so2-no-season: absolute difference surface concentration of SO4 – SH–sea surface flux surface flux surface concentration surface concentration of BC - SH-sea of SO2 - SH-sea of BC - SH-sea of SO2 - SH-sea 6.4e-19 3.0e-15 emiso2 $(kg m^{-2} s^{-1})$ 0.0e+00 Δ emibc (kg m⁻² s⁻¹) Δ mmrso4 (kg kg – 1) mmrbc (kg kg-1) (kg kg - 1)3.0e-19 -1.2e-16 so₂ (-7.5e-13 1.3e-19 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 Yea upwelling longwave flux at TOA – SH–sea upwelling shortwave flux at TOA – SH-sea upwelling clear–sky longwa flux at TOA – SH–sea net radiative flux incident shortwave flux at TOA – SH-sea at TOA - SH-sea 5.0e-02 2e-07 ∆ rlut + rsut (W m⁻ Δ rlutcs (W m-2) Δ rlut (W m – 2) 0e+00 E rsdt (W mrsut (W -1e-01 -1e-01 00+00 0.00+00 -2e-01 -1e-07 -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 dry deposition rate of BC – SH–sea upwelling clear-sky shortway flux at TOA - SH-sea wet deposition rate of BC – SH–sea clear-sky net radiative $(W \, m^{-2})$ implied cloud response flux at TOA - SH-sea at TOA - SH-sea 1.2e-16 5.5e-16 Ē rsutcs Δ rsutcs (W m – 2) drybc (kg m^{-2} s $^{-1}$ rlutcs + rsutcs (W 0e+00 2e-02 wetbc (kg m⁻² 0.0e+00 rlutcs--1e-01 0e+00 -2.5e-02 -2e-0 -2e-02 rsut rlut + 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 total deposition rate of BC – SH–sea dry deposition rate of SO4 – SH–sea wet deposition rate of SO4 – SH–sea dry deposition rate wet deposition rate of SO2 - SH-sea of SO2 - SH-sea Δ drybc + wetbc (kg m⁻² s⁻¹ 6.6e-16 wetso2 (kg m⁻² s⁻ dryso2 (kg m^{-2} s⁻ dryso4 (kg m⁻² s⁻ 3.3e-16 wetso4 (kg m⁻² -1.9e-18 -9.2e -3.3e-16 -5.4e-15 -6.8e-15 -6.2e-15 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year dryso2 + wetso2)/2 + (dryso4 + wetso4)/3total deposition rate ambient aerosol optical total cloud cover - SH-sea convective cloud cover - SHof S - SH-sea thickness at 550nm - SH-se 5.0e-15 Δ cltc (percent) 4e - 0.3∆ clt (percent) ∆ cl (percent) $(kg m^{-2} s^{-1})$ -1.0e-14 -02 -6e-02200@001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - SH-sea column mass burden column mass burden column mass burden surface concentration of DMS - SH-sea of BC - SH-sea of SO2 - SH-sea of SO4 - SH-sea 3e-04 1e-08 2e-04 Δ loadso2 (kg m $^{-2}$) Δ loadso4 (kg m⁻²) Δ clivi (kg m $^{-2}$) loadbc $({ m kg}~{ m m}^{-2})$ ∆ dms (kg kg −1) 0.0e+00 1e-04 0.0e+00 1e-07 0e+00 0e+00 -2.5e-10 -8.0e-13 -1e-04 0e+00 -1.2e-12 2000 2001 2002 2003 2004

Year

