## shp-atl-shift: absolute difference surface flux surface flux surface concentration surface concentration of SO4 – global surface concentration of BC - global of SO2 - global of BC - global of SO2 - global 2.0e-12 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ nmrso4 (kg kg – 1) emiso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ nmrbc (kg kg-1) 3.2e-16 4.7e-20 so2 (kg kg – 1) 1.0e-20 1.9e-16 0.0e+00 -2.7e-20 6.6e-17 5.0e-13 -5 0e-14 0e+00 -6.3e-20 -6 0e-1 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – global upwelling shortwave flux at TOA – global net radiative flux at TOA – global upwelling clear-sky longwav flux at TOA - global incident shortwave flux at TOA – global 5.0e-02 0e+00 0e+00 $rsut(W m^{-2})$ 5 rlut (Wm-2)rsdt (Wm-2)rlutcs (W mrsut (W m-1e-02 -2e-02 5e-03 0.0e + 0.0-2e-02 -4e-02 0e+00 -2.5e-02 0e+00 -1e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year upwelling clear-sky shortwa clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - global flux at TOA - global at TOA - global of BC – global of BC - global rsutcs $(W m^{-2})$ 7.2e-17 1.2e-02 1e-02 lutcs + rsutcs $(W m^{-2})$ 0.0e+00 wetbc $(kg m^{-2} s^{-1}$ rsutcs (Wm-2)3.9e-17 drybc (kg $m^{-2} s^{-1}$ 4.0e-03 -4 0e-03 rlutes 0.0e+00 \_3e\_02 -4.0e-03 rsut -4e-02 -1.2e-02 -8.0e-03 -6.0e-1 į 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year dry deposition rate of SO2 – global dry deposition rate of SO4 – global total deposition rate of BC – global wet deposition rate of SO2 – global wet deposition rate of SO4 – global 3.0e-17 -1.0e-15 -3.0e-19 2.8e-15 $\mathrm{drybc} + \mathrm{wetbc} \, (\mathrm{kg} \, \mathrm{m}^{-2} \, \mathrm{s}^{-1})$ $dryso4 (kg m^{-2} s^{-1}$ dryso2 (kg m $^{-2}$ s $^{-1}$ 1.7e-17 wetso2 (kg m<sup>-2</sup> s<sup>-</sup> wetso4 (kg m $^{-2}$ 3.3e-18 -2.9e-18 1.1e-16 -2.6e-15 -5.5e-18 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Dimethyl sulphide (DMS) mole fractic total deposition rate cloud cover Ice water path - global ambient aerosol optical of S - global thickness at 550nm - global 2e-14 1e-02 clivi (kg $m^{-2}$ ) \_lom lom) smb $(kg m^{-2} s^{-1})$ 0e+00 0e+00 expression cltc od550aer 0e+00 -2e-14 -8.2e-16 -2e-04 20002001200220032004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year load load of so2 - global of bc - global 2e-11 loadso4 (kg m<sup>-2</sup>) 1e-08 loadbc (kg m<sup>-2</sup>) 0e+00 5e-09 -2e-11 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year