## shp-atl-shift: absolute difference surface flux surface concentration of BC – land surface flux surface concentration surface concentration of BC - land of SO2 - land of SO4 - land of SO2 - land 6e-01 2.0e-01 1e-05 ∆ emibc ∆ emiso2 -01 $\Delta so2$ 4e-01 1.8e-01 0e+00 4e-01 0e+00 1.66-01 2e-01 3e-01 -1e-05 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2002 2000 2001 2002 2003 2004 2000 2001 2000 2001 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – land upwelling shortwave flux at TOA – land upwelling clear-sky longwav flux at TOA - land net radiative flux incident shortwave flux at TOA – land at TOA – land 5.0e-02 4e-03 2e-02 5.0e-02 2e-03 2.5e-02 1e-02 2 56-02 ∆ rlut 0.0e+0.0△ rlut + 0e+00 0.0e + 0.0e +0e+00 0.0e+00 -2e-03 -2 5e-02 -2 5e-02 -2.5e-02 -1e-02 \_4e\_03 -5.0e-02 -5.0e-02 -5.0e-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 shortway clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - land flux at TOA - land at TOA - land of BC - land of BC - land rsutcs) 1e-02 1e-01 rsutcs 0e+00 rlutcs -5e-02 1e-01 ∆ rsutcs ∆ wetbc Δ drybα -1e-02 0e+00 rsut 0e+00 -2e-02 0e+00 ₹ -3e-02 -1e-01 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 total deposition rate of BC – land dry deposition rate of SO2 – land wet deposition rate of SO2 – land dry deposition rate of SO4 – land wet deposition rate of SO4 – land 2e-01 2.1e-01 6e-01 3.5e-01 5.0e-01 drybc + wetbc 1e-01 ∆ dryso2 ∆ dryso4 3.0e-01 5e-01 1.9e-01 2.5e-01 2.5e-01 0e+00 1 8e-01 4e-01 2.0e-01 1.5e-01 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 frac total deposition rate cloud cover Ice water path - land ambient aerosol optical of S - land thickness at 550nm - land 2e-01 6e-01 0.0e+00 clivi (kg $m^{-2}$ ) \_lom lom) smb expression cltc ∆ od550ae 0.0e+00 -5.0e-02 -2e-01 4e-01 -1.0e-01 -4e-01 -1.5e-01 3e-01 -01 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year load load of so4 - land of bc - land 1e-01 5e-01 $\log \log (\log \, m^{-2})$ loadbc (kg m<sup>-2</sup>) 0e+00 4e-01 -1e-01 3e-01 2e-01 -2e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year