q12	118.6	107.9	130.0
PAR17q13	136.7	124.9	149.0
PAR17q14	130.7	116.2	147.2
PAR17q15	124.6	112.7	137.6
PAR17q16	135.7	123.6	148.4
PAR17q17	162.9	146.9	182.4
PAR17q18	163.1	151.1	175.6
PAR17q19	82.9	75.1	91.8
PAR17q20	125.9	114.9	137.6
PAR17q21	116.8	106.2	128.0
PAR17q22	125.7	114.4	138.2
PAR17q23	116.6	106.9	128.0
PAR17q24	117.3	106.0	129.9
PAR17q25	153.7	136.6	174.0

AGB USING LOCAL H:D RELATIONSHIP (agb_loc)

```
AGB_loc.list <- list()

rm(resultMC_LocalFG); gc()
resultMC_LocalFG <- by(TropiSARstemTREE, TropiSARstemTREE[,"Site"],
                       function(x) AGBmonteCarlo(D=x$Diameter, WD=x$WD, H=x$Hlocal, errWD=x$sd
WD,
                                                 errH=x$HlocRSE, Dpropag ="chave2004"), simpli
fy=F)

tempNOU <- as.data.frame(resultMC_LocalFG$NOURAGUES$AGB_simu)
tempPAR <- as.data.frame(resultMC_LocalFG$PARACOU$AGB_simu)
tempTROP <- rbind(tempNOU,tempPAR)
Tropiprop_LOCAL <- cbind(TropiSARstemTREE, tempTROP)
Tropiprop_LOCAL <- rbind(Tropiprop_LOCAL, Tropiprop_PALM)

for (i in (1:length(resolAGB))) {
```

```
  tempocalc <- by(Tropiprop_LOCAL, Tropiprop_LOCAL[,resolAGB[i]],
                  function(x) list(meanAGB = mean(apply(x[,46:1045], 2, sum, na.rm = T)),
                                   credibilityAGB = quantile(apply(x[,46:1045], 2, sum, na.rm
= T), probs = c(0.025,0.975))))

  AGB_loc.list[[i]] <- data.frame(Area_code = names(tempocalc),
                                  agb_loc = round(as.numeric(sapply(tempocalc,"[",1))*coefmult
[i],1),
                                  cred_loc_2.5 = round(as.numeric(lapply(sapply(tempocalc,"[",
2), function(x) x[1]))*coefmult[i],1),
                                  cred_loc_97.5 = round(as.numeric(lapply(sapply(tempocalc,"["
,2), function(x) x[2]))*coefmult[i],1), stringsAsFactors = F)

  AGB_loc.list[[i]] <- AGB_loc.list[[i]][match(ordarea[[i]], AGB_loc.list[[i]]$Area_code),]
  rownames(AGB_loc.list[[i]]) <- NULL
}
AGB_loc.list
AGB_loc.df <- Reduce(rbind, AGB_loc.list)
AGB_loc.df
```

Area_code	agb_loc	cred_loc_2.5	cred_loc_97.5
NOU01h1	464.8	420.0	523.6
NOU01h2	388.2	354.8	428.6
NOU02h1	284.6	255.0	323.0
NOU02h2	268.2	244.8	294.6
NOU02h3	328.9	301.2	359.7
NOU02h4	266.5	240.9	295.4
NOU02h5	288.5	258.2	326.0
NOU02h6	308.5	277.5	346.9
NOU02h7	378.6	341.5	419.7
NOU02h8	605.1	548.5	671.3
NOU02h9	461.3	423.7	504.8
NOU02h10	434.2	397.5	477.1
NOU03h1	489.8	438.4	553.9
NOU03h2	518.4	475.2	568.4
NOU03h3	444.3	398.9	496.0
NOU03h4	537.5	482.7	598.3
NOU03h5	521.0	472.7	577.4
NOU03h6	545.4	495.6	610.0
NOU04h1	425.6	393.6	463.9

NOU04h2	294.6	270.0	321.0
NOU04h3	400.9	372.3	434.8
NOU04h4	454.6	415.9	500.9
NOU04h5	417.2	383.7	454.7
NOU04h6	381.4	344.4	422.0
NOU04h7	442.3	408.8	481.0
NOU04h8	430.2	395.2	468.3
NOU04h9	508.2	465.6	554.2
NOU04h10	394.4	361.0	432.8
NOU04h11	485.0	449.1	525.2
NOU04h12	467.3	428.0	511.3
NOU08h1	495.3	454.5	540.3
NOU09h1	443.1	406.2	488.2
NOU10h1	343.3	317.9	371.7
PAR01h1	393.2	365.0	423.4
PAR01h2	269.1	252.1	287.2
PAR01h3	426.6	399.8	455.3
PAR01h4	317.7	294.9	341.7
PAR02h1	303.6	282.4	326.1
PAR02h2	301.2	283.6	320.9
PAR02h3	355.6	334.5	377.6
PAR02h4	305.8	287.9	326.8
PAR03h1	320.4	298.1	343.8
PAR03h2	300.5	282.0	321.2
PAR03h3	281.9	267.9	297.4
PAR03h4	278.3	263.1	293.9
PAR04h1	278.5	263.7	293.5
PAR04h2	297.7	281.1	315.6
PAR04h3	251.0	237.7	264.7
PAR04h4	269.9	255.7	286.3
PAR05h1	297.3	280.8	313.8

PAR05h2	286.4	270.0	302.9
PAR05h3	268.3	251.2	290.3
PAR05h4	284.7	269.7	302.3
PAR06h1	330.8	309.0	355.3
PAR06h2	419.2	393.7	446.5
PAR06h3	316.5	293.4	342.0
PAR06h4	397.0	369.2	427.1
PAR07h1	387.3	364.0	412.8
PAR07h2	377.9	353.8	404.3
PAR07h3	357.4	334.8	382.2
PAR07h4	403.1	378.6	429.8
PAR08h1	272.4	257.8	288.5
PAR08h2	245.4	231.1	261.2
PAR08h3	262.1	249.3	275.2
PAR08h4	234.7	220.0	249.2
PAR09h1	358.1	338.7	381.3
PAR09h2	324.9	301.5	350.9
PAR09h3	294.3	276.6	315.1
PAR09h4	307.6	290.0	326.4
PAR10h1	333.0	313.2	355.0
PAR10h2	263.9	248.9	282.6
PAR10h3	298.2	283.2	314.3
PAR10h4	275.5	260.4	291.6
PAR11h1	382.4	359.1	407.2
PAR11h2	356.6	335.9	377.6
PAR11h3	392.7	370.0	415.5
PAR11h4	359.5	338.7	383.1
PAR12h1	298.5	282.4	315.9
PAR12h2	281.1	265.8	297.5
PAR12h3	306.2	288.4	323.6
PAR12h4	290.8	275.5	305.7

PAR13h1	360.5	338.9	384.6
PAR13h2	352.2	330.2	377.6
PAR13h3	404.3	378.7	431.8
PAR13h4	363.4	342.7	386.0
PAR14h1	406.8	382.3	433.4
PAR14h2	406.6	382.4	431.3
PAR14h3	340.6	319.1	363.5
PAR14h4	352.9	329.9	378.1
PAR15h1	424.3	400.6	450.6
PAR15h2	350.9	328.1	376.9
PAR15h3	389.9	367.3	413.7
PAR15h4	405.1	381.2	430.5
PAR16h1	409.5	375.7	448.7
PAR16h2	401.9	371.7	435.3
PAR16h3	444.3	410.2	477.0
PAR16h4	348.5	324.7	373.8
PAR16h5	336.8	311.6	364.0
PAR16h6	368.3	341.1	400.6
PAR16h7	359.1	329.7	392.8
PAR16h8	337.4	313.9	366.6
PAR16h9	427.4	394.9	463.3
PAR16h10	392.3	361.7	430.5
PAR16h11	361.9	338.0	388.2
PAR16h12	365.1	334.7	397.6
PAR16h13	384.4	353.0	422.7
PAR16h14	356.6	331.0	384.5
PAR16h15	392.9	359.6	428.0
PAR16h16	361.7	339.2	387.3
PAR16h17	354.2	329.4	385.1
PAR16h18	368.9	338.6	404.8
PAR16h19	402.5	369.3	438.9
PAR16h20	370.9	344.1	401.5

PAR16h21	421.6	386.7	463.6
PAR16h22	399.1	372.2	429.5
PAR16h23	352.1	317.6	392.7
PAR16h24	373.1	344.8	402.8
PAR16h25	390.3	359.3	424.7
PAR17h1	122.0	117.0	127.5
PAR17h2	131.7	125.5	138.6
PAR17h3	141.8	135.4	147.7
PAR17h4	112.8	107.4	118.6
NOU01q1	348.1	302.6	406.3
NOU01q2	691.8	565.9	884.3
NOU01q3	218.3	185.5	257.2
NOU01q4	434.2	355.7	542.4
NOU01q5	442.9	385.4	512.8
NOU01q6	376.5	318.2	452.2
NOU01q7	457.4	387.5	538.0
NOU01q8	443.0	375.3	522.5
NOU02q1	350.5	279.6	460.0
NOU02q2	307.8	256.9	374.5
NOU02q3	246.7	186.4	337.5
NOU02q4	231.1	195.4	274.6
NOU02q5	231.6	202.1	267.4
NOU02q6	275.7	228.6	334.1
NOU02q7	199.6	167.0	245.6
NOU02q8	362.7	311.3	438.5
NOU02q9	205.3	173.5	245.3
NOU02q10	240.8	210.3	280.2
NOU02q11	422.2	352.9	499.2
NOU02q12	447.5	377.5	538.3
NOU02q13	169.9	146.1	197.0
NOU02q14	179.7	156.0	206.9

NOU02q15	373.7	294.5	480.2
NOU02q16	342.9	295.0	405.5
NOU02q17	324.5	274.9	393.5
NOU02q18	372.3	288.6	499.0
NOU02q19	262.1	214.0	329.3
NOU02q20	195.2	166.7	233.2
NOU02q21	274.3	242.6	314.7
NOU02q22	204.8	174.4	245.9
NOU02q23	392.2	329.4	472.2
NOU02q24	362.9	281.6	476.0
NOU02q25	450.6	367.6	557.4
NOU02q26	289.1	244.1	345.6
NOU02q27	435.2	358.9	538.8
NOU02q28	338.5	290.4	400.4
NOU02q29	802.1	653.9	982.8
NOU02q30	425.1	347.1	523.3
NOU02q31	643.9	527.8	787.1
NOU02q32	549.1	467.3	655.7
NOU02q33	434.2	370.0	505.5
NOU02q34	568.2	470.9	679.4
NOU02q35	402.0	334.1	500.6
NOU02q36	440.6	375.3	516.3
NOU02q37	462.8	380.8	582.6
NOU02q38	307.9	261.8	366.5
NOU02q39	520.2	451.3	603.5
NOU02q40	445.5	381.0	529.8
NOU03q1	321.5	270.7	378.7
NOU03q2	490.2	405.2	596.6
NOU03q3	652.7	551.8	799.9
NOU03q4	370.6	313.1	455.3
NOU03q5	330.3	291.2	376.8

NOU03q6	545.9	435.7	690.5
NOU03q7	392.8	339.6	453.5
NOU03q8	754.7	605.5	976.0
NOU03q9	604.8	515.8	707.8
NOU03q10	445.4	392.4	514.3
NOU03q11	406.7	346.2	483.5
NOU03q12	494.3	406.6	617.1
NOU03q13	458.5	375.1	558.1
NOU03q14	501.6	421.0	595.8
NOU03q15	685.5	565.3	845.1
NOU03q16	515.1	427.3	627.7
NOU03q17	470.3	402.8	546.0
NOU03q18	514.9	439.2	603.9
NOU03q19	782.6	638.6	960.6
NOU03q20	407.2	324.0	523.3
NOU03q21	481.3	397.8	586.0
NOU03q22	402.1	333.6	486.9
NOU03q23	653.9	528.0	836.9
NOU03q24	542.7	449.6	647.4
NOU04q1	454.6	388.7	540.2
NOU04q2	371.8	316.7	437.4
NOU04q3	253.3	214.7	298.0
NOU04q4	380.7	325.5	454.5
NOU04q5	444.7	376.7	524.5
NOU04q6	388.4	331.8	455.2
NOU04q7	461.7	401.5	538.3
NOU04q8	427.6	358.3	516.6
NOU04q9	411.0	358.0	474.8
NOU04q10	465.1	394.5	553.9
NOU04q11	235.2	199.2	281.8
NOU04q12	308.6	256.5	371.9
NOU04q13	390.2	338.4	446.8

NOU04q14	380.2	325.6	442.5
NOU04q15	460.0	389.0	545.2
NOU04q16	468.8	380.7	595.5
NOU04q17	597.0	518.9	687.6
NOU04q18	329.1	283.3	389.3
NOU04q19	366.1	307.2	445.0
NOU04q20	347.3	284.8	431.0
NOU04q21	476.0	412.3	554.9
NOU04q22	477.7	410.1	562.8
NOU04q23	384.9	327.5	452.2
NOU04q24	345.2	286.5	421.0
NOU04q25	400.5	337.2	476.1
NOU04q26	342.4	290.9	407.3
NOU04q27	344.3	295.4	409.7
NOU04q28	467.5	378.3	575.0
NOU04q29	418.9	357.0	502.7
NOU04q30	396.3	340.4	463.0
NOU04q31	443.3	389.1	514.2
NOU04q32	546.8	458.7	650.2
NOU04q33	600.4	518.6	693.5
NOU04q34	404.6	347.8	477.9
NOU04q35	341.5	295.5	394.7
NOU04q36	444.3	374.5	526.1
NOU04q37	520.1	451.1	608.0
NOU04q38	498.2	438.3	571.1
NOU04q39	499.4	437.3	565.7
NOU04q40	542.6	443.0	687.6
NOU04q41	469.1	404.2	542.3
NOU04q42	557.0	464.0	667.0
NOU04q43	433.6	365.2	515.2
NOU04q44	358.0	303.4	435.3

NOU04q45	486.3	419.1	578.8
NOU04q46	434.0	367.8	516.6
NOU04q47	372.3	313.4	441.2
NOU04q48	455.0	386.3	537.9
NOU05q1	186.7	164.7	213.0
NOU06q1	258.2	222.6	306.2
NOU07q1	242.9	224.4	263.2
NOU09q1	523.3	443.0	624.4
NOU09q2	347.6	293.0	418.8
NOU09q3	390.0	330.3	464.8
NOU09q4	511.7	428.7	625.6
NOU10q1	342.5	293.8	405.7
NOU10q2	363.1	306.0	442.9
NOU10q3	398.2	349.7	458.9
NOU10q4	269.3	239.9	307.8
NOU11q1	178.6	157.0	201.9
PAR01q1	324.6	279.4	373.0
PAR01q2	331.7	296.0	374.1
PAR01q3	236.1	204.2	271.7
PAR01q4	374.5	331.3	420.8
PAR01q5	379.9	335.0	432.6
PAR01q6	444.7	391.9	498.8
PAR01q7	416.6	368.8	473.7
PAR01q8	322.2	280.8	371.2
PAR01q9	234.5	210.1	266.4
PAR01q10	300.9	261.9	346.1
PAR01q11	468.2	398.0	553.6
PAR01q12	498.8	440.7	567.4
PAR01q13	392.8	342.4	457.3
PAR01q14	275.4	238.4	319.5
PAR01q15	307.1	275.9	342.9

PAR01q16	365.3	324.7	408.2
PAR01q17	377.3	335.0	424.4
PAR01q18	343.3	303.3	392.4
PAR01q19	304.4	263.7	352.8
PAR01q20	295.3	265.4	330.6
PAR01q21	370.3	332.5	419.6
PAR01q22	318.2	282.3	362.6
PAR01q23	335.3	299.8	375.6
PAR01q24	342.6	302.1	392.1
PAR01q25	240.0	211.0	274.6
PAR02q1	292.4	259.0	331.7
PAR02q2	214.9	187.1	246.8
PAR02q3	292.2	256.8	337.2
PAR02q4	276.5	243.9	316.5
PAR02q5	293.1	259.2	336.5
PAR02q6	329.4	286.4	384.2
PAR02q7	290.3	251.8	329.7
PAR02q8	310.7	271.6	355.1
PAR02q9	330.2	294.6	370.7
PAR02q10	298.9	263.1	335.7
PAR02q11	343.3	300.6	393.6
PAR02q12	300.6	264.6	339.8
PAR02q13	345.8	304.7	391.7
PAR02q14	340.7	305.2	381.9
PAR02q15	266.4	235.0	304.5
PAR02q16	373.9	332.2	422.3
PAR02q17	418.1	370.5	472.6
PAR02q18	381.7	338.9	427.7
PAR02q19	327.3	289.5	371.3
PAR02q20	246.7	218.3	278.3
PAR02q21	366.1	318.2	420.4
PAR02q22	452.6	379.7	545.8

PAR02q23	293.0	257.8	336.1
PAR02q24	326.2	284.8	374.7
PAR02q25	247.9	219.3	280.0
PAR03q1	352.4	315.8	395.0
PAR03q2	320.4	268.5	393.0
PAR03q3	271.7	241.2	307.9
PAR03q4	297.4	265.6	334.3
PAR03q5	204.2	177.1	234.4
PAR03q6	374.6	332.7	425.9
PAR03q7	357.3	316.3	402.7
PAR03q8	307.5	270.0	356.4
PAR03q9	381.0	336.7	435.7
PAR03q10	272.9	243.3	306.2
PAR03q11	301.1	275.3	331.3
PAR03q12	270.1	242.1	305.8
PAR03q13	335.2	301.8	373.8
PAR03q14	281.7	254.2	312.4
PAR03q15	286.5	253.9	323.7
PAR03q16	288.2	257.7	321.9
PAR03q17	260.0	235.3	284.3
PAR03q18	249.4	225.4	275.4
PAR03q19	294.7	266.8	327.5
PAR03q20	234.3	209.8	265.8
PAR03q21	262.5	236.3	291.7
PAR03q22	265.8	237.0	296.4
PAR03q23	221.7	200.6	246.0
PAR03q24	266.3	240.5	294.0
PAR03q25	356.9	318.4	397.1
PAR04q1	262.5	235.4	295.9
PAR04q2	255.0	228.8	285.6
PAR04q3	265.6	240.8	296.2

PAR04q4	361.0	321.3	414.3
PAR04q5	298.3	268.4	329.9
PAR04q6	240.6	217.5	265.4
PAR04q7	247.0	221.6	276.5
PAR04q8	328.2	296.5	364.7
PAR04q9	266.6	238.3	299.1
PAR04q10	238.3	209.3	269.3
PAR04q11	266.4	241.6	295.5
PAR04q12	270.5	244.3	300.7
PAR04q13	337.9	302.6	377.0
PAR04q14	223.9	201.1	247.9
PAR04q15	242.0	218.1	270.3
PAR04q16	243.6	218.6	271.5
PAR04q17	280.4	249.8	314.4
PAR04q18	257.2	230.4	289.0
PAR04q19	276.5	250.1	306.6
PAR04q20	384.6	342.5	433.0
PAR04q21	289.7	264.5	319.1
PAR04q22	211.2	188.7	238.0
PAR04q23	270.9	246.2	298.7
PAR04q24	247.2	218.0	280.3
PAR04q25	295.3	266.2	326.2
PAR05q1	259.5	235.3	288.4
PAR05q2	260.7	229.6	294.9
PAR05q3	309.4	277.6	350.8
PAR05q4	272.4	245.4	303.6
PAR05q5	278.8	249.8	313.8
PAR05q6	344.6	309.8	384.6
PAR05q7	266.6	239.2	299.4
PAR05q8	301.2	271.2	335.7
PAR05q9	247.0	220.4	280.9

PAR05q10	301.3	266.2	340.3
PAR05q11	304.2	272.4	340.4
PAR05q12	302.5	270.4	337.6
PAR05q13	415.5	364.2	480.7
PAR05q14	340.9	307.6	379.4
PAR05q15	330.6	295.0	371.6
PAR05q16	211.6	189.6	237.1
PAR05q17	228.2	202.7	257.9
PAR05q18	236.4	210.8	269.4
PAR05q19	261.3	235.5	293.2
PAR05q20	289.1	258.5	321.2
PAR05q21	247.7	223.9	272.8
PAR05q22	275.9	246.1	310.5
PAR05q23	222.8	200.2	247.9
PAR05q24	277.1	243.5	318.0
PAR05q25	319.3	290.1	352.7
PAR06q1	464.3	412.8	516.9
PAR06q2	374.0	333.9	418.2
PAR06q3	365.2	329.0	405.3
PAR06q4	427.0	378.7	484.3
PAR06q5	491.8	432.5	561.8
PAR06q6	291.3	257.1	331.3
PAR06q7	268.4	237.6	301.5
PAR06q8	350.4	307.5	402.6
PAR06q9	425.0	380.7	472.4
PAR06q10	453.5	396.9	519.8
PAR06q11	410.4	355.9	471.4
PAR06q12	360.7	315.5	413.7
PAR06q13	314.5	266.6	371.1
PAR06q14	354.1	307.4	409.4
PAR06q15	366.9	320.7	424.7
PAR06q16	320.1	279.9	363.3

PAR06q17	267.5	235.5	305.4
PAR06q18	379.4	331.7	432.3
PAR06q19	490.9	424.6	566.1
PAR06q20	387.0	342.4	440.9
PAR06q21	358.9	321.5	402.6
PAR06q22	323.4	278.5	379.0
PAR06q23	463.3	403.3	537.2
PAR06q24	447.5	393.1	501.7
PAR06q25	476.9	420.1	542.3
PAR07q1	372.2	319.9	433.8
PAR07q2	349.4	301.6	403.5
PAR07q3	382.1	334.5	439.4
PAR07q4	258.9	228.1	294.4
PAR07q5	312.8	267.4	370.7
PAR07q6	380.8	339.6	423.4
PAR07q7	327.9	294.4	365.5
PAR07q8	425.6	379.4	478.1
PAR07q9	397.2	343.6	459.9
PAR07q10	277.1	243.9	319.4
PAR07q11	345.8	304.2	393.7
PAR07q12	366.1	321.0	418.8
PAR07q13	448.5	396.5	508.0
PAR07q14	362.3	316.0	425.1
PAR07q15	334.7	294.7	379.9
PAR07q16	375.4	330.4	428.1
PAR07q17	305.0	267.5	350.2
PAR07q18	369.0	331.7	412.3
PAR07q19	441.2	386.9	501.1
PAR07q20	348.4	308.1	392.3
PAR07q21	405.7	358.3	463.5
PAR07q22	389.9	345.1	443.0

PAR07q23	301.3	264.5	343.1
PAR07q24	403.2	351.1	462.8
PAR07q25	364.5	323.1	413.6
PAR08q1	237.1	210.4	267.1
PAR08q2	169.0	149.8	191.7
PAR08q3	259.1	228.2	295.2
PAR08q4	186.5	165.8	213.0
PAR08q5	269.9	238.9	305.6
PAR08q6	276.2	246.0	311.1
PAR08q7	289.9	259.6	323.0
PAR08q8	247.7	222.8	275.5
PAR08q9	243.0	217.2	271.8
PAR08q10	244.9	217.5	276.1
PAR08q11	217.6	194.1	242.5
PAR08q12	257.6	231.0	290.3
PAR08q13	248.0	222.3	278.2
PAR08q14	266.7	232.8	307.4
PAR08q15	233.0	208.9	261.5
PAR08q16	270.9	243.1	301.3
PAR08q17	308.4	282.1	336.5
PAR08q18	249.3	225.9	274.9
PAR08q19	211.7	185.5	241.3
PAR08q20	260.5	230.9	293.8
PAR08q21	252.6	229.8	279.8
PAR08q22	216.8	195.0	241.3
PAR08q23	231.5	209.3	257.8
PAR08q24	261.9	235.8	291.6
PAR08q25	239.4	215.3	267.3
PAR09q1	334.3	300.7	372.5
PAR09q2	264.6	237.2	295.6
PAR09q3	346.4	310.8	386.9

PAR09q4	292.9	259.2	330.1
PAR09q5	234.3	208.6	265.8
PAR09q6	382.8	343.6	428.8
PAR09q7	392.6	347.3	444.4
PAR09q8	413.0	374.9	455.6
PAR09q9	295.7	256.2	343.2
PAR09q10	339.8	285.9	416.0
PAR09q11	367.7	323.4	420.7
PAR09q12	342.8	305.7	389.1
PAR09q13	309.2	274.0	351.8
PAR09q14	253.5	221.4	289.0
PAR09q15	317.9	283.3	357.0
PAR09q16	315.6	277.8	356.7
PAR09q17	322.0	284.9	364.6
PAR09q18	269.7	235.0	312.5
PAR09q19	257.7	226.7	295.3
PAR09q20	374.5	335.0	421.7
PAR09q21	244.2	219.3	274.9
PAR09q22	299.5	268.6	339.2
PAR09q23	299.0	265.8	335.6
PAR09q24	260.8	229.5	299.6
PAR09q25	429.4	385.3	486.9
PAR10q1	272.6	245.0	305.3
PAR10q2	279.2	246.0	317.0
PAR10q3	329.2	294.7	370.1
PAR10q4	240.4	214.3	270.1
PAR10q5	267.5	241.1	298.2
PAR10q6	378.7	341.3	420.8
PAR10q7	259.9	230.3	296.3
PAR10q8	254.1	222.0	290.2
PAR10q9	314.4	279.6	358.1
PAR10q10	200.1	177.3	224.8

PAR10q11	321.0	288.7	357.3
PAR10q12	330.7	292.9	376.4
PAR10q13	361.1	319.5	412.1
PAR10q14	234.3	208.3	263.8
PAR10q15	297.9	264.3	336.3
PAR10q16	339.0	304.6	377.2
PAR10q17	302.5	276.1	333.8
PAR10q18	243.3	218.1	272.2
PAR10q19	304.1	271.2	342.4
PAR10q20	267.4	243.0	295.8
PAR10q21	323.8	291.2	362.3
PAR10q22	229.8	205.4	255.0
PAR10q23	303.4	272.7	338.5
PAR10q24	310.0	277.2	344.3
PAR10q25	284.9	249.1	327.1
PAR11q1	300.3	265.6	344.6
PAR11q2	331.1	296.4	372.0
PAR11q3	374.0	331.5	422.2
PAR11q4	375.2	334.7	421.3
PAR11q5	354.3	319.1	397.2
PAR11q6	442.7	392.3	505.4
PAR11q7	307.9	273.4	346.6
PAR11q8	436.5	393.4	482.6
PAR11q9	280.8	243.2	325.3
PAR11q10	429.9	384.9	485.8
PAR11q11	491.6	442.2	552.7
PAR11q12	377.7	336.0	421.2
PAR11q13	335.6	295.2	381.0
PAR11q14	414.1	374.9	457.7
PAR11q15	413.3	358.7	485.0
PAR11q16	329.1	294.0	367.9

PAR11q17	390.3	346.5	436.9
PAR11q18	348.7	309.6	396.4
PAR11q19	391.8	348.8	440.3
PAR11q20	301.8	265.4	342.6
PAR11q21	401.2	355.0	452.7
PAR11q22	360.9	315.7	411.0
PAR11q23	375.1	333.2	423.3
PAR11q24	330.8	290.0	378.7
PAR11q25	400.6	351.7	457.5
PAR12q1	241.3	212.9	275.9
PAR12q2	259.1	231.7	289.1
PAR12q3	351.8	308.6	403.0
PAR12q4	310.2	279.7	346.4
PAR12q5	286.4	257.3	320.2
PAR12q6	329.4	295.0	370.3
PAR12q7	285.8	256.2	321.5
PAR12q8	307.8	279.3	341.3
PAR12q9	283.2	252.8	323.3
PAR12q10	277.2	249.9	310.8
PAR12q11	254.2	227.6	284.5
PAR12q12	222.2	196.5	250.7
PAR12q13	295.2	269.4	323.2
PAR12q14	275.8	248.1	306.0
PAR12q15	336.2	300.1	382.2
PAR12q16	256.5	229.3	286.8
PAR12q17	305.7	274.4	341.1
PAR12q18	345.1	310.7	384.2
PAR12q19	282.6	254.3	312.2
PAR12q20	291.8	261.5	325.1
PAR12q21	261.2	231.1	293.0
PAR12q22	288.3	256.0	324.3

PAR12q23	330.4	297.4	371.2
PAR12q24	300.6	271.3	331.7
PAR12q25	312.6	282.7	346.6
PAR13q1	413.4	366.9	467.7
PAR13q2	434.5	386.1	492.6
PAR13q3	450.7	398.3	506.2
PAR13q4	388.9	349.9	429.5
PAR13q5	412.8	367.7	466.0
PAR13q6	311.2	267.2	366.9
PAR13q7	297.5	260.8	340.4
PAR13q8	331.1	286.5	378.5
PAR13q9	333.9	296.9	380.1
PAR13q10	359.8	318.6	411.2
PAR13q11	369.7	326.6	422.7
PAR13q12	409.0	367.1	451.9
PAR13q13	361.4	325.7	400.6
PAR13q14	356.9	314.3	405.4
PAR13q15	304.1	266.6	354.2
PAR13q16	408.5	367.5	451.9
PAR13q17	366.4	320.4	423.7
PAR13q18	419.9	377.9	462.1
PAR13q19	313.1	279.9	348.3
PAR13q20	407.0	360.6	461.0
PAR13q21	440.1	387.7	501.0
PAR13q22	427.0	374.3	491.3
PAR13q23	347.7	299.4	405.6
PAR13q24	209.2	179.3	240.5
PAR13q25	401.0	354.6	463.1
PAR14q1	415.9	364.3	479.7
PAR14q2	448.2	398.0	503.9
PAR14q3	367.9	326.5	416.4
PAR14q4	359.3	320.9	400.6

PAR14q5	424.2	375.1	481.4
PAR14q6	468.9	416.1	528.9
PAR14q7	330.1	286.6	378.5
PAR14q8	407.6	355.1	466.6
PAR14q9	417.5	374.4	466.7
PAR14q10	431.7	386.2	485.0
PAR14q11	372.4	333.4	416.2
PAR14q12	344.1	303.3	387.3
PAR14q13	326.1	291.2	364.0
PAR14q14	340.5	297.9	390.0
PAR14q15	519.5	465.7	587.9
PAR14q16	338.8	302.4	379.4
PAR14q17	290.9	259.4	326.0
PAR14q18	356.8	319.5	401.2
PAR14q19	346.9	303.7	400.1
PAR14q20	360.0	309.9	418.4
PAR14q21	348.9	304.8	396.0
PAR14q22	285.4	253.1	326.2
PAR14q23	390.4	345.5	443.7
PAR14q24	411.2	362.8	464.6
PAR14q25	330.8	295.2	369.2
PAR15q1	434.9	388.0	491.3
PAR15q2	419.8	373.1	471.0
PAR15q3	345.0	295.7	404.8
PAR15q4	403.9	355.1	463.0
PAR15q5	452.5	401.1	505.6
PAR15q6	385.5	345.6	428.4
PAR15q7	457.5	409.9	518.2
PAR15q8	352.4	304.4	413.6
PAR15q9	293.4	256.7	336.8
PAR15q10	282.6	249.9	320.8

PAR15q11	394.1	352.6	445.0
PAR15q12	395.6	353.7	441.6
PAR15q13	423.8	378.7	474.3
PAR15q14	456.4	403.1	516.9
PAR15q15	240.3	211.3	271.8
PAR15q16	343.2	301.1	390.9
PAR15q17	473.5	421.7	534.7
PAR15q18	393.0	354.2	435.8
PAR15q19	318.4	283.7	359.8
PAR15q20	374.8	336.2	416.7
PAR15q21	394.3	351.6	443.0
PAR15q22	398.4	356.8	446.1
PAR15q23	388.2	345.2	441.9
PAR15q24	483.5	434.2	544.6
PAR15q25	367.9	329.9	411.6
PAR16q1	372.1	318.6	440.5
PAR16q2	512.0	435.8	609.5
PAR16q3	618.0	529.3	732.2
PAR16q4	356.6	312.9	406.8
PAR16q5	448.7	386.7	520.5
PAR16q6	432.4	378.5	492.6
PAR16q7	417.5	366.7	475.7
PAR16q8	339.0	293.1	389.7
PAR16q9	437.6	380.8	503.8
PAR16q10	275.1	226.2	332.5
PAR16q11	454.1	390.5	534.1
PAR16q12	299.7	256.0	358.9
PAR16q13	323.2	274.4	379.5
PAR16q14	309.7	272.5	354.4
PAR16q15	496.2	422.2	576.9
PAR16q16	399.8	348.8	455.7

PAR16q17	363.1	314.8	417.7
PAR16q18	274.4	238.0	322.1
PAR16q19	247.1	214.0	291.1
PAR16q20	387.4	334.0	446.7
PAR16q21	388.2	337.3	450.5
PAR16q22	318.1	268.9	380.4
PAR16q23	272.9	229.5	327.4
PAR16q24	356.2	290.3	443.1
PAR16q25	280.5	239.5	332.1
PAR16q26	285.4	253.2	325.3
PAR16q27	533.1	454.8	630.5
PAR16q28	414.8	356.7	477.3
PAR16q29	360.4	307.4	423.9
PAR16q30	300.9	258.6	351.3
PAR16q31	331.0	290.1	380.1
PAR16q32	435.9	376.7	512.4
PAR16q33	310.2	266.8	358.6
PAR16q34	497.1	426.1	588.7
PAR16q35	317.7	271.7	374.7
PAR16q36	465.9	406.2	542.9
PAR16q37	354.2	306.4	408.4
PAR16q38	407.6	356.9	463.7
PAR16q39	467.5	408.9	528.3
PAR16q40	440.3	371.1	539.0
PAR16q41	384.5	332.2	443.0
PAR16q42	328.1	283.6	378.5
PAR16q43	297.5	261.0	339.0
PAR16q44	397.2	342.4	468.8
PAR16q45	469.2	394.4	565.7
PAR16q46	363.9	311.2	421.7
PAR16q47	354.6	308.4	408.2
PAR16q48	338.8	293.3	390.3

PAR16q49	437.3	386.2	506.1
PAR16q50	357.8	299.9	425.8
PAR16q51	391.2	344.5	448.7
PAR16q52	343.7	304.8	388.9
PAR16q53	442.1	376.2	529.1
PAR16q54	323.6	262.9	398.2
PAR16q55	356.5	300.1	430.0
PAR16q56	348.0	298.7	408.3
PAR16q57	358.4	314.2	413.1
PAR16q58	374.9	328.1	429.7
PAR16q59	457.2	377.4	549.2
PAR16q60	319.3	273.1	378.3
PAR16q61	445.4	387.5	513.9
PAR16q62	234.3	206.4	266.2
PAR16q63	323.7	276.5	380.2
PAR16q64	308.0	267.2	357.5
PAR16q65	341.4	285.9	413.2
PAR16q66	225.3	197.6	257.1
PAR16q67	461.1	395.0	535.6
PAR16q68	358.4	312.4	409.8
PAR16q69	377.0	327.0	436.1
PAR16q70	318.7	270.3	383.8
PAR16q71	415.1	370.3	468.4
PAR16q72	351.8	308.0	404.8
PAR16q73	421.7	366.0	501.8
PAR16q74	363.5	315.4	419.9
PAR16q75	379.7	321.2	453.6
PAR16q76	529.0	447.2	636.3
PAR16q77	373.4	307.3	454.2
PAR16q78	417.4	352.1	496.4
PAR16q79	383.5	331.1	441.7

PAR16q80	404.3	346.6	475.7
PAR16q81	444.8	390.8	503.8
PAR16q82	275.4	240.4	316.4
PAR16q83	413.3	362.8	470.1
PAR16q84	386.4	339.8	442.2
PAR16q85	304.5	258.3	362.6
PAR16q86	308.0	257.8	368.1
PAR16q87	327.6	282.9	381.1
PAR16q88	451.7	384.5	532.9
PAR16q89	425.3	366.0	499.4
PAR16q90	363.7	306.4	436.8
PAR16q91	481.3	405.7	582.7
PAR16q92	484.8	401.2	599.4
PAR16q93	418.6	374.8	474.0
PAR16q94	377.9	328.8	436.3
PAR16q95	433.7	343.5	557.2
PAR16q96	362.1	307.4	428.3
PAR16q97	359.1	308.0	419.8
PAR16q98	354.0	301.1	413.4
PAR16q99	377.9	320.8	444.9
PAR16q100	394.2	334.3	460.6
PAR17q1	116.0	105.5	128.4
PAR17q2	136.9	119.6	160.9
PAR17q3	163.4	150.1	177.4
PAR17q4	152.7	138.5	168.6
PAR17q5	160.8	149.8	172.9
PAR17q6	115.6	106.0	125.5
PAR17q7	114.8	105.5	124.3
PAR17q8	129.3	118.0	142.0
PAR17q9	117.6	107.3	128.7
PAR17q10	131.5	118.3	148.2

PAR17q11	128.6	119.8	137.4
PAR17q12	117.3	108.5	126.5
PAR17q13	135.7	125.0	147.1
PAR17q14	129.4	117.0	145.1
PAR17q15	123.2	112.1	135.9
PAR17q16	135.1	124.7	146.7
PAR17q17	160.3	146.4	176.0
PAR17q18	161.6	151.2	172.6
PAR17q19	82.2	75.6	90.0
PAR17q20	124.7	115.2	135.3
PAR17q21	116.5	107.0	127.0
PAR17q22	125.2	115.9	134.9
PAR17q23	115.8	106.4	125.9
PAR17q24	116.2	105.5	128.2
PAR17q25	151.5	136.3	168.5

Calculating the maximum height and the Lorey's height per (sub)plot

```
TropiSARstemTREE$Hchave <- retrieveH(D=TropiSARstemTREE$Diameter, coord=cbind(TropiSARstemTREE
$long,TropiSARstemTREE$lat))$H

# Max height
maxHlocal <- tapply(TropiSARstemTREE$Hlocal, TropiSARstemTREE$Quart_code, max)
maxHchave <- tapply(TropiSARstemTREE$Hchave, TropiSARstemTREE$Quart_code, max)
maxHfeld <- tapply(TropiSARstemTREE$Hfeld, TropiSARstemTREE$Quart_code, max)

# Lorey height
TropiSARstemTREE$BAm <- (pi*(TropiSARstemTREE$Diameter/2)^2)/10000
TropiSARstemTREE$HBAlocal <- TropiSARstemTREE$Hlocal * TropiSARstemTREE$BAm
TropiSARstemTREE$HBAchave <- TropiSARstemTREE$Hchave * TropiSARstemTREE$BAm
TropiSARstemTREE$HBAfeld <- TropiSARstemTREE$Hfeld * TropiSARstemTREE$BAm
LoreyLocal <- tapply(TropiSARstemTREE$HBAlocal,TropiSARstemTREE$Quart_code,sum) / tapply(Tropi
SARstemTREE$BAm,TropiSARstemTREE$Quart_code, sum)
LoreyChave <- tapply(TropiSARstemTREE$HBAchave,TropiSARstemTREE$Quart_code,sum) / tapply(Tropi
SARstemTREE$BAm,TropiSARstemTREE$Quart_code, sum)
LoreyFeld <- tapply(TropiSARstemTREE$HBAfeld,TropiSARstemTREE$Quart_code,sum) / tapply(TropiSA
RstemTREE$BAm,TropiSARstemTREE$Quart_code, sum)

hdf <- data.frame(Area_code = names(maxHlocal), LoreyLocal=LoreyLocal, LoreyChave=LoreyChave,L
oreyFeld=LoreyFeld, maxHlocal=maxHlocal, maxHchave=maxHchave, maxHfeld=maxHfeld)
```

```
georefeatures.df <- merge(georefeatures.df, hdf, by="Area_code", sort = F, all=T)
#write.csv(georefeatures.df, "tempoFOSbis.csv", row.names = F)
```

Reshaping the different information (estimates, coordinates) in a single object

```
# Merge dataframes
AGB_FIN1 <- merge(georefeatures.df, AGB_fph.df, by="Area_code", sort = F, all=T)
AGB_FIN2 <- merge(AGB_FIN1, AGB_chv.df, by="Area_code", sort = F, all=T)
AGB_TropiSAR <- merge(AGB_FIN2, AGB_loc.df, by="Area_code", sort = F, all=T)
#AGB_TropiSAR[,c(14:15,17:18,20:21)] <- round(AGB_TropiSAR[,c(14:15,17:18,20:21)],1)

# Reorder columns
AGB_TropiSAR <- AGB_TropiSAR[c("Site","Area_code","Plot_code","Scale",
                               "Lon_sw","Lat_sw","Lon_nw","Lat_nw","Lon_se","Lat_se","Lon_ne",
"Lat_ne","Lon_cnt","Lat_cnt",
                               "LoreyLocal","LoreyChave","LoreyFeld","maxHlocal","maxHchave","
maxHfeld",
                               "agb_fph","cred_fph_2.5","cred_fph_97.5","agb_chv","cred_chv_2.
5","cred_chv_97.5","agb_loc","cred_loc_2.5","cred_loc_97.5")]

#AGB_TropiSAR
```