shp-atl-shift-1950: absolute difference surface flux surface concentration surface concentration surface concentration of SO2 – land (kg kg-1)əmiso2 (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$ so2 (kg kg-1) mmrbc (kg kg-0e+00 0e+00 mmrso4 _1e_12 00+00 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year upwelling shortwave flux at TOA – land net radiative flux at TOA – land incident shortwave flux at TOA – land upwelling clear-sky longway flux at TOA - land $rsut (W m^{-2})$ 8e-02 3e-02 rsut (W m-2) rlutcs (W m-4e-02 0e+00 -1e-02 -07 -2e-07 -2e-02 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year upwelling clear-sky shortway clear-sky net radiative flux at TOA - land implied cloud response dry deposition rate of BC – land wet deposition rate of BC – land rsutcs $(W m^{-2})$ at TOA – land 1 0e-15 1e-02 m⁻² 6e-02 vetbc (kg m⁻² s^{-′} drybc (kg m⁻² s⁻ rsutcs (W 00+00 rlutcs --2e-020e+00 rsut – r H H 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year dry deposition rate of SO2 – land wet deposition rate of SO2 – land dry deposition rate of SO4 – land wet deposition rate of SO4 – land 1.3e-14 5.6e-15 2 2e-14 $dryso4 (kg m^{-2} s^{-1})$ dryso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ $vetso2 (kg m^{-2} s^{-1}$ 7.5e-05 wetso4 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ 5.0e-05 2.5e-05 4.8e-15 1.2e-15 9.9e-0.0e + 0.0e +2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year cloud cover Ice water path - land Dimethyl sulphide (DMS) mole fraction ambient aerosol optical percentage - land thickness at 550nm – land cltc (%) m^{-2} 4e-04 0.0e+00 2e-14 clivi (kg ı dms (mol ession 2e-04 -2.5e-02 1e-14 0e+00 -5.0e-04 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year SO4 lifetime SO₂ lifetime load load of so2 of bc - land - land land land wetso4) (days 2.5e-10 6e-09 loadso2/emiso2 (days) loadso2 (kg m⁻²) oadbc $(kg m^{-2})$ 2e-09 -2.5e-10 0e+00 dryso4

surface flux of BC – land

2000 2001 2002 2003 2004

Year

2002 2003 2004

2002 2003 2004

Year

total deposition rate of BC – land

2000 2001 2002 2003 2004

Year

total deposition rate of S – land

20002001200220032004

Year

2002 2003 2004

Year

load

of so4 - land

Year

flux at TOA – land

upwelling longwave flux at TOA – land

emibc $(kg m^{-2} s^{-1})$

4.5e-19

1.2e-19

5e-02

0e+00

-5e-02

0e+00

-2e-02

-4e-02

1 0e-15

5.2e-16

2.6e-17

-4.6e-16

2000 2001

2000 2001

rlut (Wm-2)

rsutcs (W m-2)

 $drybc + wetbc (kg m^{-2} s^{-1})$

dyso2 + wetso2)/2 + (dryso4 + wetso4)/3

 $(kg m^{-2} s^{-1})$

1e-08

8e-09

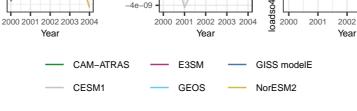
6e-09

4e-09

2000 2001

loadso4 (kg m⁻²)

2e-05



2003

2004

2000

2001

2002

Year

2003