# LAI, NPP & C-Allocation

Debora R Roberti

University of Santa Maria - Brazil

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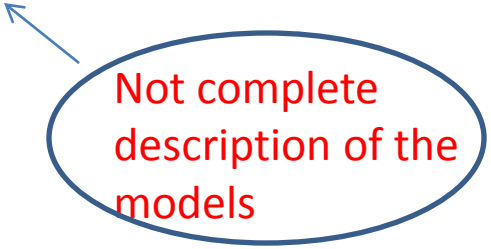
# LBA-MIP MOTIVATION

- Comparison of different models and different sites: LAI, NPP, C_allocation


- What is the reason for the differences in model results?



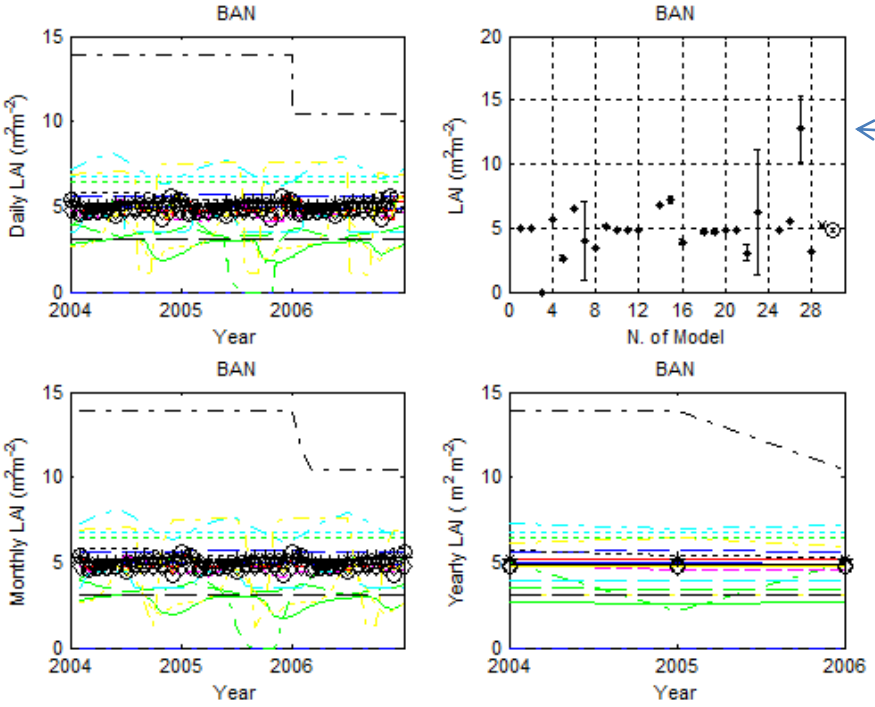

- Why models respond different to environmental conditions?

# LAI

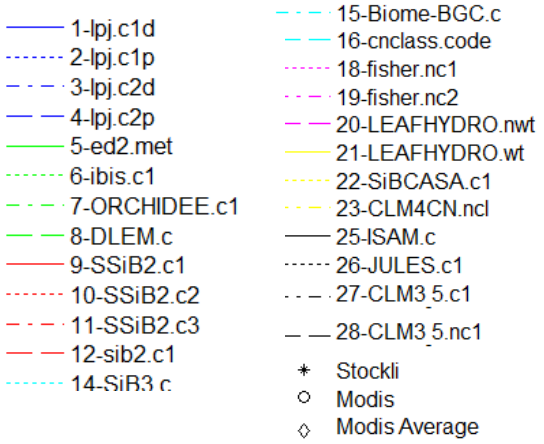
| | Model | LAI – value | LAI frequency |
|---|---|---|---|
| 1 | lpj.c1d | Constant and different for each year | d |
| 2 | lpj.c1p | Constant and different for each year | d |
| 3 | lpj.c2d | 0. | d |
| 4 | lpj.c2p | Constant and different for each year | d |
| 5 | ed2.met | Daily variation | h |
| 6 | ibis.c1 | Constant | h |
| 7 | ORCHIDEE.c1 | Daily variation | h |
| 8 | DLEM.c | constant | d |
| 9 | SSiB2.c1 | Montly variation | h |
| 10 | SSiB2.c2 | Montly variation | h |
| 11 | SSiB2.c3 | Constant | h |
| 12 | sib2.c1 | Daily variation | h |
| 13 | sib2.modified | NAN | h |
| 14 | SiB3.c | Constant | h |
| 15 | Biome-BGC.c | Daily variation | h |
| 16 | cnclass.code | Daily variation | h |
| 17 | htessel.nc1 | NAN | h |
| 18 | fisher.nc1 | Montly variation | h |
| 19 | fisher.nc2 | Montly variation | h |
| 20 | LEAFHYDRO.nwt | Daily variation | h |
| 21 | LEAFHYDRO.wt | Daily variation | h |
| 22 | SiBCASA.c1 | Daily variation | h |
| 23 | CLM4CN.ncl | Daily variation | h |
| 24 | NOAH-MP | NAN | h |
| 25 | ISAM.c | Daily variation | h |
| 26 | JULES.c1 | Constant and different for each year | h |
| 27 | CLM3_5.c1 | Constant and different for each year | h |
| 28 | CLM3_5.nc1 | Constant | h |

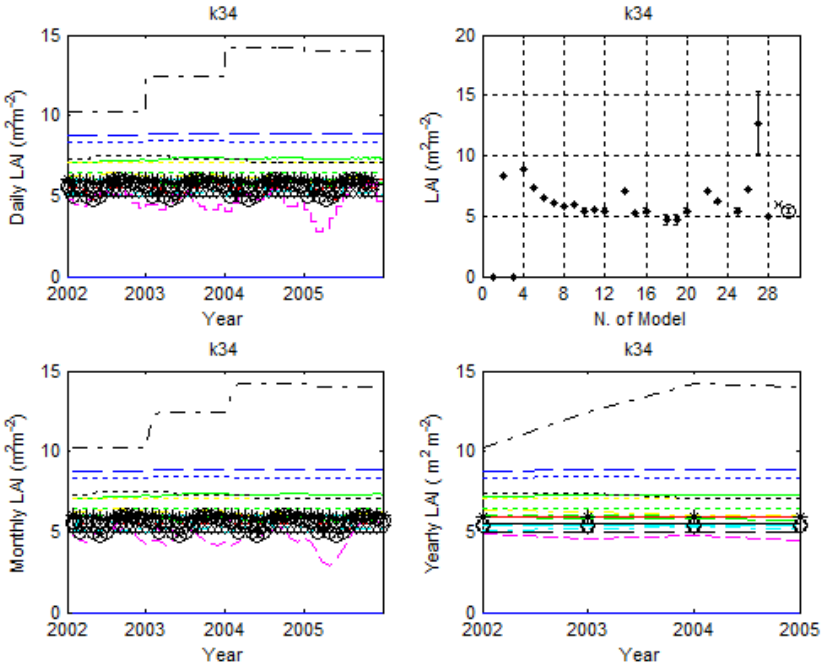
Forest: BAN, K34, RJA, k83, k67

Pasture, Savanna, Agriculture: K77, FNS, PDG

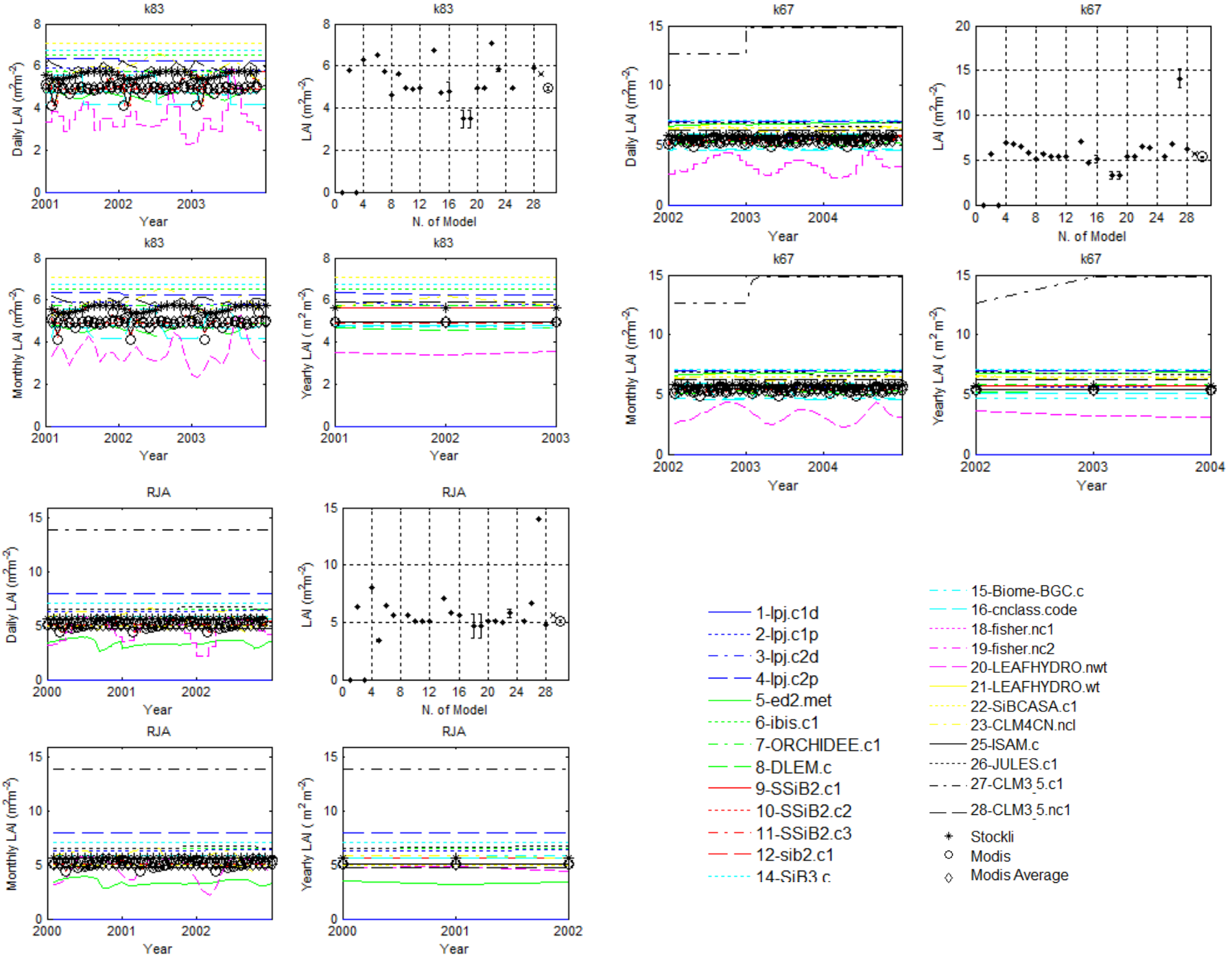



Mean and standard deviation

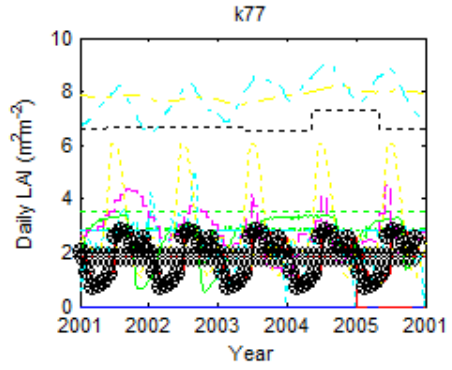


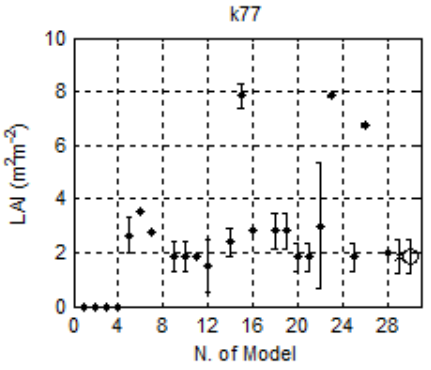



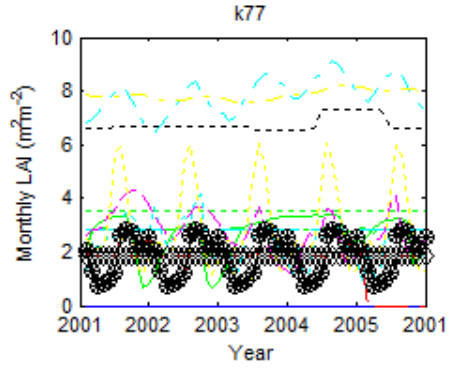

For forest, the daily LAI variation is good represented in most of models:
Problems: CLM3_5

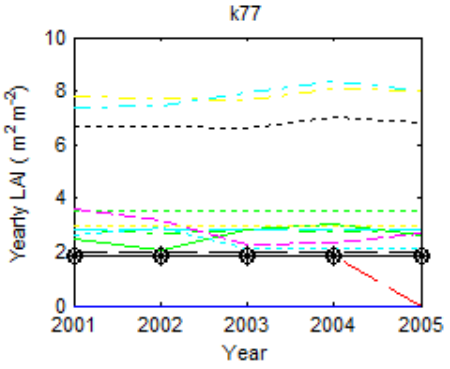

k83
Daily LAI (m²m⁻²)
Year
LAI (m²m⁻²)
N. of Model
Monthly LAI (m²m⁻²)
Yearly LAI ( m² m⁻²)
RJA
k67
1-lpj.c1d
2-lpj.c1p
3-lpj.c2d
4-lpj.c2p
5-ed2.met
6-ibis.c1
7-ORCHIDEE.c1
8-DLEM.c
9-SSiB2.c1
10-SSiB2.c2
11-SSiB2.c3
12-sib2.c1
14-SiB3.c
15-Biome-BGC.c
16-cnclass.code
18-fisher.nc1
19-fisher.nc2
20-LEAFHYDRO.nwt
21-LEAFHYDRO.wt
22-SiBCASA.c1
23-CLM4CN.ncl
25-ISAM.c
26-JULES.c1
27-CLM3_5.c1
28-CLM3_5.nc1
Stockli
Modis
Modis Average

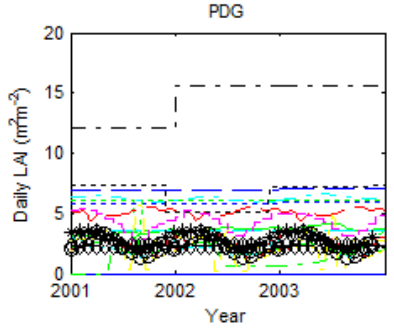
# Agriculture, Savanna

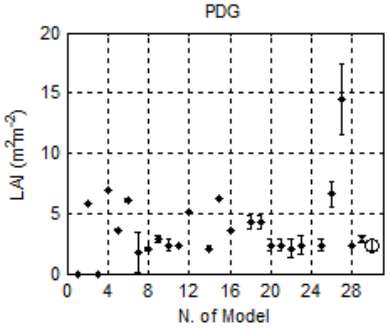


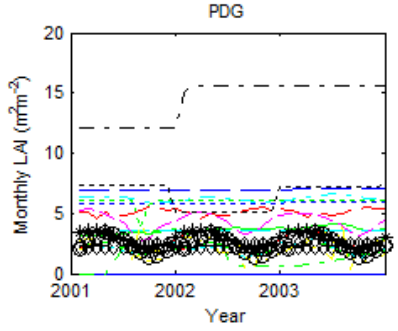



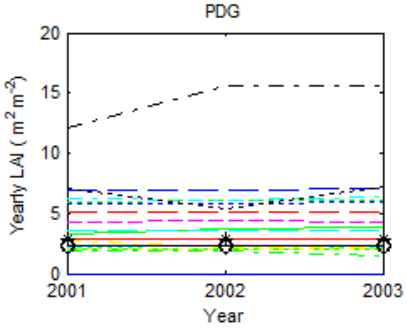



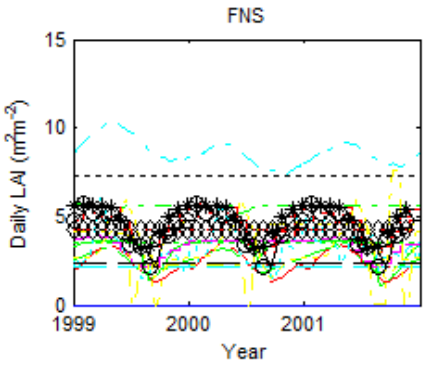



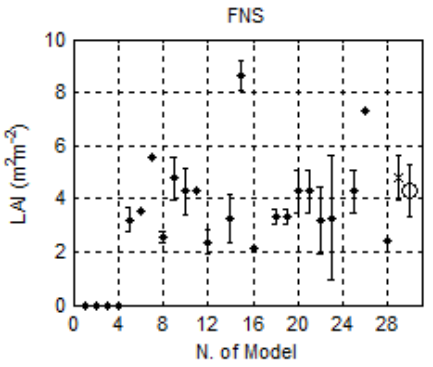



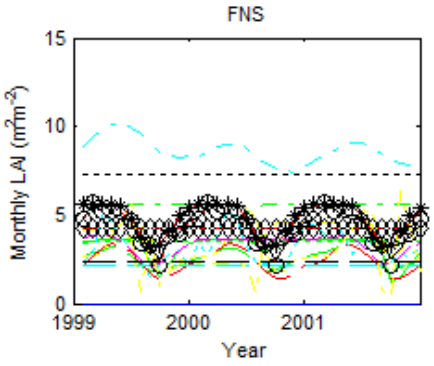



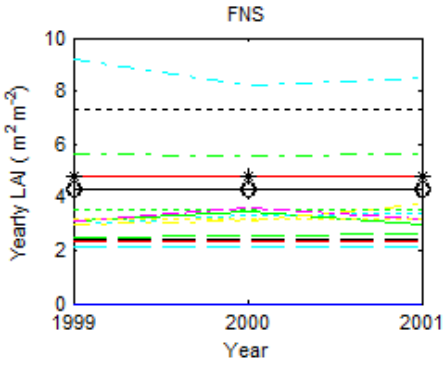




The seasonality comportment is well represented, but not the magnitude.

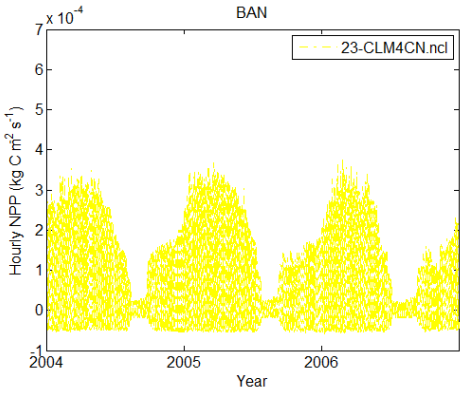
1-lpj.c1d
2-lpj.c1p
3-lpj.c2d
4-lpj.c2p
5-ed2.met
6-ibis.c1
7-ORCHIDEE.c1
8-DLEM.c
9-SSiB2.c1
10-SSiB2.c2
11-SSiB2.c3
12-sib2.c1
14-SiB3.c
15-Biome-BGC.c
16-cnclass.code
18-fisher.nc1
19-fisher.nc2
20-LEAFHYDRO.nwt
21-LEAFHYDRO.wt
22-SiBCASA.c1
23-CLM4CN.ncl
25-ISAM.c
26-JULES.c1
27-CLM3_5.c1
28-CLM3_5.nc1
Stockli
Modis
Modis Average

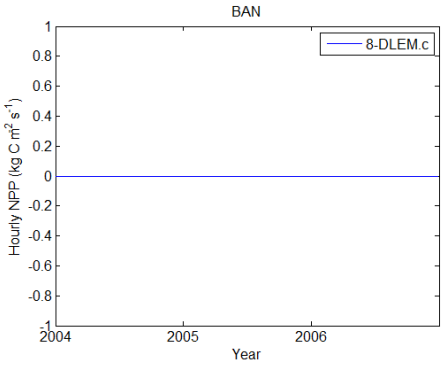
# NPP - Net Primary Production or Carbon assimilation by photosynthesis

| n | Model | npool | NPP |
|---|---|---|---|
| 1 | lpj.c1d | 1 | |
| 2 | lpj.c1p | 1 | |
| 3 | lpj.c2d | 1 | |
| 4 | lpj.c2p | 1 | |
| 5 | ed2.met | 9 | |
| 6 | ibis.c1 | 12 | |
| 7 | ORCHIDEE.c1 | 1 | |
| 8 | DLEM.c | 1 | problems |
| 9 | SSiB2.c1 | 1 | |
| 10 | SSiB2.c2 | 1 | |
| 11 | SSiB2.c3 | 1 | |
| 12 | sib2.c1 | 1 | |
| 13 | sib2.modified | 1 | |
| 14 | SiB3.c | 1 | |
| 15 | Biome-BGC.c | 27 | |
| 16 | cnclass.code | 7 | |
| 17 | htessel.nc1 | 3 | NaN |
| 18 | fisher.nc1 | 1 | NaN |
| 19 | fisher.nc2 | 1 | NaN |
| 20 | LEAFHYDRO.nwt | 3 | NaN |
| 21 | LEAFHYDRO.wt | 3 | NaN |
| 22 | SiBCASA.c1 | 13 | |
| 23 | CLM4CN.ncl | 1 | Problems |
| 24 | NOAH-MP | 1 | |
| 25 | ISAM.c | 3 | |
| 26 | JULES.c1 | 1 | |
| 27 | CLM3_5.c1 | 8 | |
| 28 | CLM3_5.nc1 | 1 | |

○ Not reported

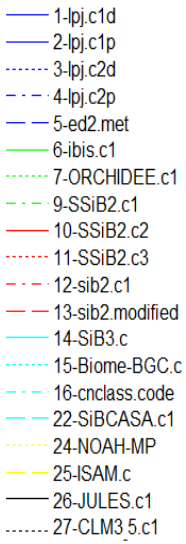
Problems:

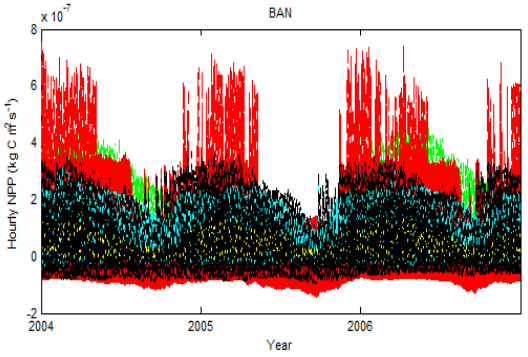


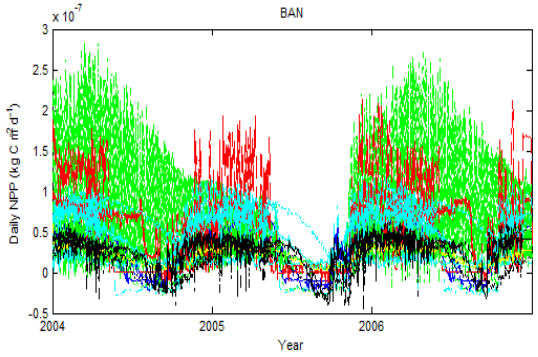




Analysis using the LE, H comportment reported in Natal for Koichi, Natalia and Michel: 'Surface Energy Flux Evaluation'

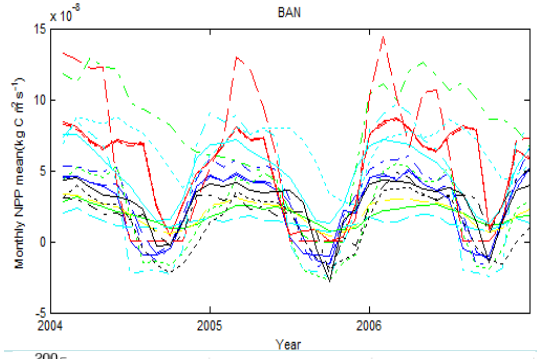
# BAN : Forest - Savanna

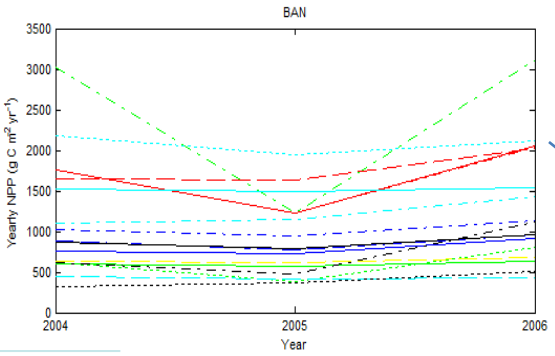


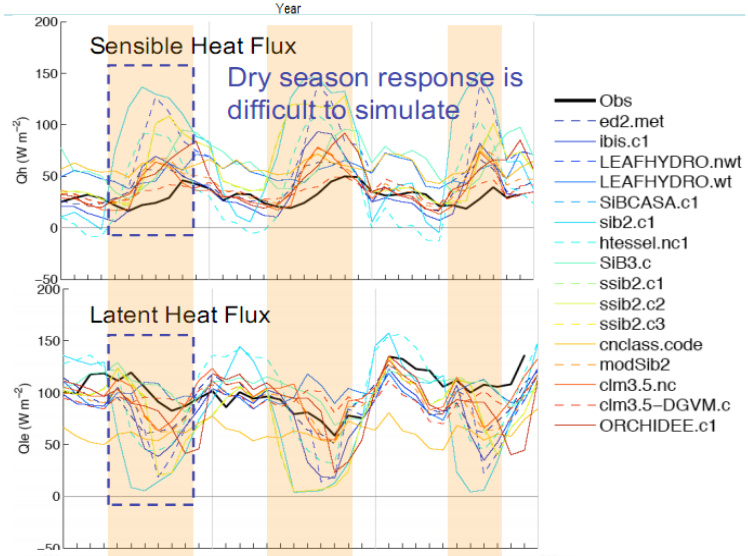



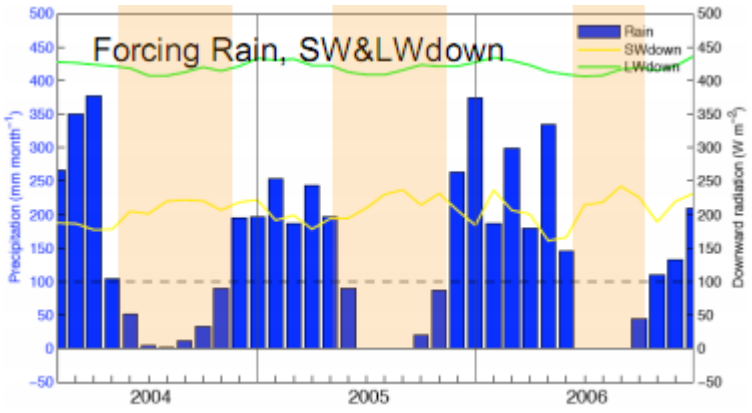

The biggest difference between models are in wet season.



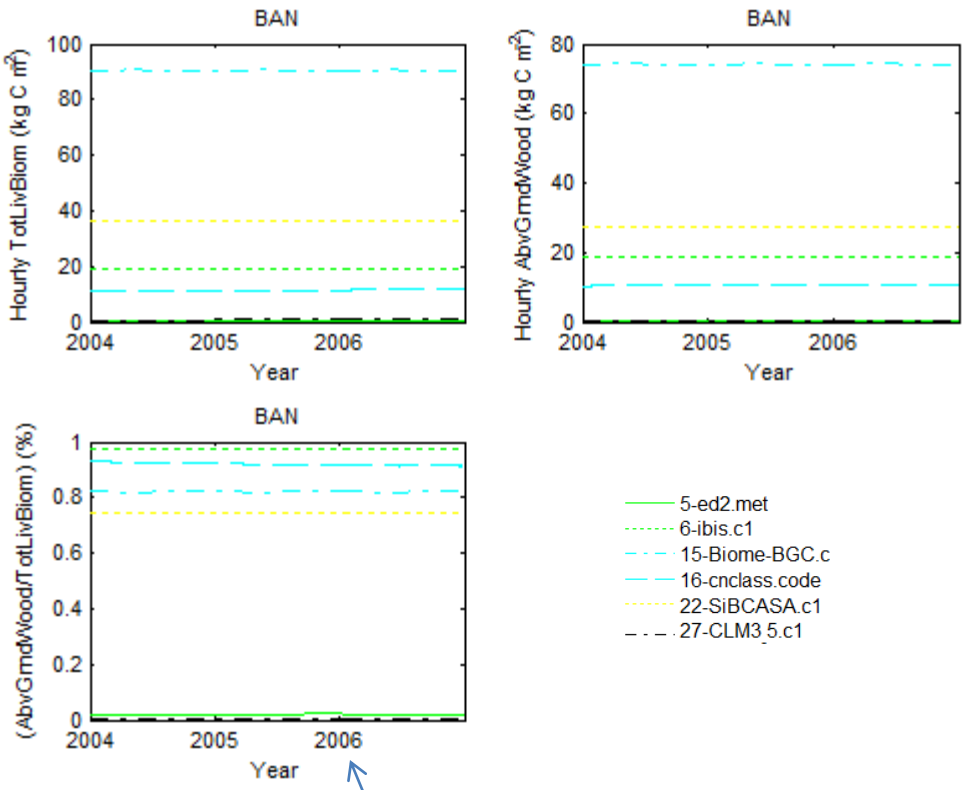




4 x is the difference between the model



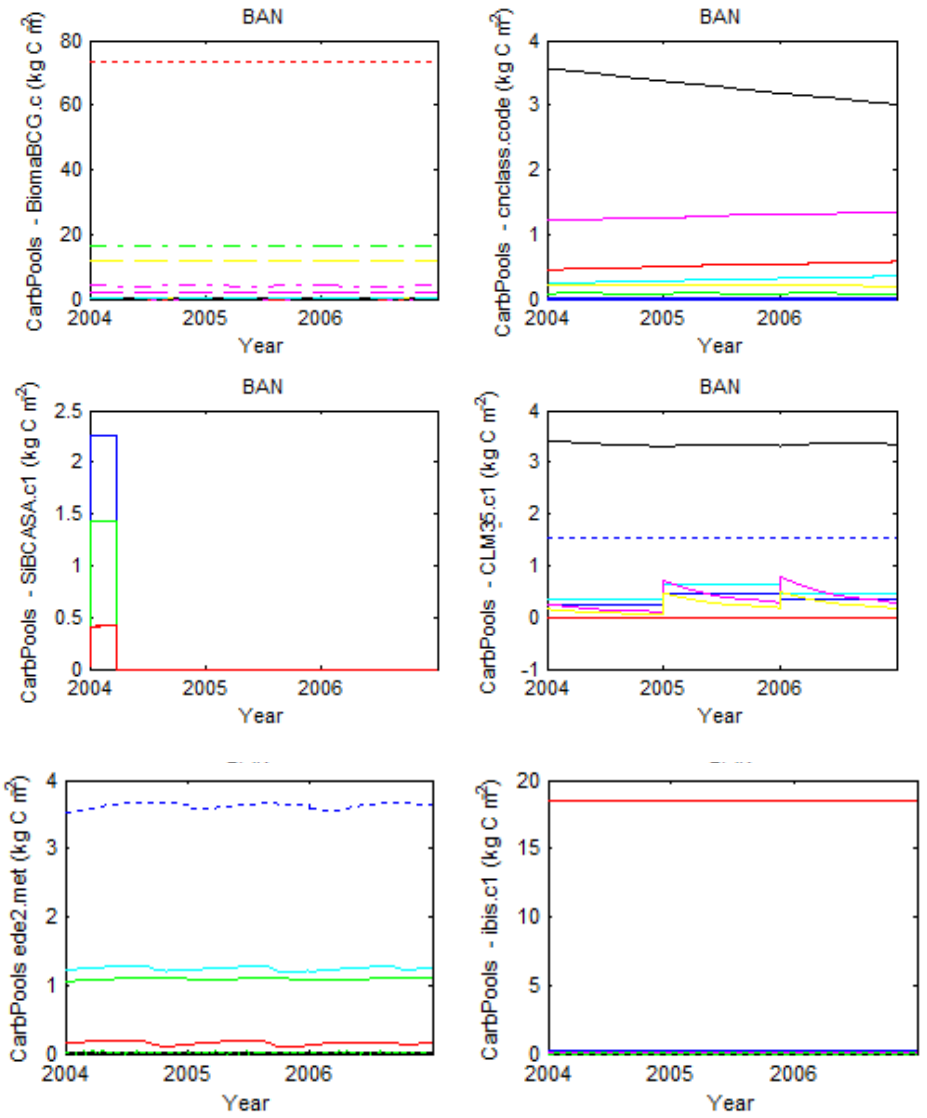



# C- allocation




Models 6, 16, 15 and 22 represent the most part of TotLivBiom as AbvGrndWood. In this models the magnitude is the same. In models 5 and 27 the magnitude is two order bellow

# CarbPools

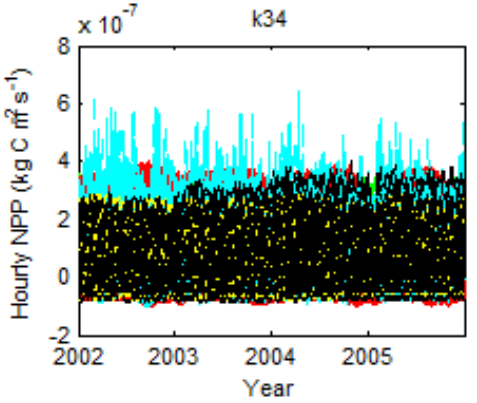


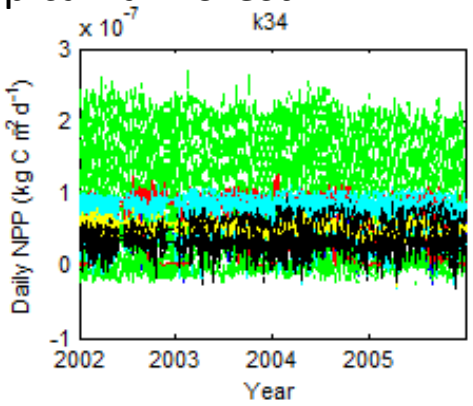

What are the Polls name?

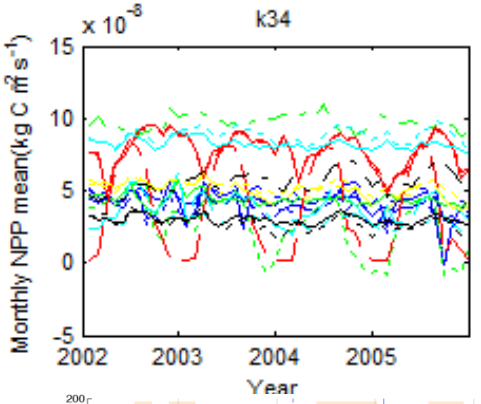
No patterns with the file position!

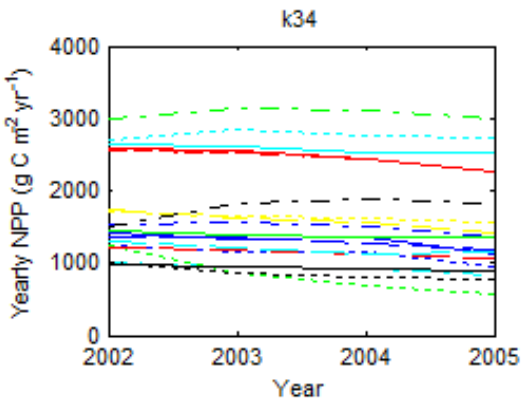
# k34 : Tropical rainforest

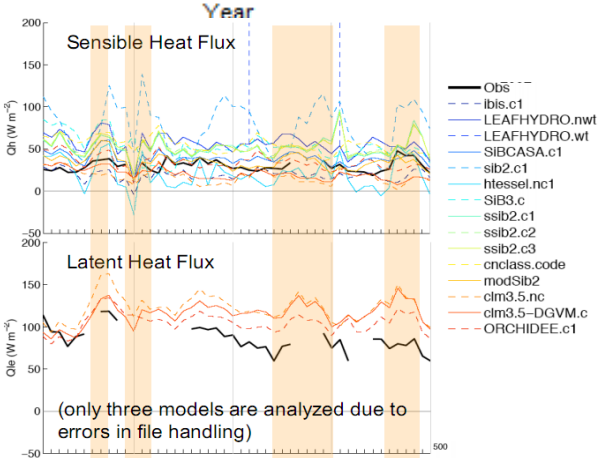
1-lpj.c1d
2-lpj.c1p
3-lpj.c2d
4-lpj.c2p
5-ed2.met
6-ibis.c1
7-ORCHIDEE.c1
9-SSiB2.c1
10-SSiB2.c2
11-SSiB2.c3
12-sib2.c1
13-sib2.modified
14-SiB3.c
15-Biome-BGC.c
16-cnclass.code
22-SiBCASA.c1
24-NOAH-MP
25-ISAM.c
26-JULES.c1
27-CLM3_5.c1



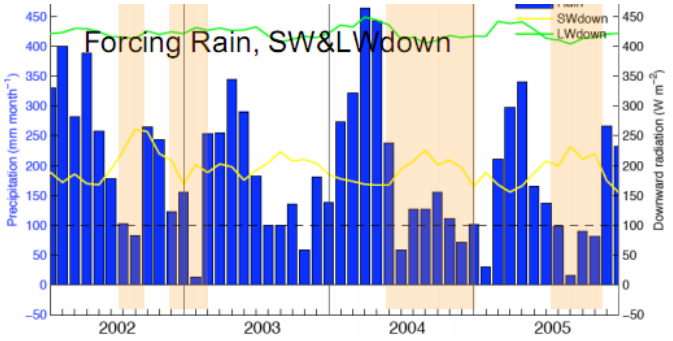



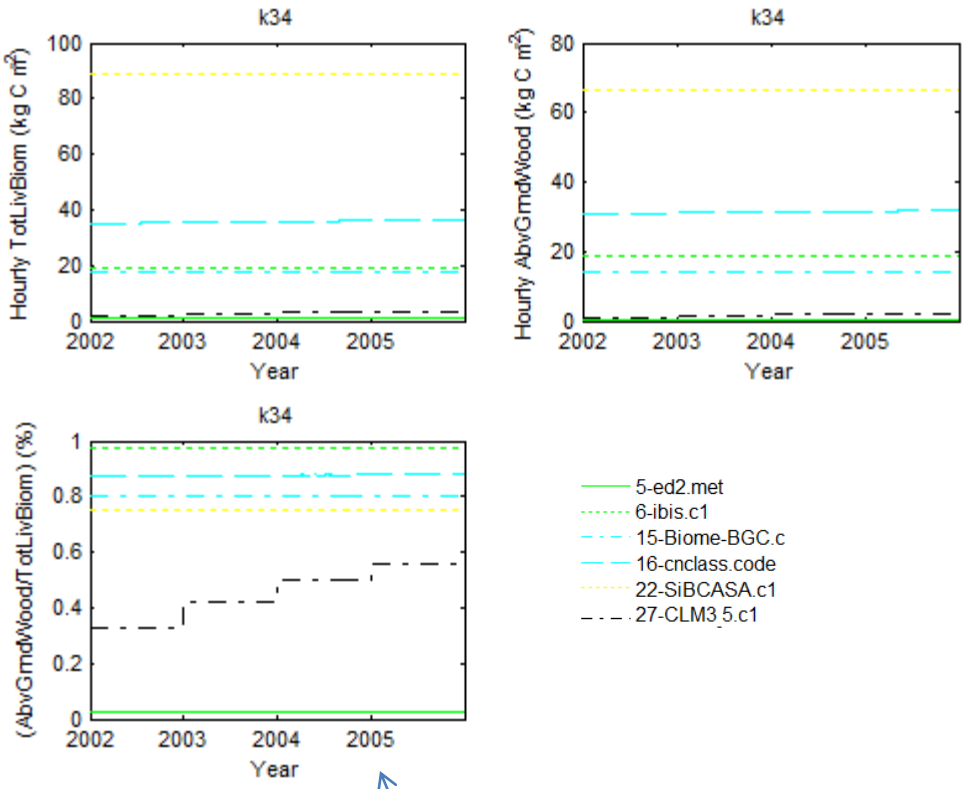




High variability in magnitude and seasonality in sib2.mod and SSib2

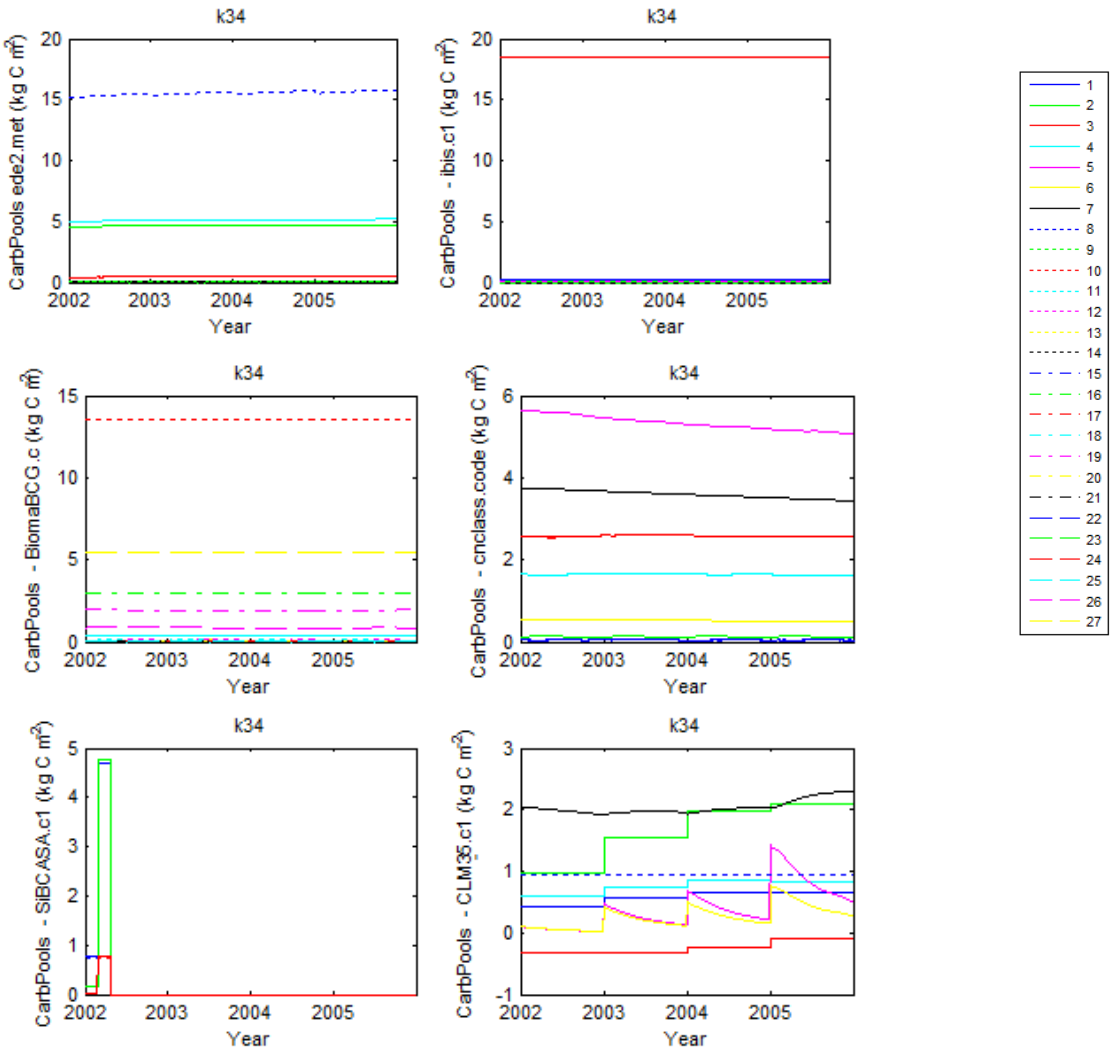


# C- allocation

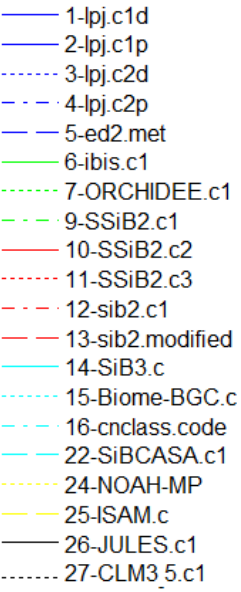


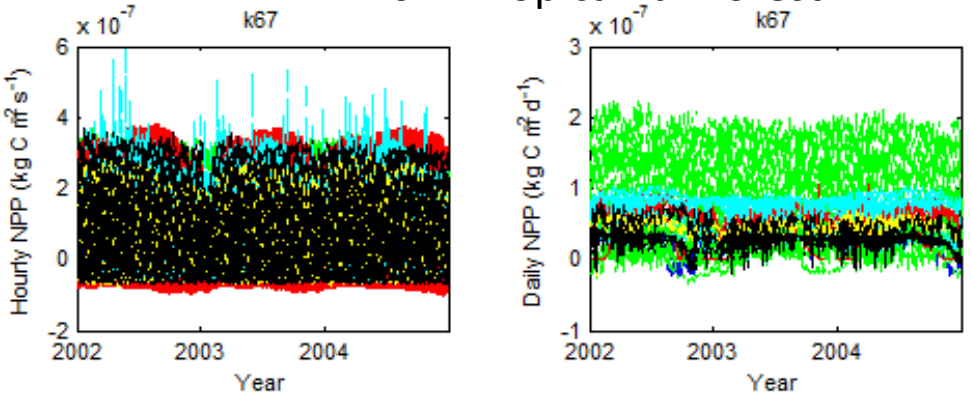

Models 6, 16, 15 and 22 represent the most part of TotLivBiom as AbvGrndWood. 27 different from the sites before.

# CarbPolls


k34
CarbPools ede2.met (kg C m-2)
CarbPools - ibis.c1 (kg C m-2)
CarbPools - BiomaBCG.c (kg C m-2)
CarbPools - cnclass.code (kg C m-2)
CarbPools - SIBCASA.c1 (kg C m-2)
CarbPools - CLM3G.c1 (kg C m-2)
Year
2002
2003
2004
2005
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

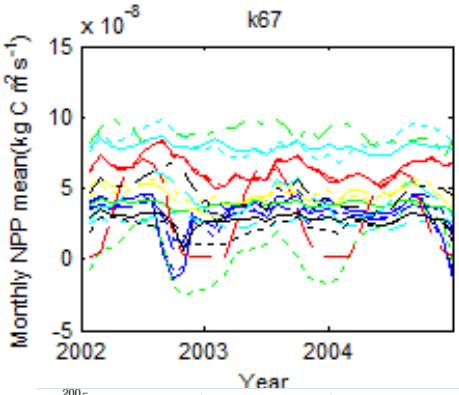
# k67 : Tropical rainforest

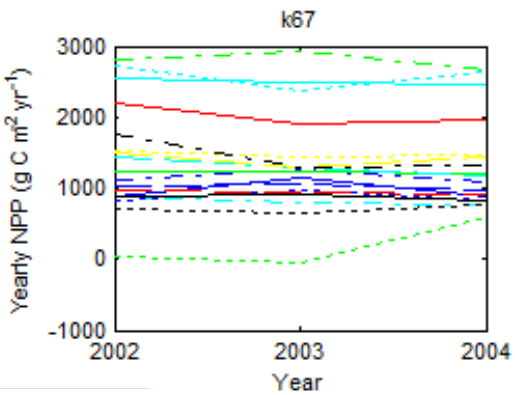


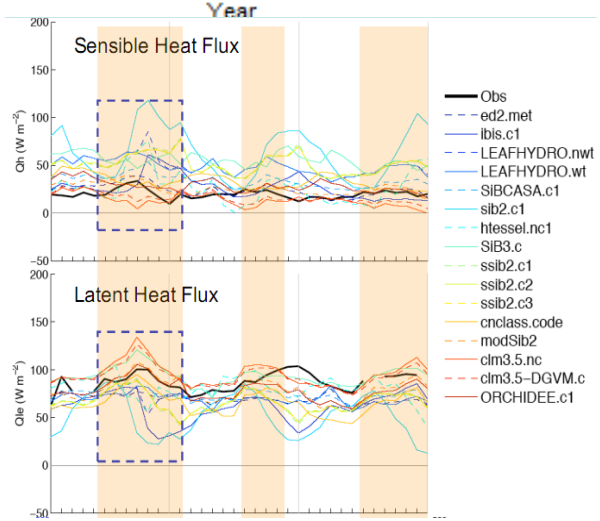



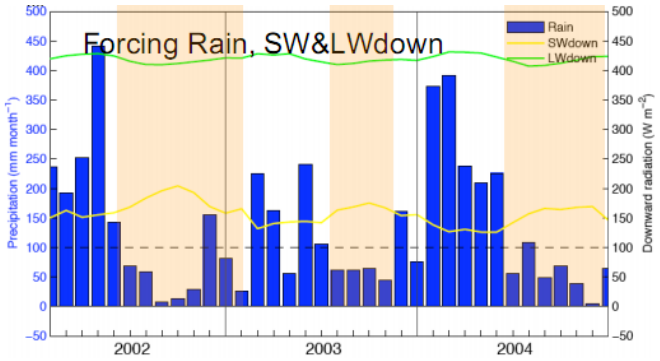






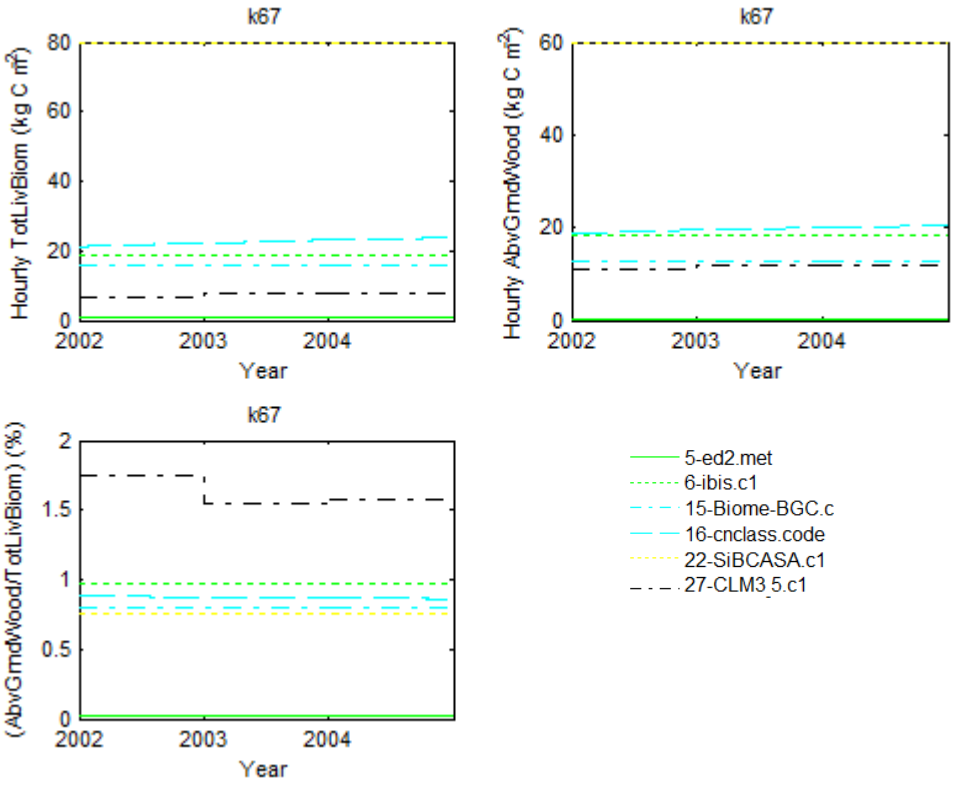



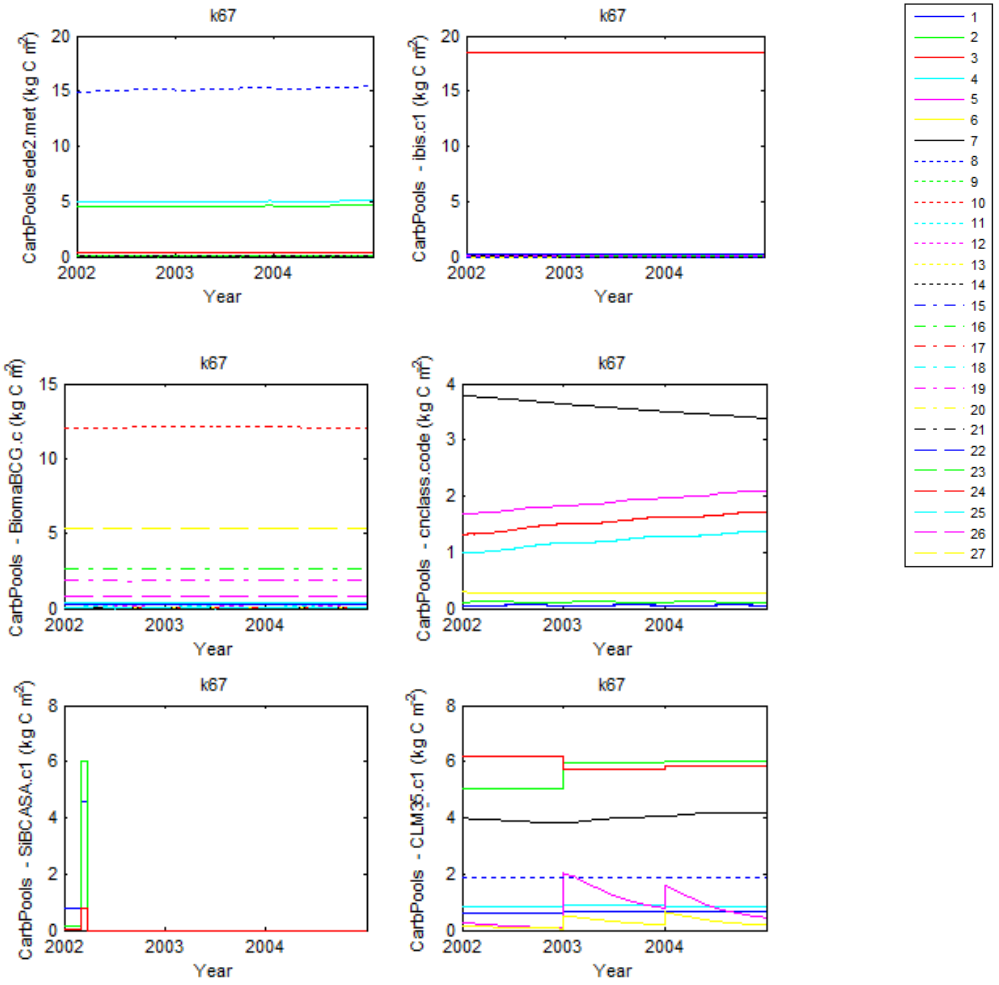




High variability in magnitude. sib2.mod represent a seasonality

# C- allocation



# CarbPools


k67
CarbPools ede2.met (kg C m2)
CarbPools - ibis.c1 (kg C m2)
CarbPools - BiomaBCG.c (kg C m2)
CarbPools - cnclass.code (kg C m2)
CarbPools - SiBCASA.c1 (kg C m2)
CarbPools - CLM35.c1 (kg C m2)
Year
2002
2003
2004
1
2
3
4
5
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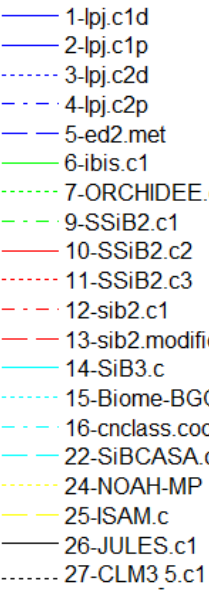
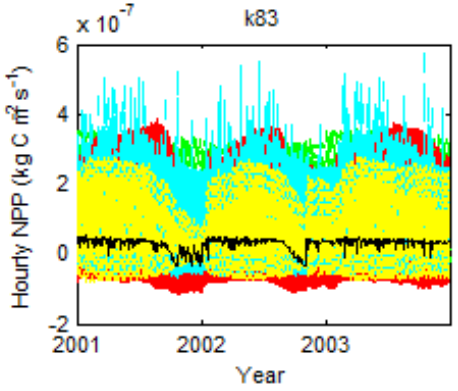
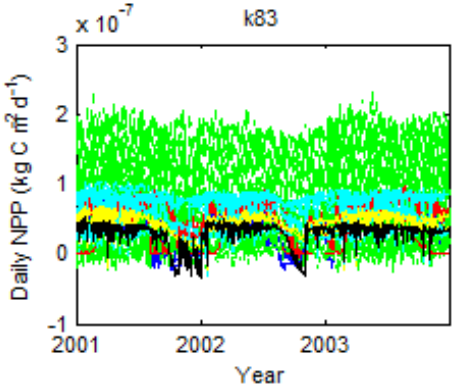
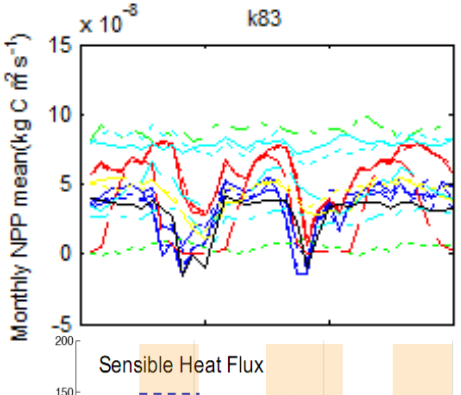
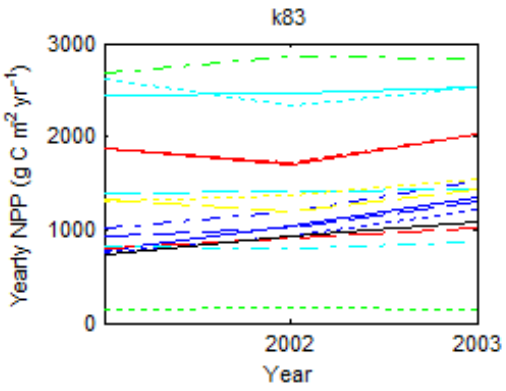
# k83 : Selectively logged tropical rainforest

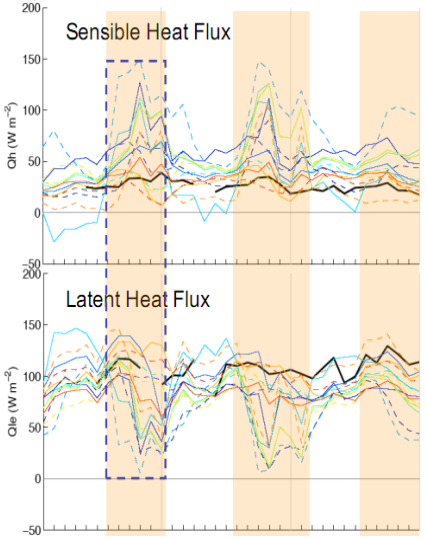


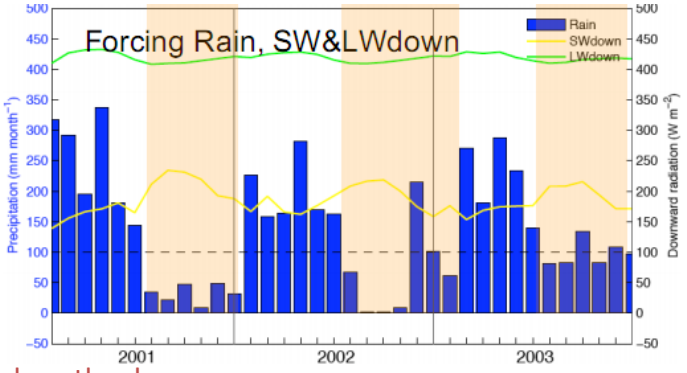



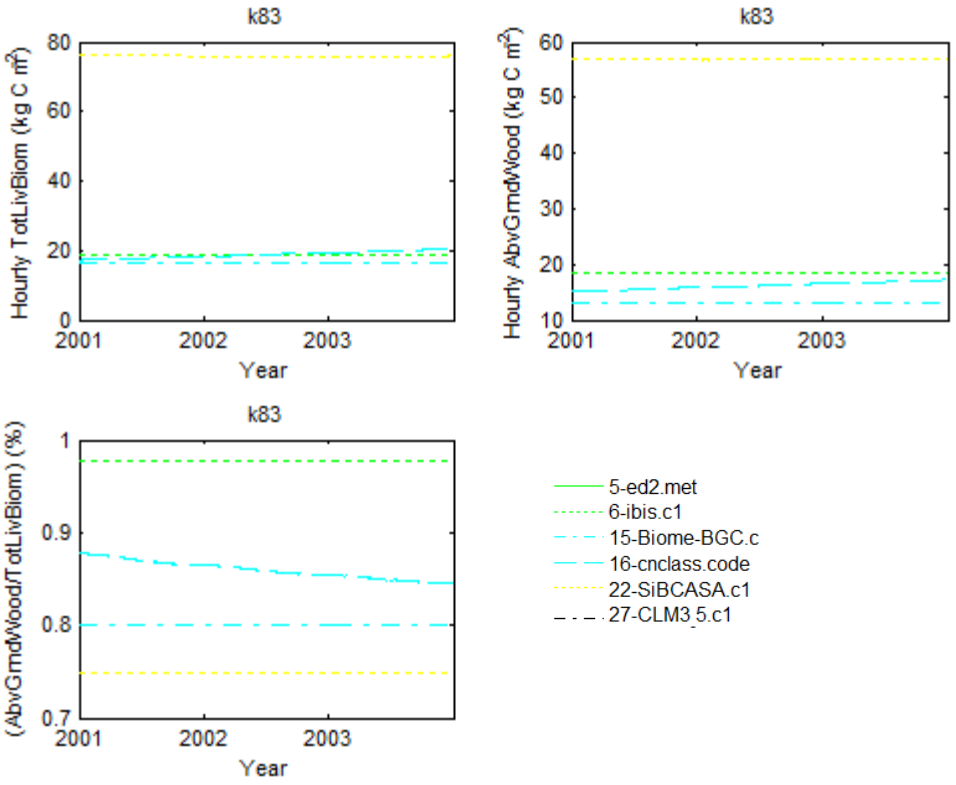




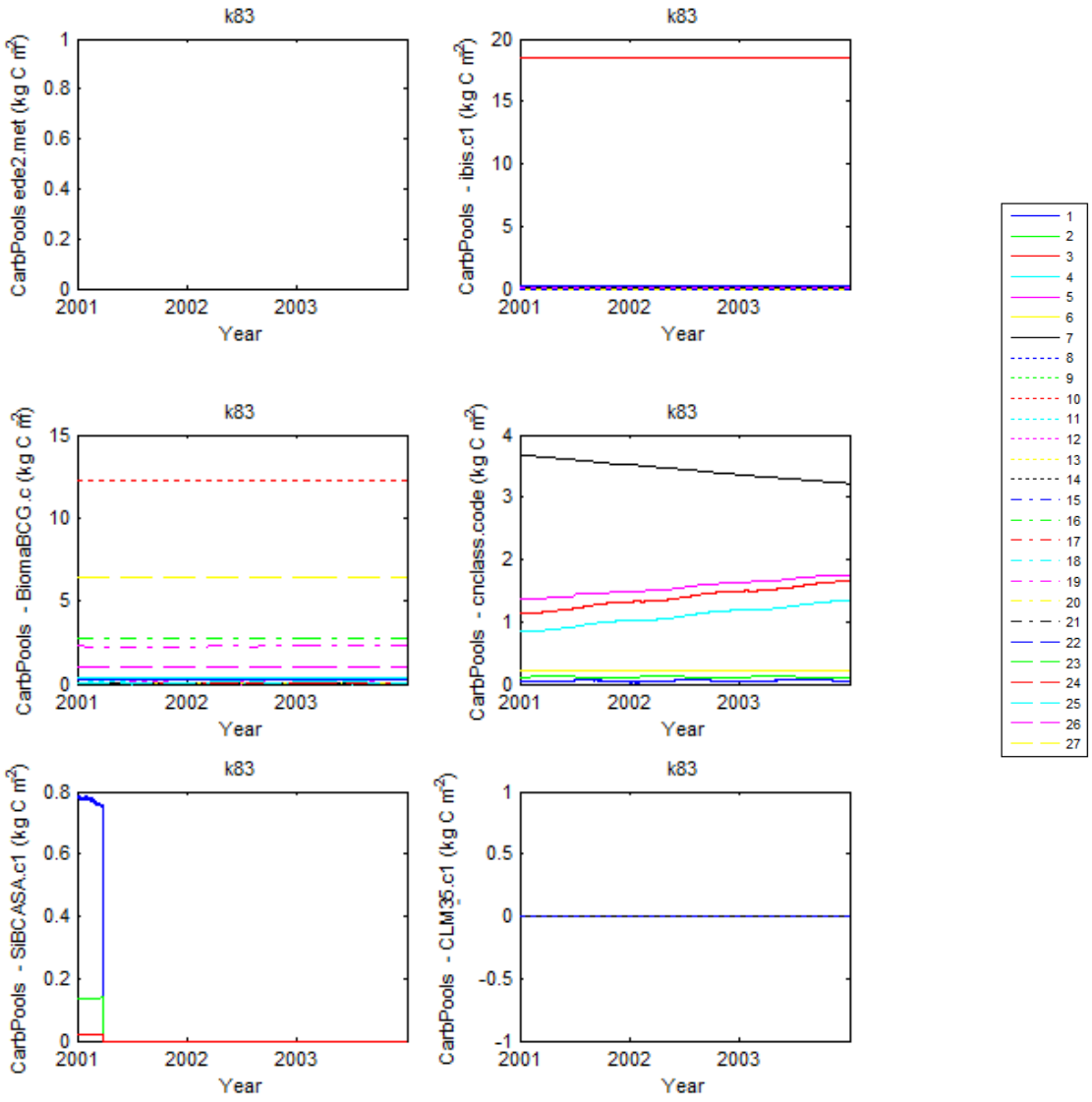

The biggest difference between models are in dry season.

Difficult to reproduce the dry season Qh and Qle

# C- allocation



# CarbPools


k83
CarbPools ede2.met (kg C m2)
CarbPools - ibis.c1 (kg C m2)
CarbPools - BiomaBCG.c (kg C m2)
CarbPools - cnclass.code (kg C m2)
CarbPools - SiBCASA.c1 (kg C m2)
CarbPools - CLM35.c1 (kg C m2)
Year
2001
2002
2003
1
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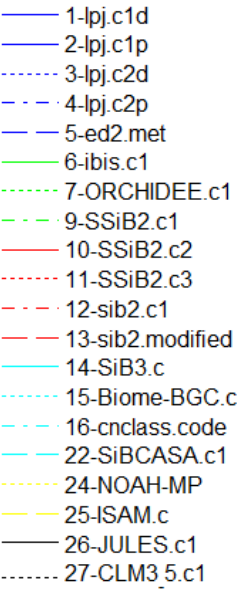
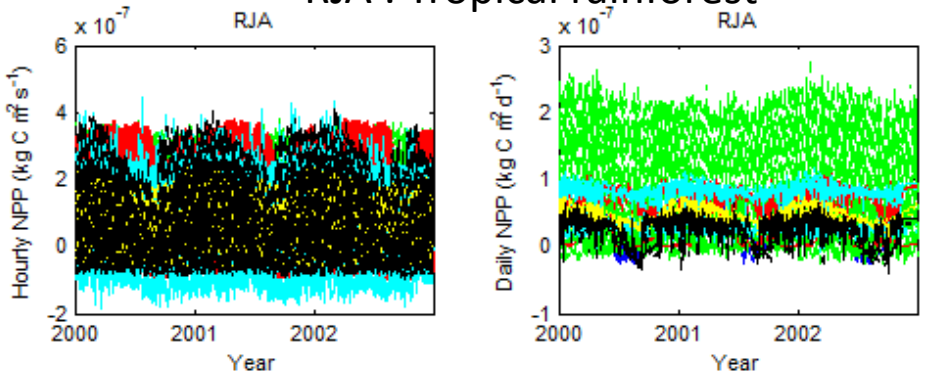
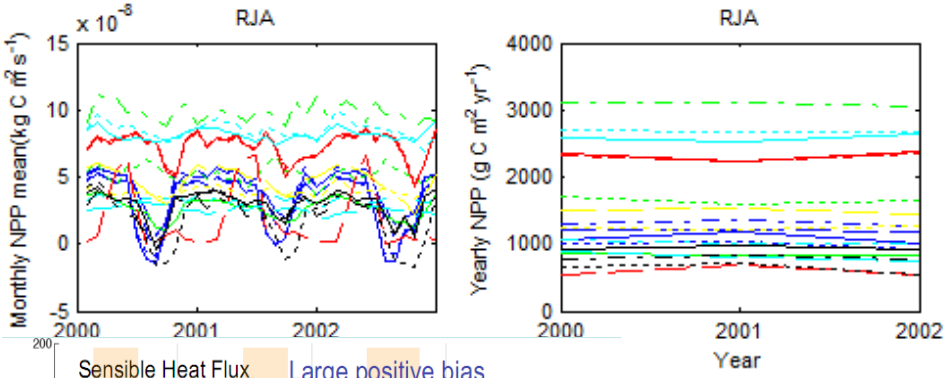
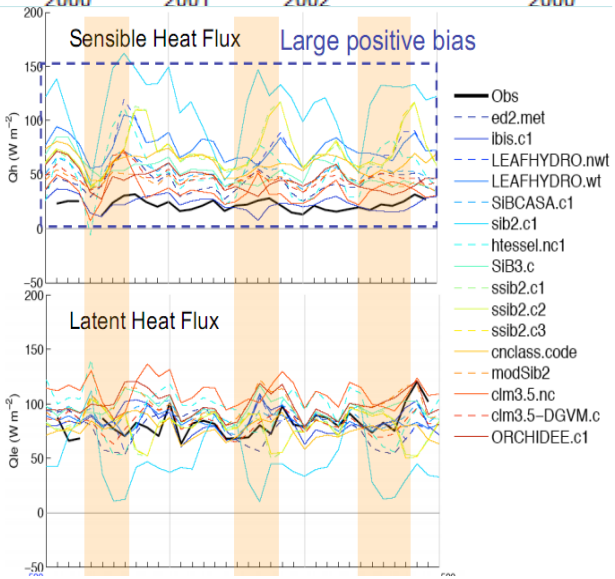
# RJA : Tropical rainforest

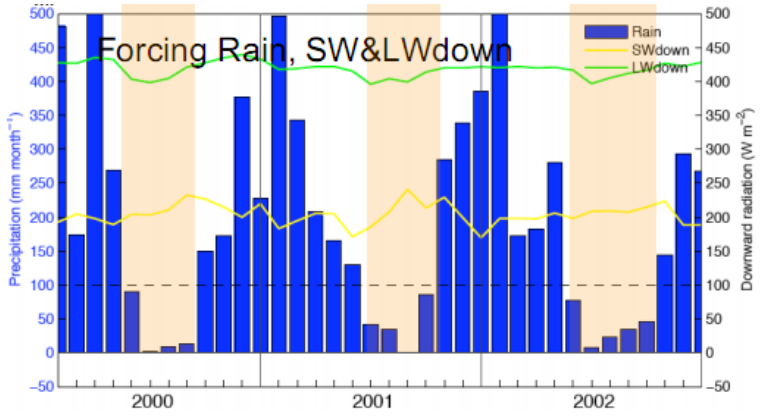


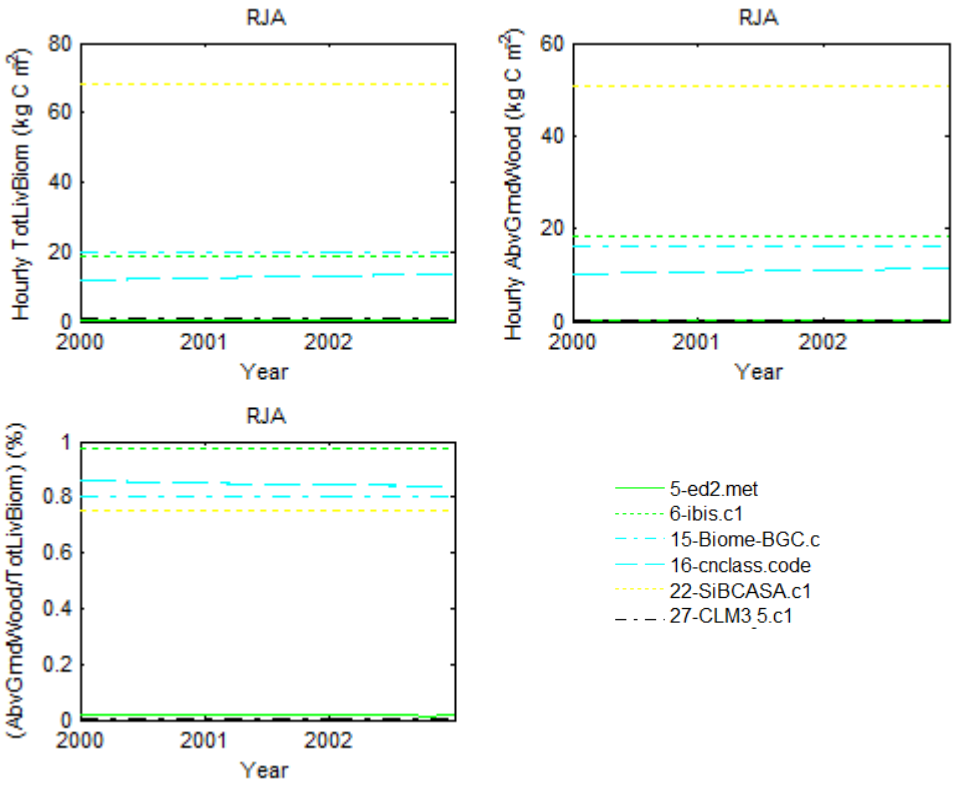




The biggest difference between models are in dry season.

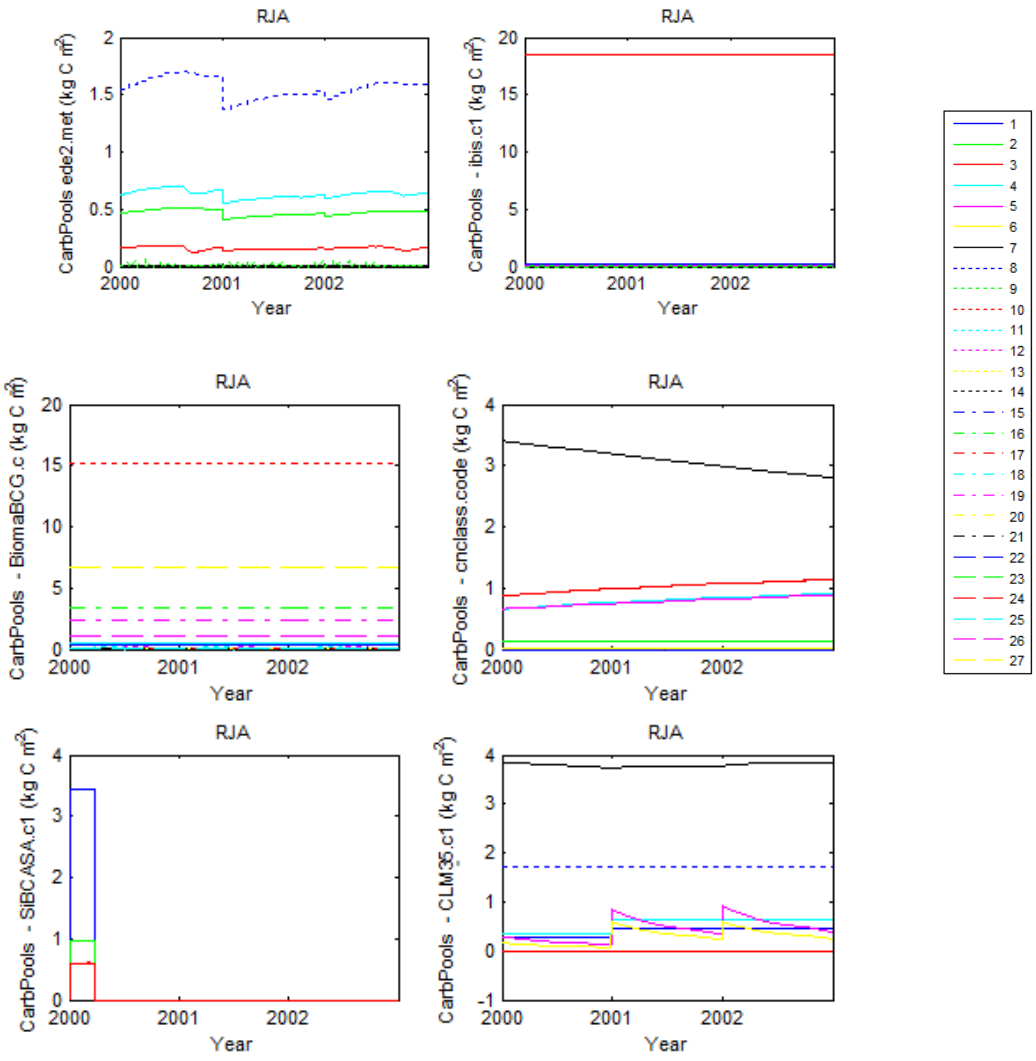


# C- allocation



# CarbPools


RJA
CarbPools ede2.met (kg C m2)
Year
RJA
CarbPools - ibis.c1 (kg C m2)
Year
RJA
CarbPools - BiomaBCG.c (kg C m2)
Year
RJA
CarbPools - cnclass.code (kg C m2)
Year
RJA
CarbPools - SIBCASA.c1 (kg C m2)
Year
RJA
CarbPools - CLM35.c1 (kg C m2)
Year
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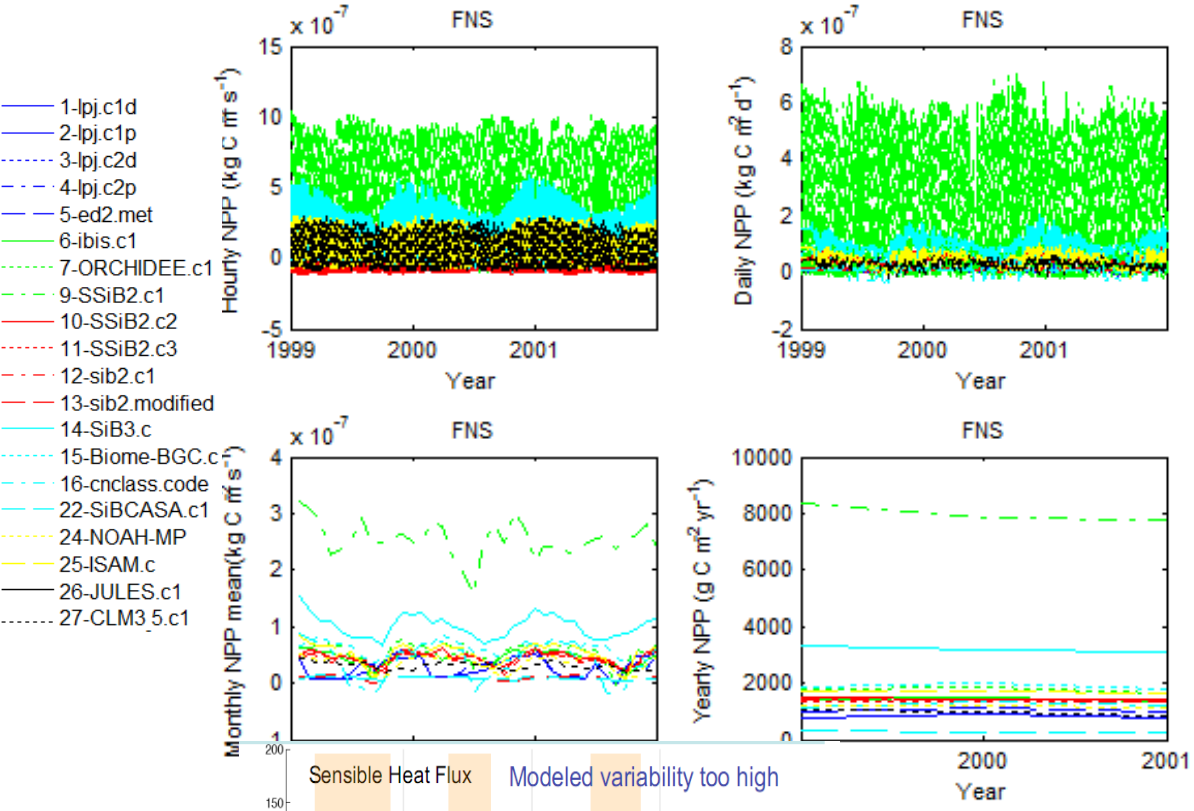
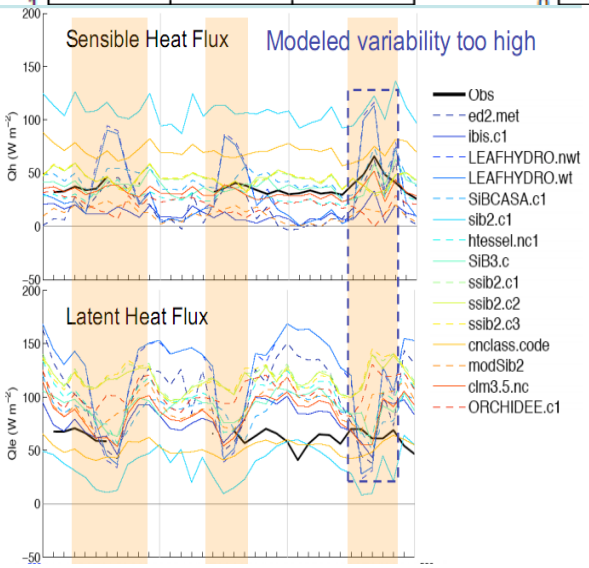
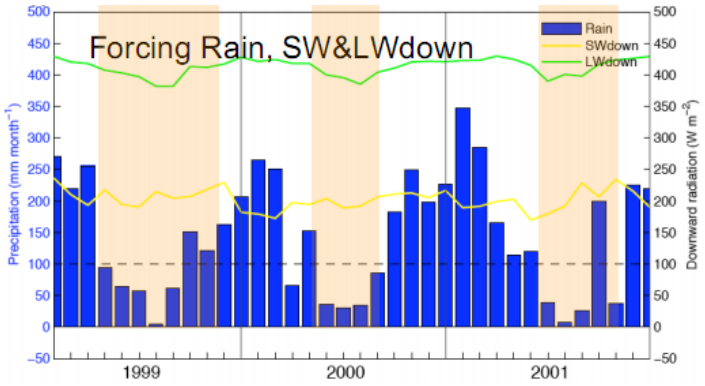
# FNS : Pasture

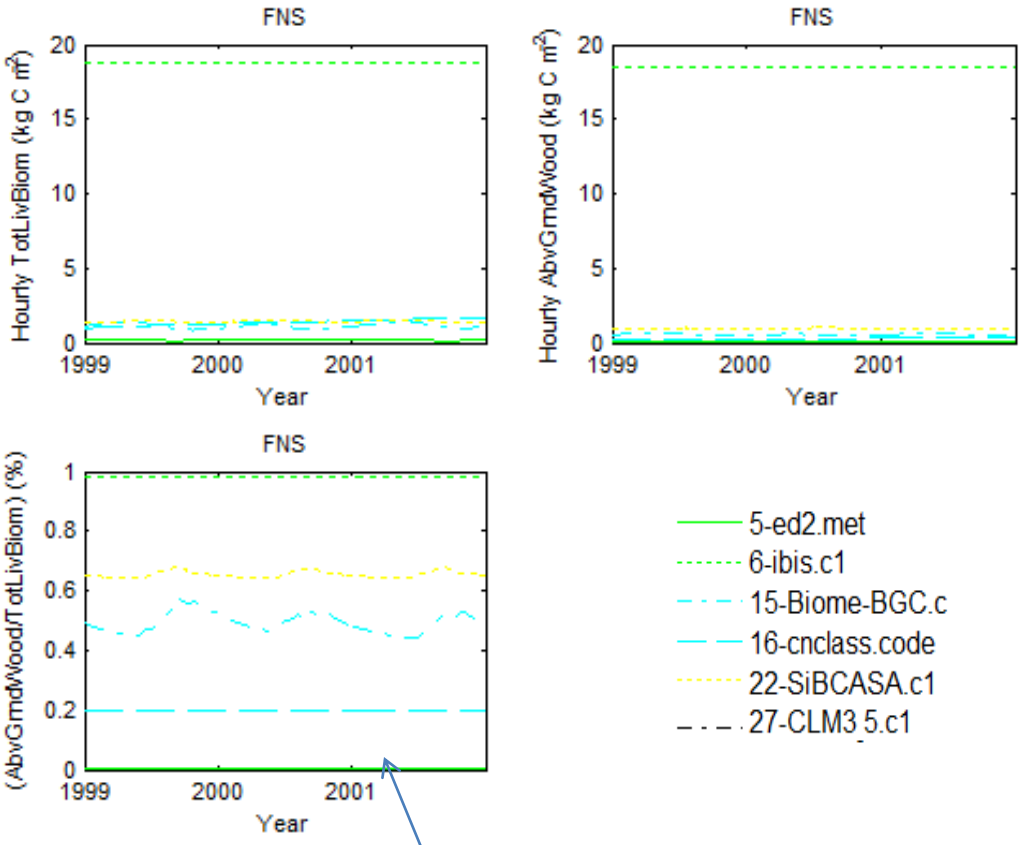



Don’t present a high variability



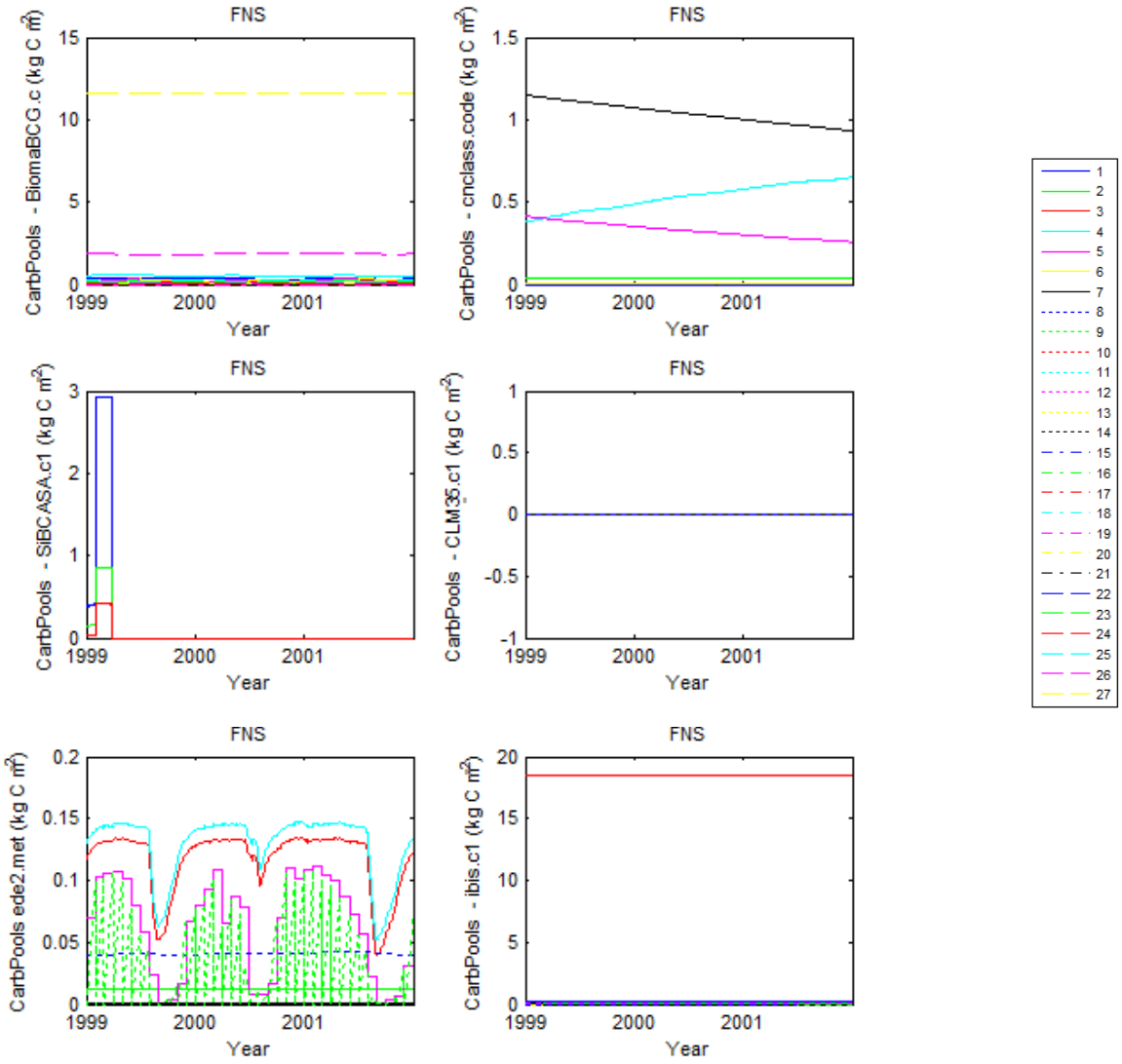



# C- allocation




Models 6 and 22 represent the most part of TotLivBiom as AbvGrndWood. 15 and 17 bellow 50% of TotLivBiom is allocated in AbvGrndWood.

# CarbPools


FNS
CarbPools - BiomaBCG.c (kg C m2)
Year
FNS
CarbPools - cnclass.code (kg C m2)
Year
FNS
CarbPools - SiBCASA.c1 (kg C m2)
Year
FNS
CarbPools - CLM35.c1 (kg C m2)
Year
FNS
CarbPools ede2.met (kg C m2)
Year
FNS
CarbPools - Ibis.c1 (kg C m2)
Year
1999
2000
2001
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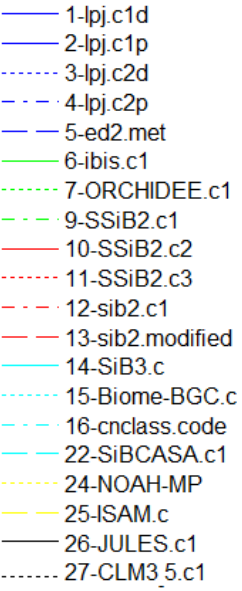
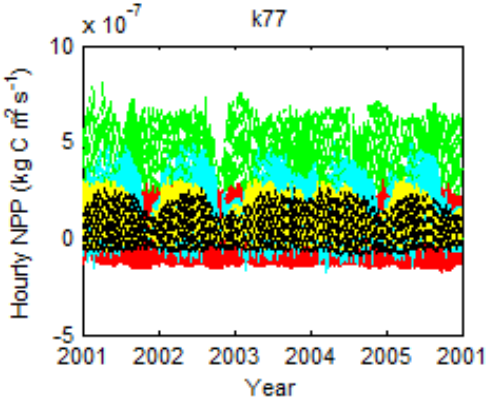
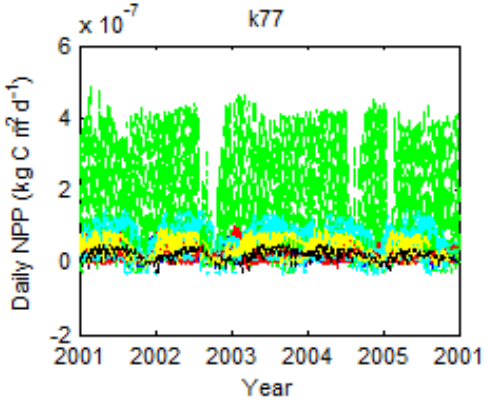
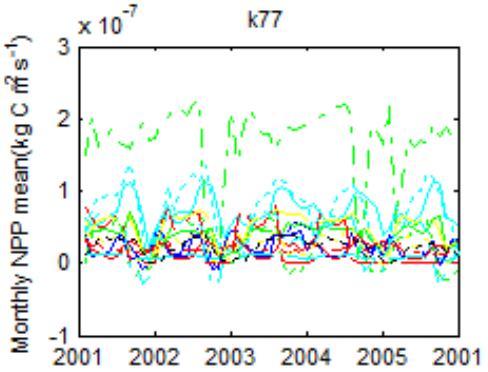
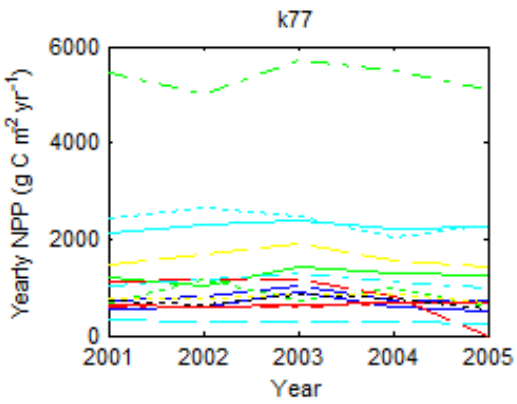
# k77 : Pasture - Agriculture

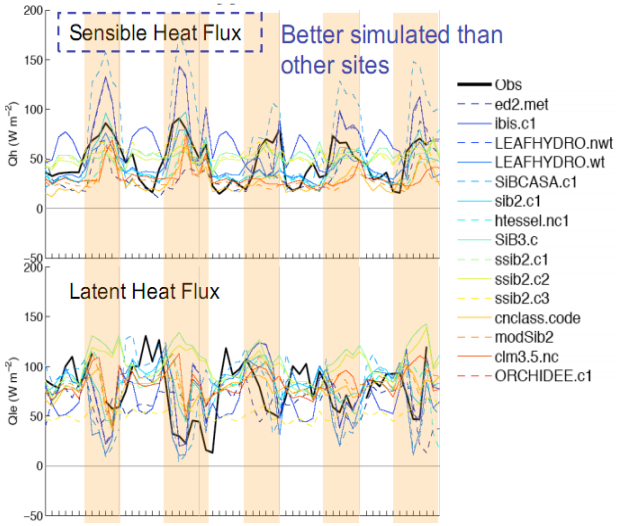


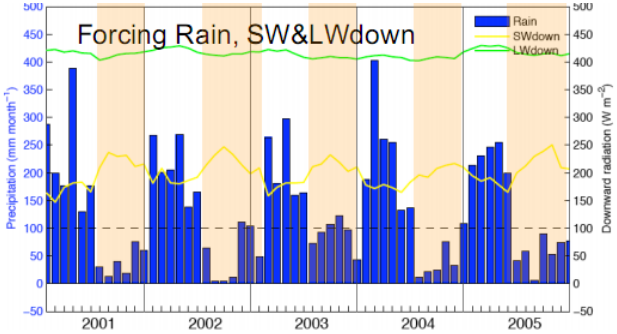



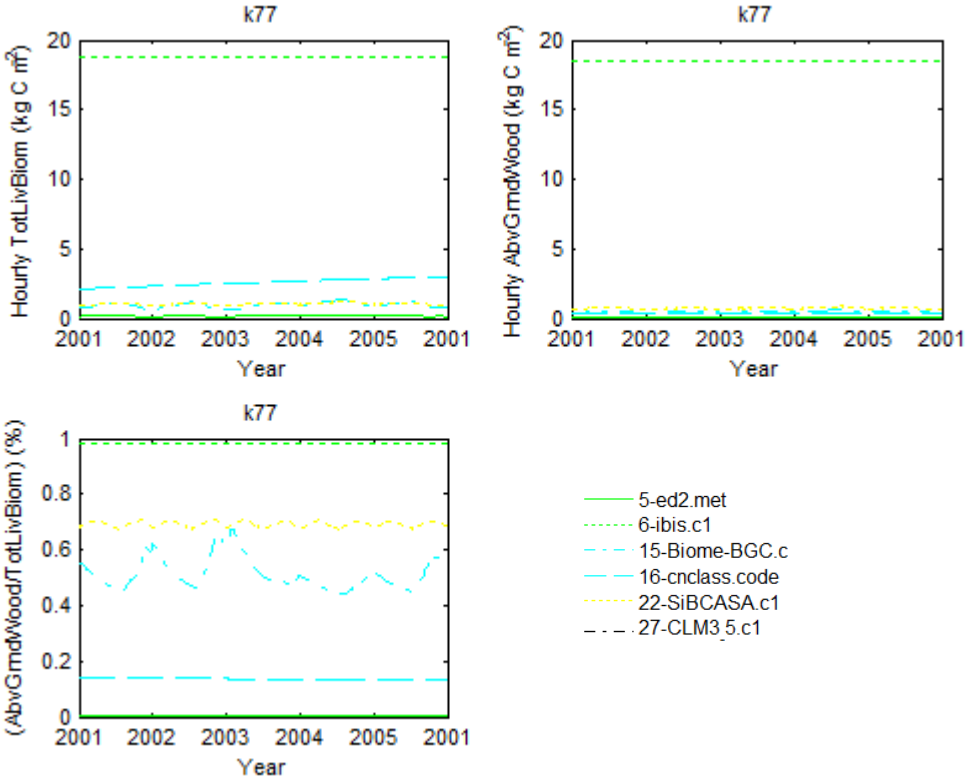



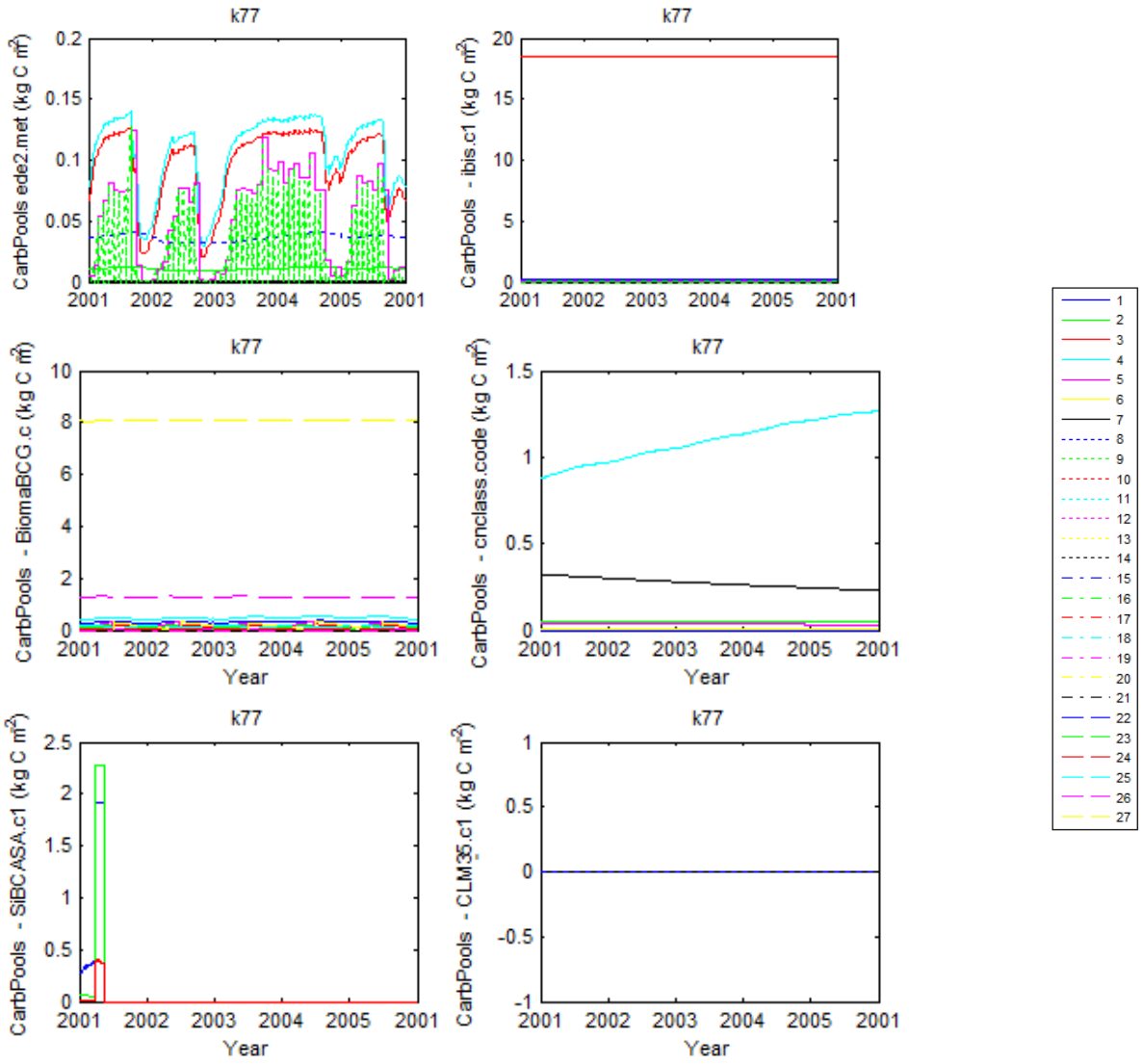



# C- allocation



# CarbPools


k77
CarbPools ede2.met (kg C m2)
CarbPools - ibis.c1 (kg C m2)
CarbPools - BiomaBCG.c (kg C m2)
CarbPools - cnclass.code (kg C m2)
CarbPools - SiBCASA.c1 (kg C m2)
CarbPools - CLM35.c1 (kg C m2)
Year
2001
2002
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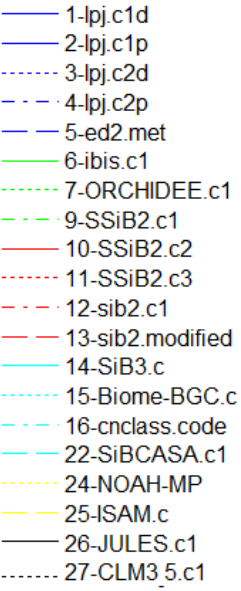
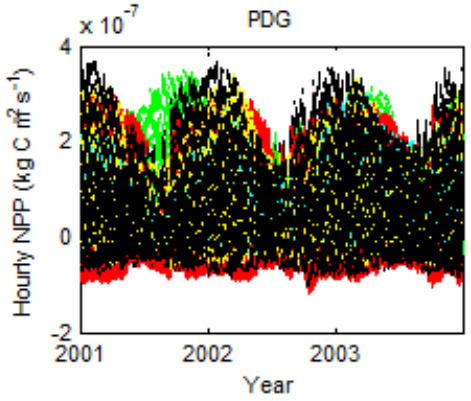
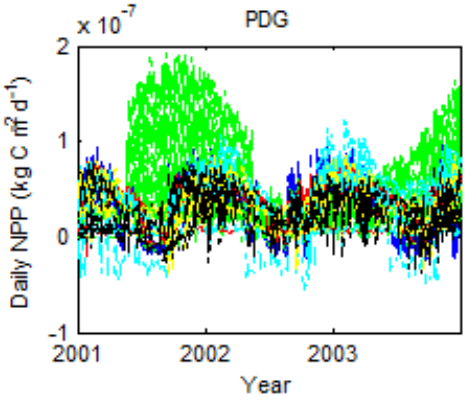
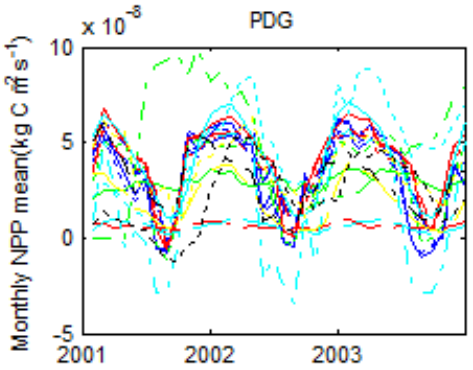
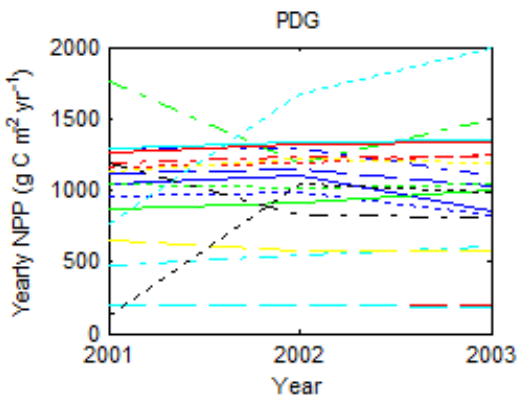
# PDG: Savanna



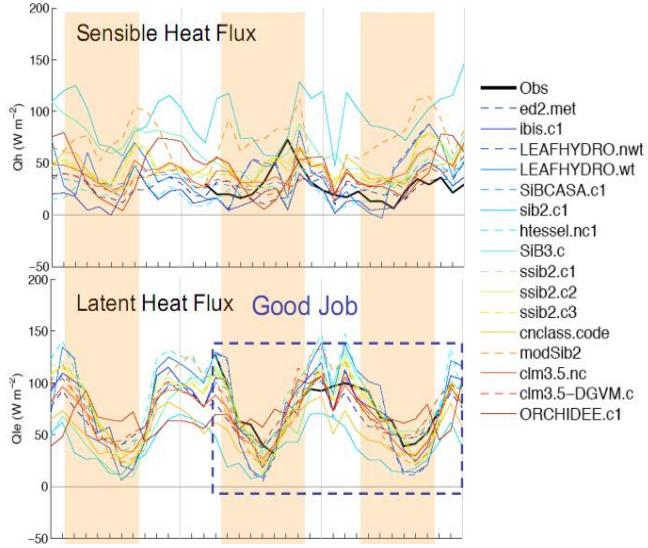



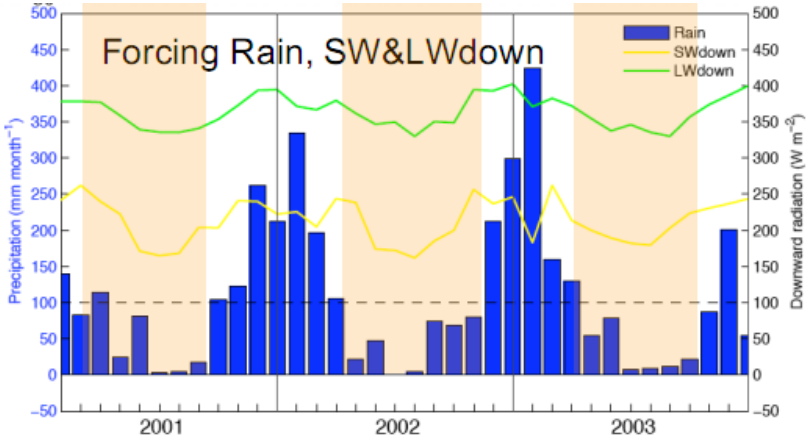



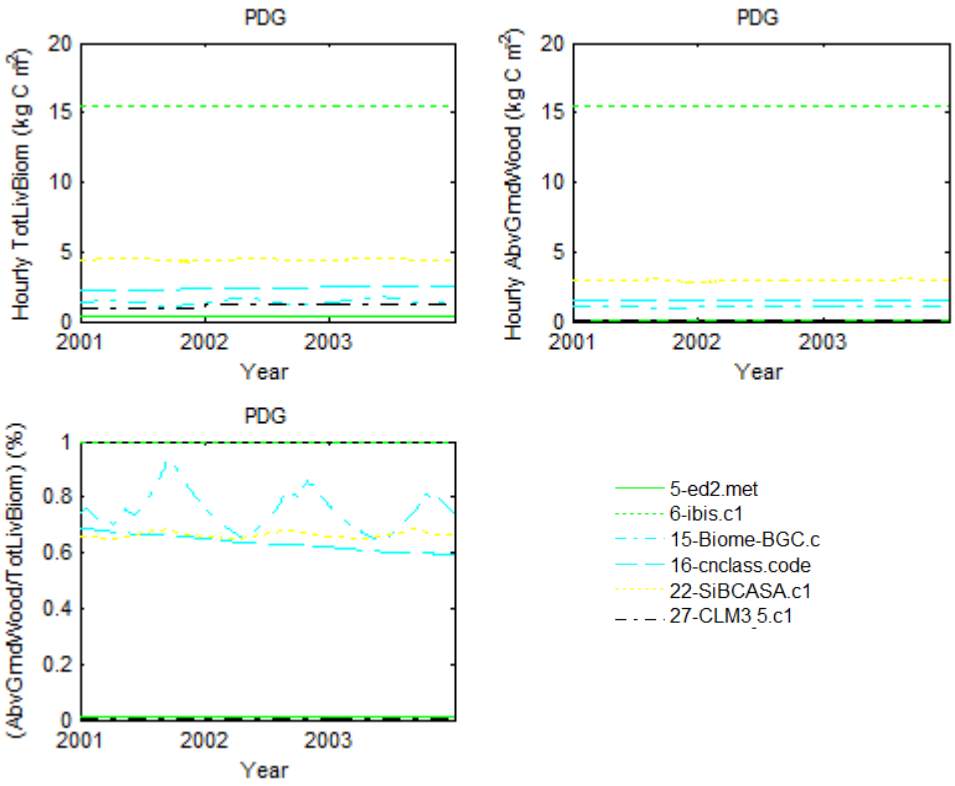




Seasonality represented in most of models.

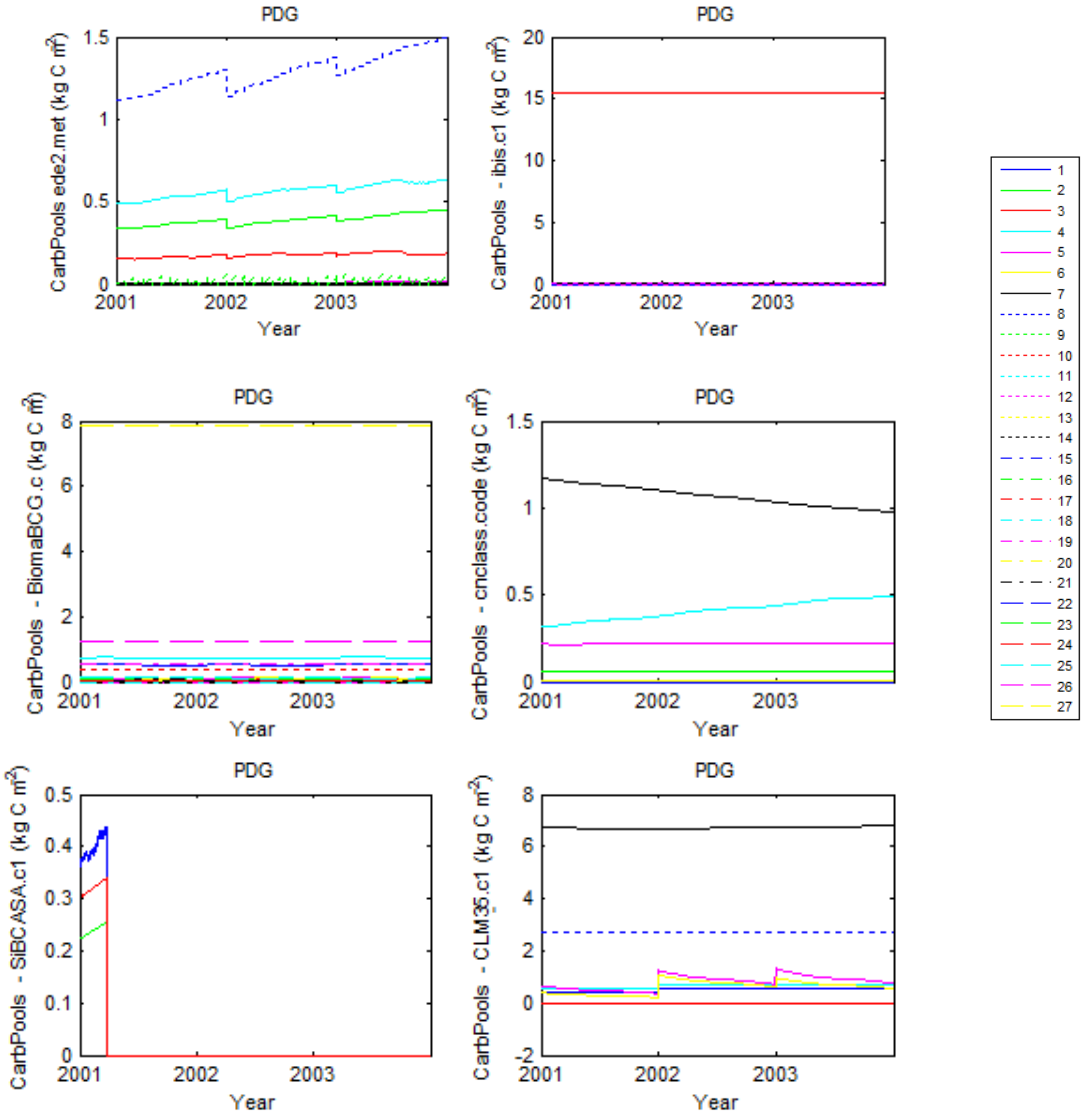


# C- allocation



# CarbPools


PDG
CarbPools ede2.met (kg C m2)
Year
PDG
CarbPools - ibis.c1 (kg C m2)
Year
PDG
CarbPools - BiomaBCG.c (kg C m2)
Year
PDG
CarbPools - cnclass.code (kg C m2)
Year
PDG
CarbPools - SIBCASA.c1 (kg C m2)
Year
PDG
CarbPools - CLM35.c1 (kg C m2)
Year
1
2
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