## NH-land: absolute difference surface flux of BC – shp–atl–shift surface flux surface concentration surface concentration surface concentration of SO2 - shp-atl-shift of BC - shp-atl-shift of SO4 - shp-atl-shift of SO2 - shp-atl-shift 1e-05 2 4e-01 7e-01 66-01 1e-01 5e-06 2.2e-01 6e-01 $\Delta$ emibc ∆ emiso2 $\Delta so2$ 4e-01 0e+00 2.0e-01 00400 4e-01 2e-01 -5e-06 1.8e-01 -1e-01 3e-01 2000 2001 2002 2003 2004 2002 2003 2004 2002 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 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 longwav 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 3e-02 0e+00 0e+00 2e-02 -1e-02 $\Delta$ rlutcs 1e-02 -2e-02 0.0e + 0.0e +0e+00 -3e-02 -2 5e-02 -1e-02 -4e-02 -5e-03 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 - 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) 5.0e-02 2e-01 1e-01 2.5e-02 0e+00 rlutcs rsu ∆ wetbc 5e-02 0.0e+00 -2e-02 \_2e\_02 rsut 0e+00 0e+00 (rlut + -4e-02 -5e-02-4e-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 – 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 2.3e-01 4.0e-01 2.2e-01 6e-01 drybc + wetbc 3.5e-01 6e-0 2 1e-01 3.0e-01 1e-0 4e-01 2.5e-01 5e-01 0e+00 2e-01 1.9e-01 4e-01 1.8e-01 0e+00 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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - shp-atl-shDimethyl 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 5e-01 0.0e+00 7e-01 % clivi (kg m<sup>-2</sup>) \_lom lom) smb expression cltc 5e-01 6e-01 0e+00 ∆ od550ae -1.0e-01 0e+00 5e-01 -1.5e-01 -5e-01 4e-01 -2 0e-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 1e-01 6e-01 loadso4 (kg m<sup>-2</sup>) $loadbc (kg m^{-2})$ 0e+00 5e-01 4e-01 -1e-01 -2e-01 2e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year