NH-sea: absolute difference surface flux surface concentration surface concentration surface concentration of SO2 - shp-atl-shift-19 of BC - shp-atl-shift-195 of SO2 - shp-atl-shift-195 of SO4 - shp-atl-shift-195 7.5e-14 -4e-13 nmrso4 (kg kg – 1) 0e+00 nmrbc (kg kg-1) so2 (kg kg – 1) -6e-13 0.0e+00-8e-13 -3 6e-14 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year upwelling shortwave flux at TOA – shp-atl-shift-195 net radiative flux at TOA – shp-atl-shift-19 upwelling clear-sky longway flux at TOA - shp-atl-shift-1 incident shortwave flux at TOA – shp-atl-shift-19 5e-02 rsut (W m⁻²) rlutes (W m-2) rsdt (Wm-2)0.0e+00 0e+00 0.0e + 0.0-5e-02 -2e-02 -2 5e-02 -5.0e-022000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year implied cloud response dry deposition rate wet deposition rate clear-sky net radiative flux at TOA - shp-atl-shiftat TOA - shp-atl-shift-195 of BC - shp-atl-shift-195 of BC - shp-atl-shift-198 rsutcs (W m^{-2}) 9.2e-1 5.6e-2.5e-02 2e-02 4.3e-17 wetbc (kg ${\sf m}^{-2}\,{\sf s}^{-1}$ 4.0e-16 drybc (kg m⁻² s⁻ 0.0e+0.00e+00rlutes -2e-02 rsut – _1 Oe_16 -8.9e-1 rit + 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year dry deposition rate of SO4 – shp-atl-shift-19 dry deposition rate of SO2 – shp-atl-shift-19 wet deposition rate of SO2 – shp-atl-shift-19 wet deposition rate of SO4 – shp-atl-shift-19 9.4e-16 wetso2 (kg m⁻² s⁻ dryso4 (kg m $^{-2}$ s $^{-1}$ wetso4 $(kg m^{-2})$ -9.2e-18 -3.2e-15 -2.5e-14 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Ice water path - shp-atl-sDiffnethyl sulphide (DMS) mole fraction - sh cloud cover ambient aerosol optical thickness at 550nm - shp-atl-shift-1 0e+00 clivi (kg ${\sf m}^{-2}$) _lom lom) smb 0e+00-1e-04 od550aer -2e-04 -3e-04 -1e-13 -4e-04

surface flux

of BC - shp-atl-shift-195

2000 2001 2002 2003 2004

Year

upwelling longwave flux at TOA – shp-atl-shift-19

2000 2001 2002 2003 2004

Year

upwelling clear-sky shortwa

flux at TOA - shp-atl-shift-

emiso2 (kg m⁻² s⁻

rsut (Wm-2)

 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$

rlut (Wm-2)

3.3e-22

-2.6e-2

-5.6e-21

-8 6e-2°

5.0e-02

0.0e+00

-5.0e-02

-1.0e-01

0.0e+00

-2.5e-03