## shp-atl-shift: absolute difference surface flux surface flux surface concentration surface concentration surface concentration of BC - NH-land of SO2 - NH-land of BC - NH-land of SO4 - NH-land of SO2 - NH-land 1.8e-19 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ nmrbc (kg kg-1) emiso2 (kg m $^{-2}$ s $^{-1}$ 8.8e-20 5.6e-14 so2 (kg kg – 1) mmrso4 (kg kg 0e+00 1.5e-1 5e-12 -8.7e-20 4.6e-14 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – NH–land upwelling shortwave flux at TOA – NH–land net radiative flux at TOA – NH–land upwelling clear-sky longwav flux at TOA - NH-land incident shortwave flux at TOA – NH–land 5 0e=02 2e-02 0.0e + 00 $rsut(W m^{-2})$ rlutes (W m-2) rlut (Wm-2)(Wm-2)rsut (W m-2.5e-02 -2.5e-02 0.0e + 0.00.00+00 0e+00 0.0e+00 rsdt -2 5e-02 \_2 5e\_02 -2.5e-02 -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 dry deposition rate of BC – NH–land wet deposition rate of BC – NH–land upwelling clear-sky shortway clear-sky net radiative implied cloud response flux at TOA - NH-land flux at TOA - NH-land at TOA - NH-land rsutcs (W $m^{-2}$ ) 1.7e-15 6e-02 lutcs + rsutcs (W m<sup>-2</sup>) 2e-02 rsutcs (Wm-2)2.6e-16 wetbc (kg ${\sf m}^{-2}\,{\sf s}^{-1}$ 1.0e-15 drybc (kg $m^{-2} s^{-1}$ 0e+00 3e-02 1e-02 rlutcs – -1e-02 1.0e-3.6e 0e+00 0e+00 -2e-02 rsut – -1e-02 -3e-02 -3e-02 -2.1e-16 rit + 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 – NH–land dry deposition rate of SO2 – NH–land wet deposition rate of SO2 – NH–land dry deposition rate of SO4 – NH–land wet deposition rate of SO4 – NH–land 1.5e-15 2.8e-14 3.4e-17 2.2e-14 $\mathrm{drybc} + \mathrm{wetbc} \, (\mathrm{kg} \, \mathrm{m}^{-2} \, \mathrm{s}^{-1})$ wetso2 $(kg m^{-2} s^{-1})$ dryso2 (kg m $^{-2}$ s $^{-1}$ 9.3e-16 dryso4 (kg $m^{-2}$ s<sup>-</sup> wetso4 (kg m<sup>-2</sup> : 3.2e-16 1.6e-17 1.6e-14 5e-14 4e-14 -2.9e-16 -9.0e-16 -8.8e-19 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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - NH-lanc Dimethyl sulphide (DMS) mole fractio total deposition rate cloud cover ambient aerosol optical of S - NH-land percentage - NH-land thickness at 550nm - NH-land 7.5e-04 4e - 022e-02 clivi (kg m<sup>-2</sup>) \_lom lom) smp $(kg m^{-2} s^{-1})$ ctc 0e+00 od550aeı 3.2e 0.0e+00 -2e-02 -2.5e-04 -4e-02 20002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year load load of so2 - NH-land of bc - NH-land 7e-08 6e-08 $loadso4 (kg m^{-2})$ loadbc (kg m $^{-2}$ ) 0e+00 5e-08 4e-08 3e-08 2e-08 -1e-10 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year