## 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 BC - shp-atl-shift of SO4 - shp-atl-shift of SO2 - shp-atl-shift 6e-06 -1.0e+00 1e-01 4e-06 -1.5e+00 $\Delta so2$ 0e+00 2e-06 -5e-02 0e+00 -2.5e+00 -1e-01 -6e-01 -2e-06 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 – shp-atl-shift upwelling shortwave flux at TOA – shp–atl–shift upwelling clear-sky longwave flux at TOA - shp-atl-shift net radiative flux incident shortwave flux at TOA - shp-atl-shift at TOA - shp-atl-shift 5 0e-02 -2.5e-02 1e-02 2e-02 + rsut ∆ rlut -8.0e-02 -7.5e-02 0.0e + 0.0e +∆ rlut ₁ 1e-02 -2 5e-02 0e+00 0e+00 -1.2e-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 upwelling clear-sky shortway implied cloud response dry deposition rate wet deposition rate clear-sky net radiative flux at TOA - shp-atl-shift flux at TOA - shp-atl-shift at TOA - shp-atl-shift of BC - shp-atl-shift of BC - shp-atl-shift rsutcs) 2e-02 1e-02 1e-01 0e+00 rlutcs -0e+00 rsu ∆ drybc 0e+00 0e+00 rlutcs -1e-02\_1e\_02 rsut rlut + -2e-02 -1e-01 -2e-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 – shp-atl-shift dry deposition rate of SO2 – shp-atl-shift wet deposition rate of SO2 – shp-atl-shift dry deposition rate of SO4 – shp-atl-shift wet deposition rate of SO4 – shp-atl-shift 2e-01 -8.0e-01 -8.8e-01 -4e-01 1e-01 -8.5e-01 drybc + wetbc -9.2e-0 0e+00 ∆ dryso2 -5e-01 -9.0e-01 -1e-01 -9.6e-01 -6e-01 \_9 5e\_01 -2e-01 -7.5e-01 -7e-01 -1.0e+00 -3e-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 $\frac{dyso2 + wetso2}{2 + (dyso4 + wetso4)/3}$ Ice 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-0 2e-01 -1.0e+00 expression cltc (%) 2e-01 clivi (kg $m^{-2}$ ) \_lom lom) smb 0e+00 4e-02 ∆ od550aer -1.1e+000e+00 -2e-0 -1.1e+00 -2e-01 -01 -1.2e+00 0e+00 -6e-01 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 2e-01 2e-01 loadso4 (kg m<sup>-2</sup>) loadbc (kg m<sup>-2</sup>) 1e-01 0e+00 -1e-01 -2e-01 -2e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004

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