Biomass estimation on 0.25 ha FOS Rainfor data

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Load and prepare data

```
library(BIOMASS)

##Read in data (Modification="NULL" values converted in NA)
FosData<-read.csv("100Plots/FOSDataDecember2016/FOSDataIndvData2016modifMRM.csv")
# Plot latlong and dimension
FosDataCoord<-read.csv("100Plots/FOSDataDecember2016/FOSPlotsLatLongWithAllometricRegion.csv")
FosData$Long<-FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCode),"LongitudeDecimal"]
FosData$Lat<-FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCode),"LatitudeDecimal"]
# Feldpausch regions
FosData$FeldRegion<-paste(as.character(FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCo
de),"Continent"]),
                          as.character(FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCo
de),"Region"]),sep="")
# Plot dimension
maxXperplot<-tapply(FosData$x_standard,FosData$PlotCode,function(x) quantile(x,probs = 0.95,na
.rm = T)) # use of quantile to avoid the effect of outliers
MinDim<-FosDataCoord[match(names(maxXperplot),FosDataCoord$PlotCode),"MinimumDimension"]
MaxDim<-FosDataCoord[match(names(maxXperplot),FosDataCoord$PlotCode),"MaximumDimension"]
plotDim<-data.frame(PlotCode=names(maxXperplot),dimX=MinDim,dimY=MinDim)
filt=maxXperplot>MinDim
plotDim$dimX[filt]<-MaxDim[filt]
plotDim$dimY[!filt]<-MaxDim[!filt]
# Correct plotdim for GAU-06
plotDim[plotDim$PlotCode=="GAU-06",c("dimX","dimY")]=c(180,60)
#
FosData=merge(FosData,plotDim)
# D in cm
FosData$Dcm<-FosData$D/10
#### Dealing with trees that do not have coordinates or that have wrong coordinates (outside t
he plot)
FosData$Plot_Subplot=paste(FosData$PlotID,"_",FosData$Subplot_Standard,sep="")
meanX<-tapply(FosData$x_standard,FosData$Plot_Subplot,mean,na.rm=T)
meanY<-tapply(FosData$y_standard,FosData$Plot_Subplot,mean,na.rm=T)
#
filtNA <- (is.na(FosData$x_standard) | is.na(FosData$y_standard))
filtNoSubplot <- is.na(FosData$Subplot_Standard)
filtWrong <- !filtNA & !filtNoSubplot & (FosData$y_standard<0 | FosData$x_standard<0 | FosData
$y_standard> FosData$dimY | FosData$x_standard>FosData$dimX)
# Based on subplot
FosData$x_standard[(filtWrong | filtNA) & !filtNoSubplot]<-meanX[FosData$Plot_Subplot[(filtWro
                                                              ]]
```

```
FosData$y_standard[(filtWrong | filtNA) & !filtNoSubplot]<-meanY[FosData$Plot_Subplot[(filtWro
ng | filtNA) & !filtNoSubplot]]
# Based on the closest treeID
filt2<- FosData$TreeID==(FosData$TreeID[(filtWrong | filtNA) & filtNoSubplot]-1)
FosData$x_standard[(filtWrong | filtNA) & filtNoSubplot]<-FosData$x_standard[filt2]
FosData$y_standard[(filtWrong | filtNA) & filtNoSubplot]<-FosData$y_standard[filt2]

############################
# Designing subquadrats
FosData$x_standard[FosData$x_standard==FosData$dimX]=FosData$dimX[FosData$x_standard==FosData$
dimX]-0.1
FosData$y_standard[FosData$y_standard==FosData$dimY]=FosData$dimY[FosData$y_standard==FosData$
dimY]-0.1
QuaDindex=function(gx,gy,gridsizeX,gridsizeY){
  output=paste(floor(gx/gridsizeX),floor(gy/gridsizeY),sep="_")
  return(output)
} # end gxgy.2.index

gridsizeX<-pmin(FosData$dimX,50)
gridsizeY=pmin(FosData$dimY,50)
gridsizeX[gridsizeY<50]<-2500/gridsizeY[gridsizeY<50]
gridsizeY[gridsizeX<50]<-2500/gridsizeX[gridsizeX<50]
# Correction for GAU-06
gridsizeX[FosData$PlotCode=="GAU-06"]=180/4 # 2500/60
gridsizeY[FosData$PlotCode=="GAU-06"]=60
#
FosData$gridsizeX=gridsizeX
FosData$gridsizeY=gridsizeY
FosData$QuadID<-paste(FosData$PlotCode,QuaDindex(FosData$x_standard,FosData$y_standard,gridsiz
eX=gridsizeX,gridsizeY=gridsizeY))
#
FOSCoordQuad<-unique(FosData[,c("PlotCode","QuadID","dimX","dimY","gridsizeX","gridsizeY")])

## Plots corner in UTM
source("100Plots/ScriptCoordSubPlot140217.R")
getLeedsUTMcoord()
```

```
## Loading required package: proj4
```

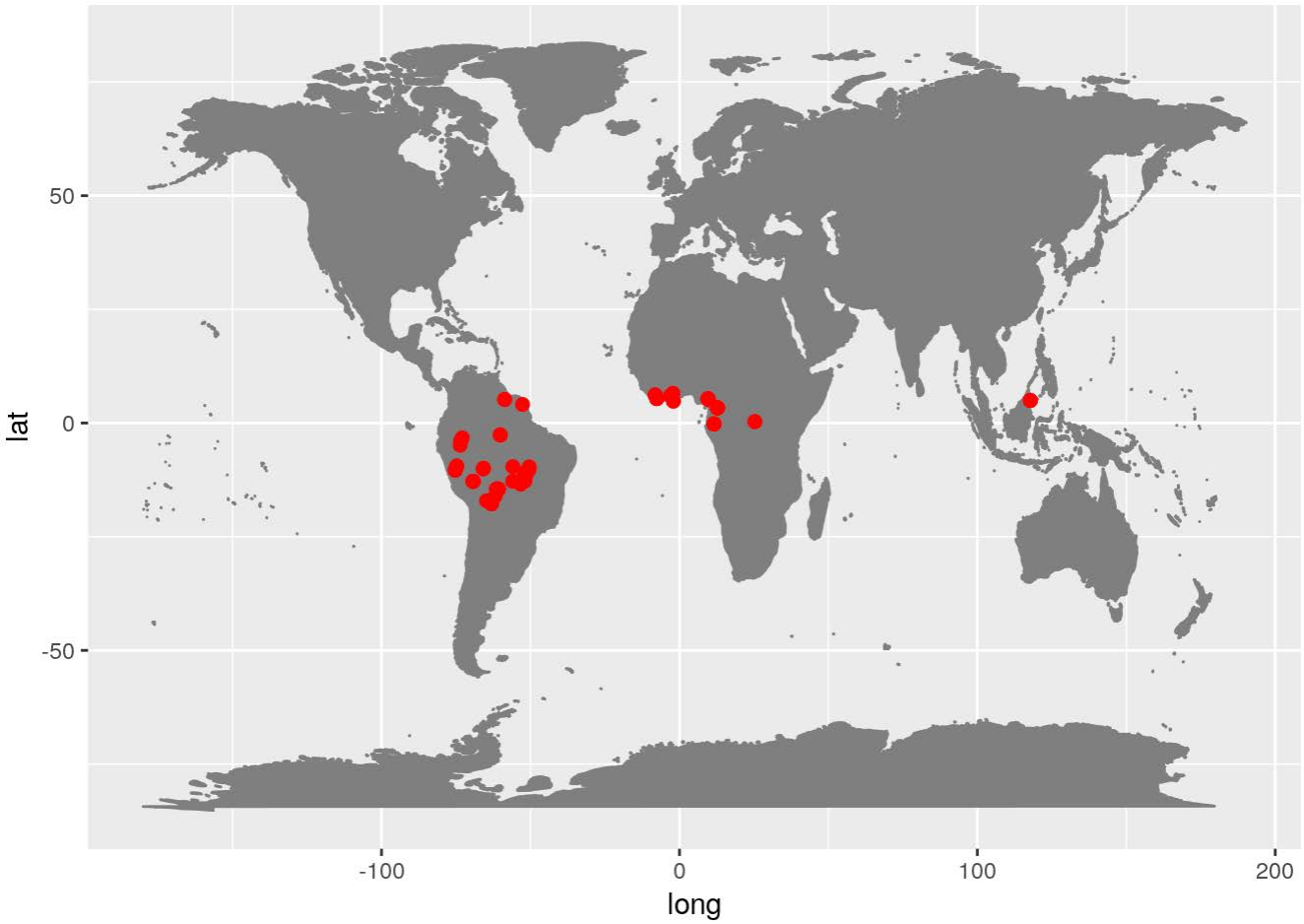
```
UTMcoord<-read.csv("/media/rejou-mechain/DATADRIVE1/Rejou/Collab/FOS/Rainfor/LeedsVisit/100Plo
ts/OutCoord.csv")

# Correction for LFB-01 and LFB-02 that do not follow the clockwise rule
UTMcoord[UTMcoord$PlotCode%in%c("LFB-01","LFB-02"),c("Corner1X","Corner2X","Corner3X","Corner4
X","Corner1Y","Corner2Y","Corner3Y","Corner4Y")]=UTMcoord[UTMcoord$PlotCode%in%c("LFB-01","LFB
-02"),c("Corner4X","Corner1X","Corner2X","Corner3X","Corner4Y","Corner1Y","Corner2Y","Corner3Y
")]
#
FOSCoordQuad=merge(FOSCoordQuad,UTMcoord)
# Building the relative coordinate center of quadrats
codeQuad=strsplit(sapply(strsplit(FOSCoordQuad$QuadID,split = " "),"[",2),split="_")
codeQuadX=as.numeric(sapply(codeQuad,"[",1))
```

```
codeQuadY=as.numeric(sapply(codeQuad,"[",2))
FOSCoordQuad$QuadXrel=((codeQuadX+1)*FOSCoordQuad$gridsizeX+codeQuadX*FOSCoordQuad$gridsizeX)/
2
FOSCoordQuad$QuadYrel=((codeQuadY+1)*FOSCoordQuad$gridsizeY+codeQuadY*FOSCoordQuad$gridsizeY)/
2
#
FOSCoordQuad$Sizeha=FOSCoordQuad$gridsizeX*FOSCoordQuad$gridsizeY/10000
#
FOSCoordQuad$QuadXabs<-(1-FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX)*(1-FOSCoordQuad$QuadYrel/FO
SCoordQuad$dimY)*FOSCoordQuad$Corner1X+FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX*(1-FOSCoordQuad
$QuadYrel/FOSCoordQuad$dimY)*FOSCoordQuad$Corner2X+FOSCoordQuad$QuadYrel/FOSCoordQuad$dimY*(1-
FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX)*FOSCoordQuad$Corner4X+FOSCoordQuad$QuadXrel*FOSCoordQ
uad$QuadYrel/(FOSCoordQuad$dimX*FOSCoordQuad$dimY)*FOSCoordQuad$Corner3X
#
FOSCoordQuad$QuadYabs<-(1-FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX)*(1-FOSCoordQuad$QuadYrel/FO
SCoordQuad$dimY)*FOSCoordQuad$Corner1Y+FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX*(1-FOSCoordQuad
$QuadYrel/FOSCoordQuad$dimY)*FOSCoordQuad$Corner2Y+FOSCoordQuad$QuadYrel/FOSCoordQuad$dimY*(1-
FOSCoordQuad$QuadXrel/FOSCoordQuad$dimX)*FOSCoordQuad$Corner4Y+FOSCoordQuad$QuadXrel*FOSCoordQ
uad$QuadYrel/(FOSCoordQuad$dimX*FOSCoordQuad$dimY)*FOSCoordQuad$Corner3Y
#
FOSCoordQuad$Quadlat=NA
FOSCoordQuad$Quadlong=NA
for (i in 1:nrow(FOSCoordQuad)){
  FOSCoordQuad[i,c("Quadlong","Quadlat")]<-project(cbind(FOSCoordQuad$QuadXabs[i],FOSCoordQuad
$QuadYabs[i]),proj=FOSCoordQuad$UTMzone[i],inverse=T)
}

# Remove quadrats with less than 2 trees > 10 cm dbh
FosData<-FosData[!FosData$QuadID%in%names(table(FosData$QuadID))[table(FosData$QuadID)<2],]
```

Location of the plots



Retrieve wood density

```
## [1] "Calling http://taxosaurus.org/retrieve/1540f5a82dde3856ae13b1f6b0f429e2"
## [1] "Calling http://taxosaurus.org/retrieve/b8724811995659d027600a92b16ca147"
## [1] "Calling http://taxosaurus.org/retrieve/f0c1ae68a3339c2dd4e108960de84b9e"
## [1] "Calling http://taxosaurus.org/retrieve/f32ef1974b8b07f1e3eabe7d76262913"
## [1] "Calling http://taxosaurus.org/retrieve/b3528a41defa9155d47ab7aa764910f2"
## [1] "Calling http://taxosaurus.org/retrieve/a8a84ba984e4eb51253d92f6cfb24b8f"
## [1] "Calling http://taxosaurus.org/retrieve/84ba59af10579c8d6c9f76c9727ceeb1"
## [1] "Calling http://taxosaurus.org/retrieve/a4d9423593211694234 68caf960bca93"
## [1] "Calling http://taxosaurus.org/retrieve/c53ea30dec94651bfb9365e1bb33e7f4"
## [1] "Calling http://taxosaurus.org/retrieve/e1d5715e0e9657ff79eded9eec13c557"
## [1] "Calling http://taxosaurus.org/retrieve/15867a0bb0463543308d4a5a72d4bc76"
## [1] "Calling http://taxosaurus.org/retrieve/0e73527203aba1ba58fc2d0cf2faf7fc"
## [1] "Calling http://taxosaurus.org/retrieve/9eec069b49cc09422f23a5bb2f51bf1f"
## [1] "Calling http://taxosaurus.org/retrieve/ff4430e0880e9d9de42cbba9355675d3"
## [1] "Calling http://taxosaurus.org/retrieve/8616159c50e49ea16a6bead3cd48b4c5"
## [1] "Calling http://taxosaurus.org/retrieve/735c07b2a16fb8305b0a923a7a5876b3"
## [1] "Calling http://taxosaurus.org/retrieve/d57d510da5b45b387de0f2e3a0e7e12f"
## [1] "Calling http://taxosaurus.org/retrieve/80fbae552ec0227f6e6aa7d85bad5ffb"
## [1] "Calling http://taxosaurus.org/retrieve/a2856229f9aa2a2490be9c59031e7ed3"
## [1] "Calling http://taxosaurus.org/retrieve/e2b309fe985fd82fe81be766ed5a8e47"
## [1] "Calling http://taxosaurus.org/retrieve/2c20e14439ca5c5200b48bcb83dff4f6"
## [1] "Calling http://taxosaurus.org/retrieve/c2235f470361a21257f02e5e6c4735a4"
## [1] "Calling http://taxosaurus.org/retrieve/8472e6cf25dcf7284ac5a78c4e3769ea"
```

```
## [1] "Calling http://taxosaurus.org/retrieve/94bd82000ac1512342010bd11e7a5eee"
## [1] "Calling http://taxosaurus.org/retrieve/0d919c830ccc48385cbccedbd7e6eaf9"
## [1] "Calling http://taxosaurus.org/retrieve/e196a6f51f20d78dc8450dcbbefae184"
## [1] "Calling http://taxosaurus.org/retrieve/7c021a99a8bd3a14e33905c0390a5fbd"
## [1] "Calling http://taxosaurus.org/retrieve/6b49a174789c15d2a76d515b0dd418e6"
## [1] "Calling http://taxosaurus.org/retrieve/cda7b62e94125d7fde5d6cbdadb0bc0d"
## [1] "Calling http://taxosaurus.org/retrieve/e15d6995ce2983444e53d7357bd730c8"
## [1] "Calling http://taxosaurus.org/retrieve/51950b8ffeb4895df3e57f5e3a10bbb3"
## [1] "Calling http://taxosaurus.org/retrieve/4d8368f197aa64a149a98235de87df45"
## [1] "Calling http://taxosaurus.org/retrieve/26514896b13673773998ef53c82184ac"
## [1] "Calling http://taxosaurus.org/retrieve/81f2e7799a45918fd8b5e8cc5c518291"
## [1] "Calling http://taxosaurus.org/retrieve/911604a378129d46b715323225ae433b"
## [1] "Calling http://taxosaurus.org/retrieve/8c5053d0edd9594f144151b5f55843aa"
## [1] "Calling http://taxosaurus.org/retrieve/89916c0c4df9a51367c9b474b0752af0"
## [1] "Calling http://taxosaurus.org/retrieve/112b075880bdfe831cbcbb1edeb2bff4"
## [1] "Calling http://taxosaurus.org/retrieve/d18753a34df11bb070e2fcf49a2d203a"
## [1] "Calling http://taxosaurus.org/retrieve/213169da276c9a557e101d051de26790"
## [1] "Calling http://taxosaurus.org/retrieve/02a4c93f4ea09be10d1be40571c84bf0"
## [1] "Calling http://taxosaurus.org/retrieve/2f92e6c642b17908687051307ac129ff"
## [1] "Calling http://taxosaurus.org/retrieve/34ba89084d9e16c68a38523b096f1863"
## [1] "Calling http://taxosaurus.org/retrieve/f6db68fa7a6014c1ccd866f00c635e24"
## [1] "Calling http://taxosaurus.org/retrieve/bf361524e9502ab54548a9d90851cc0a"
## [1] "Calling http://taxosaurus.org/retrieve/34bdf8a9935d18114b8dd4c880a6b8a5"
## [1] "Calling http://taxosaurus.org/retrieve/7c0fe98c7cb87f90b87d61d544389abe"
## [1] "Calling http://taxosaurus.org/retrieve/cc185bf477827bb812a46cd887102741"
## [1] "Calling http://taxosaurus.org/retrieve/f699e13a36e676039d2154dc8bac2d9e"
## [1] "Calling http://taxosaurus.org/retrieve/31dbbc82ad34d60f8cb9597454a67f60"
## [1] "Calling http://taxosaurus.org/retrieve/95066bcf3acf378386efab9c55467766"
## [1] "Calling http://taxosaurus.org/retrieve/5726f0c03ef2aa6f0f5076d8968913df"
## [1] "Calling http://taxosaurus.org/retrieve/18626010eb732a4defce38a29afa085d"
## [1] "Calling http://taxosaurus.org/retrieve/6c35fc6dc07e5e4c96c2b1367a76980d"
## [1] "Calling http://taxosaurus.org/retrieve/3641404758f4a49fa3cc53c16d9ae8ba"
## [1] "Calling http://taxosaurus.org/retrieve/01ca1c693270ba5cb3af2d5ebeea1fe0"
## [1] "Calling http://taxosaurus.org/retrieve/6073f58880a120fc48b7ddb18836b693"
## [1] "Calling http://taxosaurus.org/retrieve/5470f493047f48b89cf27b037c13acc4"
## [1] "Calling http://taxosaurus.org/retrieve/fc992ccea864ffb31602a1f6da095bac"
## [1] "Calling http://taxosaurus.org/retrieve/9470cd3dcddd7e262d52463871158257"
## [1] "Calling http://taxosaurus.org/retrieve/ed23546250f8cb6be177c57bb458b222"
## [1] "Calling http://taxosaurus.org/retrieve/6477135221b988ceebeed0111b00f4c9"
## [1] "Calling http://taxosaurus.org/retrieve/61555775dacdd3e979e747514917502f"
## [1] "Calling http://taxosaurus.org/retrieve/4b601885a7f5518c7feaa58cb6ae73b9"
## [1] "Calling http://taxosaurus.org/retrieve/57905a62b002d162302bdce19d6f80be"
## [1] "Calling http://taxosaurus.org/retrieve/b28e2d1715a6731e668aaeb120df8557"
## [1] "Calling http://taxosaurus.org/retrieve/1a3cb8fff8ef35b5a9720828470bed75"
## [1] "Calling http://taxosaurus.org/retrieve/74b6472c8b8cacbe18934c2c28975de5"
## [1] "Calling http://taxosaurus.org/retrieve/c6edb8f90989185b19248651e8b13a85"
## [1] "Calling http://taxosaurus.org/retrieve/4eeeaa5f17c29cef60968bf9c7af30a1"
## [1] "Calling http://taxosaurus.org/retrieve/7789888ffa622991e476e68c33a0bf21"
## [1] "Calling http://taxosaurus.org/retrieve/0162fd2c746a526687ac9b95462a0b2f"
## [1] "Calling http://taxosaurus.org/retrieve/821474a75cc55eb2060bc0cd04109359"
## [1] "Calling http://taxosaurus.org/retrieve/98981d067130ce5471febb1427090295"
## [1] "Calling http://taxosaurus.org/retrieve/a8099447f8248c615e96b346129a46c7"
## [1] "Calling http://taxosaurus.org/retrieve/fd9ea3e9c1b45139b832061fd9bcd89f"
## [1] "Calling http://taxosaurus.org/retrieve/a3b95d7c0fa4751dda979245c50a0ccd"
```

```
## [1] "Calling http://taxosaurus.org/retrieve/d147be3df3dcfc11d03c388fad6651d4"
## [1] "Calling http://taxosaurus.org/retrieve/a2fd4d3bf64b2ecba3b91ef96a5ecd73"
## [1] "Calling http://taxosaurus.org/retrieve/23b091f1129f3ff9295d1fb4b9f89dc4"
## [1] "Calling http://taxosaurus.org/retrieve/0b523c295799aec9a723697299b26d63"
## [1] "Calling http://taxosaurus.org/retrieve/676ba060321b0d90ea16d4dda20f32b4"
## [1] "Calling http://taxosaurus.org/retrieve/ff2ace330ab7d266244f314ea9a80694"
## [1] "Calling http://taxosaurus.org/retrieve/6542140306b875dece3f5e32950f8816"
## [1] "Calling http://taxosaurus.org/retrieve/fa8051f664a7544fdae340ea039e11a2"
## [1] "Calling http://taxosaurus.org/retrieve/f957b2b9b31f18b15059c4828e107cf2"
## [1] "Calling http://taxosaurus.org/retrieve/7ae5cfca507be3ccc1fa4445769b965d"
## [1] "Calling http://taxosaurus.org/retrieve/0f6b2f774b9655979bca54d075853014"
## [1] "Calling http://taxosaurus.org/retrieve/ed35efdb87e02dfd4919c1603ac4fa6c"
## [1] "Calling http://taxosaurus.org/retrieve/98b5aed589c1e4e1b6d5c669541e4bf7"
## [1] "Calling http://taxosaurus.org/retrieve/540fd69f543150425f25a763a8364a00"
```

```
# Retrieve wood density
dataWD<-getWoodDensity(genus=tax.cor$genusCorrected,
                       species=tax.cor$speciesCorrected,
                       stand=FosData$QuadID)
```

```
## The reference dataset contains 16467 wood density values
## Your taxonomic table contains 2706 taxa
```

```
FosData$WD=dataWD$meanWD
FosData$sdWD=dataWD$sdWD
```

Overall, 60.8 % of the values have been attributed at the species level, 31.6 % at the genus level, and 7.7 % at the plot level.

Construct H-D models

We implemented a three parameter weibull model of the form:

$$H = a \quad (1 - exp(-(D/b)^c))$$

where *a* represents the asymptotic height of trees in the stand. Note that the model is fitted by giving a proportional weight to the volume of trees (proportional to D^2*H).

```
# Number of tree height data per plot
ntree <- tapply(FosData$Height,FosData$PlotCode,function(x) length(x[!is.na(x)]))
ntree
```

```
## ALF-01 ALP-01 ALP-02 ALP-30 ALV-02 ASN-02 BNT-01 BNT-02 BNT-04 CAP-09
##     46     21     41     40      0     54      0      0     38     59
## CAP-10 CRP-02 CVL-01 CVL-11 DAD-03 DAD-04 DAN-01 DAN-02 DAN-03 DJK-01
##     63      0     66     61     38     53     39      0      0     56
## DJK-02 DJK-03 DJK-04 DJK-05 DJK-06 FLO-02 FMH-01 FMH-02 FMH-03 FRP-01
##     62     59     60     58     60    584      0      0      0    549
## FRP-02 GAU-02 GAU-05 GAU-06 GBO-02 GBO-04 GBO-08 GBO-11 GBO-15 GBO-19
##    258    520    505    483     85     61     69     72     60     66
```

```
## HCC-21 HCC-22 JBS-01 JBS-02 JEN-11 KSN-01 KSN-02 KSN-05 KSN-06 LFB-01
##     21     26    423    776     33     73     66     75     85     70
## LFB-02 LFB-03 LNL-02 LNL-03 LNL-04 LNL-05 LNL-06 LNL-07 LNL-08 LNL-09
##     29      0      8     19     52     27     41     68     53     77
## LNL-10 LNL-11 LNL-12 LSL-02 MBT-01 MBT-02 MBT-08 NGI-01 NGI-02 NGI-03
##     78     68     82      0      0      0      0      0      0      0
## NGI-05 NGI-06 NGI-07 NGI-08 NGI-09 NGI-10 NGI-11 NGI-12 NOU-03 PNY-05
##     59     69     73     74     72     75     77     86      7     39
## PNY-06 PNY-07 POA-01 POA-02 RCS-01 RCS-02 RCS-05 SAA-02 SAT-01 SAT-02
##     40     40    651    353      0      0      0    546    518    374
## SCT-06 SOR-01 SUC-01 TAM-01 TAM-02 TAM-05 TAM-06 TAM-07 TAM-09
##      0    451     40     41    309    170    357    180      0
```

Note that the number of tree height measurements per stand is pretty low in many plots

```
# Compute models specific to given stands

filt=FosData$PlotCode%in%names(ntree[ntree>=30])
modelHDperplot <- by(FosData[filt,],FosData$PlotCode[filt],
function(x) modelHD(D=x$Dcm,H=x$Height, method="weibull",useWeight =T),
simplify=F)
RSEmodels<-sapply(modelHDperplot,function(x) x$RSE)
Coeffmodels<-lapply(modelHDperplot,function(x) x$coefficients)
ResHD<-data.frame(Plot=names(unlist(RSEmodels)),
                  a=round(unlist(sapply(Coeffmodels,"[",1)),3),
                  b=round(unlist(sapply(Coeffmodels,"[",2)),3),
                  c=round(unlist(sapply(Coeffmodels,"[",3)),3),
                  RSE=round(unlist(RSEmodels),3))
```

Plot	a	b	c	RSE
ALF-01	47.754	57.283	0.601	3.825
ALP-02	27.331	22.878	1.081	3.593
ALP-30	33.688	35.068	0.642	3.481
ASN-02	54.321	55.267	1.122	4.839
BNT-04	33.403	23.816	0.867	2.690
CAP-09	34.714	26.109	1.391	5.121
CAP-10	45.388	36.587	1.067	4.987
CVL-01	34.357	24.987	1.070	5.137
CVL-11	153.267	4473.585	0.351	4.854
DAD-03	1648.937	10608.775	0.772	3.674
DAD-04	47.326	52.340	1.391	6.614
DAN-01	2600.614	95336.808	0.590	6.282
DJK-01	48.015	30.180	1.262	7.192
DJK-02	45.919	33.417	0.947	7.917
DJK-03	41.658	24.297	1.615	6.463
DJK-04	35.899	27.558	1.621	6.273
DJK-05	41.551	23.115	1.203	4.989
DJK-06	71.541	81.978	0.558	8.816
FLO-02	28.160	28.022	0.550	2.634
FRP-01	27.895	27.183	0.767	3.030
FRP-02	79.021	1362.718	0.532	1.282

GAU-02	17.972	7.143	0.763	1.894	
GAU-05	24.605	20.425	0.882	3.318	
GAU-06	40.829	53.330	0.921	3.311	
GBO-02	33.352	23.246	1.032	4.492	
GBO-04	981.574	321678.126	0.407	5.211	
GBO-08	37.927	30.683	1.102	5.045	
GBO-11	262.001	11841.805	0.392	4.174	
GBO-15	37.903	34.861	1.357	5.508	
GBO-19	49.884	54.469	0.651	4.500	
JBS-01	28.579	25.750	1.134	3.875	
JBS-02	15.486	16.342	0.814	1.968	
JEN-11	1258.544	277668.814	0.421	4.782	
KSN-01	786.020	226029.401	0.384	4.861	
KSN-02	470.081	78093.838	0.375	4.862	
KSN-05	47.967	46.756	0.717	3.975	
KSN-06	278.783	6442.648	0.439	4.730	
LFB-01	223.926	8323.731	0.386	4.517	
LNL-04	43.240	34.418	1.221	4.594	
LNL-06	29.774	17.478	1.288	3.596	
LNL-07	270.717	9322.774	0.394	7.942	
LNL-08	35.089	19.955	1.062	4.438	
LNL-09	43.794	31.907	1.226	7.096	
LNL-10	49.840	55.152	0.665	8.034	
LNL-11	43.061	44.592	0.653	6.137	
LNL-12	36.688	42.946	1.352	5.475	
NGI-05	45.534	54.993	0.914	5.109	
NGI-06	48.184	45.760	0.796	4.381	
NGI-07	38.756	39.189	1.471	5.297	
NGI-08	38.079	36.279	1.225	5.466	
NGI-09	775.822	97697.876	0.453	4.382	
NGI-10	1219.571	145489.070	0.478	4.227	
NGI-11	30.916	27.148	1.284	3.573	
NGI-12	35.725	33.473	1.890	5.429	
PNY-05	1288.410	63534.149	0.528	4.315	
PNY-06	1439.938	34559.162	0.573	5.270	
PNY-07	1117.740	45026.577	0.516	6.215	
POA-01	25.689	18.300	0.576	2.295	
POA-02	9.700	13.073	1.540	1.333	
SAA-02	34.257	54.621	0.546	2.787	
SAT-01	25.726	19.309	0.666	3.370	
SAT-02	11.282	17.046	0.997	1.231	
SOR-01	1175.202	46548.185	0.643	1.342	
SUC-01	31.649	20.256	1.054	4.029	
TAM-01	280.493	31643.366	0.372	4.093	
TAM-02	285.322	13079.055	0.419	4.092	
TAM-05	246.249	7791.457	0.430	3.328	
TAM-06	85.938	258.106	0.524	5.030	
TAM-07	47.073	62.143	0.669	3.176	

Weibull parameters are unrealistic for some plots (e.g. assymptotic height > 1000 m).

```
# retrieving predicted height values in the database
FosData$Hlocal<-FosData$Height # keeping directly measured trees
FosData$HlocalRSE<- 1 # to be refined

Plot=as.character(ResHD$Plot)
for(i in 1:length(ResHD$Plot)){
  filt<-FosData$PlotCode==Plot[i] & is.na(FosData$Hlocal)
  FosData$Hlocal[filt]<-retrieveH(D=FosData$Dcm[filt],model=modelHDperplot[[Plot[i]]])$H
  FosData$HlocalRSE[filt]<-modelHDperplot[[Plot[i]]]$RSE
}
```

Estimating biomass and associated uncertainties

Below, we used a Bayesian Monte-Carlo scheme to estimate the mean AGB and associated credibility interval per plot.

Using a local H-D model for all plots with at least 30 height measurements

```
#Below we only consider the small error from Chave 2004 to occur in the Rainfor dataset - larg
e errors presumed to be corrected during quality control
filt <- FosData$PlotCode%in%Plot
FosDataH<-droplevels(FosData[filt,])
resultMC<- by(FosDataH,FosDataH$QuadID,
              function(x)AGBmonteCarlo(D=x$Dcm,
                              WD=x$WD,
                              H=x$Hlocal,
                              errWD =x$sdWD,
                              errH=x$HlocalRSE,
                              Dpropag =0.0062*x$Dcm+0.0904),
              simplify=FALSE)

credperplot<-t(as.data.frame(sapply(resultMC,"[",4)))*4
ResHDlocal<-data.frame(Plot=names(resultMC),
                    AGB=round(unlist(sapply(resultMC,"[",1)),1)*4,
                    Cred_2.5=round(credperplot[,"2.5%"],1),
                    Cred_97.5=round(credperplot[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01 0_0	356.8	306.7	419.0
ALF-01 0_1	164.0	135.8	204.6
ALF-01 0_2	212.8	186.5	244.7
ALF-01 0_3	176.4	156.3	201.1
ALP-02 0_0	214.4	186.8	247.8
ALP-02 0_1	189.2	166.5	216.3
ALP-02 0_2	220.4	188.1	259.5
ALP-02 0_3	248.8	211.3	298.5
ALP-30 0_0	220.4	195.1	248.5

ALP-30	1_0	247.2	216.6	283.8
ALP-30	2_0	163.2	143.5	186.4
ALP-30	3_0	187.6	166.6	212.9
ASN-02	0_0	160.0	139.3	184.6
ASN-02	0_1	255.2	205.7	328.0
ASN-02	1_0	247.2	211.4	297.7
ASN-02	1_1	322.0	208.1	518.1
BNT-04	0_0	225.2	196.3	258.6
BNT-04	0_1	369.2	332.5	410.0
BNT-04	1_0	286.4	255.3	320.8
BNT-04	1_1	381.6	327.4	455.9
CAP-09	0_0	358.4	307.2	418.1
CAP-09	0_1	357.2	308.0	413.7
CAP-09	1_0	373.2	323.5	429.3
CAP-09	1_1	470.8	408.2	542.6
CAP-10	0_0	336.8	289.7	388.6
CAP-10	0_1	356.4	300.4	425.7
CAP-10	1_0	140.0	121.3	162.9
CAP-10	1_1	188.0	155.8	227.1
CVL-01	0_0	325.6	276.5	377.9
CVL-01	0_1	330.4	279.1	396.2
CVL-01	1_0	252.4	218.6	294.9
CVL-01	1_1	312.0	263.8	369.8
CVL-11	0_0	280.0	235.5	340.5
CVL-11	0_1	360.8	312.2	421.4
CVL-11	1_0	368.4	288.8	479.8
CVL-11	1_1	356.4	310.3	416.2
DAD-03	0_0	132.4	75.6	229.9
DAD-03	0_1	131.6	87.5	200.2
DAD-03	1_0	83.6	59.9	116.6
DAD-03	1_1	60.0	44.3	81.2
DAD-04	0_0	86.4	72.2	105.7
DAD-04	0_1	448.4	333.4	606.2
DAD-04	1_0	299.6	237.5	384.8
DAD-04	1_1	206.8	142.4	308.6
DAN-01	0_0	197.2	158.5	248.3
DAN-01	0_1	301.6	206.7	460.6
DAN-01	1_0	322.8	242.7	436.6
DAN-01	1_1	391.2	285.6	537.7
DJK-01	0_0	524.8	421.5	649.5
DJK-01	0_1	518.8	403.0	677.3
DJK-01	1_0	696.8	554.6	888.9
DJK-01	1_1	583.2	486.6	702.7
DJK-02	0_0	340.0	286.2	399.0
DJK-02	0_1	639.2	509.4	817.0
DJK-02	1_0	235.6	203.3	274.4
DJK-02	1_1	228.8	194.1	269.5
DJK-03	0_0	449.2	366.8	551.4

DJK-03	0_1	423.6	334.2	537.6
DJK-03	1_0	396.0	329.2	473.8
DJK-03	1_1	855.6	690.7	1053.7
DJK-04	0_0	248.8	212.7	295.7
DJK-04	0_1	315.2	255.1	393.1
DJK-04	1_0	218.4	176.3	269.3
DJK-04	1_1	205.6	172.8	246.3
DJK-05	0_0	525.2	426.9	642.4
DJK-05	0_1	551.6	457.2	664.8
DJK-05	1_0	608.8	485.3	764.8
DJK-05	1_1	631.6	542.9	739.8
DJK-06	0_0	317.6	265.2	384.9
DJK-06	0_1	334.0	277.3	400.9
DJK-06	1_0	263.2	225.7	304.7
DJK-06	1_1	373.2	297.6	465.9
FLO-02	0_0	145.6	126.3	172.2
FLO-02	0_1	143.6	129.4	160.4
FLO-02	1_0	142.8	124.7	166.0
FLO-02	1_1	147.6	127.8	173.1
FRP-01	0_0	198.0	168.7	238.1
FRP-01	0_1	177.2	154.2	206.1
FRP-01	1_0	146.0	128.4	168.5
FRP-01	1_1	188.0	163.6	216.4
FRP-02	0_0	15.2	13.3	17.2
FRP-02	0_1	12.0	10.6	14.0
FRP-02	1_0	11.2	9.5	13.6
FRP-02	1_1	15.2	13.3	17.0
GAU-02	0_0	160.8	145.6	177.6
GAU-02	0_1	145.6	133.3	158.4
GAU-02	1_0	140.8	129.1	153.6
GAU-02	1_1	132.8	120.8	146.1
GAU-05	0_0	166.8	152.1	185.2
GAU-05	0_1	140.4	127.7	155.1
GAU-05	1_0	172.4	154.8	195.1
GAU-05	1_1	102.8	91.1	115.6
GAU-06	0_0	355.2	264.7	477.4
GAU-06	1_0	116.4	93.7	146.3
GAU-06	2_0	247.2	196.8	315.5
GAU-06	3_0	294.8	226.5	395.3
GBO-02	0_0	309.6	257.9	375.9
GBO-02	0_1	399.2	341.4	471.9
GBO-02	1_0	310.0	255.0	374.6
GBO-02	1_1	380.8	327.2	441.8
GBO-04	0_0	363.2	288.7	456.8
GBO-04	0_1	203.6	166.1	249.9
GBO-04	1_0	350.8	300.6	415.1
GBO-04	1_1	236.4	199.4	285.2
GBO-08	0_0	291.2	227.6	373.3

GBO-08 0_1	390.4	309.1	503.2
GBO-08 1_0	346.4	280.3	424.4
GBO-08 1_1	342.4	289.8	403.2
GBO-11 0_0	391.2	328.4	475.7
GBO-11 0_1	237.2	203.8	283.2
GBO-11 1_0	184.8	159.3	215.6
GBO-11 1_1	426.0	362.1	504.0
GBO-15 0_0	436.4	333.7	588.4
GBO-15 0_1	196.0	160.6	242.4
GBO-15 1_0	180.4	158.9	205.4
GBO-15 1_1	283.6	231.0	350.6
GBO-19 0_0	345.2	287.3	421.9
GBO-19 0_1	314.0	234.0	445.8
GBO-19 1_0	390.0	315.2	486.1
GBO-19 1_1	248.0	208.0	296.7
JBS-01 0_0	261.6	218.2	314.3
JBS-01 0_1	364.0	318.3	422.0
JBS-01 1_0	288.4	254.4	328.9
JBS-01 1_1	229.6	195.3	267.7
JBS-02 0_0	106.0	96.6	117.5
JBS-02 0_1	106.4	98.8	115.4
JBS-02 1_0	110.4	101.1	120.3
JBS-02 1_1	112.0	104.5	121.3
JEN-11 0_0	314.4	270.1	366.4
JEN-11 0_1	222.4	192.7	258.3
JEN-11 1_0	357.6	316.8	404.9
JEN-11 1_1	396.0	341.1	464.1
KSN-01 0_0	281.6	245.2	321.9
KSN-01 0_1	479.6	385.0	611.1
KSN-01 0_2	354.4	295.9	425.5
KSN-01 0_3	328.0	282.0	378.4
KSN-02 0_0	181.2	148.8	226.9
KSN-02 0_1	401.2	332.5	497.7
KSN-02 0_2	385.6	301.4	501.5
KSN-02 0_3	293.2	248.1	345.8
KSN-05 0_0	270.4	230.3	320.2
KSN-05 0_1	524.0	435.8	632.1
KSN-05 0_2	412.0	332.6	524.4
KSN-05 0_3	257.2	209.7	318.9
KSN-06 0_0	220.4	183.6	274.3
KSN-06 0_1	184.4	153.7	226.2
KSN-06 0_2	330.8	278.4	393.1
KSN-06 0_3	639.2	533.3	768.8
LFB-01 0_0	283.6	235.5	351.2
LFB-01 1_0	298.4	248.0	369.1
LFB-01 2_0	285.6	244.6	331.5
LFB-01 3_0	246.4	203.6	298.7
LNL-04 0_0	295.6	256.7	342.6

LNL-04	1_0	129.6	112.7	149.4
LNL-06	0_0	159.6	144.4	175.6
LNL-06	1_0	208.8	192.0	228.2
LNL-07	0_0	370.8	313.7	439.7
LNL-07	0_1	335.2	293.0	384.9
LNL-07	1_0	298.0	257.7	347.2
LNL-07	1_1	306.8	267.0	357.8
LNL-08	0_0	309.2	277.2	344.2
LNL-08	0_1	328.0	295.0	362.7
LNL-08	1_0	293.2	261.2	326.4
LNL-08	1_1	297.2	264.0	338.5
LNL-09	0_0	439.2	361.6	538.1
LNL-09	0_1	310.8	269.6	357.4
LNL-09	1_0	270.8	228.1	328.3
LNL-09	1_1	421.2	347.7	506.5
LNL-10	0_0	331.6	286.4	390.1
LNL-10	0_1	297.2	249.7	355.0
LNL-10	1_0	496.4	409.0	596.9
LNL-10	1_1	352.0	279.1	457.8
LNL-11	0_0	403.6	334.8	495.1
LNL-11	0_1	261.6	222.9	306.2
LNL-11	1_0	368.8	291.6	479.5
LNL-11	1_1	311.6	255.3	386.3
LNL-12	0_0	310.8	266.1	362.2
LNL-12	0_1	249.2	212.8	296.3
LNL-12	1_0	358.0	293.9	433.9
LNL-12	1_1	164.8	140.9	193.8
NGI-05	0_0	295.2	247.2	361.8
NGI-05	0_1	316.8	265.8	378.1
NGI-05	1_0	420.8	333.1	544.4
NGI-05	1_1	257.2	218.5	304.6
NGI-06	0_0	403.6	339.0	490.6
NGI-06	0_1	318.4	273.1	374.3
NGI-06	1_0	369.6	308.0	450.6
NGI-06	1_1	277.2	241.3	322.5
NGI-07	0_0	270.0	224.6	328.2
NGI-07	0_1	242.0	204.7	292.0
NGI-07	1_0	233.6	196.3	282.2
NGI-07	1_1	241.2	188.7	316.7
NGI-08	0_0	229.2	189.3	281.5
NGI-08	0_1	193.2	161.2	235.0
NGI-08	1_0	146.8	115.5	190.8
NGI-08	1_1	105.6	88.9	128.1
NGI-09	0_0	274.8	237.0	324.4
NGI-09	0_1	262.8	230.2	298.7
NGI-09	1_0	190.0	165.2	219.1
NGI-09	1_1	255.6	199.9	335.8
NGI-10	0_0	306.4	261.4	355.0

NGI-10	0_1	445.2	384.0	522.8
NGI-10	1_0	379.6	325.7	451.3
NGI-10	1_1	356.0	313.0	402.7
NGI-11	0_0	407.6	359.8	463.0
NGI-11	0_1	306.4	264.8	355.0
NGI-11	1_0	304.8	267.3	349.0
NGI-11	1_1	185.6	161.4	213.6
NGI-12	0_0	266.4	223.2	314.1
NGI-12	0_1	198.4	157.2	255.3
NGI-12	1_0	361.6	306.0	430.7
NGI-12	1_1	398.4	342.9	461.1
PNY-05	0_0	429.2	336.8	560.3
PNY-05	0_1	257.6	215.8	311.7
PNY-05	1_0	262.0	225.5	306.3
PNY-05	1_1	240.4	214.7	270.2
PNY-06	0_0	304.4	257.0	366.5
PNY-06	0_1	197.2	169.9	229.3
PNY-06	1_0	267.6	217.4	336.5
PNY-06	1_1	275.6	234.1	328.5
PNY-07	0_0	173.2	149.5	200.5
PNY-07	0_1	171.2	150.6	196.9
PNY-07	1_0	250.8	213.0	294.9
PNY-07	1_1	248.4	221.5	279.8
POA-01	0_0	180.8	158.8	207.7
POA-01	0_1	158.4	143.0	177.9
POA-01	1_0	157.6	143.5	172.6
POA-01	1_1	145.6	134.1	159.2
POA-02	0_0	18.0	16.0	21.1
POA-02	0_1	24.0	21.3	26.9
POA-02	1_0	23.6	20.9	26.8
POA-02	1_1	27.2	24.1	30.2
SAA-02	0_0	161.6	137.0	193.3
SAA-02	0_1	130.0	114.8	149.9
SAA-02	1_0	136.8	121.9	155.0
SAA-02	1_1	94.4	82.9	108.8
SAT-01	0_0	120.0	108.0	133.3
SAT-01	0_1	155.2	131.6	184.5
SAT-01	1_0	136.4	114.3	162.6
SAT-01	1_1	105.6	94.6	119.4
SAT-02	0_0	30.0	27.1	33.8
SAT-02	0_1	30.0	26.7	33.8
SAT-02	1_0	24.4	20.5	29.2
SAT-02	1_1	19.2	16.8	22.0
SOR-01	0_0	26.0	23.6	29.0
SOR-01	0_1	20.0	17.8	22.8
SOR-01	1_0	20.0	18.2	22.2
SOR-01	1_1	22.0	19.9	24.8
SUC-01	0_0	221.2	191.9	255.2

SUC-01	0_1	320.0	273.2	373.4
SUC-01	0_2	300.0	264.3	346.4
SUC-01	0_3	292.0	256.2	337.1
TAM-01	0_0	190.4	167.5	216.7
TAM-01	0_1	144.4	123.3	174.0
TAM-01	1_0	310.0	259.3	374.1
TAM-01	1_1	192.8	169.2	221.7
TAM-02	0_0	242.8	203.9	305.9
TAM-02	0_1	189.6	162.5	229.2
TAM-02	1_0	197.6	173.2	227.9
TAM-02	1_1	224.0	169.2	310.8
TAM-05	0_0	218.4	186.8	255.9
TAM-05	0_1	232.4	188.9	294.5
TAM-05	1_0	249.2	216.2	291.2
TAM-05	1_1	299.2	247.4	363.9
TAM-06	0_0	278.8	244.8	321.9
TAM-06	0_1	249.2	214.6	293.7
TAM-06	1_0	296.0	235.7	379.7
TAM-06	1_1	398.4	296.6	565.3
TAM-07	0_0	277.2	220.8	355.1
TAM-07	0_1	218.8	176.2	284.1
TAM-07	1_0	208.8	168.4	270.3
TAM-07	1_1	162.4	143.3	185.3

Using Feldpausch et al. 2012 regional Weibull models

```
FosData$FeldRegion<-sub("Amazonia Brazilian Shield","BrazilianShield",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia W","WAmazonia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Africa W","WAfrica",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia E-Central","ECAmazonia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Asia SE","SEAsia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Africa C","CAfrica",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia Guyana Shield","GuianaShield",FosData$FeldRegion)

# Retrieving height
temp=by(FosData,FosData$FeldRegion,
   function(x) retrieveH(D=x$Dcm,region =unique(x$FeldRegion)),
   simplify=F)

region=unique(FosData$FeldRegion)
FosData$Hfeld=rep(NA,nrow(FosData))
FosData$RSEfeld=rep(NA,nrow(FosData))
for(i in 1:length(region))
 FosData[FosData$FeldRegion==region[i],c("Hfeld","RSEfeld")]=
  temp[[region[i]]][c("H","RSE")]
# Retrieving agb per plot
resultMC<-by(FosData, FosData$QuadID,
             function(x) AGBmonteCarlo(D=x$Dcm,WD=x$WD,errWD=x$sdWD,H=x$Hfeld,
                                       errH=x$RSEfeld,Dpropag =0.0062*x$Dcm+0.0904),
             simplify=FALSE)
```

```
credperplot<-t(as.data.frame(sapply(resultMC,"[",4)))*4

ResFeld<-data.frame(Plot=names(resultMC),
                    AGB=round(unlist(sapply(resultMC,"[",1)),1)*4,
                    Cred_2.5=round(credperplot[,"2.5%"],1),
                    Cred_97.5=round(credperplot[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01 0_0	321.6	270.6	389.0
ALF-01 0_1	141.6	115.1	178.4
ALF-01 0_2	188.8	162.3	219.1
ALF-01 0_3	154.8	134.0	177.6
ALP-01 0_0	249.2	210.8	298.9
ALP-01 0_1	323.6	256.2	420.6
ALP-01 0_2	231.6	202.5	266.9
ALP-01 0_3	295.6	251.8	339.8
ALP-02 0_0	256.4	223.3	293.3
ALP-02 0_1	219.2	192.2	251.7
ALP-02 0_2	264.4	225.4	314.9
ALP-02 0_3	303.6	257.3	366.3
ALP-30 0_0	254.4	224.6	287.8
ALP-30 1_0	292.8	252.1	342.1
ALP-30 2_0	184.8	161.9	211.2
ALP-30 3_0	221.6	192.7	254.2
ALV-02 0_0	307.2	266.1	357.8
ALV-02 0_1	312.8	268.1	361.3
ALV-02 1_0	268.4	229.9	316.8
ALV-02 1_1	253.6	220.1	293.0
ASN-02 0_0	171.6	150.2	195.1
ASN-02 0_1	259.6	210.2	325.3
ASN-02 1_0	250.8	214.4	295.7
ASN-02 1_1	316.4	207.9	484.4
BNT-01 0_0	410.0	344.0	501.6
BNT-01 0_1	316.4	274.2	367.4
BNT-01 1_0	338.0	282.5	413.9
BNT-01 1_1	374.0	325.3	429.8
BNT-02 0_0	424.4	373.3	483.5
BNT-02 0_1	355.6	314.8	405.8
BNT-02 1_0	283.2	254.5	317.9
BNT-02 1_1	388.4	340.8	440.6
BNT-04 0_0	217.6	188.4	255.5
BNT-04 0_1	359.2	321.9	401.2
BNT-04 1_0	275.2	243.2	313.4
BNT-04 1_1	400.8	334.7	480.1
CAP-09 0_0	384.4	327.0	459.3
CAP-09 0_1	364.0	311.5	424.5
CAP-09 1_0	376.8	323.2	446.7
CAP-09 1_1	472.4	402.9	545.6
CAP-10 0_0	294.0	253.0	340.1

CAP-10	0_1	332.8	278.1	405.9
CAP-10	1_0	135.6	115.8	159.6
CAP-10	1_1	188.4	152.9	236.7
CRP-02	0_0	200.0	172.7	233.0
CRP-02	0_1	216.0	184.2	254.8
CRP-02	1_0	232.0	199.8	276.0
CRP-02	1_1	176.8	153.8	204.0
CVL-01	0_0	348.0	286.9	429.1
CVL-01	0_1	357.6	291.2	450.9
CVL-01	1_0	264.4	227.4	308.8
CVL-01	1_1	322.0	271.6	383.0
CVL-11	0_0	282.8	238.0	338.2
CVL-11	0_1	369.6	311.6	440.8
CVL-11	1_0	393.6	293.6	533.5
CVL-11	1_1	373.6	318.1	439.9
DAD-03	0_0	126.4	81.5	196.4
DAD-03	0_1	137.6	95.8	202.7
DAD-03	1_0	96.4	72.7	130.7
DAD-03	1_1	68.0	50.5	93.1
DAD-04	0_0	110.8	92.8	133.4
DAD-04	0_1	498.4	368.7	676.5
DAD-04	1_0	369.6	287.2	481.3
DAD-04	1_1	203.6	147.8	290.7
DAN-01	0_0	238.0	187.6	301.7
DAN-01	0_1	297.2	201.7	430.7
DAN-01	1_0	322.8	252.0	425.1
DAN-01	1_1	397.6	291.9	545.3
DAN-02	0_0	249.2	199.4	308.3
DAN-02	0_1	398.8	307.4	515.2
DAN-02	1_0	216.0	165.3	287.4
DAN-02	1_1	280.0	231.9	343.6
DAN-03	0_0	237.6	200.9	277.7
DAN-03	0_1	451.2	350.3	592.2
DAN-03	1_0	614.4	456.1	853.3
DAN-03	1_1	295.2	239.4	369.0
DJK-01	0_0	494.4	387.6	627.2
DJK-01	0_1	475.2	363.9	608.3
DJK-01	1_0	624.8	491.9	803.8
DJK-01	1_1	514.4	425.3	625.0
DJK-02	0_0	334.4	284.2	393.7
DJK-02	0_1	645.2	512.0	809.2
DJK-02	1_0	238.0	200.9	279.0
DJK-02	1_1	229.6	194.0	273.8
DJK-03	0_0	438.8	348.6	548.4
DJK-03	0_1	431.6	328.8	579.7
DJK-03	1_0	353.2	291.0	431.4
DJK-03	1_1	879.6	713.8	1086.3
DJK-04	0_0	286.8	244.5	338.4

DJK-04	0_1	369.6	304.1	459.5
DJK-04	1_0	244.0	198.4	306.8
DJK-04	1_1	232.0	195.9	275.3
DJK-05	0_0	536.8	431.1	673.5
DJK-05	0_1	536.0	442.0	663.1
DJK-05	1_0	596.4	474.1	767.1
DJK-05	1_1	599.2	507.5	709.9
DJK-06	0_0	293.2	242.8	357.5
DJK-06	0_1	315.2	259.7	383.8
DJK-06	1_0	225.6	194.6	265.8
DJK-06	1_1	324.0	257.2	412.3
FLO-02	0_0	177.6	148.2	218.0
FLO-02	0_1	155.2	136.4	180.2
FLO-02	1_0	164.8	141.2	197.8
FLO-02	1_1	169.6	141.5	208.8
FMH-01	0_0	621.6	522.8	732.2
FMH-01	0_1	771.2	654.0	901.9
FMH-01	1_0	737.6	638.9	856.0
FMH-01	1_1	885.6	744.7	1059.3
FMH-02	0_0	799.6	681.0	936.6
FMH-02	0_1	498.8	417.1	607.9
FMH-02	1_0	586.0	486.5	705.0
FMH-02	1_1	689.6	578.9	826.1
FMH-03	0_0	474.8	423.5	532.4
FMH-03	0_1	407.2	360.8	464.8
FMH-03	1_0	454.8	405.0	515.8
FMH-03	1_1	433.2	386.0	486.6
FRP-01	0_0	235.2	195.0	292.0
FRP-01	0_1	204.4	175.2	240.5
FRP-01	1_0	167.6	143.6	195.1
FRP-01	1_1	220.0	189.9	260.4
FRP-02	0_0	30.0	25.9	34.9
FRP-02	0_1	25.2	21.4	30.2
FRP-02	1_0	22.4	18.6	27.7
FRP-02	1_1	31.2	26.9	35.7
GAU-02	0_0	187.2	165.4	209.8
GAU-02	0_1	163.2	146.0	183.2
GAU-02	1_0	159.6	143.2	178.1
GAU-02	1_1	152.0	134.8	170.9
GAU-05	0_0	190.0	169.2	214.2
GAU-05	0_1	151.2	133.2	171.9
GAU-05	1_0	192.8	168.9	222.9
GAU-05	1_1	126.8	110.4	147.2
GAU-06	0_0	416.4	306.3	559.8
GAU-06	1_0	150.8	115.3	198.0
GAU-06	2_0	258.0	208.2	330.9
GAU-06	3_0	348.0	263.0	468.3
GBO-02	0_0	368.8	297.0	455.4

GBO-02 0_1	420.4	354.0	511.2
GBO-02 1_0	336.4	269.3	421.0
GBO-02 1_1	392.8	334.9	459.4
GBO-04 0_0	404.4	316.6	523.7
GBO-04 0_1	229.2	185.0	290.6
GBO-04 1_0	397.2	328.0	483.4
GBO-04 1_1	248.4	204.3	305.2
GBO-08 0_0	318.8	248.6	418.2
GBO-08 0_1	412.8	324.9	542.9
GBO-08 1_0	384.0	307.7	486.1
GBO-08 1_1	342.0	289.3	405.3
GBO-11 0_0	401.2	333.7	496.7
GBO-11 0_1	246.8	205.4	293.8
GBO-11 1_0	176.8	150.8	210.2
GBO-11 1_1	436.8	364.0	534.1
GBO-15 0_0	532.4	396.6	749.8
GBO-15 0_1	211.2	172.7	264.3
GBO-15 1_0	203.6	178.2	232.2
GBO-15 1_1	299.2	243.3	368.8
GBO-19 0_0	335.6	272.5	416.2
GBO-19 0_1	306.4	227.0	452.8
GBO-19 1_0	412.8	324.9	528.1
GBO-19 1_1	248.8	206.4	309.8
HCC-21 0_0	330.8	278.9	395.9
HCC-21 0_1	248.0	194.7	327.5
HCC-21 0_2	188.4	156.4	232.1
HCC-21 0_3	162.0	141.2	186.1
HCC-22 0_0	271.2	213.0	345.9
HCC-22 0_1	220.0	182.8	263.0
HCC-22 0_2	206.4	181.6	235.0
HCC-22 0_3	327.2	276.0	395.4
JBS-01 0_0	313.6	261.5	381.5
JBS-01 0_1	412.0	353.4	477.8
JBS-01 1_0	356.0	310.1	413.5
JBS-01 1_1	294.0	250.9	346.3
JBS-02 0_0	192.4	172.8	216.1
JBS-02 0_1	193.2	175.8	213.1
JBS-02 1_0	208.4	186.4	232.2
JBS-02 1_1	217.2	199.8	235.5
JEN-11 0_0	268.4	230.8	316.6
JEN-11 0_1	192.8	167.0	221.9
JEN-11 1_0	310.8	275.5	349.4
JEN-11 1_1	335.2	286.6	392.2
KSN-01 0_0	314.4	270.1	370.4
KSN-01 0_1	507.6	403.3	630.9
KSN-01 0_2	387.2	317.2	492.2
KSN-01 0_3	374.8	319.2	447.2
KSN-02 0_0	217.6	170.9	290.0

KSN-02	0_1	454.4	374.3	554.0
KSN-02	0_2	440.8	336.7	579.8
KSN-02	0_3	327.2	272.7	396.4
KSN-05	0_0	305.2	255.0	365.6
KSN-05	0_1	574.0	477.1	699.3
KSN-05	0_2	436.4	344.3	561.8
KSN-05	0_3	283.6	224.9	370.8
KSN-06	0_0	236.4	193.4	294.9
KSN-06	0_1	204.8	165.4	253.9
KSN-06	0_2	353.6	294.5	422.1
KSN-06	0_3	669.2	543.5	823.9
LFB-01	0_0	256.0	208.5	323.7
LFB-01	1_0	276.4	226.4	340.1
LFB-01	2_0	249.6	212.8	296.6
LFB-01	3_0	212.0	175.0	260.5
LFB-02	0_0	283.2	226.4	364.3
LFB-02	1_0	330.4	273.7	403.6
LFB-02	2_0	292.0	245.1	351.3
LFB-02	3_0	220.0	181.1	264.4
LFB-03	0_0	23.2	19.6	27.3
LFB-03	0_1	26.8	22.8	31.5
LFB-03	1_0	21.2	18.2	24.6
LFB-03	1_1	20.4	17.5	23.9
LNL-02	0_1	0.8	0.2	1.3
LNL-02	1_1	1.6	1.1	2.8
LNL-03	0_0	15.6	11.6	20.6
LNL-03	0_1	93.6	61.1	144.1
LNL-03	1_0	3.2	2.2	4.3
LNL-03	1_1	4.4	2.0	8.0
LNL-04	0_0	310.4	268.2	361.4
LNL-04	1_0	150.0	127.2	175.7
LNL-05	0_0	53.6	44.0	64.9
LNL-05	1_0	77.6	66.3	89.6
LNL-06	0_0	169.2	151.8	187.4
LNL-06	1_0	215.6	195.4	239.8
LNL-07	0_0	381.2	322.4	454.6
LNL-07	0_1	345.6	302.7	398.3
LNL-07	1_0	312.0	267.9	360.2
LNL-07	1_1	330.0	284.6	388.4
LNL-08	0_0	305.6	270.4	344.7
LNL-08	0_1	320.8	287.8	357.5
LNL-08	1_0	292.0	259.5	330.1
LNL-08	1_1	303.2	268.0	347.9
LNL-09	0_0	465.2	369.5	572.1
LNL-09	0_1	294.8	255.1	340.0
LNL-09	1_0	266.0	222.4	318.6
LNL-09	1_1	436.0	363.7	521.5
LNL-10	0_0	373.6	323.8	433.6

LNL-10	0_1	353.6	298.2	427.2
LNL-10	1_0	539.6	443.0	661.7
LNL-10	1_1	400.0	317.1	525.1
LNL-11	0_0	478.0	389.1	587.7
LNL-11	0_1	313.2	265.0	368.9
LNL-11	1_0	452.4	352.3	588.6
LNL-11	1_1	377.2	303.7	474.9
LNL-12	0_0	425.6	367.0	495.6
LNL-12	0_1	351.2	302.0	411.2
LNL-12	1_0	491.6	406.8	605.0
LNL-12	1_1	258.4	223.4	300.9
LSL-02	0_0	126.4	112.1	144.6
LSL-02	0_1	221.6	196.4	253.3
LSL-02	0_2	230.0	204.6	258.1
LSL-02	0_3	222.4	196.1	254.4
MBT-01	0_0	264.8	218.1	327.0
MBT-01	0_1	195.6	164.8	238.4
MBT-01	1_0	191.6	161.2	227.3
MBT-01	1_1	190.8	164.1	222.5
MBT-02	0_0	275.6	220.0	354.9
MBT-02	0_1	141.6	121.1	167.7
MBT-02	1_0	226.8	185.2	292.7
MBT-02	1_1	251.2	184.3	351.1
MBT-08	0_0	132.8	113.4	158.3
MBT-08	0_1	284.8	228.1	371.5
MBT-08	1_0	168.8	139.4	208.1
MBT-08	1_1	190.4	162.3	222.6
NGI-01	0_0	519.2	407.2	664.2
NGI-01	0_1	308.8	265.8	358.3
NGI-01	1_0	282.8	228.8	352.7
NGI-01	1_1	391.2	326.3	477.4
NGI-02	0_0	409.2	325.2	516.9
NGI-02	0_1	570.8	447.6	767.4
NGI-02	1_0	483.6	362.1	667.3
NGI-02	1_1	590.8	504.9	698.1
NGI-03	0_0	281.6	232.2	347.5
NGI-03	0_1	284.4	214.5	392.5
NGI-03	1_0	434.8	333.6	576.4
NGI-03	1_1	371.6	290.6	473.7
NGI-05	0_0	405.2	328.7	510.1
NGI-05	0_1	401.2	340.9	479.1
NGI-05	1_0	508.0	402.2	638.2
NGI-05	1_1	334.4	287.2	387.0
NGI-06	0_0	377.6	314.7	468.2
NGI-06	0_1	314.4	262.0	379.0
NGI-06	1_0	356.8	295.1	429.5
NGI-06	1_1	271.6	231.6	320.7
NGI-07	0_0	335.6	284.1	396.7

NGI-07	0_1	316.8	266.1	376.1
NGI-07	1_0	318.4	268.2	386.0
NGI-07	1_1	278.4	226.6	346.5
NGI-08	0_0	272.0	224.2	333.4
NGI-08	0_1	236.0	200.2	282.9
NGI-08	1_0	194.0	153.9	247.7
NGI-08	1_1	142.0	121.0	169.3
NGI-09	0_0	381.6	322.3	454.2
NGI-09	0_1	352.0	307.7	402.5
NGI-09	1_0	257.6	221.7	303.7
NGI-09	1_1	318.0	252.7	425.9
NGI-10	0_0	393.6	333.2	461.8
NGI-10	0_1	546.4	465.3	642.0
NGI-10	1_0	457.6	389.5	538.4
NGI-10	1_1	456.8	395.0	525.7
NGI-11	0_0	530.8	463.2	609.4
NGI-11	0_1	395.2	338.3	461.6
NGI-11	1_0	391.6	340.4	446.0
NGI-11	1_1	242.4	207.7	284.9
NGI-12	0_0	340.8	287.9	410.3
NGI-12	0_1	276.8	222.7	353.6
NGI-12	1_0	425.6	358.0	499.9
NGI-12	1_1	481.2	416.4	559.5
NOU-03	0_0	388.8	325.9	467.1
NOU-03	0_1	508.0	433.0	600.0
NOU-03	1_0	646.8	536.4	792.6
NOU-03	1_1	707.6	577.9	867.5
PNY-05	0_0	387.2	310.2	489.3
PNY-05	0_1	254.0	216.0	301.5
PNY-05	1_0	260.8	223.6	304.8
PNY-05	1_1	248.0	221.4	277.3
PNY-06	0_0	258.8	220.5	306.9
PNY-06	0_1	175.6	152.7	204.6
PNY-06	1_0	229.6	188.4	287.7
PNY-06	1_1	246.0	208.5	291.3
PNY-07	0_0	156.4	135.9	180.0
PNY-07	0_1	165.6	143.6	192.7
PNY-07	1_0	221.6	187.9	263.3
PNY-07	1_1	222.4	196.1	252.9
POA-01	0_0	201.2	171.6	239.2
POA-01	0_1	160.8	141.3	184.3
POA-01	1_0	166.8	147.0	189.9
POA-01	1_1	152.0	136.6	170.4
POA-02	0_0	39.6	33.8	47.1
POA-02	0_1	50.8	45.1	57.7
POA-02	1_0	50.4	43.3	58.7
POA-02	1_1	53.6	46.8	61.4
RCS-01	0_0	261.2	235.9	290.7

RCS-01	0_1	298.8	267.1	333.1
RCS-01	1_0	174.8	154.5	196.3
RCS-01	1_1	244.0	218.7	273.1
RCS-02	0_0	179.6	160.4	202.5
RCS-02	0_1	267.6	237.5	301.4
RCS-02	1_0	246.0	222.6	274.2
RCS-02	1_1	258.0	231.6	288.2
RCS-05	0_0	168.0	143.5	199.4
RCS-05	0_1	204.0	175.1	237.7
RCS-05	1_0	269.6	221.9	326.7
RCS-05	1_1	244.0	215.1	280.1
SAA-02	0_0	196.4	163.6	242.1
SAA-02	0_1	145.2	126.4	168.5
SAA-02	1_0	154.8	133.8	182.1
SAA-02	1_1	115.2	99.4	134.0
SAT-01	0_0	130.4	114.4	147.4
SAT-01	0_1	176.0	144.6	216.4
SAT-01	1_0	176.4	143.7	219.0
SAT-01	1_1	117.6	102.8	135.7
SAT-02	0_0	62.0	54.5	70.8
SAT-02	0_1	63.2	55.4	73.0
SAT-02	1_0	55.6	45.1	68.0
SAT-02	1_1	42.4	36.6	49.5
SCT-06	0_0	237.6	203.7	282.6
SCT-06	0_1	175.6	151.9	203.0
SCT-06	1_0	206.8	174.9	253.6
SCT-06	1_1	142.8	123.1	164.9
SOR-01	0_0	53.2	47.3	59.7
SOR-01	0_1	42.8	37.8	49.4
SOR-01	1_0	42.8	38.2	47.4
SOR-01	1_1	47.2	41.9	53.3
SUC-01	0_0	219.2	189.3	256.3
SUC-01	0_1	323.6	272.0	380.0
SUC-01	0_2	292.0	254.2	339.4
SUC-01	0_3	283.6	245.5	328.0
TAM-01	0_0	222.8	193.5	259.3
TAM-01	0_1	163.6	138.6	197.8
TAM-01	1_0	350.0	289.4	431.8
TAM-01	1_1	213.2	186.3	242.8
TAM-02	0_0	254.4	210.4	322.6
TAM-02	0_1	200.4	168.8	244.6
TAM-02	1_0	216.4	188.0	252.1
TAM-02	1_1	238.4	179.8	330.1
TAM-05	0_0	233.2	194.6	279.1
TAM-05	0_1	248.0	199.1	322.1
TAM-05	1_0	272.8	232.5	326.7
TAM-05	1_1	303.2	247.0	369.1
TAM-06	0_0	266.4	232.3	311.3

TAM-06 0_1	239.6	207.2	277.9
TAM-06 1_0	303.6	236.6	399.5
TAM-06 1_1	364.0	275.5	513.7
TAM-07 0_0	288.8	232.0	365.4
TAM-07 0_1	227.6	183.5	292.2
TAM-07 1_0	222.8	177.0	299.9
TAM-07 1_1	174.8	153.1	200.1
TAM-09 0_0	210.0	178.4	249.5
TAM-09 0_1	305.2	255.5	365.3
TAM-09 1_0	239.2	194.9	304.2
TAM-09 1_1	222.0	192.5	259.0

Using Chave et al. 2014 Equation 7 model

```
# Retrieving agb per plot
resultMC<-by(FosData, FosData$QuadID,
             function(x) AGBmonteCarlo(D=x$Dcm,WD=x$WD,errWD=x$sdWD,
                                       coord=cbind(x$Long,x$Lat),
                                       Dpropag =0.0062*x$Dcm+0.0904),
             simplify=F)
credperplot<-t(as.data.frame(sapply(resultMC,"[",4)))*4
ResChave<-data.frame(Plot=names(resultMC),
                     AGB=round(unlist(sapply(resultMC,"[",1)),1)*4,
                     Cred_2.5=round(credperplot[,"2.5%"],1),
                     Cred_97.5=round(credperplot[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01 0_0	370.4	307.1	469.3
ALF-01 0_1	163.6	130.5	217.3
ALF-01 0_2	220.4	188.1	257.8
ALF-01 0_3	179.6	155.0	209.2
ALP-01 0_0	260.8	218.3	315.4
ALP-01 0_1	353.2	270.8	482.5
ALP-01 0_2	237.2	204.2	276.5
ALP-01 0_3	306.0	261.2	363.5
ALP-02 0_0	264.8	225.2	316.1
ALP-02 0_1	223.6	192.3	263.8
ALP-02 0_2	279.6	235.0	337.9
ALP-02 0_3	319.2	263.4	399.7
ALP-30 0_0	259.2	225.9	297.1
ALP-30 1_0	302.4	257.0	355.9
ALP-30 2_0	187.6	162.6	216.2
ALP-30 3_0	228.0	195.9	264.3
ALV-02 0_0	212.0	180.0	255.5
ALV-02 0_1	214.8	185.7	255.0
ALV-02 1_0	185.6	155.3	220.7
ALV-02 1_1	176.0	150.7	205.1
ASN-02 0_0	156.0	136.1	178.8
ASN-02 0_1	232.0	188.7	297.0

ASN-02	1_0	224.8	192.1	266.2
ASN-02	1_1	313.2	195.1	510.2
BNT-01	0_0	456.0	369.4	575.3
BNT-01	0_1	344.8	293.7	404.0
BNT-01	1_0	368.8	309.0	462.9
BNT-01	1_1	408.8	355.9	471.4
BNT-02	0_0	462.0	402.0	537.9
BNT-02	0_1	389.6	339.1	446.2
BNT-02	1_0	310.4	276.6	351.4
BNT-02	1_1	427.2	371.6	488.2
BNT-04	0_0	241.2	204.1	288.8
BNT-04	0_1	394.0	346.4	453.9
BNT-04	1_0	301.6	264.1	350.8
BNT-04	1_1	442.0	363.4	546.0
CAP-09	0_0	388.4	326.0	468.9
CAP-09	0_1	367.6	308.9	442.1
CAP-09	1_0	382.0	325.6	457.9
CAP-09	1_1	478.8	405.3	570.4
CAP-10	0_0	303.6	257.9	358.8
CAP-10	0_1	349.2	285.4	432.0
CAP-10	1_0	142.8	120.7	167.4
CAP-10	1_1	196.8	159.5	246.8
CRP-02	0_0	176.0	149.9	206.2
CRP-02	0_1	189.2	159.2	223.9
CRP-02	1_0	203.2	173.7	241.0
CRP-02	1_1	153.6	133.5	178.6
CVL-01	0_0	340.8	282.6	418.8
CVL-01	0_1	353.6	282.5	439.4
CVL-01	1_0	260.0	221.9	305.4
CVL-01	1_1	316.4	264.8	383.4
CVL-11	0_0	276.8	224.1	339.6
CVL-11	0_1	364.4	303.0	443.0
CVL-11	1_0	392.8	285.0	547.6
CVL-11	1_1	368.4	306.8	438.6
DAD-03	0_0	124.0	76.3	207.1
DAD-03	0_1	131.6	90.9	203.7
DAD-03	1_0	92.0	67.8	128.7
DAD-03	1_1	64.8	48.1	88.6
DAD-04	0_0	105.2	87.4	130.3
DAD-04	0_1	477.6	343.0	684.0
DAD-04	1_0	345.6	259.6	459.7
DAD-04	1_1	194.4	136.6	296.2
DAN-01	0_0	220.4	170.8	288.6
DAN-01	0_1	284.0	188.9	442.0
DAN-01	1_0	296.0	221.6	401.9
DAN-01	1_1	367.2	261.2	515.2
DAN-02	0_0	228.0	183.6	285.6
DAN-02	0_1	367.6	276.5	498.7

DAN-02	1_0	201.2	153.8	279.8
DAN-02	1_1	255.6	207.8	316.4
DAN-03	0_0	213.2	179.5	257.9
DAN-03	0_1	420.8	312.2	595.3
DAN-03	1_0	579.2	410.7	847.7
DAN-03	1_1	270.0	213.0	340.6
DJK-01	0_0	469.2	354.6	616.1
DJK-01	0_1	463.2	346.4	628.6
DJK-01	1_0	608.4	467.8	820.9
DJK-01	1_1	484.4	391.5	594.2
DJK-02	0_0	310.4	260.2	373.9
DJK-02	0_1	620.0	487.8	806.4
DJK-02	1_0	219.2	185.5	261.6
DJK-02	1_1	211.2	176.8	256.5
DJK-03	0_0	416.0	323.9	539.1
DJK-03	0_1	412.4	299.3	567.4
DJK-03	1_0	328.4	261.7	412.0
DJK-03	1_1	865.2	674.5	1113.0
DJK-04	0_0	265.6	224.2	316.9
DJK-04	0_1	353.6	278.0	465.1
DJK-04	1_0	230.8	185.6	293.9
DJK-04	1_1	213.6	178.1	259.4
DJK-05	0_0	516.0	400.6	669.9
DJK-05	0_1	503.2	404.9	637.0
DJK-05	1_0	586.8	436.6	807.8
DJK-05	1_1	561.6	458.8	680.8
DJK-06	0_0	273.2	222.0	343.9
DJK-06	0_1	295.6	236.9	377.6
DJK-06	1_0	206.8	178.0	244.5
DJK-06	1_1	304.0	236.6	404.8
FLO-02	0_0	178.4	147.5	221.1
FLO-02	0_1	158.8	138.3	184.9
FLO-02	1_0	168.4	143.5	200.8
FLO-02	1_1	171.6	142.5	215.6
FMH-01	0_0	597.6	489.3	747.2
FMH-01	0_1	748.0	622.7	918.8
FMH-01	1_0	705.6	596.1	849.7
FMH-01	1_1	876.8	714.7	1083.8
FMH-02	0_0	786.8	658.3	945.7
FMH-02	0_1	473.2	381.3	590.1
FMH-02	1_0	569.2	455.1	713.1
FMH-02	1_1	668.8	556.9	814.3
FMH-03	0_0	430.4	378.4	492.6
FMH-03	0_1	371.2	322.2	437.8
FMH-03	1_0	413.2	362.7	472.4
FMH-03	1_1	390.4	342.9	445.6
FRP-01	0_0	241.6	197.8	298.8
FRP-01	0_1	210.4	178.2	251.9

FRP-01	1_0	171.6	147.4	203.2
FRP-01	1_1	225.6	190.6	268.9
FRP-02	0_0	30.8	26.7	36.0
FRP-02	0_1	25.6	22.1	30.3
FRP-02	1_0	22.8	19.1	27.8
FRP-02	1_1	32.0	27.6	36.6
GAU-02	0_0	192.4	169.6	221.0
GAU-02	0_1	167.6	149.1	186.3
GAU-02	1_0	164.0	146.6	184.2
GAU-02	1_1	156.0	137.2	176.0
GAU-05	0_0	194.4	172.5	220.5
GAU-05	0_1	154.8	137.6	178.1
GAU-05	1_0	197.2	169.5	231.7
GAU-05	1_1	130.0	111.7	152.6
GAU-06	0_0	409.2	294.7	569.3
GAU-06	1_0	154.4	119.4	207.1
GAU-06	2_0	261.2	205.8	343.9
GAU-06	3_0	343.2	254.4	480.6
GBO-02	0_0	370.8	293.3	473.6
GBO-02	0_1	420.8	350.5	521.0
GBO-02	1_0	343.6	268.8	440.9
GBO-02	1_1	396.4	329.2	472.2
GBO-04	0_0	410.8	312.9	556.3
GBO-04	0_1	227.2	175.1	292.3
GBO-04	1_0	400.4	322.4	499.3
GBO-04	1_1	254.4	207.3	321.8
GBO-08	0_0	322.8	239.7	433.6
GBO-08	0_1	418.0	314.5	572.0
GBO-08	1_0	385.2	302.3	492.2
GBO-08	1_1	340.4	279.3	411.1
GBO-11	0_0	402.8	325.5	501.6
GBO-11	0_1	248.8	205.0	308.9
GBO-11	1_0	179.6	150.6	216.0
GBO-11	1_1	438.4	360.7	535.7
GBO-15	0_0	559.6	390.2	849.1
GBO-15	0_1	215.2	174.4	271.5
GBO-15	1_0	209.2	182.5	238.4
GBO-15	1_1	304.4	245.3	386.3
GBO-19	0_0	340.0	275.2	427.2
GBO-19	0_1	322.0	225.7	479.7
GBO-19	1_0	416.0	322.0	542.0
GBO-19	1_1	250.4	204.1	310.4
HCC-21	0_0	306.0	257.6	368.6
HCC-21	0_1	226.8	177.3	300.7
HCC-21	0_2	176.4	144.7	219.7
HCC-21	0_3	154.0	131.7	185.5
HCC-22	0_0	250.8	193.7	334.8
HCC-22	0_1	204.0	169.3	255.8

HCC-22	0_2	192.4	167.2	222.1
HCC-22	0_3	303.6	250.5	374.1
JBS-01	0_0	167.6	133.8	208.2
JBS-01	0_1	217.6	182.8	260.3
JBS-01	1_0	182.4	155.6	217.2
JBS-01	1_1	154.0	127.9	185.9
JBS-02	0_0	92.0	81.5	104.2
JBS-02	0_1	91.2	81.9	101.1
JBS-02	1_0	100.4	89.7	112.0
JBS-02	1_1	101.6	92.0	111.7
JEN-11	0_0	282.8	236.3	342.1
JEN-11	0_1	202.4	171.4	241.4
JEN-11	1_0	324.0	279.2	375.2
JEN-11	1_1	357.2	302.0	433.4
KSN-01	0_0	279.6	236.9	335.0
KSN-01	0_1	475.2	364.8	634.2
KSN-01	0_2	347.6	281.5	444.7
KSN-01	0_3	336.0	274.3	412.6
KSN-02	0_0	199.2	152.0	272.8
KSN-02	0_1	414.8	332.6	529.3
KSN-02	0_2	410.0	301.9	570.4
KSN-02	0_3	294.0	240.6	355.8
KSN-05	0_0	271.6	226.3	324.6
KSN-05	0_1	523.2	425.4	654.7
KSN-05	0_2	406.4	306.5	555.7
KSN-05	0_3	254.4	200.1	342.3
KSN-06	0_0	212.8	168.5	276.1
KSN-06	0_1	182.0	144.4	235.7
KSN-06	0_2	318.0	259.5	392.6
KSN-06	0_3	618.4	491.0	758.2
LFB-01	0_0	232.0	185.7	295.7
LFB-01	1_0	250.0	202.2	315.1
LFB-01	2_0	226.4	187.9	273.4
LFB-01	3_0	192.8	155.7	248.4
LFB-02	0_0	256.0	201.6	335.2
LFB-02	1_0	300.0	244.2	373.7
LFB-02	2_0	265.6	217.8	326.5
LFB-02	3_0	201.2	163.9	245.1
LFB-03	0_0	20.4	17.3	24.1
LFB-03	0_1	23.6	20.4	26.8
LFB-03	1_0	18.4	16.0	20.7
LFB-03	1_1	18.0	15.5	20.8
LNL-02	0_1	0.8	0.3	1.1
LNL-02	1_1	1.6	1.1	2.5
LNL-03	0_0	14.4	11.2	19.8
LNL-03	0_1	88.0	56.0	139.9
LNL-03	1_0	2.8	2.3	3.9
LNL-03	1_1	4.0	2.0	7.6

LNL-04	0_0	299.6	257.8	351.9
LNL-04	1_0	138.4	118.2	160.6
LNL-05	0_0	49.2	41.1	59.4
LNL-05	1_0	71.6	61.9	83.0
LNL-06	0_0	156.0	139.0	174.0
LNL-06	1_0	199.2	179.2	221.2
LNL-07	0_0	377.6	312.0	458.5
LNL-07	0_1	331.6	289.9	381.4
LNL-07	1_0	300.0	256.9	351.5
LNL-07	1_1	316.4	267.9	381.1
LNL-08	0_0	287.6	252.0	328.7
LNL-08	0_1	300.4	267.2	336.5
LNL-08	1_0	274.8	241.6	314.6
LNL-08	1_1	284.8	245.5	327.4
LNL-09	0_0	469.2	363.0	606.5
LNL-09	0_1	285.2	242.6	329.3
LNL-09	1_0	258.4	214.6	315.9
LNL-09	1_1	416.8	341.0	513.4
LNL-10	0_0	350.8	296.3	412.0
LNL-10	0_1	336.0	275.4	407.8
LNL-10	1_0	531.6	424.0	671.4
LNL-10	1_1	398.4	300.0	552.6
LNL-11	0_0	458.4	364.4	581.5
LNL-11	0_1	294.0	243.5	352.1
LNL-11	1_0	441.2	337.3	621.2
LNL-11	1_1	364.8	284.8	480.0
LNL-12	0_0	408.8	345.6	480.4
LNL-12	0_1	330.0	280.1	391.5
LNL-12	1_0	478.8	387.1	593.0
LNL-12	1_1	241.6	205.4	286.4
LSL-02	0_0	115.6	100.1	133.9
LSL-02	0_1	204.0	179.7	234.7
LSL-02	0_2	212.8	187.1	243.3
LSL-02	0_3	204.0	178.4	236.6
MBT-01	0_0	288.8	230.0	371.2
MBT-01	0_1	199.2	166.9	241.3
MBT-01	1_0	200.4	165.3	241.4
MBT-01	1_1	192.8	164.6	226.8
MBT-02	0_0	297.2	229.9	409.4
MBT-02	0_1	142.0	120.8	169.5
MBT-02	1_0	240.4	188.4	319.7
MBT-02	1_1	278.4	192.0	447.8
MBT-08	0_0	132.8	112.4	159.3
MBT-08	0_1	308.4	243.6	401.7
MBT-08	1_0	170.4	137.5	211.0
MBT-08	1_1	192.4	161.1	230.1
NGI-01	0_0	494.8	376.6	663.0
NGI-01	0_1	276.4	236.8	328.2

NGI-01	1_0	256.4	203.7	322.5
NGI-01	1_1	356.0	285.8	437.7
NGI-02	0_0	377.6	302.7	481.0
NGI-02	0_1	542.0	409.8	771.4
NGI-02	1_0	468.0	329.7	680.5
NGI-02	1_1	535.6	442.9	642.1
NGI-03	0_0	254.0	204.0	317.9
NGI-03	0_1	268.4	198.7	373.5
NGI-03	1_0	411.6	304.4	589.9
NGI-03	1_1	344.4	267.2	468.7
NGI-05	0_0	370.8	297.0	483.1
NGI-05	0_1	366.0	299.9	445.2
NGI-05	1_0	468.0	363.5	614.1
NGI-05	1_1	301.2	256.9	359.4
NGI-06	0_0	378.8	312.1	475.5
NGI-06	0_1	319.2	267.6	391.3
NGI-06	1_0	356.4	289.2	439.9
NGI-06	1_1	273.6	232.1	322.5
NGI-07	0_0	300.4	250.4	365.2
NGI-07	0_1	288.0	237.6	361.1
NGI-07	1_0	291.6	242.5	364.4
NGI-07	1_1	251.6	202.0	322.8
NGI-08	0_0	249.2	200.9	314.2
NGI-08	0_1	212.0	176.7	259.2
NGI-08	1_0	179.6	139.1	242.9
NGI-08	1_1	125.6	104.0	151.5
NGI-09	0_0	338.8	281.4	411.7
NGI-09	0_1	308.0	264.6	363.1
NGI-09	1_0	226.0	191.2	270.3
NGI-09	1_1	292.4	226.0	406.6
NGI-10	0_0	354.4	291.8	438.3
NGI-10	0_1	496.4	417.7	602.2
NGI-10	1_0	407.2	340.9	491.2
NGI-10	1_1	402.8	344.4	478.6
NGI-11	0_0	467.6	401.1	550.3
NGI-11	0_1	348.4	293.1	419.8
NGI-11	1_0	345.6	295.4	410.1
NGI-11	1_1	214.4	180.5	256.8
NGI-12	0_0	305.2	251.4	375.3
NGI-12	0_1	250.8	196.7	328.7
NGI-12	1_0	387.6	322.3	469.7
NGI-12	1_1	424.0	365.0	501.9
NOU-03	0_0	372.0	308.1	449.3
NOU-03	0_1	488.4	405.8	590.6
NOU-03	1_0	658.0	529.6	809.2
NOU-03	1_1	723.2	572.9	921.1
PNY-05	0_0	507.6	400.7	673.4
PNY-05	0_1	308.8	259.8	381.6

PNY-05	1_0	313.6	264.7	379.6
PNY-05	1_1	294.0	257.6	335.6
PNY-06	0_0	319.2	267.0	390.8
PNY-06	0_1	209.2	181.3	243.8
PNY-06	1_0	284.0	228.6	372.5
PNY-06	1_1	298.8	247.2	370.4
PNY-07	0_0	186.0	159.0	220.2
PNY-07	0_1	195.2	166.4	230.3
PNY-07	1_0	272.4	226.4	328.9
PNY-07	1_1	269.6	233.8	312.7
POA-01	0_0	215.6	182.9	255.0
POA-01	0_1	171.2	148.1	198.3
POA-01	1_0	179.6	158.6	207.6
POA-01	1_1	162.4	145.6	182.0
POA-02	0_0	42.0	36.0	51.1
POA-02	0_1	54.0	47.6	61.4
POA-02	1_0	53.6	46.2	61.8
POA-02	1_1	57.2	50.5	64.9
RCS-01	0_0	283.6	250.8	320.9
RCS-01	0_1	327.6	289.4	375.1
RCS-01	1_0	187.6	165.1	214.0
RCS-01	1_1	262.8	233.5	296.0
RCS-02	0_0	183.6	163.9	207.2
RCS-02	0_1	281.6	248.4	319.4
RCS-02	1_0	251.6	226.3	281.1
RCS-02	1_1	267.6	238.3	300.6
RCS-05	0_0	188.8	158.4	229.4
RCS-05	0_1	228.4	193.8	272.1
RCS-05	1_0	306.8	250.7	384.0
RCS-05	1_1	273.6	236.7	313.5
SAA-02	0_0	214.8	174.0	274.3
SAA-02	0_1	156.8	135.8	185.5
SAA-02	1_0	168.4	146.9	198.0
SAA-02	1_1	126.0	109.3	151.2
SAT-01	0_0	140.8	123.1	161.0
SAT-01	0_1	188.0	152.6	239.5
SAT-01	1_0	189.6	150.9	242.5
SAT-01	1_1	128.4	110.8	148.2
SAT-02	0_0	65.6	57.8	74.3
SAT-02	0_1	66.8	58.2	76.7
SAT-02	1_0	59.6	48.6	74.1
SAT-02	1_1	45.2	38.7	52.3
SCT-06	0_0	221.6	186.8	267.4
SCT-06	0_1	161.6	139.7	190.8
SCT-06	1_0	193.6	159.8	241.7
SCT-06	1_1	129.2	109.9	152.0
SOR-01	0_0	54.8	49.1	62.3
SOR-01	0_1	44.4	39.4	50.8

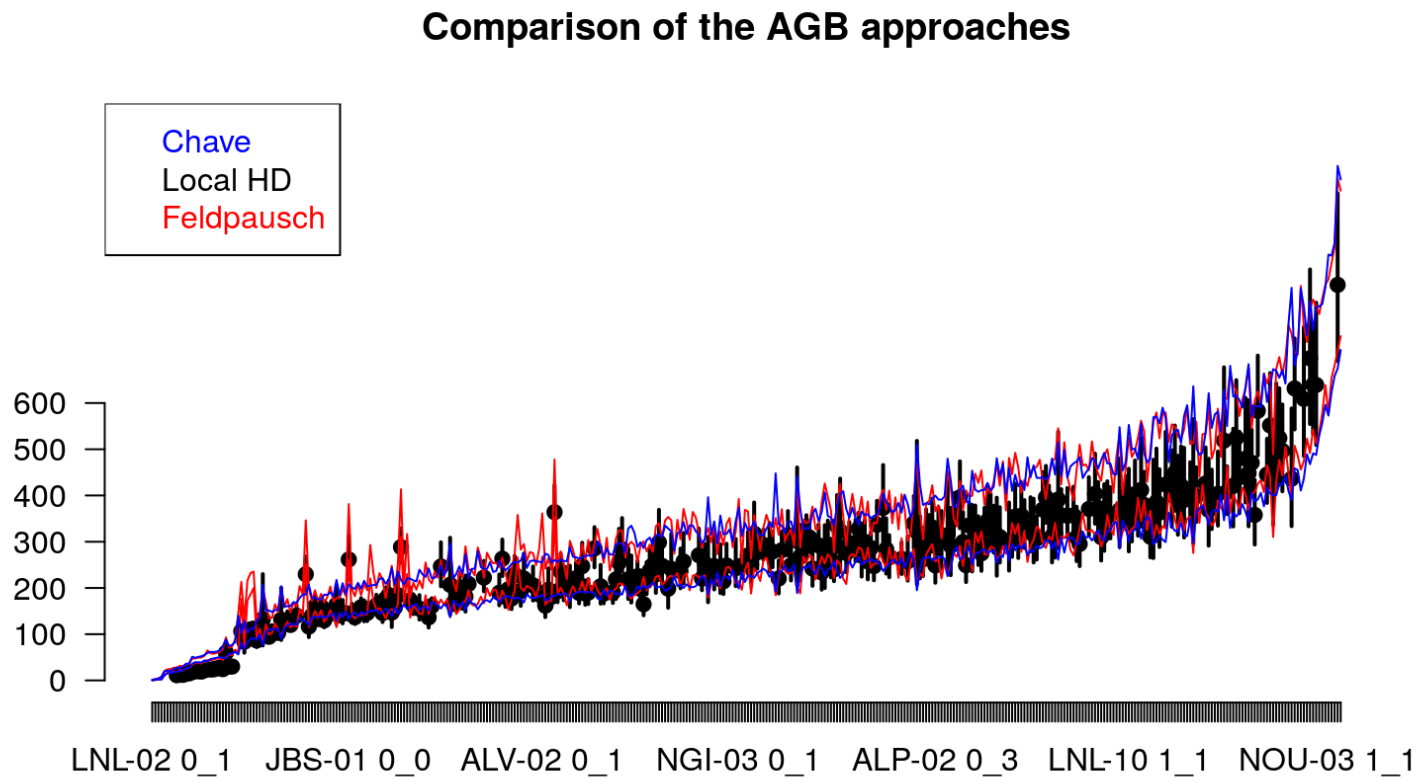
SOR-01	1_0	44.0	39.4	49.0
SOR-01	1_1	48.8	43.2	54.8
SUC-01	0_0	222.8	188.8	266.3
SUC-01	0_1	339.6	283.2	412.1
SUC-01	0_2	300.4	257.8	358.3
SUC-01	0_3	291.2	248.2	344.5
TAM-01	0_0	229.2	193.9	272.4
TAM-01	0_1	167.2	136.9	210.2
TAM-01	1_0	383.2	310.8	476.3
TAM-01	1_1	217.6	187.1	256.4
TAM-02	0_0	268.0	216.2	344.6
TAM-02	0_1	205.2	169.0	257.9
TAM-02	1_0	219.2	187.3	258.3
TAM-02	1_1	260.4	186.0	396.2
TAM-05	0_0	244.8	199.1	303.5
TAM-05	0_1	263.2	203.7	356.5
TAM-05	1_0	282.8	238.0	344.0
TAM-05	1_1	329.2	265.9	421.2
TAM-06	0_0	277.2	235.5	331.6
TAM-06	0_1	248.8	211.8	294.5
TAM-06	1_0	332.4	250.7	453.7
TAM-06	1_1	420.8	297.3	636.2
TAM-07	0_0	313.2	240.5	423.6
TAM-07	0_1	237.6	183.7	328.4
TAM-07	1_0	238.0	182.5	334.6
TAM-07	1_1	176.0	152.2	206.7
TAM-09	0_0	214.0	179.8	258.0
TAM-09	0_1	321.6	263.2	397.8
TAM-09	1_0	255.6	202.0	335.4
TAM-09	1_1	226.0	190.9	269.7

```
# Calculating the maximum height and the Lorey's height per (sub)plot
FosData$Hchave<-retrieveH(D=FosData$Dcm,coord=cbind(FosData$Long,FosData$Lat))$H

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

# Lorey height
FosData$BAm<-(pi*(FosData$Dcm/2)^2)/10000
FosData$HBAlocal<-FosData$Hlocal*FosData$BAm
FosData$HBAchave<-FosData$Hchave*FosData$BAm
FosData$HBAfeld<-FosData$Hfeld*FosData$BAm
LoreyLocal<-tapply(FosData$HBAlocal,FosData$QuadID,sum)/tapply(FosData$BAm,FosData$QuadID,sum)
LoreyChave<-tapply(FosData$HBAchave,FosData$QuadID,sum)/tapply(FosData$BAm,FosData$QuadID,sum)
LoreyFeld<-tapply(FosData$HBAfeld,FosData$QuadID,sum)/tapply(FosData$BAm,FosData$QuadID,sum)

# Mean wood density
meanWD=tapply(FosData$WD,FosData$QuadID,mean)
```


Comparison of the AGB approaches
Chave
Local HD
Feldpausch
600
500
400
300
200
100
0
LNL-02 0_1
JBS-01 0_0
ALV-02 0_1
NGI-03 0_1
ALP-02 0_3
LNL-10 1_1
NOU-03 1_1

Biomass estimation on 1 ha FOS Rainfor data

Martin Sullivan & Maxime Rejou-Mechain

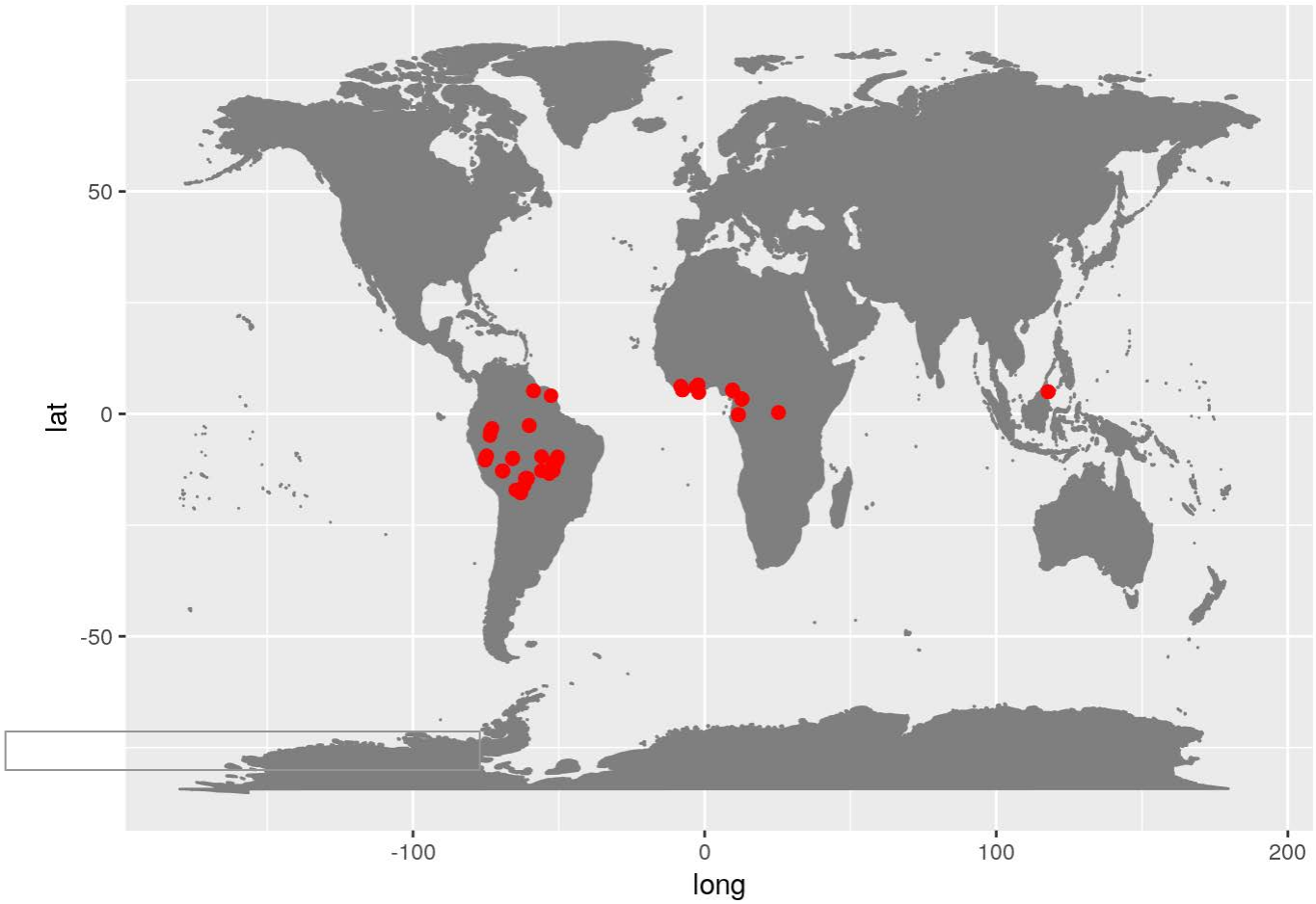
27 January 2017

Load data

```
library(BIOMASS)
#Read in data (Modification="NULL" values converted in NA)
FosData<-read.csv("100Plots/FOSDataDecember2016/FOSDataIndvData2016modifMRM.csv")
# Plot latlong and dimension
FosDataCoord<-read.csv("100Plots/FOSDataDecember2016/FOSPlotsLatLongWithAllometricRegion.csv")
FosData$Long<-FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCode),"LongitudeDecimal"]
FosData$Lat<-FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCode),"LatitudeDecimal"]
# Feldpausch regions
FosData$FeldRegion<-paste(as.character(FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCo
de),"Continent"]),
                          as.character(FosDataCoord[match(FosData$PlotCode,FosDataCoord$PlotCo
de),"Region"]),sep="")
# D in cm
FosData$Dcm<-FosData$D/10
```

Location of the plots

Retrieve



wood density

```
## [1] "Calling http://taxosaurus.org/retrieve/deed01d27c1d5dbf9be6a0a55de5d676"
## [1] "Calling http://taxosaurus.org/retrieve/7c468d2584a3d80233ae6a69a37889e8"
## [1] "Calling http://taxosaurus.org/retrieve/386c9d7aee0f1d0f4127dee3b279e9bb"
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## [1] "Calling http://taxosaurus.org/retrieve/2270d6f3746f8eae8dd7ed5e5523532a"
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## [1] "Calling http://taxosaurus.org/retrieve/4daa2bddb51a04e6cd257da17ad6b46d"
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## [1] "Calling http://taxosaurus.org/retrieve/99b9118ce5dcdfe52cae1e9b20731eaf"
## [1] "Calling http://taxosaurus.org/retrieve/0165246d128b0dcb298055b5635d3193"
## [1] "Calling http://taxosaurus.org/retrieve/0e45e8a64ed330a5084090881155b714"
## [1] "Calling http://taxosaurus.org/retrieve/0eb4c0c75a7d16801dabb466703f95a2"
```

```
## [1] "Calling http://taxosaurus.org/retrieve/0383e4ab1a33267d2a530ed40de36fd8"
## [1] "Calling http://taxosaurus.org/retrieve/c01fd4f950baa222336914a03daa447c"
## [1] "Calling http://taxosaurus.org/retrieve/0b4e8b8ac0e72c314fdb3cd78a7cbfbd"
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## [1] "Calling http://taxosaurus.org/retrieve/960abfeb70fc9ad2c5e1a1b5e9186c50"
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## [1] "Calling http://taxosaurus.org/retrieve/608f9c49a585c89f09be27e37a76eb53"
## [1] "Calling http://taxosaurus.org/retrieve/6b6c9f2b0bdc8fab59111857be37b58d"
## [1] "Calling http://taxosaurus.org/retrieve/a8b308400bd4623d429ac4d5c4f8a929"
## [1] "Calling http://taxosaurus.org/retrieve/04487872c83e579a8e42ed13fe471709"
## [1] "Calling http://taxosaurus.org/retrieve/1d9aaf7a7e0d92492e5b361c71ecf3ad"
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## [1] "Calling http://taxosaurus.org/retrieve/8d240a68385736100b29341a6b2b418e"
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## [1] "Calling http://taxosaurus.org/retrieve/607fc4919882913d3ad8685b85d6b797"
## [1] "Calling http://taxosaurus.org/retrieve/6d5eecace0c330dd8eaa3183fb6ef8e8"
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## [1] "Calling http://taxosaurus.org/retrieve/f697506e61630dfc54ad9256945f77ef"
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## [1] "Calling http://taxosaurus.org/retrieve/9196d2c38345c43cbf5dea6654c5d7e5"
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## [1] "Calling http://taxosaurus.org/retrieve/b613aa6f480876a5768d691570b5c128"
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## [1] "Calling http://taxosaurus.org/retrieve/a1050dec24d8121198a81458c32365bf"
```

```
## [1] "Calling http://taxosaurus.org/retrieve/59392b28b1dd7d5a746467665716e269"
## [1] "Calling http://taxosaurus.org/retrieve/f255d5165e565564b873d5335516d032"
## [1] "Calling http://taxosaurus.org/retrieve/9abde043f457ccb59594e443184a6f0b"
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## [1] "Calling http://taxosaurus.org/retrieve/8607db498ab966c1018b29718242923f"
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## [1] "Calling http://taxosaurus.org/retrieve/b09cf77a8c36d77ea2bced61c1507274"
## [1] "Calling http://taxosaurus.org/retrieve/da5f13495d27b23fd70877c289d397ca"
```

```
# Retrieve wood density
dataWD<-getWoodDensity(genus=tax.cor$genusCorrected,
                       species=tax.cor$speciesCorrected,
                       stand=FosData$PlotCode)
```

```
## The reference dataset contains 16467 wood density values
## Your taxonomic table contains 2706 taxa
```

```
FosData$WD=dataWD$meanWD
FosData$sdWD=dataWD$sdWD
```

Overall, 60.7 % of the values have been attributed at the species level, 31.6 % at the genus level, and 7.7 % at the plot level.

Construct H-D models

We implemented a three parameter weibull model of the form:

$$H = a \quad (1 - exp(-(D/b)^c))$$

where *a* represents the asymptotic height of trees in the stand. Note that the model is fitted by giving a proportional weight to the volume of trees (proportional to D^2*H).

```
# Number of tree height data per plot
ntree <- tapply(FosData$Height,FosData$PlotCode,function(x) length(x[!is.na(x)]))
ntree
```

```
## ALF-01 ALP-01 ALP-02 ALP-30 ALV-02 ASN-02 BNT-01 BNT-02 BNT-04 CAP-09
##     46     21     41     40      0     54      0      0     38     59
## CAP-10 CRP-02 CVL-01 CVL-11 DAD-03 DAD-04 DAN-01 DAN-02 DAN-03 DJK-01
##     63      0     66     61     38     53     39      0      0     56
## DJK-02 DJK-03 DJK-04 DJK-05 DJK-06 FLO-02 FMH-01 FMH-02 FMH-03 FRP-01
##     62     59     60     58     60    584      0      0      0    549
## FRP-02 GAU-02 GAU-05 GAU-06 GBO-02 GBO-04 GBO-08 GBO-11 GBO-15 GBO-19
##    258    520    505    483     85     61     69     72     60     66
## HCC-21 HCC-22 JBS-01 JBS-02 JEN-11 KSN-01 KSN-02 KSN-05 KSN-06 LFB-01
##     21     26    423    776     33     73     66     75     85     70
```

```
## LFB-02 LFB-03 LNL-02 LNL-03 LNL-04 LNL-05 LNL-06 LNL-07 LNL-08 LNL-09
##     29      0      9     19     52     27     41     68     53     77
## LNL-10 LNL-11 LNL-12 LSL-02 MBT-01 MBT-02 MBT-08 NGI-01 NGI-02 NGI-03
##     78     68     82      0      0      0      0      0      0      0
## NGI-05 NGI-06 NGI-07 NGI-08 NGI-09 NGI-10 NGI-11 NGI-12 NOU-03 PNY-05
##     59     69     73     74     72     75     77     86      7     39
## PNY-06 PNY-07 POA-01 POA-02 RCS-01 RCS-02 RCS-05 SAA-02 SAT-01 SAT-02
##     40     40    651    353      0      0      0    546    518    374
## SCT-06 SOR-01 SUC-01 TAM-01 TAM-02 TAM-05 TAM-06 TAM-07 TAM-09
##      0    451     40     41    309    170    357    180      0
```

```
# Compute models specific to given stands (those having a minimum of 30 measured trees)
filt=FosData$PlotCode%in%names(ntree[ntree>=30])
modelHDperplot <- by(FosData[filt,],FosData$PlotCode[filt],
function(x) modelHD(D=x$Dcm,H=x$Height, method="weibull",useWeight =T),
simplify=F)
RSEmodels<-sapply(modelHDperplot,function(x) x$RSE)
Coeffmodels<-lapply(modelHDperplot,function(x) x$coefficients)
ResHD<-data.frame(Plot=names(unlist(RSEmodels)),
                  a=round(unlist(sapply(Coeffmodels,"[",1)),3),
                  b=round(unlist(sapply(Coeffmodels,"[",2)),3),
                  c=round(unlist(sapply(Coeffmodels,"[",3)),3),
                  RSE=round(unlist(RSEmodels),3))
```

Plot	a	b	c	RSE
ALF-01	47.754	57.283	0.601	3.825
ALP-02	27.331	22.878	1.081	3.593
ALP-30	33.688	35.068	0.642	3.481
ASN-02	54.321	55.267	1.122	4.839
BNT-04	33.403	23.816	0.867	2.690
CAP-09	34.714	26.109	1.391	5.121
CAP-10	45.388	36.587	1.067	4.987
CVL-01	34.357	24.987	1.070	5.137
CVL-11	153.267	4473.585	0.351	4.854
DAD-03	1648.937	10608.775	0.772	3.674
DAD-04	47.326	52.340	1.391	6.614
DAN-01	2600.614	95336.808	0.590	6.282
DJK-01	48.015	30.180	1.262	7.192
DJK-02	45.919	33.417	0.947	7.917
DJK-03	41.658	24.297	1.615	6.463
DJK-04	35.899	27.558	1.621	6.273
DJK-05	41.551	23.115	1.203	4.989
DJK-06	71.541	81.978	0.558	8.816
FLO-02	28.160	28.022	0.550	2.634
FRP-01	27.895	27.183	0.767	3.030
FRP-02	79.021	1362.718	0.532	1.282
GAU-02	17.972	7.143	0.763	1.894
GAU-05	24.605	20.425	0.882	3.318
GAU-06	40.829	53.330	0.921	3.311
GBO-02	33.352	23.246	1.032	4.492

GBO-04	981.574	32167	8.126	0.407	5.211
GBO-08	37.927	30.683	1.102	5.045	
GBO-11	262.001	11841.805	0.392	4.174	
GBO-15	37.903	34.861	1.357	5.508	
GBO-19	49.884	54.469	0.651	4.500	
JBS-01	28.579	25.750	1.134	3.875	
JBS-02	15.486	16.342	0.814	1.968	
JEN-11	1258.544	27766	8.814	0.421	4.782
KSN-01	786.020	22602	9.401	0.384	4.861
KSN-02	470.081	78093.838	0.375	4.862	
KSN-05	47.967	46.756	0.717	3.975	
KSN-06	278.783	6442.648	0.439	4.730	
LFB-01	223.926	8323.731	0.386	4.517	
LNL-04	43.240	34.418	1.221	4.594	
LNL-06	29.774	17.478	1.288	3.596	
LNL-07	270.717	9322.774	0.394	7.942	
LNL-08	35.089	19.955	1.062	4.438	
LNL-09	43.794	31.907	1.226	7.096	
LNL-10	49.840	55.152	0.665	8.034	
LNL-11	43.061	44.592	0.653	6.137	
LNL-12	36.688	42.946	1.352	5.475	
NGI-05	45.534	54.993	0.914	5.109	
NGI-06	48.184	45.760	0.796	4.381	
NGI-07	38.756	39.189	1.471	5.297	
NGI-08	38.079	36.279	1.225	5.466	
NGI-09	775.822	97697.876	0.453	4.382	
NGI-10	1219.571	145489.070	0.478	4.227	
NGI-11	30.916	27.148	1.284	3.573	
NGI-12	35.725	33.473	1.890	5.429	
PNY-05	1288.410	63534.149	0.528	4.315	
PNY-06	1439.938	34559.162	0.573	5.270	
PNY-07	1117.740	45026.577	0.516	6.215	
POA-01	25.689	18.300	0.576	2.295	
POA-02	9.700	13.073	1.540	1.333	
SAA-02	34.257	54.621	0.546	2.787	
SAT-01	25.726	19.309	0.666	3.370	
SAT-02	11.282	17.046	0.997	1.231	
SOR-01	1175.202	46548.185	0.643	1.342	
SUC-01	31.649	20.256	1.054	4.029	
TAM-01	280.493	31643.366	0.372	4.093	
TAM-02	285.322	13079.055	0.419	4.092	
TAM-05	246.249	7791.457	0.430	3.328	
TAM-06	85.938	258.106	0.524	5.030	
TAM-07	47.073	62.143	0.669	3.176	

Weibull parameters are unrealistic for some plots (e.g. assymptotic height > 1000 m).

```
# retrieving predicted height values in the database
FosData$Hlocal<-FosData$Height # keeping directly measured trees
FosData$HlocalRSE<- 1 # to be refined?! Assume a 1-m error on directly measured trees
```

```
Plot=as.character(ResHD$Plot)
for(i in 1:length(ResHD$Plot)){
  filt<-FosData$PlotCode==Plot[i] & is.na(FosData$Hlocal)
  FosData$Hlocal[filt]<-retrieveH(D=FosData$Dcm[filt],model=modelHDperplot[[Plot[i]]])$H
  FosData$HlocalRSE[filt]<-modelHDperplot[[Plot[i]]]$RSE
}
```

Estimating biomass and associated uncertainties

Below, we used a Bayesian Monte-Carlo scheme to estimate the mean AGB and associated credibility interval per plot.

Using a local H-D model for all plots with at least 30 height measurements

```
#Below we only consider the small error from Chave 2004 to occur in the Rainfor dataset - larg
e errors presumed to be corrected during quality control
filt <- FosData$PlotCode%in%Plot
FosDataH<-droplevels(FosData[filt,])
resultMClocal<- by(FosDataH,FosDataH$PlotCode,
              function(x)AGBmonteCarlo(D=x$Dcm,
                              WD=x$WD,
                              H=x$Hlocal,
                              errWD =x$sdWD,
                              errH=x$HlocalRSE,
                              Dpropag =0.0062*x$Dcm+0.0904),
              simplify=FALSE)

credperplotlocal<-t(as.data.frame(sapply(resultMClocal,"[",4)))
ResHDlocal<-data.frame(Plot=names(resultMClocal),
                    AGB=round(unlist(sapply(resultMClocal,"[",1)),1),
                    Cred_2.5=round(credperplotlocal[,"2.5%"],1),
                    Cred_97.5=round(credperplotlocal[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01	227.6	209.4	246.8
ALP-02	218.2	203.3	235.2
ALP-30	204.6	191.6	219.2
ASN-02	246.2	211.0	297.8
BNT-04	315.4	294.5	339.9
CAP-09	389.4	360.8	419.8
CAP-10	254.7	233.2	280.9
CVL-01	305.4	280.5	332.4
CVL-11	341.9	312.1	377.4
DAD-03	102.5	81.4	133.1
DAD-04	261.4	221.6	314.1
DAN-01	301.7	256.6	359.3
DJK-01	577.4	512.3	650.5
DJK-02	360.7	323.3	408.6

DJK-03	531.2	478.6	592.3
DJK-04	246.3	223.7	271.9
DJK-05	579.3	523.7	643.9
DJK-06	322.4	293.2	357.0
FLO-02	144.9	135.0	156.9
FRP-01	178.0	165.6	191.8
FRP-02	13.4	12.5	14.4
GAU-02	145.2	138.0	152.5
GAU-05	145.9	138.0	155.5
GAU-06	253.1	219.2	293.5
GBO-02	350.5	321.6	384.0
GBO-04	289.6	261.4	324.4
GBO-08	343.1	307.8	385.4
GBO-11	309.4	282.7	341.5
GBO-15	273.9	240.7	316.0
GBO-19	323.9	289.2	364.3
JBS-01	285.8	265.0	309.1
JBS-02	108.9	104.3	113.7
JEN-11	322.2	298.3	347.4
KSN-01	360.8	327.0	401.7
KSN-02	313.5	280.8	350.7
KSN-05	365.6	331.2	407.6
KSN-06	343.3	308.6	381.1
LFB-01	279.0	254.4	306.5
LNL-04	106.5	95.1	119.2
LNL-06	92.2	86.0	98.5
LNL-07	329.2	305.5	354.1
LNL-08	306.9	289.2	325.7
LNL-09	360.1	326.7	397.5
LNL-10	369.5	335.2	409.0
LNL-11	336.7	304.4	375.8
LNL-12	271.3	248.6	298.0
NGI-05	322.2	291.1	357.5
NGI-06	343.6	314.6	379.3
NGI-07	247.6	224.1	275.2
NGI-08	169.3	152.6	188.5
NGI-09	244.6	223.1	272.2
NGI-10	371.0	341.5	404.5
NGI-11	301.0	281.2	323.3
NGI-12	306.0	280.3	335.5
PNY-05	296.2	268.4	328.5
PNY-06	259.8	236.9	286.4
PNY-07	211.1	196.4	227.4
POA-01	160.5	151.8	170.0
POA-02	23.2	21.8	24.7
SAA-02	130.6	121.8	142.5
SAT-01	129.6	120.2	141.1
SAT-02	25.9	24.3	27.8

SOR-01	22.1	20.9	23.2
SUC-01	283.2	264.6	305.5
TAM-01	209.1	192.9	227.8
TAM-02	214.0	192.8	241.1
TAM-05	249.6	225.5	278.7
TAM-06	306.6	271.9	354.3
TAM-07	215.9	193.7	242.9

Using Feldpausch et al. 2012 regional Weibull models

```
FosData$FeldRegion<-sub("Amazonia Brazilian Shield","BrazilianShield",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia W","WAmazonia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Africa W","WAfrica",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia E-Central","ECAmazonia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Asia SE","SEAsia",FosData$FeldRegion)
FosData$FeldRegion<-sub("Africa C","CAfrica",FosData$FeldRegion)
FosData$FeldRegion<-sub("Amazonia Guyana Shield","GuianaShield",FosData$FeldRegion)

# Retrieving height
temp=by(FosData,FosData$FeldRegion,
   function(x) retrieveH(D=x$Dcm,region =unique(x$FeldRegion)),
   simplify=F)

region=unique(FosData$FeldRegion)
FosData$Hfeld=rep(NA,nrow(FosData))
FosData$RSEfeld=rep(NA,nrow(FosData))
for(i in 1:length(region))
 FosData[FosData$FeldRegion==region[i],c("Hfeld","RSEfeld")]=
  temp[[region[i]]][c("H","RSE")]
# Retrieving agb per plot
resultMCfeld<-by(FosData, FosData$PlotCode,
              function(x) AGBmonteCarlo(D=x$Dcm,WD=x$WD,errWD=x$sdWD,H=x$Hfeld,
                                        errH=x$RSEfeld,Dpropag =0.0062*x$Dcm+0.0904),
              simplify=F)
credperplotfeld<-t(as.data.frame(sapply(resultMCfeld,"[",4)))

ResFeld<-data.frame(Plot=names(resultMCfeld),
                    AGB=round(unlist(sapply(resultMCfeld,"[",1)),1),
                    Cred_2.5=round(credperplotfeld[,"2.5%"],1),
                    Cred_97.5=round(credperplotfeld[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01	201.4	183.9	223.1
ALP-01	275.3	251.5	303.4
ALP-02	261.1	241.7	286.9
ALP-30	238.6	221.5	257.2
ALV-02	284.8	263.8	307.9
ASN-02	249.3	216.4	296.2
BNT-01	358.4	328.3	392.8
BNT-02	363.2	339.5	388.3
BNT-04	313.3	291.5	339.4

CAP-09	400.6	369.2	436.8
CAP-10	238.7	216.7	263.0
CRP-02	206.0	191.3	224.1
CVL-01	322.6	293.9	356.5
CVL-11	354.8	317.7	402.7
DAD-03	107.5	87.5	132.7
DAD-04	295.2	249.4	349.9
DAN-01	315.4	270.0	374.0
DAN-02	286.1	252.7	327.3
DAN-03	400.4	345.6	468.0
DJK-01	527.2	468.4	597.2
DJK-02	361.5	319.9	410.0
DJK-03	524.4	463.2	593.8
DJK-04	283.3	257.2	312.9
DJK-05	567.2	510.8	634.4
DJK-06	290.6	261.7	324.3
FLO-02	166.3	152.7	184.2
FMH-01	753.6	696.2	820.9
FMH-02	641.6	585.9	702.6
FMH-03	442.8	415.4	471.6
FRP-01	206.9	189.7	227.9
FRP-02	27.3	25.0	29.8
GAU-02	165.4	155.7	175.3
GAU-05	165.3	155.0	176.4
GAU-06	292.2	252.5	342.3
GBO-02	379.4	343.3	417.9
GBO-04	319.5	283.4	362.6
GBO-08	364.0	322.3	411.7
GBO-11	314.8	284.1	349.9
GBO-15	312.4	272.0	371.7
GBO-19	325.0	286.2	369.8
HCC-21	232.5	210.3	258.7
HCC-22	256.1	231.4	283.1
JBS-01	344.2	316.4	373.4
JBS-02	203.0	192.8	213.6
JEN-11	277.1	256.6	301.2
KSN-01	396.8	357.4	441.0
KSN-02	360.0	317.4	413.6
KSN-05	400.1	356.9	447.5
KSN-06	364.9	325.3	412.0
LFB-01	247.7	224.2	275.1
LFB-02	281.2	253.5	313.0
LFB-03	22.8	21.1	24.6
LNL-02	1.2	0.7	2.0
LNL-03	29.0	21.2	40.1
LNL-04	114.8	102.5	128.3
LNL-05	32.7	29.1	36.9
LNL-06	96.2	89.3	103.2

LNL-07	342.3	316.1	372.2
LNL-08	305.2	285.6	324.4
LNL-09	363.8	327.3	404.6
LNL-10	416.6	375.8	463.5
LNL-11	405.8	361.7	456.6
LNL-12	380.8	350.4	415.2
LSL-02	200.8	188.3	214.4
MBT-01	211.1	193.0	232.7
MBT-02	224.0	195.0	260.4
MBT-08	193.2	174.7	215.5
NGI-01	376.4	338.2	419.5
NGI-02	512.7	455.0	588.9
NGI-03	345.0	303.9	393.4
NGI-05	411.6	369.3	462.2
NGI-06	331.5	302.5	364.5
NGI-07	312.5	285.2	344.4
NGI-08	211.0	191.1	235.8
NGI-09	327.1	298.8	359.9
NGI-10	463.6	428.3	504.0
NGI-11	390.5	361.3	424.4
NGI-12	382.0	347.5	420.8
NOU-03	562.7	510.2	618.2
PNY-05	288.1	262.0	318.4
PNY-06	226.9	207.9	249.8
PNY-07	191.1	178.0	205.8
POA-01	170.7	159.5	183.7
POA-02	48.6	45.2	52.4
RCS-01	244.7	231.1	259.4
RCS-02	237.8	224.4	251.3
RCS-05	221.4	204.0	241.3
SAA-02	152.9	140.6	168.5
SAT-01	149.3	136.7	165.0
SAT-02	55.8	51.9	60.7
SCT-06	190.5	175.7	208.6
SOR-01	46.4	43.6	49.6
SUC-01	279.0	258.6	300.6
TAM-01	237.3	215.6	262.0
TAM-02	227.8	205.7	259.3
TAM-05	264.5	239.0	292.8
TAM-06	294.9	260.1	337.7
TAM-07	229.5	205.9	257.1
TAM-09	244.7	224.0	273.1

Using Chave et al. 2014 Equation 7 model

```
# Retrieving agb per plot
resultMCchave<-by(FosData, FosData$PlotCode,
              function(x) AGBmonteCarlo(D=x$Dcm,WD=x$WD,errWD=x$sdWD,
```

```
                                        coord=cbind(x$Long,x$Lat),
                                        Dpropag =0.0062*x$Dcm+0.0904),
              simplify=F)
credperplotchave<-t(as.data.frame(sapply(resultMCchave,"[",4)))
ResChave<-data.frame(Plot=names(resultMCchave),
                     AGB=round(unlist(sapply(resultMCchave,"[",1)),1),
                     Cred_2.5=round(credperplotchave[,"2.5%"],1),
                     Cred_97.5=round(credperplotchave[,"97.5%"],1))
```

Plot	AGB	Cred_2.5	Cred_97.5
ALF-01	232.2	209.0	259.8
ALP-01	289.9	257.5	329.9
ALP-02	271.5	245.5	301.4
ALP-30	244.1	223.4	267.1
ALV-02	197.3	180.4	217.2
ASN-02	232.2	198.2	288.0
BNT-01	394.6	358.7	439.9
BNT-02	397.3	369.5	428.4
BNT-04	343.9	315.8	378.4
CAP-09	403.8	367.5	446.1
CAP-10	248.1	223.5	279.0
CRP-02	180.4	165.6	197.2
CVL-01	317.9	285.7	357.3
CVL-11	349.4	309.8	398.9
DAD-03	103.1	84.4	132.0
DAD-04	280.9	234.6	351.1
DAN-01	290.5	241.1	349.9
DAN-02	263.6	228.6	302.8
DAN-03	372.3	315.3	453.9
DJK-01	504.1	437.8	582.4
DJK-02	340.2	298.3	392.8
DJK-03	505.7	432.8	588.0
DJK-04	267.1	236.9	300.3
DJK-05	540.0	475.9	616.1
DJK-06	269.7	241.0	304.9
FLO-02	170.1	153.3	189.4
FMH-01	729.8	646.4	810.3
FMH-02	623.7	554.7	702.7
FMH-03	402.0	375.5	434.5
FRP-01	211.7	192.1	234.9
FRP-02	27.8	25.6	30.3
GAU-02	170.4	158.9	182.3
GAU-05	168.8	156.6	182.7
GAU-06	291.5	247.0	344.4
GBO-02	382.7	340.2	431.7
GBO-04	324.2	283.1	379.6
GBO-08	368.1	321.2	423.5
GBO-11	317.4	281.9	359.3
GBO-15	322.1	276.9	394.5

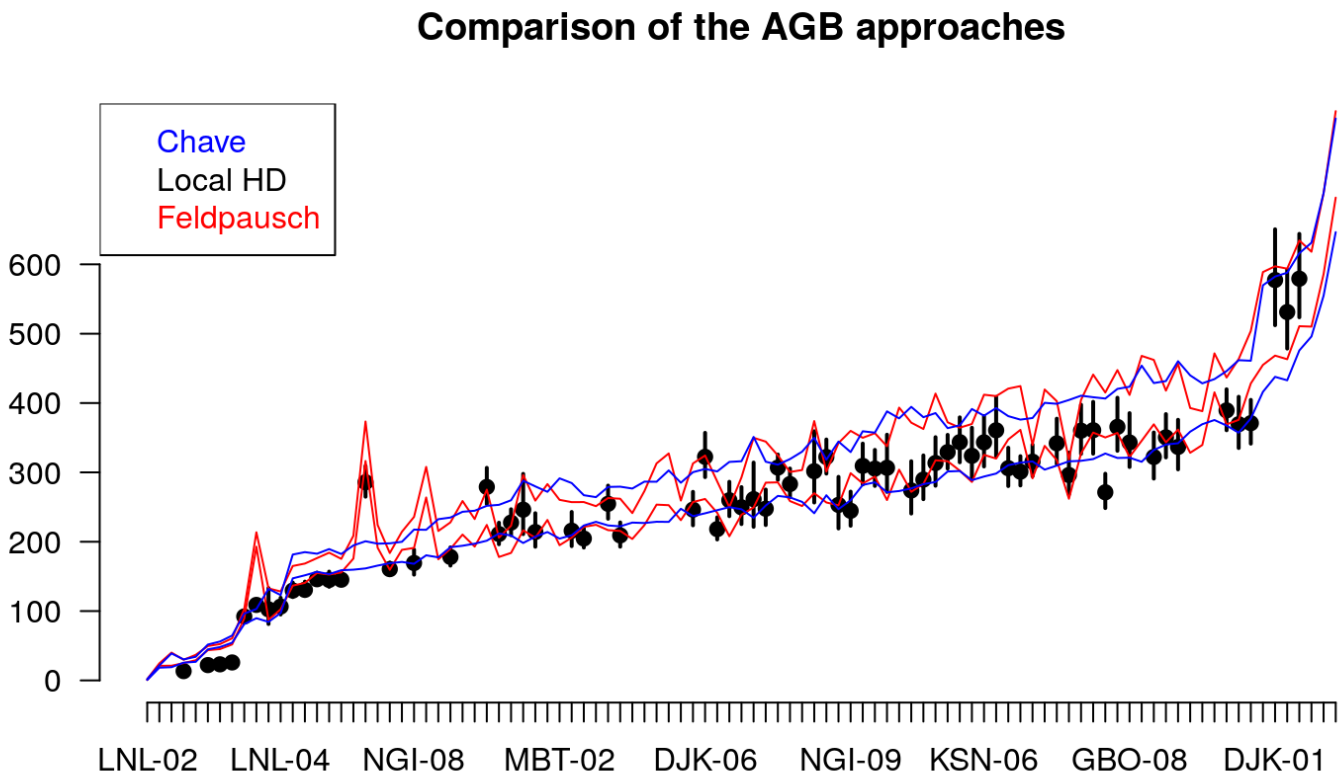
GBO-19	333.3	288.8	391.4
HCC-21	216.3	194.2	243.2
HCC-22	238.4	214.0	272.0
JBS-01	180.2	161.5	200.7
JBS-02	96.2	89.7	103.0
JEN-11	291.1	267.0	318.3
KSN-01	361.3	319.2	408.4
KSN-02	329.6	286.1	385.5
KSN-05	365.2	320.8	420.4
KSN-06	334.5	294.0	381.7
LFB-01	224.9	201.5	251.8
LFB-02	255.3	228.8	286.5
LFB-03	20.0	18.4	21.6
LNL-02	1.1	0.7	1.9
LNL-03	27.4	19.1	38.9
LNL-04	109.8	97.2	123.1
LNL-05	30.3	26.8	34.1
LNL-06	88.8	81.2	96.4
LNL-07	331.0	301.3	363.8
LNL-08	287.0	266.1	311.1
LNL-09	357.9	316.7	410.6
LNL-10	404.1	357.3	461.8
LNL-11	391.8	342.0	460.3
LNL-12	364.3	327.2	406.5
LSL-02	184.7	170.9	199.9
MBT-01	219.2	197.2	244.7
MBT-02	239.5	204.5	291.4
MBT-08	201.3	177.5	232.5
NGI-01	346.2	304.0	400.3
NGI-02	479.1	416.2	569.8
NGI-03	319.6	273.1	377.9
NGI-05	376.0	332.3	428.8
NGI-06	332.2	302.0	367.9
NGI-07	282.9	252.2	315.4
NGI-08	191.2	168.2	217.5
NGI-09	291.5	259.8	329.3
NGI-10	415.2	377.7	461.0
NGI-11	343.8	314.1	376.1
NGI-12	342.4	310.4	381.1
NOU-03	560.5	496.0	631.2
PNY-05	354.8	315.9	404.4
PNY-06	278.6	249.9	315.1
PNY-07	231.0	211.9	253.2
POA-01	182.1	169.0	197.7
POA-02	51.8	48.1	56.1
RCS-01	265.6	247.5	285.1
RCS-02	245.8	228.7	264.3
RCS-05	249.7	227.6	276.7

SAA-02	166.6	151.6	185.0
SAT-01	161.9	147.2	181.5
SAT-02	59.2	54.4	64.7
SCT-06	175.8	159.7	194.7
SOR-01	48.0	44.8	51.7
SUC-01	289.1	263.9	319.2
TAM-01	249.1	222.2	279.4
TAM-02	238.1	207.3	279.8
TAM-05	279.8	246.8	316.1
TAM-06	318.5	271.3	388.0
TAM-07	241.5	209.4	284.6
TAM-09	254.9	227.0	286.7

```
# Calculating the maximum height and the Lorey's height per (sub)plot
FosData$Hchave<-retrieveH(D=FosData$Dcm,coord=cbind(FosData$Long,FosData$Lat))$H

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

# Lorey height
FosData$BAm<-(pi*(FosData$Dcm/2)^2)/10000
FosData$HBAlocal<-FosData$Hlocal*FosData$BAm
FosData$HBAchave<-FosData$Hchave*FosData$BAm
FosData$HBAfeld<-FosData$Hfeld*FosData$BAm
LoreyLocal<-tapply(FosData$HBAlocal,FosData$PlotCode,sum)/tapply(FosData$BAm,FosData$PlotCode,
sum)
LoreyChave<-tapply(FosData$HBAchave,FosData$PlotCode,sum)/tapply(FosData$BAm,FosData$PlotCode,
sum)
LoreyFeld<-tapply(FosData$HBAfeld,FosData$PlotCode,sum)/tapply(FosData$BAm,FosData$PlotCode,su
m)
```


Comparison of the AGB approaches
Chave
Local HD
Feldpausch
600
500
400
300
200
100
0
LNL-02
LNL-04
NGI-08
MBT-02
DJK-06
NGI-09
KSN-06
GBO-08
DJK-01