NH-land: absolute difference surface flux surface flux surface concentration surface concentration surface concentration of BC - shp-atl-shift-1950 of SO2 - shp-atl-shift-195 of BC - shp-atl-shift-1950 of SO4 - shp-atl-shift-195 of SO2 - shp-atl-shift-195 3e-02 3.0e-01 1.7e-01 2.5e-01 0e+00 1.6e-01 0e+00 4.0e-01 1.5e-01 2.0e-01 -3e-02 3.5e-01 -5e-06 -6e-02 2.5e-01 -9e-022000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Year Year Year upwelling longwave flux at TOA – shp-atl-shift-195 upwelling shortwave flux at TOA – shp–atl–shift–195 upwelling clear-sky longwav flux at TOA - shp-atl-shift-19 incident shortwave flux at TOA – shp-atl-shift-195 net radiative flux at TOA - shp-atl-shift-195 5.0e-02 8e-02 0e+00 0e+00 4e-02 -1e-02 rsut 0.0e + 0.0e +₽ 0e+00 4e-03 -2e-02 -3e-02 -2 5e-02 -8e-03 -4e-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 - shp-atl-shift-19 flux at TOA - shp-atl-shift-19 at TOA - shp-atl-shift-195 of BC - shp-atl-shift-1950 of BC - shp-atl-shift-1950 rsutcs) 2e-02 3e-02 2e-02 rsutcs 3e-01 0e+00 rlutcs -∆ wetbc ∆ drybc 2e-01 1e-02 0e+00 rsut 1e-01 0e+00 -1e-02 (rlut + -1e-01 0e+00 4e-02 -1e-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-1950 dry deposition rate of SO2 – shp-atl-shift-195 wet deposition rate of SO2 – shp-atl-shift-1950 dry deposition rate of SO4 – shp-atl-shift-195 wet deposition rate of SO4 – shp-atl-shift-1950 3e-0 2.2e-01 3.0e-01 2e-01 6e-01 1.8e-01 3e-01 1e-01 4e-01 2.5e-01 1.4e-01 2e-01 2e-01 0e+00 2.0e-01 1e-01 0e+00 -1e-01 6.0e-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 Ice water path - shp-atl-sDiffnethyl sulphide (DMS) mole fraction - sh total deposition rate cloud cover ambient aerosol optical thickness at 550nm - shp-atl-shift-1 of S - shp-atl-shift-195 percentage - shp-atl-shift-19 1e+00 5e-01 expression cltc (%) 2e-01 clivi (kg m⁻²) _lom lom) smp 5e-01 5e-0° ∆ od550aeı 0e+00 0e+00 4e-01 0e+00 -5e-0 -2e-01 -5e-0 2e-01 20002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 Year Year Year Year Year load load of so4 - shp-atl-shift-1950 of bc - shp-atl-shift-1950 loadso4 (kg m⁻²) 4e-02 4e-01 loadbc (kg m 3e-01 0e+00

 Δ emibc

∆ rsutcs

drybc + wetbc

 $\frac{dyso2 + wetso2}{2 + (dyso4 + wetso4)/3}$

2e-01

1e-01

2000 2001

2002 2003 2004

Year

-4e-02

2000 2001 2002 2003 2004