so2-at-height: absolute difference surface flux surface flux surface concentration surface concentration of SO2 - NH-sea of BC - NH-sea of BC - NH-sea of SO4 - NH-sea of SO2 - NH-sea 1.6e-20 6e-13 2 56-13 Δ emibc (kg m⁻² s⁻¹) ∆ mmrso4 (kg kg − 1) ∆ mmrbc (kg kg − 1) so2 (kg kg-1) Δ emiso2 (kg m $^{-2}$ 2e-13 5.0e-21 1.0e-13 5.0e-14 0.0e+00 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 upwelling longwave flux at TOA – NH–sea upwelling shortwave flux at TOA – NH–sea upwelling clear-sky longway flux at TOA - NH-sea net radiative flux incident shortwave flux at TOA – NH-sea at TOA - NH-sea 2e-07 2e-01 ∆ rlut + rsut (W m⁻ Δ rlutcs (W m-2) $\Delta \operatorname{rsdt}(\operatorname{Wm}-2)$ Δ rlut (W m – 2) 5e-02 1e-01 ∆ rsut (W m – 0e+00 -4e-01 -6e-01 -2e-01 2002 2003 2004 2000 2001 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 clear-sky shortway flux at TOA - NH-sea dry deposition rate of BC – NH–sea wet deposition rate of BC – NH–sea clear-sky net radiative rsutcs (W m⁻²) implied cloud response flux at TOA - NH-sea at TOA - NH-sea 1.7e-15 2.3e-15 2e-01 m⁻²) 0e+00 wetbc (kg m⁻² s⁻¹) Δ rsutcs (W m – 2) drybc (kg m^{-2} s $^{-1}$ rlutcs + rsutcs (W rlutcs – -4e-01 3.8e-16 -4e-0-6e-01 -6e-01 rsut – -8e-01 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 total deposition rate of BC – NH–sea dry deposition rate of SO2 – NH–sea wet deposition rate of SO2 – NH–sea dry deposition rate of SO4 – NH–sea wet deposition rate of SO4 – NH–sea Δ drybc + wetbc (kg m⁻² s⁻¹) 3.8e-15 ∆ dryso2 (kg m⁻² s^{−′} wetso4 (kg m $^{-2}$ s $^{-}$ wetso2 (kg m⁻² s⁻ $_{ m \Delta}$ dryso4 (kg m $^{-2}$ s $^{-}$ 2.2e-15 2e-13 2e-13 6.3e-16 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Year Yea Year dryso2 + wetso2)/2 + (dryso4 + wetso4)/3 ambient aerosol optical thickness at 550nm – NH–se total deposition rate total cloud cover - NH-se convective cloud cover - NH-s surface cloud cover - NH-s of S - NH-sea 1.5e-01 ∆ cltc (percent) ∆ clt (percent) ∆ cl (percent) $(kg m^{-2} s^{-1})$ 5.0e-02 ∆ od550ae -2e-02 0.0e+0.0-4e-021e+35 -8e-02 0e+00 2000 2001 2002 2003 2004 20002001200220032004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year ice water path - NH-sea surface concentration column mass burden column mass burden column mass burden of SO4 - NH-sea of DMS - NH-sea of BC - NH-sea 9e-04 Δ loadso4 (kg m⁻²) $\Delta\,\mathrm{clivi}\,\left(\mathrm{kg}\;\mathrm{m}^{-2}\right)$ 6e-04 Δ dms (kg kg-1) $loadbc (kg m^{-2})$ Δ loadso2 (kg m $^{-2}$ 1.0e-06 3e-04 -1.0e-09 4e-07 -1.5e-09 0e+00 0e+00 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

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL

GISS

MIROC

NorESM2

OsloCTM3

UKESM