arctic: 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 1.5e+00 1e-04 3e-02 1.6e+00 4e-01 1.2e+00 5e-05 ∆ emibc ∆ emiso2 2e-01 2e-02 ∆ so2 0e+00 0e+00 1e-02 0.00+00 4 0e-01 -5e-05 -5.0e-01 2002 2000 2001 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year upwelling longwave flux at TOA – shp-atl-shift upwelling shortwave flux at TOA – shp–atl–shift upwelling clear-sky longwar flux at TOA - shp-atl-shi net radiative flux incident shortwave flux at TOA - shp-atl-shift at TOA - shp-atl-shift 5 0e-02 1.5e-01 1.5e-02 2e-02 1.0e-01 1.0e-01 rsut 5 0e-02 5.0e-02 1e-02 0.0e + 0.0e +∆ rlut -0.0e+0.05.0e-03 0.0e+00 0e+00 -5.0e-02 -2 5e-02 0.0e + 0.0e +-5 0e-02 -1.0e-01 -1e-02 -1.0e-01 -5.0e-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 dry deposition rate of BC – shp-atl-shift upwelling clear-sky shortwa clear-sky net radiative implied cloud response wet deposition rate flux at TOA - shp-atl-shif flux at TOÁ – shp-atl-shift at TOA - shp-atl-shift of BC - shp-atl-shift rsutcs) 1.5e-01 rsutcs 1.0e-01 rlutcs -0e+00 0.0e + Δ rsutcs ∆ drybc 5 0e-02 rlutcs + 0.0e+00 rsut (rlut + -5.0e-01 -5.0e-02 0e+00 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 1.6e + 0.03.6e-01 7e-01 5.0e-01 drybc + wetbc 3.2e 1.2e+00 ∆ dryso2 ∆ dryso4 6e-01 2.5e-0 2.8e 5.0e 8 0e=01 0.0e+00 0.0e+00 -2.5e-01 2.4e-01 4e 4.0e-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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - shp-atl-spimethyl sulphide (DMS) mole fraction total deposition rate cloud cover ambient aerosol optical of S - shp-atl-shift percentage - shp-atl-shif thickness at 550nm - shp-atl-8.5e-01 5.0e-01 6e-01 8 5e-0 2.5e-01 clivi (kg m⁻²) 8.0e-01 3e-01 당 ∆ od550aer 0.0e+00 0e+00 ow) 7.5e-01 0e+00 -2.5e-01 dms (-5e-01 1e-01 7.0e-01 -3e-01 -5.0e-01 -1e+00 0e+00 -7 5e-01 -6e-01 20002001200220032004 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 load load of so4 - shp-atl-shift of bc - shp-atl-shift 7.5e-01 2.5e-01 loadso4 (kg m⁻²) 5.0e-01 loadbc (kg m 0.0e+00 2.5e-01 0.0e+00 -5.0e-01

2000 2001 2002 2003 2004

Year

2000 2001 2002 2003 2004

Year