Budgets for annvi

Soluble nucleation-mode budget in annvia.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvi/
All fluxes in Tg/yr

Factor to account for sampling: 1.00000

Incoming mass for SO4 (Tg[S]/yr:
| Nucleation: 0.103997
| Condensation: 0.678882
\------> Total: 0.782878

Outgoing mass for SO4:
| Dry deposition: 0.00135950
| Impaction scavenging: 0.000610919
| Coagulation (to Aitken soluble): 0.478212
| Coagulation (to accum. soluble): 0.0445170
| Coagulation (to coarse soluble): 0.00145971
| Coagulation (to Aitken insolu.): 0.00443797
| Mode merging (to Aitken solub.): 0.248077
\------------------------> Total: 0.778674

SO4 burden: 0.00487030 (Tg[S])
Timescale for dry deposition loss: 1308.48 (days)
Timescale for total losses: 2.28449 (days)

Incoming mass for OC:
| Condensation: 0.0888467
\------> Total: 0.0888467

Outgoing mass for OC:
| Dry deposition: 0.000190828
| Impaction scavenging: 8.28729e-05
| Coagulation (to Aitken soluble): 0.0427342
| Coagulation (to accum. soluble): 0.00245872
| Coagulation (to coarse soluble): 0.000108486
| Coagulation (to Aitken insolu.): 0.000990004
| Mode merging (to Aitken solub.): 0.0412893
\------------------------> Total: 0.0878544

Organic carbon burden: 0.000602380 (Tg[C])
Timescale for dry deposition loss: 1152.97 (days)
Timescale for total losses: 2.50436 (days)

Summary: Mass balances per species:
SO4, mass in: 0.782878
SO4, mass out: 0.778674
SO4, imbalance: -0.00420415 -0.537012%
OC, mass in: 0.0888467
OC, mass out: 0.0878544
OC, imbalance: -0.000992231 -1.11679%
Total mass in: 0.871725
Total mass out: 0.866529
Total imbalance: -0.00519639 -0.596104%

Soluble Aitken-mode budget in annvia.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvi/
All fluxes in Tg/yr

Factor to account for timestep sampling: 1.00000

Incoming mass for SO4:
| Primary emissions: 0.0810579
| In-cloud oxidation by H2O2: MISSING 0.00000
| In-cloud oxidiation by O3: MISSING 0.00000
| Condensation: 9.17319
| Coagulation of nucl. sol.: 0.478212
| Ageing of Aitken insoluble: 0.249073
| Mode-merging of nucl. sol.: 0.248077
\----------> Total: 10.2296

Outgoing mass for SO4:
| Dry deposition: 0.876040
| Nucleation scavenging: 0.941069
| Impaction scavenging: 0.180408
| Cloud processing to accum. sol.: 4.07017
| Coagulation to accum. soluble: 0.615322
| Coagulation to coarse soluble: 0.00562226
| Mode-merging to accum. soluble: 1.46782
\----------> Total: 8.15645

SO4 burden: 0.188948 (Tg[S])
Timescale for nucleation scavenging loss: 73.3350 (days)
Timescale for dry deposition loss: 78.7787 (days)
Timescale for total losses: 8.46119 (days)

Incoming mass for BC:
| Ageing of Aitken insoluble: 5.97012
\----------> Total: 5.97012

Outgoing mass for BC:
| Dry deposition: 0.576629
| Nucleation scavenging: 0.275826
| Impaction scavenging: 0.0590409
| Cloud processing to accum. sol.: 2.27228
| Coagulation to accum. soluble: 0.281138
| Coagulation to coarse soluble: 0.00126951
| Mode-merging to accum. soluble: 1.30917
\----------> Total: 4.77536

Black carbon burden: 0.0290059 (Tg)
Timescale for nucleation scavenging loss: 38.4098 (days)
Timescale for dry deposition loss: 18.3730 (days)
Timescale for total losses: 2.21856 (days)

Incoming mass for OC:
| Condensation: 5.47969
| Coagulation of nucl. sol.: 0.0427342
| Ageing of Aitken insoluble: 21.9919
| Mode-merging of nucl. sol.: 0.0412893
\----------> Total: 27.5556

Outgoing mass for OC:
| Dry deposition: 2.20530
| Nucleation scavenging: 1.23596

| Impaction scavenging: 0.315240
| Cloud processing to accum. sol.: 9.15645
| Coagulation to accum. soluble: 1.07817
| Coagulation to coarse soluble: 0.00519132
| Mode-merging to accum. soluble: 6.80323
\----------> Total: 20.7995

Organic carbon burden: 0.151750 (Tg[C])
Timescale for nucleation scavenging loss: 44.8450 (days)
Timescale for dry deposition loss: 25.1334 (days)
Timescale for total losses: 2.66480 (days)

Summary: Mass balances per species:

SO4, mass in:	10.2296	
SO4, mass out:	8.15645	
SO4, imbalance:	-2.07316	-20.2663%
BC, mass in:	5.97012	
BC, mass out:	4.77536	
BC, imbalance:	-1.19476	-20.0123%
OC, mass in:	27.5556	
OC, mass out:	20.7995	
OC, imbalance:	-6.75608	-24.5180%
Total mass in:	43.7553	
Total mass out:	33.7313	
Total imbalance:	-10.0240	-22.9092%

Soluble accumulation-mode budget in annvia.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvi/
All fluxes in Tg/yr

Incoming mass for SO4:
| Primary emissions: 0.411063
| In-cloud oxidation by H2O2: 19.8013
| In-cloud oxidiation by O3: 8.43147
| Cloud proc. of Aitken Sol.: 4.07017
| Condensation: 6.10281
| Coagulation of nucl. sol.: 0.0445170
| Coagulation of Aitken sol.: 0.615322
| Mode-merging of Aitk. sol.: 1.46782
\----------> Total: 40.9445

Outgoing mass for SO4:
| Dry deposition: 4.51008
| Nucleation scavenging: 24.2885
| Impaction scavenging: 0.983612
| Coagulation to coarse soluble: 0.00699849
| Mode-merging to coarse soluble: 0.446080
\----------> Total: 30.2353

SO4 burden: 0.494314 (Tg[S])
Timescale for dry deposition loss: 40.0321 (days)
Timescale for nucleation scavenging loss: 7.43348 (days)
Timescale for total losses: 5.97144 (days)

Incoming mass for sea-salt:
| Primary emissions: 22.1850
\----------> Total: 22.1850

Outgoing mass for sea-salt:
| Dry deposition: 4.84116
| Nucleation scavenging: 10.7567
| Impaction scavenging: 0.403890
| Coagulation to coarse soluble: 0.0114885
| Mode-merging to coarse soluble: 0.0134134
\----------> Total: 16.0267

Sea-salt burden: 0.0997442 (Tg)
Timescale for dry deposition loss: 7.52538 (days)
Timescale for nucleation scavenging loss: 3.38687 (days)
Timescale for total losses: 2.27319 (days)

Incoming mass for BC:
| Cloud proc. of Aitken Sol.: 2.27228
| Coagulation of Aitken sol.: 0.281138
| Coagulation of Aitken ins.: 0.368811
| Mode-merging of Aitk. sol.: 1.30917
\----------> Total: 4.23140

Outgoing mass for BC:)
| Dry deposition: 0.621593
| Nucleation scavenging: 2.22829
| Impaction scavenging: 0.122901
| Coagulation to coarse soluble: 0.000545870
| Mode-merging to coarse soluble: 0.0178192
\----------> Total: 2.99115

Black carbon burden: 0.0352133 (Tg)
Timescale for dry deposition loss: 20.6914 (days)
Timescale for nucleation scavenging loss: 5.77200 (days)
Timescale for total losses: 4.29991 (days)

Incoming mass for OC:
| Cloud proc. of Aitken Sol.: 9.15645
| Condensation: 8.07180
| Coagulation of nucl. sol.: 0.00245872
| Coagulation of Aitken sol.: 1.07817
| Coagulation of Aitken ins.: 1.28354
| Mode-merging of Aitk. sol.: 6.80323
\----------> Total: 26.3956

Outgoing mass for OC:
| Dry deposition: 3.56658
| Nucleation scavenging: 12.5971
| Impaction scavenging: 0.884432
| Coagulation to coarse soluble: 0.00256342
| Mode-merging to coarse soluble: 0.00156852
\----------> Total: 17.0522

Organic carbon burden: 0.195527 (Tg[C])
Timescale for dry deposition loss: 20.0238 (days)
Timescale for nucleation scavenging loss: 5.66927 (days)
Timescale for total losses: 4.18809 (days)

Summary: Mass balances per species:
SO4, mass in: 40.9445
SO4, mass out: 30.2353
SO4, imbalance: -10.7092 -26.1553%
SS, mass in: 22.1850
SS, mass out: 16.0267
SS, imbalance: -6.15835 -27.7591%
BC, mass in: 4.23140
BC, mass out: 2.99115
BC, imbalance: -1.24026 -29.3107%
OC, mass in: 26.3956
OC, mass out: 17.0522
OC, imbalance: -9.34341 -35.3975%
Total mass in: 93.7565
Total mass out: 66.3053
Total imbalance: -27.4512 -29.2792%

Soluble coarse-mode budget in annvia.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvi/
All fluxes in Tg/yr

Factor to account for timestep sampling: 1.00000

Incoming mass for SO4:
| Primary emissions: 0.330005
| In-cloud oxidation by H2O2: 0.266638
| In-cloud oxidiation by O3: 0.0750418
| Condensation: 0.219265
| Coagulation of nucl. sol.: 0.00145971
| Coagulation of Aitken sol.: 0.00562226
| Coagulation of accum. sol.: 0.00699849
| Mode-merging of acc. sol.: 0.446080
\----------> Total: 1.35111

Outgoing mass for SO4:
| Dry deposition: 0.376939
| Nucleation scavenging: 0.634683
| Impaction scavenging: 0.0509539
\----------> Total: 1.06258

SO4 burden: 0.0100066 (Tg[S])
Timescale for dry deposition loss: 9.68967 (days)
Timescale for nucleation scavenging loss: 5.75471 (days)
Timescale for total losses: 3.43732 (days)

Incoming mass for sea-salt:
| Primary emissions: 4037.35
| Coagulation of accum. sol.: 0.0114885
| Mode-merging of acc. sol.: 0.0134134
\----------> Total: 4037.37

Outgoing mass for sea-salt:
| Dry deposition: 1790.30
| Nucleation scavenging: 1258.39
| Impaction scavenging: 183.516
\----------> Total: 3232.20

Sea-salt burden: 10.7879 (Tg)
Timescale for dry deposition loss: 2.20090 (days)
Timescale for nucleation scavenging loss: 3.13121 (days)
Timescale for total losses: 1.21907 (days)

Incoming mass for BC:
| Coagulation of Aitken sol.: 0.00126951
| Coagulation of accum. sol.: 0.000545870
| Coagulation of Aitken ins.: 0.00149624
| Mode-merging of acc. sol.: 0.0178192
\----------> Total: 0.0211308

Outgoing mass for BC:
| Dry deposition: 0.00201026
| Nucleation scavenging: 0.00256033
| Impaction scavenging: 0.000213502
\----------> Total: 0.00478409

Black carbon burden: 8.59559e-05 (Tg)
Timescale for dry deposition loss: 15.6176 (days)

Timescale for nucleation scavenging loss: 12.2623 (days)
Timescale for total losses: 6.56246 (days)

Incoming mass for OC:
| Condensation: 0.169783
| Coagulation of nucl. sol.: 0.000108486
| Coagulation of Aitken sol.: 0.00519132
| Coagulation of accum. sol.: 0.00256342
| Coagulation of Aitken ins.: MISSING 0.00000
| Mode-merging of acc. sol.: 0.00156852
\----------> Total: 0.179215

Outgoing mass for OC:
| Dry deposition: 0.0897768
| Nucleation scavenging: 0.0584542
| Impaction scavenging: 0.0114269
\----------> Total: 0.159658

Black carbon burden: 0.00106450 (Tg[C])
Timescale for dry deposition loss: 4.33084 (days)
Timescale for nucleation scavenging loss: 6.65151 (days)
Timescale for total losses: 2.43526 (days)

Summary: Mass balances per species:
SO4, mass in: 1.35111
SO4, mass out: 1.06258
SO4, imbalance: -0.288534 -21.3553%
SS, mass in: 4037.37
SS, mass out: 3232.20
SS, imbalance: -805.171 -19.9430%
BC, mass in: 0.0211308
BC, mass out: 0.00478409
BC, imbalance: -0.0163467 -77.3596%
OC, mass in: 0.179215
OC, mass out: 0.159658
OC, imbalance: -0.0195566 -10.9124%
Total mass in: 4038.92
Total mass out: 3233.43
Total imbalance: -805.496 -19.9433%

Insoluble Aitken-mode budget in annvia.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvi/
All fluxes in Tg/yr

Using factor to account for sampling: 1.00000

Incoming mass for SO4:
| Condensation: 0.244669
| Coagulation of nucl. sol.: 0.00443797
\----------> Total: 0.249107

Outgoing mass for SO4:
| Ageing to Aitken soluble: 0.249073
\----------> Total: 0.249073

Incoming mass for BC:
| Primary emissions: 7.51692
\----------> Total: 7.51692

Outgoing mass for BC:
| Dry deposition: 1.08073
| Impaction scavenging: 0.0696059
| Coagulation to accum. soluble: 0.368811
| Coagulation to coarse soluble: 0.00149624
| Ageing to Aitken soluble: 5.97012
\----------> Total: 7.49076

Black carbon burden: 0.00535615 (Tg)
Timescale for dry deposition loss: 1.80896 (days)
Timescale for total losses: 0.260988 (days)

Incoming mass for OC:
| Primary emissions: 26.0938
| Condensation: 0.603032
| Coagulation of nucl. sol.: 0.000990004
\----------> Total: 26.6979

Outgoing mass for OC:
| Dry deposition: 2.81979
| Impaction scavenging: 0.279851
| Coagulation to accum. soluble: 1.28354
| Coagulation to coarse soluble: MISSING 0.00000
| Ageing to Aitken soluble: 21.9919
\----------> Total: 26.3751

Organic carbon burden: 0.0348696 (Tg)
Timescale for dry deposition loss: 4.51359 (days)
Timescale for total losses: 0.482553 (days)

Summary: Mass balances per species:
SO4, mass in: 0.249107
SO4, mass out: 0.249073
SO4, imbalance: -3.47793e-05 -0.0139616%
BC, mass in: 7.51692
BC, mass out: 7.49076
BC, imbalance: -0.0261669 -0.348107%
OC, mass in: 26.6979
OC, mass out: 26.3751
OC, imbalance: -0.322765 -1.20896%
Total mass in: 34.4639

Total mass out:	34.1149	
Total imbalance:	-0.348969	-1.01256%