

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

Factor to account for sampling: 1.00000

Incoming mass for SO₄ (Tg[S]/yr:

| Nucleation: 0.109414

| Condensation: 0.676655

\-----> Total: 0.786069

Outgoing mass for SO₄:

| Dry deposition: 0.000977927

| Impaction scavenging: 0.000502703

| Coagulation (to Aitken soluble): 0.472298

| Coagulation (to accum. soluble): 0.0654937

| Coagulation (to coarse soluble): 0.00146701

| Coagulation (to Aitken insol.): 0.00443678

| Mode merging (to Aitken solub.): 0.236027

\-----> Total: 0.781203

SO₄ burden: 0.00470234 (Tg[S])

Timescale for dry deposition loss: 1756.30 (days)

Timescale for total losses: 2.19857 (days)

Incoming mass for OC:

| Condensation: 0.0920786

\-----> Total: 0.0920786

Outgoing mass for OC:

| Dry deposition: 0.000147228

| Impaction scavenging: 7.99725e-05

| Coagulation (to Aitken soluble): 0.0453740

| Coagulation (to accum. soluble): 0.00380339

| Coagulation (to coarse soluble): 0.000101148

| Coagulation (to Aitken insol.): 0.00101825

| Mode merging (to Aitken solub.): 0.0407241

\-----> Total: 0.0912481

Organic carbon burden: 0.000644569 (Tg[C])

Timescale for dry deposition loss: 1599.07 (days)

Timescale for total losses: 2.58010 (days)

Summary: Mass balances per species:

SO₄, mass in: 0.786069

SO₄, mass out: 0.781203

SO₄, imbalance: -0.00486571 -0.618992%

OC, mass in: 0.0920786

OC, mass out: 0.0912481

OC, imbalance: -0.000830546 -0.901997%

Total mass in: 0.878148

Total mass out: 0.872451

Total imbalance: -0.00569630 -0.648672%

Soluble Aitken-mode budget in annvla.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvl/
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 oxidation by O₃: MISSING 0.00000
 | Condensation: 9.03091
 | Coagulation of nucl. sol.: 0.472298
 | Ageing of Aitken insoluble: 0.250242
 | Mode-merging of nucl. sol.: 0.236027
 \-----> Total: 10.0705

Outgoing mass for SO₄:

| Dry deposition: 0.827164
 | Nucleation scavenging: 0.955138
 | Impaction scavenging: 0.176680
 | Cloud processing to accum. sol.: 3.88386
 | Coagulation to accum. soluble: 0.681478
 | Coagulation to coarse soluble: 0.00540475
 | Mode-merging to accum. soluble: 1.54310
 \-----> Total: 8.07282

SO₄ burden: 0.184361 (Tg[S])
 Timescale for nucleation scavenging loss: 70.5007 (days)
 Timescale for dry deposition loss: 81.4081 (days)
 Timescale for total losses: 8.34131 (days)

Incoming mass for BC:

| Ageing of Aitken insoluble: 5.98573
 \-----> Total: 5.98573

Outgoing mass for BC:

| Dry deposition: 0.559774
 | Nucleation scavenging: 0.288846
 | Impaction scavenging: 0.0593681
 | Cloud processing to accum. sol.: 2.25662
 | Coagulation to accum. soluble: 0.281157
 | Coagulation to coarse soluble: 0.00129261
 | Mode-merging to accum. soluble: 1.31498
 \-----> Total: 4.76204

Black carbon burden: 0.0284366 (Tg)
 Timescale for nucleation scavenging loss: 35.9585 (days)
 Timescale for dry deposition loss: 18.5548 (days)
 Timescale for total losses: 2.18110 (days)

Incoming mass for OC:

| Condensation: 5.31830
 | Coagulation of nucl. sol.: 0.0453740
 | Ageing of Aitken insoluble: 22.0215
 | Mode-merging of nucl. sol.: 0.0407241
 \-----> Total: 27.4259

Outgoing mass for OC:

| Dry deposition: 2.10437
 | Nucleation scavenging: 1.28532

Impaction scavenging:	0.314624
Cloud processing to accum. sol.:	8.94343
Coagulation to accum. soluble:	1.07754
Coagulation to coarse soluble:	0.00512404
Mode-merging to accum. soluble:	6.78225
\-----> Total: 20.5127	

Organic carbon burden:	0.147378 (Tg[C])
Timescale for nucleation scavenging loss:	41.8804 (days)
Timescale for dry deposition loss:	25.5801 (days)
Timescale for total losses:	2.62423 (days)

Summary: Mass balances per species:

SO4, mass in:	10.0705	
SO4, mass out:	8.07282	
SO4, imbalance:	-1.99772	-19.8372%
BC, mass in:	5.98573	
BC, mass out:	4.76204	
BC, imbalance:	-1.22369	-20.4435%
OC, mass in:	27.4259	
OC, mass out:	20.5127	
OC, imbalance:	-6.91322	-25.2069%
Total mass in:	43.4821	
Total mass out:	33.3475	
Total imbalance:	-10.1346	-23.3076%

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

Incoming mass for SO₄:

Primary emissions:	0.411063
In-cloud oxidation by H ₂ O ₂ :	19.9163
In-cloud oxidation by O ₃ :	8.31374
Cloud proc. of Aitken Sol.:	3.88386
Condensation:	6.67139
Coagulation of nucl. sol.:	0.0654937
Coagulation of Aitken sol.:	0.681478
Mode-merging of Aitk. sol.:	1.54310
-----> Total:	41.4865

Outgoing mass for SO₄:

Dry deposition:	4.65950
Nucleation scavenging:	26.8263
Impaction scavenging:	1.05683
Coagulation to coarse soluble:	0.00839824
Mode-merging to coarse soluble:	0.161923
-----> Total:	32.7130

SO ₄ burden:	0.556772 (Tg[S])
Timescale for dry deposition loss:	43.6443 (days)
Timescale for nucleation scavenging loss:	7.58064 (days)
Timescale for total losses:	6.21652 (days)

Incoming mass for sea-salt:

Primary emissions:	22.5692
-----> Total:	22.5692

Outgoing mass for sea-salt:

Dry deposition:	5.15569
Nucleation scavenging:	12.1470
Impaction scavenging:	0.416304
Coagulation to coarse soluble:	0.0143257
Mode-merging to coarse soluble:	0.00893911
-----> Total:	17.7422

Sea-salt burden:	0.121248 (Tg)
Timescale for dry deposition loss:	8.58966 (days)
Timescale for nucleation scavenging loss:	3.64582 (days)
Timescale for total losses:	2.49606 (days)

Incoming mass for BC:

Cloud proc. of Aitken Sol.:	2.25662
Coagulation of Aitken sol.:	0.281157
Coagulation of Aitken ins.:	0.359408
Mode-merging of Aitk. sol.:	1.31498
-----> Total:	4.21216

Outgoing mass for BC:)

Dry deposition:	0.608362
Nucleation scavenging:	2.45362
Impaction scavenging:	0.128719
Coagulation to coarse soluble:	0.000614656
Mode-merging to coarse soluble:	0.0124114
-----> Total:	3.20372

Black carbon burden: 0.0382522 (Tg)
Timescale for dry deposition loss: 22.9660 (days)
Timescale for nucleation scavenging loss: 5.69430 (days)
Timescale for total losses: 4.36106 (days)

Incoming mass for OC:
| Cloud proc. of Aitken Sol.: 8.94343
| Condensation: 8.20073
| Coagulation of nucl. sol.: 0.00380339
| Coagulation of Aitken sol.: 1.07754
| Coagulation of Aitken ins.: 1.24896
| Mode-merging of Aitk. sol.: 6.78225
\\-----> Total: 26.2567

Outgoing mass for OC:
| Dry deposition: 3.51472
| Nucleation scavenging: 14.1196
| Impaction scavenging: 0.935677
| Coagulation to coarse soluble: 0.00279743
| Mode-merging to coarse soluble: 0.00121628
\\-----> Total: 18.5740

Organic carbon burden: 0.214573 (Tg[C])
Timescale for dry deposition loss: 22.2984 (days)
Timescale for nucleation scavenging loss: 5.55062 (days)
Timescale for total losses: 4.21947 (days)

Summary: Mass balances per species:

SO4, mass in:	41.4865	
SO4, mass out:	32.7130	
SO4, imbalance:	-8.77349	-21.1478%
SS, mass in:	22.5692	
SS, mass out:	17.7422	
SS, imbalance:	-4.82701	-21.3876%
BC, mass in:	4.21216	
BC, mass out:	3.20372	
BC, imbalance:	-1.00844	-23.9411%
OC, mass in:	26.2567	
OC, mass out:	18.5740	
OC, imbalance:	-7.68267	-29.2598%
Total mass in:	94.5246	
Total mass out:	72.2330	
Total imbalance:	-22.2916	-23.5829%

Soluble coarse-mode budget in annvla.py20001201
Using directory: /data/local/frjy/UKCA/GA4/vn8p4/annvl/
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: 0.179805
| In-cloud oxidation by O₃: 0.0619968
| Condensation: 0.239289
| Coagulation of nucl. sol.: 0.00146701
| Coagulation of Aitken sol.: 0.00540475
| Coagulation of accum. sol.: 0.00839824
| Mode-merging of acc. sol.: 0.161923
|-----> Total: 0.988289

Outgoing mass for SO₄:

| Dry deposition: 0.369760
| Nucleation scavenging: 0.440601
| Impaction scavenging: 0.0404612
|-----> Total: 0.850822

SO₄ burden: 0.00630210 (Tg[S])
Timescale for dry deposition loss: 6.22098 (days)
Timescale for nucleation scavenging loss: 5.22075 (days)
Timescale for total losses: 2.70358 (days)

Incoming mass for sea-salt:

| Primary emissions: 4107.27
| Coagulation of accum. sol.: 0.0143257
| Mode-merging of acc. sol.: 0.00893911
|-----> Total: 4107.29

Outgoing mass for sea-salt:

| Dry deposition: 1893.48
| Nucleation scavenging: 1411.08
| Impaction scavenging: 182.755
|-----> Total: 3487.32

Sea-salt burden: 12.4120 (Tg)
Timescale for dry deposition loss: 2.39426 (days)
Timescale for nucleation scavenging loss: 3.21276 (days)
Timescale for total losses: 1.29999 (days)

Incoming mass for BC:

| Coagulation of Aitken sol.: 0.00129261
| Coagulation of accum. sol.: 0.000614656
| Coagulation of Aitken ins.: 0.00171000
| Mode-merging of acc. sol.: 0.0124114
|-----> Total: 0.0160287

Outgoing mass for BC:

| Dry deposition: 0.00198510
| Nucleation scavenging: 0.00229643
| Impaction scavenging: 0.000195852
|-----> Total: 0.00447738

Black carbon burden: 8.24965e-05 (Tg)
Timescale for dry deposition loss: 15.1790 (days)

Timescale for nucleation scavenging loss: 13.1212 (days)
Timescale for total losses: 6.72980 (days)

Incoming mass for OC:

| Condensation: 0.178124
| Coagulation of nucl. sol.: 0.000101148
| Coagulation of Aitken sol.: 0.00512404
| Coagulation of accum. sol.: 0.00279743
| Coagulation of Aitken ins.: MISSING 0.00000
| Mode-merging of acc. sol.: 0.00121628
\\-----> Total: 0.187363

Outgoing mass for OC:

| Dry deposition: 0.0942210
| Nucleation scavenging: 0.0650082
| Impaction scavenging: 0.0120918
\\-----> Total: 0.171321

Black carbon burden: 0.00110788 (Tg[C])
Timescale for dry deposition loss: 4.29470 (days)
Timescale for nucleation scavenging loss: 6.22462 (days)
Timescale for total losses: 2.36195 (days)

Summary: Mass balances per species:

SO4, mass in:	0.988289	
SO4, mass out:	0.850822	
SO4, imbalance:	-0.137467	-13.9096%
SS, mass in:	4107.29	
SS, mass out:	3487.32	
SS, imbalance:	-619.977	-15.0945%
BC, mass in:	0.0160287	
BC, mass out:	0.00447738	
BC, imbalance:	-0.0115513	-72.0664%
OC, mass in:	0.187363	
OC, mass out:	0.171321	
OC, imbalance:	-0.0160417	-8.56182%
Total mass in:	4108.48	
Total mass out:	3488.34	
Total imbalance:	-620.142	-15.0942%

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

Using factor to account for sampling: 1.00000

Incoming mass for SO₄:

| Condensation: 0.245839
 | Coagulation of nucl. sol.: 0.00443678
 \-----> Total: 0.250276

Outgoing mass for SO₄:

| Ageing to Aitken soluble: 0.250242
 \-----> Total: 0.250242

Incoming mass for BC:

| Primary emissions: 7.51692
 \-----> Total: 7.51692

Outgoing mass for BC:

| Dry deposition: 1.06899
 | Impaction scavenging: 0.0719699
 | Coagulation to accum. soluble: 0.359408
 | Coagulation to coarse soluble: 0.00171000
 | Ageing to Aitken soluble: 5.98573
 \-----> Total: 7.48781

Black carbon burden: 0.00537499 (Tg)
 Timescale for dry deposition loss: 1.83526 (days)
 Timescale for total losses: 0.262009 (days)

Incoming mass for OC:

| Primary emissions: 26.0938
 | Condensation: 0.605364
 | Coagulation of nucl. sol.: 0.00101825
 \-----> Total: 26.7002

Outgoing mass for OC:

| Dry deposition: 2.78635
 | Impaction scavenging: 0.289760
 | Coagulation to accum. soluble: 1.24896
 | Coagulation to coarse soluble: MISSING 0.00000
 | Ageing to Aitken soluble: 22.0215
 \-----> Total: 26.3465

Organic carbon burden: 0.0348851 (Tg)
 Timescale for dry deposition loss: 4.56980 (days)
 Timescale for total losses: 0.483291 (days)

Summary: Mass balances per species:

SO₄, mass in: 0.250276
 SO₄, mass out: 0.250242
 SO₄, imbalance: -3.35574e-05 -0.0134082%
 BC, mass in: 7.51692
 BC, mass out: 7.48781
 BC, imbalance: -0.0291162 -0.387341%
 OC, mass in: 26.7002
 OC, mass out: 26.3465
 OC, imbalance: -0.353670 -1.32460%
 Total mass in: 34.4674

Total mass out: 34.0846
Total imbalance: -0.382820 -1.11067%