## NH-sea: absolute difference surface flux of SO2 – shp–atl–shift surface flux of BC – shp–atl–shift surface concentration surface concentration surface concentration of SO4 - shp-atl-shift of BC - shp-atl-shift of SO2 - shp-atl-shift -1.0e-12 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ nmrso4 (kg kg – 1) emiso2 (kg m<sup>-2</sup> s<sup>-</sup> nmrbc (kg kg-1) 2.7e-2 (kg kg - 1)1.3e-21 -8.0e-14 -1.6e-12 -1.6e-22 -8.5e-14 \_9 Ne\_14 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – shp-atl-shift upwelling shortwave flux at TOA – shp–atl–shift upwelling clear-sky longwav flux at TOA - shp-atl-shift incident shortwave flux at TOA – shp-atl-shift net radiative flux at TOA - shp-atl-shift 5 0e-02 -2e-02 6e-02 $rsut(W m^{-2})$ /a\_02 5 rlut (Wm-2)rsut (Wm-2)rsdt (Wm-2)rlutcs (W m-4e-02 -6e-02 0.0e + 0.02e-02 1e-02 -8e-02 rlit + -1.2e-01 -2 5e-02 0e+00 -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 clear-sky net radiative implied cloud response dry deposition rate wet deposition rate upwelling clear-sky shortway flux at TOA - shp-atl-shif flux at TOA - shp-atl-shif at TOA - shp-atl-shift of BC - shp-atl-shift of BC - shp-atl-shift rsutcs (W $m^{-2}$ ) 0e+00 5e-03 3e-02 lutcs + rsutcs (W m $^{-2}$ ) rsutcs (W m-2) drybc (kg $m^{-2}$ s<sup>-1</sup> 7.4e-17 3.8e-17 vetbc (kg m<sup>-2</sup> s<sup>-</sup> 2e-02 0e+00 1e-02 rlutcs -5e-03 0e+00 -1e-01 rsut – -1e-02 -1e-02 rt H \_1 2e\_16 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 SO4 – shp–atl–shift total deposition rate of BC - shp-atl-shift dry deposition rate of SO2 – shp-atl-shift wet deposition rate of SO2 – shp-atl-shift wet deposition rate of SO4 – shp-atl-shift 4.1e-16 -5.8e-14 -1.4e-16 $drybc + wetbc \left( kg \ m^{-2} \ s^{-1} \right)$ dryso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ wetso2 (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$ wetso4 (kg m $^{-2}$ s $^{-1}$ 1.1e-16 dryso4 (kg $m^{-2}$ s<sup>-</sup> -1.9e-16 -6.3e-14 -8.5e-15 -6.8e-14 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 - shp-atl-spimethyl sulphide (DMS) mole fraction total deposition rate cloud cover ambient aerosol optical thickness at 550nm - shp-atl-shift of S - shp-atl-shift percentage - shp-atl-shift 4e - 024e-14 expression cltc (%) clivi (kg m<sup>-2</sup>) 2e-02 dms (mol mol $(kg m^{-2} s^{-1})$ od550aer 0e+00 -5.0e-14 0e+00 20002001200220032004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year load load of so4 - shp-atl-shift of bc - shp-atl-shift 1.5e-08 1.0e-08 2e-11 $\log \log (\log \, m^{-2})$ oadbc (kg m<sup>-2</sup>) 5.0e-09 0e+00 0.0e+00 -2e-11 -5.0e-09

2000 2001 2002 2003 2004

Year

-1.0e-08

2000 2001 2002 2003 2004

Year