arctic: absolute difference surface flux surface flux surface concentration surface concentration surface concentration of BC - shp-atl-shift-195 of SO2 - shp-atl-shift-19 of BC - shp-atl-shift-1950 of SO4 - shp-atl-shift-195 of SO2 - shp-atl-shift-19 1.5e-12 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ emiso2 (kg m $^{-2}$ s $^{-1}$ nmrbc (kg kg-1) 9.8e-21 1.8e-16 so2 (kg kg – 1) 5 0e-13 nmrso4 (kg kg 5.5e-21 1.2e-16 0.0e+00 -5.0e-13 1.2e-21 4.8e-17 0.0e+00 -2 0e-1 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 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-195 upwelling shortwave flux at TOA – shp-atl-shift-195 upwelling clear-sky longway flux at TOA - shp-atl-shift-1 incident shortwave flux at TOA – shp-atl-shift-19 net radiative flux at TOA - shp-atl-shift-195 5 0e=02 4e-02 2e-01 $rsut(W m^{-2})$ rlut (Wm-2)2e-02 rsut (Wm-2)rsdt (Wm-2)rlutcs (W m -1e-01 0.0e + 0.00e+00 0e+00 0e+00 00+00 -2 5e-02 -2e-02 -3e-02 -1e-01 -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-shift-1 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}) 3.6e-17 2e-0 5.0e-02 lutcs + rsutcs (W m⁻²) rsutcs (W m-2) 9.0e-19 wetbc (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ 3.1e-16 drybc (kg $m^{-2} s^{-1}$ 1e-02 1e-01 2.5e-02 rlutcs -0.0e+00 0e+00 0e+00 rsut – -6.8e-17 -9.5e--1e-02 1e-01 -5.0e-02 _1 0e_16 -3.0e-16 + <u>+</u> 10. 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-195 dry deposition rate of SO2 – shp-atl-shift-195 wet deposition rate of SO2 – shp-atl-shift-19 dry deposition rate of SO4 – shp-atl-shift-19 wet deposition rate of SO4 – shp-atl-shift-195 5.2e 5.2e-15 2.8e 4.2e-15 $\mathrm{drybc} + \mathrm{wetbc} \, (\mathrm{kg} \, \mathrm{m}^{-2} \, \mathrm{s}^{-1})$ wetso4 $(kg m^{-2} s^{-1})$ dryso2 (kg m $^{-2}$ s $^{-1}$ wetso2 (kg m $^{-2}$ s $^{-1}$ dryso4 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ 3.0e-16 2.8e-15 8.4e-17 4.3e-15 1.2e-18 1.4e-15 1e-14 3.9e-15 0e+003.4e-15 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-sDiffnethyl sulphide (DMS) mole fraction - sh total deposition rate cloud cover ambient aerosol optical of S - shp-atl-shift-19 percentage - shp-atl-shift-19 thickness at 550nm - shp-atl-shi 1e-01 expression cltc (%) 6.0e clivi (kg m⁻²) _lom lom) smb $(kg m^{-2} s^{-1})$ 1.5e-04 0e+00 1.0e-04 -5e-05 -6e-13 -1e-04 20002001200220032004 2002 2003 2004 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 2000 2001 Year Year Year Year Year load load of so4 - shp-atl-shift-1950 of bc - shp-atl-shift-1950 5e-12 loadso4 (kg m⁻²) 1e-08 0e+00 loadbc (kg m⁻² -5e-12 -1e-11 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004

Year